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2014 Photonics West[®]

1–6 February

Technical Program

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**MOEMS-
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RESEARCH**

**GREEN
PHOTONICS**

**INDUSTRY
EVENTS**

Conferences and Courses

1–6 February 2014

Exhibition

BiOS Expo: 1–2 February

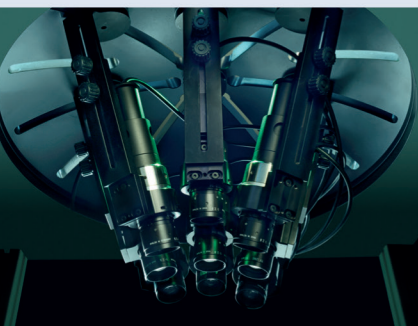
Photonics West: 4–6 February

Location

The Moscone Center
San Francisco, California, USA



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PHOTONICS**

**INDUSTRY
EVENTS**



Facility Maps2-4

Special Events

Daily Schedule14-15

Plenary Sessions and Special Events

BiOS17-21
LASE22-23
MOEMS-MEMS24-26
OPTO28-29

Industry Events30-37

Executive Sessions | Panels | Workshops

Professional Development38-39

Speaker Series | Workshops | Women in Optics | Job Fair | Panels

Social and Networking Events40-41

Receptions | Student and Early Career Events

Exhibition Overviews43-48

SPIE Photonics West | SPIE BiOS EXPO | Product Demonstrations | Sponsors

Professional Development

Daily Course Schedule50-58

Technical Conferences

Conference Index5-12

BiOS61-176
Translational Research177-190
LASE191-238
MOEMS-MEMS239-256
OPTO257-353
GREEN PHOTONICS354-365

Index of Authors, Chairs, and

Committee Members366-424

General Information425-429

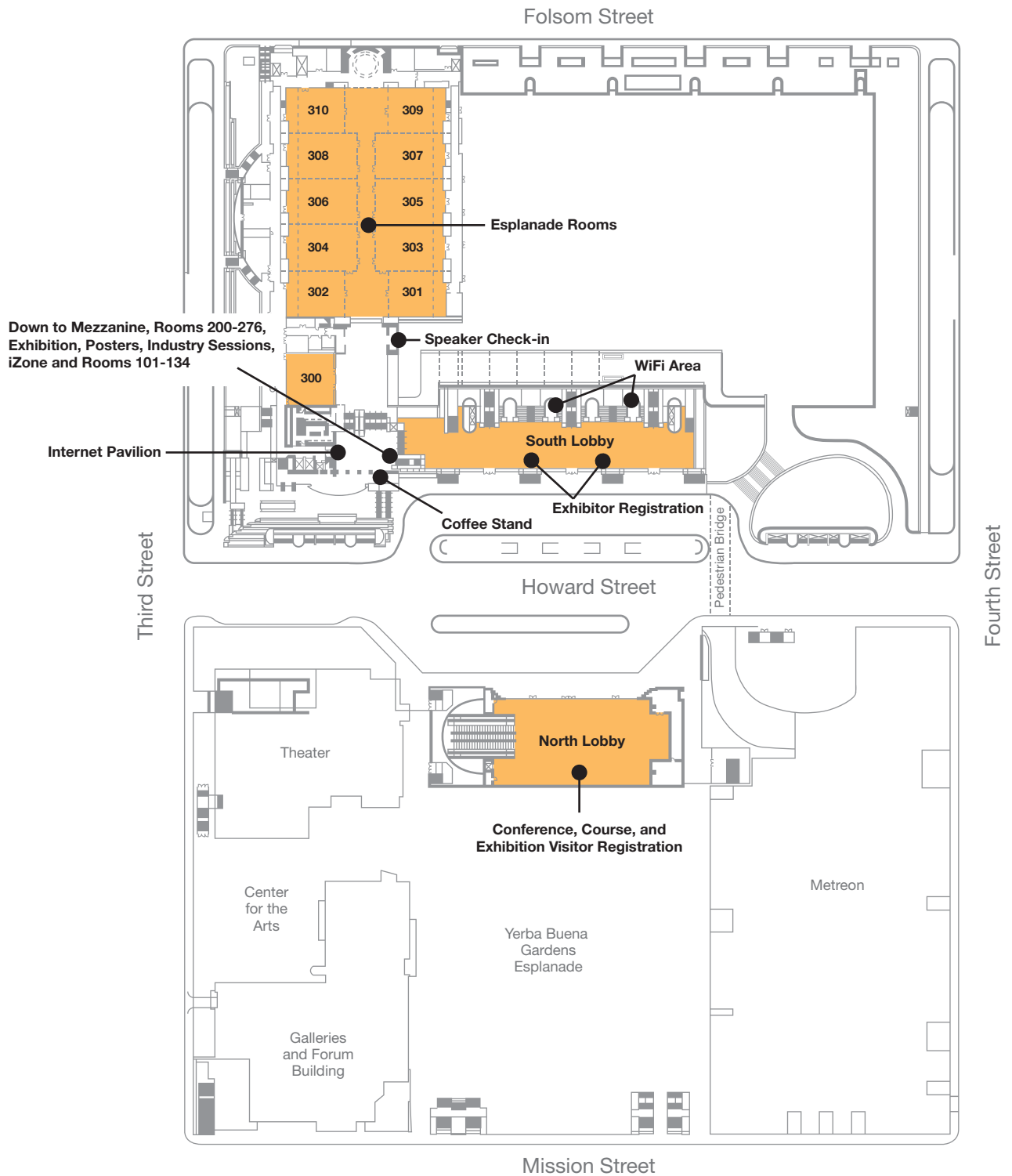
Photonics West Proceedings/CDs430-431



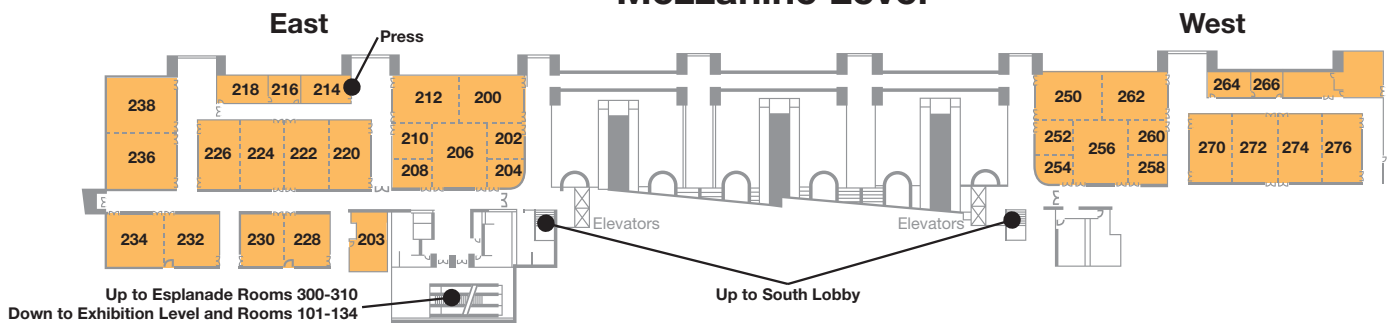
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The Moscone Center

Esplanade/Lobby Levels



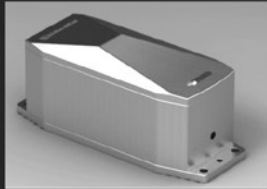
Mezzanine Level



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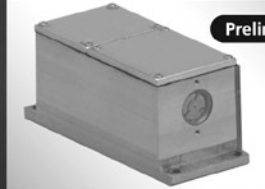
Laser Module

Wavelength Stabilized LD Module



Wavelength : 405-635 nm
Wavelength accuracy : $< \pm 1$ nm
Ellipticity : < 1.2

Compact Low Noise Green Laser Module



Preliminary

Power : > 50 mW
Low optical noise : $< 0.2\%$ (rms)
All-In-One design

Multiple Wavelength Laser Module (Beam Combiner)



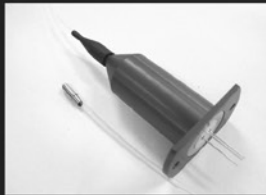
Preliminary

Wavelength : 405-790 nm
More than 4 wavelengths combined
SM/PM fiber output

Applications

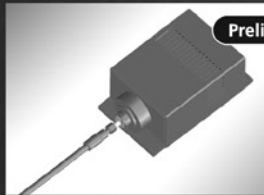
- Biomedical · DNA sequencers · Flow cytometry · Inspection · Microscopy
- Raman spectrometer · Spectroscopy · Marking

External Cavity Short Pulse Laser Diode For Fiber Laser



Wavelength : 920-1070 nm
Pulse width : < 500 psec
Spectral width : < 0.1 nm

High Brightness Fiber Coupled BLUE Laser Diode



Preliminary

Wavelength : 450 nm
Power : 10, 50, 100 W
Fiber core : $\geq \phi 100$ μ m core MM fiber

355nm UV Pulse Laser



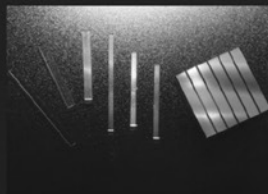
Preliminary

Average output power : > 1 W
Pulse width : > 20 nsec
Repetition rate : < 100 kHz

Applications

- Material processing · Micromachining · Welding · Mass spectrometry
- Solar cell ablation · Silicon wafer scribing

PPMgSLT Crystal



Wide transparent range : 270-4,500 nm
High thermal conductivity
High conversion efficiency with large aperture

Applications

- SHG / Frequency doubling
- OPO / Optical parametric oscillation
- High power wavelength conversion for Laser processing / machining

CONTACT

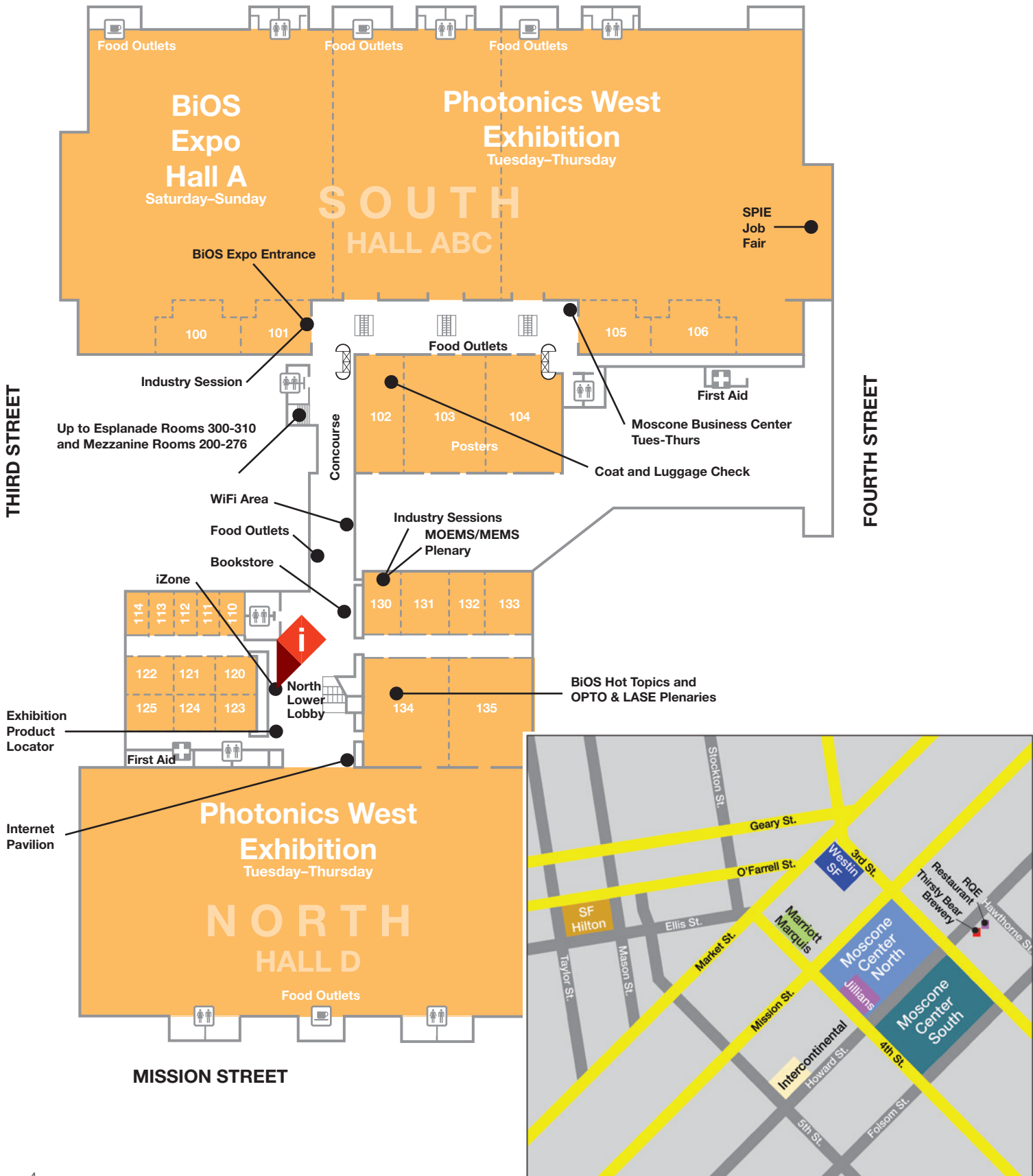
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The Moscone Center

EXHIBIT LEVEL

FOLSOM STREET



Technical Conference Index

BIOS

SPIE Photonics West

Symposium Chairs



James Fujimoto
Massachusetts Institute of Technology (USA)



R. Rox Anderson, M.D.
Wellman Center for Photomedicine,
Massachusetts General Hospital and
Harvard School of Medicine (USA)

Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong**, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

8926A	Photonics in Dermatology and Plastic Surgery (Choi, Kollias, Zeng)	65
8926B	Therapeutics and Diagnostics in Urology (Kang)	68
8926C	Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology (Wong, Ilgner)	70
8926D	Diagnostic and Therapeutic Applications of Light in Cardiology (Tearney, Gregory, Marcu)	72
8926E	Optics in Bone Surgery and Diagnostics (Mandelis, Morris)	75
8927A	Endoscopic Microscopy IX (Tearney, Wang)	76
8927B	Optical Techniques in Pulmonary Medicine (Suter, Lam, Brenner)	78
8928A	Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (Hirschberg, Madsen)	80
8928B	Neurophotonics (Jansen, Luo, Ding, Roe)	82
8928C	Optogenetics and Optical Control of Cells (Mohanty, Thakor)	85
8929	Lasers in Dentistry XX (Rechmann, Fried)	87
8930	Ophthalmic Technologies XXIV (Manns, Söderberg, Ho)	89
8931	Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII (Kessel, Hasan)	92
8932	Mechanisms for Low-Light Therapy IX (Hamblin, Carroll, Arany)	95
8933	Frontiers in Biological Detection: From Nanosensors to Systems (Miller, Fauchet, Cunningham)	97

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Fitzpatrick Institute for Photonics, Duke Univ. (USA) and **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

8934	Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII (Izatt, Fujimoto, Tuchin)	99
8935	Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII (Vo-Dinh, Mahadevan-Jansen, Grundfest)	104
8936	Design and Quality for Biomedical Technologies VI (Raghavachari, Liang, Pfefer)	108
8937	Multimodal Biomedical Imaging IX (Azar, Intes)	111
8938	Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XIV (Gannot)	113
8939	Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry (Mahadevan-Jansen, Petrich)	116
8940	Optical Biopsy XII (Alfano, Demos)	118

8972	Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications XIV (Heisterkamp, Herman, Meunier, Nolte)	235
8976	Microfluidics, BioMEMS, and Medical Microsystems XII (Gray, Becker)	248

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **William P. Roach**, Air Force Office of Scientific Research (USA)

8941A	Optical Interactions with Tissue and Cells XXV (Jansen, Thomas)	120
8941B	Terahertz and Ultrashort Electromagnetic Pulses for Biomedical Applications (Wilmink, Ibey)	123
8942	Dynamics and Fluctuations in Biomedical Photonics XI (Tuchin, Larin, Leahy, Wang)	125
8943	Photons Plus Ultrasound: Imaging and Sensing 2014 (Oraevsky, Wang)	127
8944	Biophotonics and Immune Responses IX (Chen)	135
8945	Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VI (Nordstrom, Bouchard, Allen)	137
8946	Optical Elastography and Tissue Biomechanics (Larin, Sampson)	139

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA); **Daniel L. Farkas**, Univ. of Southern California (USA)

8947	Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII (Farkas, Nicolau, Leif, Leary, Tarnok, Richards-Kortum)	141
8948	Multiphoton Microscopy in the Biomedical Sciences XIV (Periasamy, So, König)	145
8949	Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI (Brown, Cogswell, Wilson)	150
8950	Single Molecule Spectroscopy and Superresolution Imaging VII (Enderlein, Gregor, Gryczynski, Erdmann, Koberling)	153
8951	Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics (Coté)	156
8952	Biomedical Applications of Light Scattering IX (Wax, Backman)	158
8953	Optical Methods in Developmental Biology II (Rollins, Lo, Fraser)	161

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Univ. Buffalo (USA); **Dan V. Nicolau**, McGill Univ. (Canada)

8954	Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X (Cartwright, Nicolau)	163
8955	Colloidal Nanoparticles for Biomedical Applications IX (Parak, Osiriski, Yamamoto)	165
8956	Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications (Achilefu, Raghavachari)	169
8957	Plasmonics in Biology and Medicine XI (Vo-Dinh, Lakowicz)	172
8958	Bioinspired, Biointegrated, Bioengineered Photonic Devices II (Lee, Rogers, Yun)	174

LASE

SPIE Photonics West

Symposium Chairs



Bo Gu
Bos Photonics (USA)



Andreas Tünnermann
Fraunhofer-Institut für Angewandte
Optik und Feinmechanik (Germany) and
Friedrich-Schiller-Univ. Jena (Germany)

Symposium Cochairs



Guido Hennig
Daetwyler Graphics AG (Switzerland)



Yongfeng Lu
Univ. of Nebraska-Lincoln (USA)

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, Optoelectronics Management Network (USA)

8959	Solid State Lasers XXIII: Technology and Devices (Clarkson, Shori)	194
8960	Laser Resonators, Microresonators, and Beam Control XVI (Kudryashov, Paxton, Ilchenko, Aschke, Washio)	198
8961	Fiber Lasers XI: Technology, Systems, and Applications (Ramachandran, Shaw)	202
8962	High Energy/Average Power Lasers and Intense Beam Applications VIII (Davis, Heaven, Schriempf)	208
8963	High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III (Dorsch)	210

Nonlinear Optics

8964	Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIII (Vodopyanov, Kalisky)	213
8983	Organic Photonic Materials and Devices XVI (Tabor, Kajzar, Kaino, Koike)	272
8984	Ultrafast Phenomena and Nanophotonics XVIII (Betz, Elezzabi, Song, Tsen)	275

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

8965	High-Power Diode Laser Technology and Applications XII (Zediker)	217
8966	Vertical External Cavity Surface Emitting Lasers (VECSELs) IV (Moloney)	220
8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç, Piprek, Yoon, Fujioka)	281
9001	Vertical-Cavity Surface-Emitting Lasers XVIII (Guenter, Le)	329
9002	Novel In-Plane Semiconductor Lasers XIII (Belyanin, Smowton)	330
9003	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII (Streubel, Jeon, Tu)	333

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA) and **Alberto Piqué**, U.S. Naval Research Lab. (USA)

8967	Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	222
8968	Laser-based Micro- and Nano-Processing VIII (Klotzbach, Washio, Arnold)	226
8969	Synthesis and Photonics of Nanoscale Materials XI (Geohegan, Träger, Dubowski)	229
8970	Laser 3D Manufacturing (Helvajian, Piqué, Wegener, Gu)	231
8973	Micromachining and Microfabrication Process Technology XIX (Maher, Resnick)	241
8974	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (von Freymann, Schoenfeld, Rumpf)	243
8975	Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII (Shea, Ramesham)	246

Laser Applications

8967	Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	222
8971	Free-Space Laser Communication and Atmospheric Propagation XXVI (Hemmati, Boroson)	233
8972	Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XIV (Heisterkamp, Herman, Meunier, Nolte)	235
8999	Complex Light and Optical Forces VIII (Andrews, Galvez, Glückstad, Soskin)	324
9000	Laser Refrigeration of Solids VII (Epstein, Seletskiy, Sheik-Bahae)	327



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Sponsored by The Laser Society of Japan
- **Biomedical imaging and Optical Sensing Conference 2014 (BISC '14)**
Sponsored by Center for Optical Research and Education, Utsunomiya University
- **International Conference on High Energy Density Science 2014 (HEDS2014)**
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- **Conference on LED and Its Industrial Application'14 (LEDIA '14)**
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Sponsored by Micro Solid-State Photonics Group of the Laser Society of Japan
- **The 1st Conference on Laser and Synchrotron Radiation Experiment 2014 (LSC'14)**
Sponsored by Institute of Laser Engineering, Osaka University
- **Optical Manipulation Conference 2014 (OMC2014)**
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MOEMS- MEMS

SPIE Photonics West

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David L. Dickensheets
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Symposium Cochair



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(Germany)

Steering Committee Chair



Rajeshuni Ramesham
Jet Propulsion Lab. (USA)

Founding Chair



M. Edward Motamedi
Revoltech Microsystems (USA)

Micro/Nanofabrication

8973	Micromachining and Microfabrication Process Technology XIX (<i>Maier, Resnick</i>)	241
8974	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (<i>von Freymann, Schoenfeld, Rumpf</i>)	243
8967	Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (<i>Nakata, Xu, Roth, Neuenschwander</i>)	222
8968	Laser-based Micro- and Nano-Processing VIII (<i>Klotzbach, Washio, Arnold</i>)	226

Devices/Applications/Reliability

8975	Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII (<i>Shea, Ramesham</i>)	246
8976	Microfluidics, BioMEMS, and Medical Microsystems XII (<i>Gray, Becker</i>)	248
8977	MOEMS and Miniaturized Systems XIII (<i>Piyawattanametha, Park</i>)	251
8978	MEMS Adaptive Optics VIII (<i>Bifano, Kubby, Gigan</i>)	253
8979	Emerging Digital Micromirror Device Based Systems and Applications VI (<i>Douglass, King, Lee</i>)	254

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Technical Conference Index

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OptiGrate Corp. (USA)

Symposium Cochairs



Jean Emmanuel Broquin
IMEP-LAHC (France)



Shibin Jiang
AdValue Photonics, Inc. (USA)

Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8981	Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III (Freundlich, Guillemoles)	264
8982	Optical Components and Materials XI (Digonnet, Jiang).	268
8983	Organic Photonic Materials and Devices XVI (Tabor, Kajzar, Kaino, Koike)	272
8984	Ultrafast Phenomena and Nanophotonics XVIII (Betz, Elezzabi, Song, Tsen)	275
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç)	281
8987	Oxide-based Materials and Devices V (Teherani, Look, Rogers)	286

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles & Brady LLP (USA)

8988	Integrated Optics: Devices, Materials, and Technologies XVIII (Broquin, Nunzi Conti)	290
8989	Smart Photonic and Optoelectronic Integrated Circuits XVI (Eldada, Lee, He)	294
8990	Silicon Photonics IX (Kubby, Reed)	296
8991	Optical Interconnects XIV (Schröder, Chen, Glebov)	299
8992	Photonic Instrumentation Engineering (Soskind, Olson)	302
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

8993	Quantum Sensing and Nanophotonic Devices XI (Razeghi)	304
8994	Photonic and Phononic Properties of Engineered Nanostructures IV (Adibi, Lin, Scherer)	310

8995	High Contrast Metastructures III (Chang-Hasnain, Fattal, Koyama, Zhou)	314
8996	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI (Huffaker, Szmulowicz, Eisele)	316
8974	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (von Freymann, Schoenfeld, Rumpf)	243

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

8997	Advances in Photonics of Quantum Computing, Memory, and Communication VII (Hasan, Hemmer, Lee, Santori)	318
8998	Advances in Slow and Fast Light VII (Shahriar, Narducci)	321
8999	Complex Light and Optical Forces VIII (Andrews, Galvez, Glückstad)	324
9000	Laser Refrigeration of Solids VII (Epstein, Seletskiy, Sheik-Bahae)	327
8993	Quantum Sensing and Nanophotonic Devices XI (Razeghi)	304
8996	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI (Huffaker, Szmulowicz, Eisele)	316

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

9001	Vertical-Cavity Surface-Emitting Lasers XVIII (Guenther, Lei)	329
9002	Novel In-Plane Semiconductor Lasers XIII (Belyanin, Smowton)	330
9003	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII (Streubel, Jeon, Tu)	333
8965	High-Power Diode Laser Technology and Applications XII (Zediker)	217
8966	Vertical External Cavity Surface Emitting Lasers (VECSELs) IV (Moloney)	220
8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç)	281

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

9004	Emerging Liquid Crystal Technologies IX (Chien)	337
9005	Advances in Display Technologies IV (Chien, Lee, Wu)	339
9006	Practical Holography XXVIII: Materials and Applications (Bjelhagen, Bove)	340

Optical Communications: Devices to Systems

Program Chair: **Benjamin Dingel**, Nasfinc Photonics, Inc. (USA)

9007	Broadband Access Communication Technologies VIII (Dingel, Tsukamoto)	343
9008	Optical Metro Networks and Short-Haul Systems VI (Weiershausen, Dingel, Dutta, Srivastava)	346
9009	Next-Generation Optical Communication: Components, Sub-Systems, and Systems III (Li)	349
9010	Next-Generation Optical Networks for Data Centers and Short-Reach Links (Srivastava)	352
8971	Free-Space Laser Communication and Atmospheric Propagation XXVI (Hemmati, Boroson)	233
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278
8990	Silicon Photonics IX (Kubby, Reed)	296
8991	Optical Interconnects XIV (Schröder, Chen, Glebov)	299



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Technical Conference Index

These tracks highlight papers being presented all week during Photonics West that address the need for advancing resource conservation (Green Photonics) and technology solutions for health care (Translational Research).



TRANSLATIONAL RESEARCH

Symposium Chair



Bruce Tromberg
Beckman Laser Institute
and Medical Clinic (USA)

The global community recognizes the need for advances in technology to meet challenges in health care.

SPIE Translational Research highlights 200 papers from BiOS that address the latest technologies, tools, and devices that have high potential for clinical use.

Translational Research Topic Areas

Photonic Therapeutics and Diagnostics	177
Clinical Technologies and Systems	180
Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering	184
Biomedical Spectroscopy, Microscopy, and Imaging	186
Nano/Biophotonics	188



GREEN PHOTONICS

Symposium Chair



Stephen J. Eglash
Executive Director
Energy and Environment Affiliates
Program, Stanford Univ. (USA)

SPIE Green Photonics 2014 highlights the latest photonics and optoelectronic tools and materials that reduce power consumption and enable cleaner manufacturing and new energy generation.

Hear 200 papers that address the need for resource conservation, as well as opportunities to spur economic growth.

Green Photonics Topic Areas

Laser-assisted Manufacturing and Micro/Nano Fabrication	354
Renewable Energy Generation: Fusion and Photovoltaics	357
Solid State Lighting and Displays	362
Communications	364

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Special Event Daily Schedule

Saturday 1 February	Sunday 2 February	Monday 3 February
	<h2 style="margin: 0;">SPIE BIOS EXPO</h2> <p style="margin: 0;">The world's largest biophotonics and biomedical optics show</p> <p style="margin: 0;">Exhibition Dates and Hours: Saturday 1 February . . 12:00 pm to 5:00 pm Sunday 2 February . . . 10:00 am to 5:00 pm</p>	<p>PLENARY SESSION: MOEMS-MEMS 9:00 am to 12:00 pm, p.24 Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award (<i>Dickensheets/Becker</i>) Electrostatic Nano Electromechanical Switches (NEMS) for Energy-Efficient Digital Systems (<i>Howe</i>) Tailoring Light for Optically-Guided Nano- and Microassembly: From Bio-Hybrid Robots to Droplet Cages (<i>Denz</i>) Bio-Integrated and Bio-Inspired Optical Microsystems (<i>Rogers</i>)</p>
<p>PLENARY SESSION: BiOS Hot Topics 7:00 to 9:00 pm, p.17 Britton Chance Biomedical Optics and Biophotonics Technology Innovator Awards, Presentation by SPIE President H. Philip Stahl Hot Topics Moderator (<i>Fantini</i>) Diffuse Optical Methods for Assessing Breast Cancer Chemotherapy (<i>Tromberg</i>) Scanning Fiber Endoscopy: Multimodes of Guided Intervention (<i>Seibel</i>) Clinical Translation in OCT: Role of Research, Funding, and Entrepreneurism (<i>Swanson</i>) Optical Spectroscopy and Tomography of Oxygen Delivery: From Macro to Micro and Back (<i>Boas</i>) Photoacoustic Tomography: Ultrasonically Beating Optical Diffusion and Diffraction (<i>Wang</i>) Single-cell Photonic Nanocavity Probes (<i>Vuckovic</i>) New Small Quantum Dots for Neuroscience (<i>Selvin</i>)</p>	<p>WORKSHOP: Research Proposals: Improving Your Odds for Success (<i>Alley</i>) 8:30 am to 12:30 pm, p.38</p>	<p>MEMBER EVENT: SPIE Fellows Luncheon 12:00 to 1:30 pm, p.40 Luncheon Presentation: Update on Silicon Photonics for High-Efficiency Computing (<i>Krishnamoorthy</i>)</p>
<p>POSTER SESSION: BiOS 3:00 to 4:00 pm, p.18</p>	<p>STUDENT EVENT: Lunch with the Experts - A BiOS Student Networking Event 12:30 to 1:30 pm, p.40</p>	<p>WORKSHOP: The Craft of Scientific Presentations: A Workshop on Technical Presentations (<i>Alley</i>) · 8:30 am to 12:30 pm, p.39</p>
	<p>LUNCHTIME FORUM: Translational Research (<i>Tromberg</i>) 12:30 to 2:00 pm, p.18</p>	<p>WORKSHOP: The Craft of Scientific Writing: A Workshop on Technical Writing (<i>Alley</i>) 1:30 to 5:30 pm, p.39</p>
<p>INDUSTRY EVENT: Financing Life Sciences & Healthcare Ventures 3:30 to 5:00 pm, p.30</p>	<p>INDUSTRY EVENT: Charting a Course in the Photonics Industry 1:30 to 3:30 pm, p.31 James Fisher, Newport Corp. - How to shape yourself for a future in Photonics Simon Poole, Director New Business Ventures - Confessions of a Serial Entrepreneur: 30 years of photonic start-ups in academia and industry Andrea Belz, Belz Consulting LLC - How do you create and validate a technology-based business opportunity?</p>	<p>INDUSTRY EVENT: Accelerator Forum: What Startups Need to be Successful (<i>Belz</i>) 2:30 to 4:00 pm, p. 31</p>
<p>POSTER SESSION: BiOS 3:00 to 4:00 pm, p.18</p>	<p>TECHNICAL EVENT: FDA Policies and Procedures: What Academic Investigators and Small Business Should Know (<i>Grundfest/Raghavachari</i>) 5:00 to 7:00 pm, p.18</p>	<p>INDUSTRY EVENT: The Science of Financing Start-ups, 4:00 to 5:00 pm, p.31</p>
<p>STUDENT EVENT: Student Chapter Meeting · 6:00 to 9:00 pm, p.40</p>	<p>POSTER SESSION: BiOS 5:30 to 7:30 pm, p.18</p>	<p>NETWORKING EVENT: Women in Optics Panel and Reception · 5:00 to 6:30 pm, p.40</p>
<p>INDUSTRY EVENT: Financing Life Sciences & Healthcare Ventures 3:30 to 5:00 pm, p.30</p>	<p>POSTER SESSION: BiOS 5:30 to 7:30 pm, p.18</p>	<p>PANEL DISCUSSION: Prospects and Future of Microfluidics (<i>Becker</i>) 5:30 to 7:00 pm, p.25</p>
<p>INDUSTRY EVENT: Financing Life Sciences & Healthcare Ventures 3:30 to 5:00 pm, p.30</p>	<p>POSTER SESSION: BiOS 5:30 to 7:30 pm, p.18</p>	<p>POSTER SESSION: BiOS 5:30 to 7:30 pm, p.18</p>
<p>INDUSTRY EVENT: Financing Life Sciences & Healthcare Ventures 3:30 to 5:00 pm, p.30</p>	<p>INDUSTRY EVENT: Financing Life Sciences & Healthcare Ventures 3:30 to 5:00 pm, p.30</p>	<h2 style="margin: 0;">Photonics West Welcome Reception</h2> <p style="margin: 0;">A Night at the Movies Monday 3 February 7:00 to 8:30 pm Marriott Marquis Hotel <i>See p. 40 for details.</i></p>

Tuesday
4 February

Wednesday
5 February

Thursday
6 February



SPIE Photonics West Exhibition

Walk the floor of the world's premier lasers and photonics marketplace

Exhibition Dates and Hours:

Tuesday 4 February 10:00 am to 5:00 pm
 Wednesday 5 February 10:00 am to 5:00 pm
 Thursday 6 February 10:00 am to 4:00 pm



SPIE Photonics West JOB FAIR

Meet 40 recruiters face-to-face

South Exhibition Hall C
 Tuesday 4 February · 10:00 am to 5:00 pm
 Wednesday 5 February · 10:00 am to 5:00 pm

INDUSTRY EVENT:
Technology-Transfer Showcase (Moderator: Wick)
 10:30 am to 1:00 pm, p.35

MEMBER EVENT: **SPIE Senior Member Breakfast**
 8:00 to 9:00 am, p.41

PLENARY SESSION: **OPTO** · 8:30 to 10:00 am, p.28
 Welcome and Opening Remarks (*Glebov/Andrews*)
 Announcement of the Green Photonics Awards (*Eglash*)
 Pushing the Boundaries of Silicon Photonics (*Lipson*)
 The Previously Unbelievable Performance of Ultrafast Thin Disk Lasers (*Keller*)

WORKSHOP: **Resumes to Interviews: Strategies for a Successful Job Search** (*Lawson/Krinsky*) · 8:30 am to 12:30 pm, p.39

INDUSTRY EVENT: **Workshops**, 10:30 to 5:00 pm, p.32

STUDENT EVENT: **Lunch with the Experts - A Student Networking Event**, 12:30 to 1:30 pm, p.41

STUDENT EVENT: **Student Chapter Info Session**
 1:45 to 2:30 pm, p.40

PLENARY SESSION: **Nano/Biophotonics Program Track**
 2:00 to 3:00 pm, p.19

INDUSTRY EVENT: **Silicon Photonics and Photonic Integrated Circuits** (Moderator: *Hallett*) 2:00 to 3:00 pm, p.32

INDUSTRY EVENT; **Green Photonics: a Solar Revolution** (Moderator: *Eglash*) 3:30 to 4:30 pm, p.32

PANEL DISCUSSION: **Getting Hired in 2014 and Beyond**
 3:30 to 4:30 pm, p.38

NETWORKING EVENT: **Speed Networking Social**
 4:30 to 6:00 pm, p.41

TECHNICAL EVENT: **Biophotonics in Brazil: Opportunities and Research**, 5:30 to 7:00 pm, p.19
 Moderator: Carlos H. de Brito Cruz, FAPESP (Brazil)

POSTER SESSION: **BiOS, LASE and MOEMS-MEMS** · 6:00 to 8:00 pm, pp.18, 23, 25

TECHNICAL EVENT: **IBOS: International Biomedical Optics Society** · 7:30 to 9:00 pm
 Label free vibrational imaging for biology and medicine (*Xie*), p.19

TECHNICAL EVENT: **Laser Communications** (*Hemmati/Boroson*)
 7:30 to 9:00 pm, p.23

TECHNICAL EVENT: **The Nature of Light: What Are Photons?** (*Prasad*) 7:30 to 9:00 pm, p.29

TECHNICAL EVENT: **Holography** (*Bjelkhagen*) 7:30 to 9:00 pm, p.29

MEMBER EVENT: **SPIE Member Reception** · 8:00 to 9:30 pm, p.41

PLENARY SESSION: **LASE**
 10:20 am to 12:30 pm, p.22
 Welcome and Opening Remarks (*Gu/Tünnermann*)
 Announcement of the Best "Green" LASE Paper Award (*Eglash*)
 Photonics21 and the Perspectives from the European Photonics Industry (*Mertin*)
 Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication (*Sugioka*)
 A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel (*Meunier*)

PROFESSIONAL DEVELOPMENT:
Career Advancement through SPIE Involvement · 10:30 to 11:15 am, p.32

INDUSTRY EVENT: **Workshops**, 10:30 am to 5:00 pm, p.34

INDUSTRY EVENT: **Executive Perspectives on the World of Optics and Photonics** (Moderator: *Anderson*)
 1:30 to 2:30 pm, p.34

INDUSTRY EVENT: STARTUP challenge

See and hear new entrepreneurs pitch their new photonics business and compete for \$10,000
 3:30 to 6:00 pm, p.35

POSTER SESSION: **OPTO**,
 6:00 to 8:00 pm, p.29

INDUSTRY EVENT:
PRISM20 AWARDS14
Prism Awards Ceremony and Banquet · 6:00 to 10:00 pm, p.35



STUDENT EVENT: **"No Ties" Student Social**, 8:00 to 10:00 pm, p.41

Photonics West

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SPIE Awards Program is not only one of the most prestigious ways the Society recognizes excellence, but also one of the longest running SPIE Programs. Since 1959, SPIE has honored the best in optics and photonics for their significant achievements and contributions in advancing the science of light.

-
- Gold Medal of the Society*
 - Britton Chance Biomedical Optics Award*
 - Biophotonics Technology Innovator Award*
 - A.E. Conrady Award*
 - Harold E. Edgerton Award*
 - Dennis Gabor Award*
 - George W. Goddard Award*
 - Rudolf Kingslake Medal and Prize*
 - G. G. Stokes Award*
 - Chandra S. Vikram Award in Optical Metrology*
 - Frits Zernike Award for Microlithography*
 - Early Career Achievement Award*
 - SPIE Educator Award*
 - SPIE Technology Achievement Award*
 - President's Award*
 - Directors' Award*
 - Joseph W. Goodman Book Writing Award*
-

ANNOUNCEMENT OF
*Biophotonics
Technology Innovator
Award,
and Britton Chance
Biomedical Optics Award*

BiOS Hot Topics
1 February
7:00 to 9:00 pm

See www.spie.org/awards for details.

SPIE[®]

BiOS Special Events



BiOS

SPIE Photonics West

HOT TOPICS

Saturday 1 February · 7:00 to 9:00 pm · Location: Room 134 (Exhibit Level)

Hear the latest technical breakthroughs and directions from leading worldwide experts. Access to the BiOS Hot Topics included with your conference registration.

7:00 to 7:25 pm

Welcome and Introduction



James Fujimoto
Massachusetts Institute of
Technology (USA)
BiOS 2014 Symposium Chair



R. Rox Anderson
Wellman Ctr. for Photomedicine,
Massachusetts General Hospital
(USA) and Harvard School of
Medicine (USA)
BiOS 2014 Symposium Chair

7:25 to 7:45 pm

Announcement of Awards



Announcement of Award
Winners by
SPIE President
H. Philip Stahl

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Hot Topics Moderator



Sergio Fantini
Tufts Univ. (USA)

7:45 to 7:55 pm



Diffuse Optical Methods for Assessing Breast Cancer Chemotherapy

Bruce Tromberg
Beckman Laser Institute and
Medical Clinic (USA)

7:55 to 8:05 pm



Scanning Fiber Endoscopy: Multimodes of Guided Intervention

Eric Seibel
Univ. of Washington (USA)

8:05 to 8:15 pm



Clinical Translation in OCT: Role of Research, Funding, and Entrepreneurism

Eric Swanson
OCT News (USA)

8:15 to 8:25 pm



Optical Spectroscopy and Tomography of Oxygen Delivery: From Macro to Micro and Back

David Boas
Massachusetts General Hospital
(USA)

8:25 to 8:35 pm



Photoacoustic Tomography: Ultrasonically Beating Optical Diffusion and Diffraction

Lihong Wang
Washington Univ.
in St. Louis (USA)

8:35 to 8:45 pm



Single-cell Photonic Nanocavity Probes

Jelena Vuckovic
Stanford Univ. (USA)

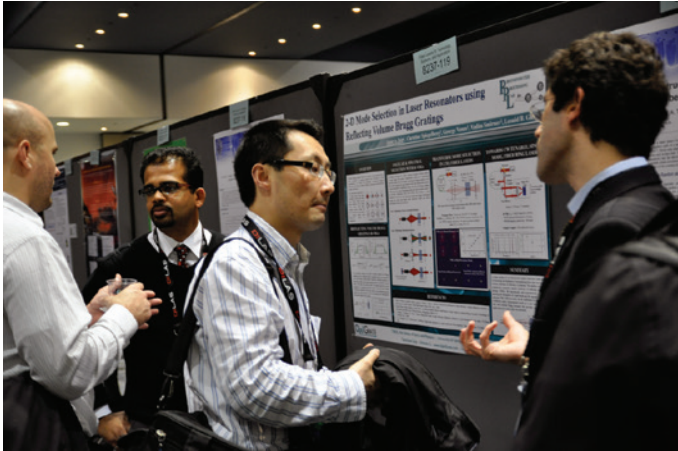
8:45 to 8:55 pm



New Small Quantum Dots for Neuroscience

Paul Selvin
Univ. of Illinois at Urbana-
Champaign (USA)

BiOS Special Events



BiOS Interactive Poster Sessions

Location: South Hall A
 Saturday-Sunday 1-2 February
 (with BiOS EXPO).....3:00 to 4:00 pm
 Sun-Tue Location: Room 103 (Exhibit Level)
 Sunday 2 February 5:30 to 7:30 pm
 Monday 3 February 5:30 to 7:30 pm
 Tuesday 4 February
 (with LASE and MOEMS-MEMS)..... 6:00 to 8:00 pm

Conference attendees are invited to attend the BiOS poster sessions throughout the week. Come view the posters, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Please see individual conference programs for poster session timing. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors: view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>

Translational Research Lunchtime Forum

Sunday 2 February 2014 · 12:30 to 2:00 pm
 Location: Room 300 (Esplanade)



Discussion Facilitator:
Bruce J. Tromberg
 Beckman Laser Institute and Medical Ctr.
 Translational Research Symposium Chair

Join your colleagues in a discussion of outcomes-based studies that can change the lives of patients. Select participants from the Translational Research virtual symposium will have the opportunity to present their methodology and findings. These speakers will demonstrate the use of optical/light-based techniques that are innovative and clever and can change the outcome for patients in a positive and life-giving way.

Best Paper Awards in the category of evidence-based medicine will be presented.

Sponsored by:



Through the generosity of OCT News, boxed lunches will be provided to the first 100 forum attendees.

FDA Policies and Procedures: What Academic Investigators and Small Business Should Know

Sunday 2 February 2014 · 5:00 to 7:00 pm
 Location: Room 226 (Mezzanine)

Chairs: **Warren Grundfest**, Univ. of California, Los Angeles and **Ramesh Raghavachari**, U.S. Food and Drug Administration

5:00 to 5:10 pm: **Welcome and Introduction**

5:10 to 5:35 pm: **Anya Harry**, Molecular Pathology and Cytology Branch, Center for Devices and Radiological Health, US- Food and Drug Administration

5:35 to 6:00 pm

Small Business Perspective on 3rd Party Review and Regulatory Approval for Medical Devices, Roger Bagwell, Actuated Medical, Inc.

6:00 to 6:25 pm: **Jennifer Shen**, Molecular Pathology and Cytology Branch, Center for Devices and Radiological Health, US- Food and Drug Administration

6:25 to 6:50 pm: **Incorporating Regulatory Requirements into Product Development: How to Achieve Successful Regulatory Strategies, Andrea K. Scott**, Esquire, Regulatory Affairs, Emerging Technologies, Bioethics

6:50 to 7:00 pm: **Final Discussion**

Laser-Tissue Interaction

Monday 3 February 2014 · 8:30 am to 12:30 am
 Location: Room 238 (Mezzanine)



Organized by:
E. Duco Jansen, Vanderbilt Univ. (USA)

Join us for a morning of sessions commemorating the 25th anniversary of the conference Optical Interactions with Tissue and Cells (8941). This conference has been an instrumental incubator for technologies that have since become prominent features of biomedical optics. The special anniversary sessions will include pioneering participants from the original conference offering their perspectives on where the field has been, and where it's going.

Chaired by: **E. Duco Jansen**, Vanderbilt Univ. and **Steven Jacques**, Oregon Health & Science Univ.

ANNIVERSARY SESSION PRESENTATIONS INCLUDE:

- **Erbium laser tissue interaction: from bench to bedside** (Invited Paper) Paper 8941-1
Martin Frenz, Univ. Bern (Switzerland)
- **Photons kill, cure, and diagnose: what's next?** (Invited Paper) Paper 8941-2
Joseph T. Walsh, Northwestern Univ. (USA)
- **From cooking egg whites to gold nano-particles: a 25 year journey** (Invited Paper) Paper 8941-3
Massoud Motamedi, The Univ. of Texas Medical Branch (USA)
- **Enhanced imaging techniques for research and education of medical professionals: playing "Mythbuster" for 25 years** (Invited Paper) Paper 8941-4
Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands);
Tjeerd de Boorder, Herke Jan Noordmans, John H. Klaessens, Univ. Medical Ctr. Utrecht (Netherlands); **Albert J. Van der Veen**, Vrije Univ. Medical Ctr. (Netherlands)
- **Laser surgery to imaging to image-guided surgery in 25 years** (Invited Paper) Paper 8941-5
Joseph A. Izatt, Duke Univ. (USA)
- **PDT: Back to the future (25 years of follies and fortunes)** (Invited Paper) Paper 8941-6
Tayyaba Hasan, Massachusetts General Hospital (USA);
David H. Kessel, Wayne State Univ. (USA)
- **Photofrin as a gateway drug: how PDT can lead to hardcore tissue optics and obsession with oxygen metabolism** (Invited Paper) Paper 8941-7
Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA)

Biophotonics in Brazil: Opportunities and Research

Tuesday 4 February 2014 · 5:30 to 7:00 pm
Location: InterContinental Hotel, Sutter

Moderator: **Carlos H. de Brito Cruz**, FAPESP (Brazil)

5:30 to 5:35 pm

Welcome and Introduction

5:35 to 5:50 pm

Biophotonics Research Supported by the São Paulo Research Foundation (FAPESP)



Carlos H. de Brito Cruz
FAPESP, Science Director (Brazil)

FAPESP is a public foundation, funded by the taxpayer in the State of São Paulo, with the mission to support research in all fields of knowledge. The State constitution establishes that 1% of all state taxes belong to the foundation and the government transfers these funds monthly. FAPESP's expenditures in 2012 were R\$ 1.035 billion (approximately US\$ 500 million). FAPESP offers programs to support foreign scientists willing to work in research institutions in the state of São Paulo, Brazil: post-doctoral fellowships (<http://www.fapesp.br/en/5427>), young investigator awards (<http://www.fapesp.br/en/4479>) and visiting researcher grants (<http://www.fapesp.br/147>).

5:50 to 6:05 pm

Multimodal Photonic Microscopy Platform: Observing Single Cell Processes



Carlos Lenz Cesar
State Univ. of Campinas (Brazil)

We developed a multimodal photonic platform to manipulate and acquire spatial and time resolved, biochemical and biomechanical information of live single cells. All techniques must be integrated into the same instrument to allow simultaneous observation and manipulations in real time. Our multimodal platform includes: single-multiphoton confocal microscopy, FLIM, FRET, FCS, SHG/THG, CARS, Raman, AFM/tip-enhancement microscopy/spectroscopy, optical tweezers and laser cutting. We will present examples of the use of this tool.

6:05 to 6:20 pm

Biophotonics Uncovers the Mode of Action of Antithrombotic and Anti-Angiogenic Drugs



Helena B. Nader
Univ. Federal de São Paulo (Brazil)

Heparin, and its derivatives, remains a mainstay of anti-thrombotic therapy in medicine. It is also known to regulate a variety of pathophysiological events related to vascular biology due to its abilities to bind and modulate enzymes, serpins, as well as growth factors and cytokines. Using confocal microscopy, flow cytometry, FRET analysis, scanning fluorometry, synchrotron circular dichroism spectroscopy among other techniques we were able to reveal novel information on the modulation of heparin upon antithrombin. The cell signaling evoked by heparin upon endothelial and smooth muscle cells, such as the kinetics of NO formation and intracellular Ca²⁺ trafficking was demonstrated by the use of these complementary methodologies. Work supported by FAPESP, CNPq and CAPES.

6:20 to 6:30 pm

Final Discussion

6:30 to 7:00 pm

Reception sponsored by:



Nano/Biophotonics Program Track Plenary Session

Tuesday 4 February 2014 · 2:00 to 3:00 pm
Location: Room 305 (Esplanade Level)

2:00 to 2:15 pm

Welcome and Introduction

Dan Nicolau, McGill Univ. (Canada)

2:15 to 3:00 pm

Direct Laser Writing: Biomimetic Photonics and Superresolution Nanolithography



Min Gu
Swinburne Univ. (Australia)

Biomimetic photonics is inspired by nature's ability to self-assemble complex nanostructured materials with superior properties to that of conventional materials. Biomimetic engineering of novel nanophotonic devices has led to optical nanofountains, artificial compound eyes and optical gas sensors. Direct laser writing (DLW) is a powerful tool toward the development of ultimate three-dimensional (3D) biomimetic photonic devices. Here we demonstrate the fabrication (DWL) of a novel class of 3D photonic microstructures inspired by a recent finding in butterfly wing-scales and show that these nano-engineered 3D gyroid structures have the ability to redirect circularly polarized light as a chiral beamsplitter. Because of the increasing demand for realising nanogeometries, the diffraction-limited resolution associated with DLW, should be overcome to access to the nanoscale. We will report on our recent progress on optical beam nanolithography by using the superresolution photoinduction-inhibited nanolithography (SPIN) technique. The smallest feature size of 9 nm for free-standing lines has been demonstrated.

Professor Min Gu, a Laureate Fellow of the Australian Research Council, is Director of the Centre for Micro-Photonics and University Distinguished Professor at Swinburne University of Technology. He is an elected Fellow of the Australian Academy of Science as well as the Australian Academy of Technological Sciences and Engineering. He was awarded the most prestigious W. H. (Beattie) Steel Medal of the Australian Optical Society. He is an elected fellow of the Optical Society of America, SPIE, and the Institute of Physics (UK). He was President of the International Society of Optics within Life Sciences. He was Vice President of the Bureau of the International Commission for Optics (ICO) (Chair of the ICO Prize Committee). He serves on the ICO Galileo Award Committee and the Young Scientist Prize Committee in Optics and is the Board of Director, Executive Committee member, and Chair of the International Council of the Optical Society of America.

IBOS: International Biomedical Optics Society

Tuesday 4 February 2014 · 7:30 to 9:00 pm
Location: InterContinental Hotel, Ballroom C

Chairs: **Jennifer Barton**, The University of Arizona (USA)
Lihong Wang, Washington Univ. in St. Louis (USA)

All registered conference participants are encouraged to attend this evening session. Attendees are required to wear their conference badges.

Biomedical optics is a major growth area in modern medicine. The International Biomedical Optics Society is a nonprofit interdisciplinary group that provides a unique channel for communications among physicians and clinicians employing optics in medicine and the scientists and engineers who provide foundations for advancements in this field.

The BiOS symposium, where IBOS meets, is the premier annual international forum for discussions and announcements of technical/clinical and educational/pedagogical developments in the use of lasers, optical fibers, spectroscopic diagnostic techniques, and related areas of optical medicine.

The 2014 program will include the following presentation:



Label free vibrational imaging for biology and medicine

X. Sunney Xie
Harvard Univ. (USA)



The discovery of supercontinuum generation and applications

Wednesday 5 February 2014 · 1:30 to 5:30 pm
 Location: Room 309 (Esplanade)

Organized by:



Robert Alfano
 The City College New York (USA)

Join us for an afternoon of special sessions commemorating the 45th anniversary of the discovery of supercontinuum generation and applications. Part of the Optical Biopsy (8940) conference, the anniversary event will feature innovative works in non-invasive spectroscopic methods to detect the onset and progression of disease.

Chaired by:



Robert A. Fisher
 RA Fisher Associates, LLC (USA)



Robert W. Boyd
 Univ. of Ottawa (Canada)

Sponsored by:



ANNIVERSARY SESSION PRESENTATIONS INCLUDE:

- **Ultimate ultrafast white light's first observations: early discovery circa 1970** (Invited Paper) Paper 8940-32
Robert R. Alfano, The City College of New York (USA)
- **Evolution of the supercontinuum source** (Invited Paper) Paper 8940-33
James Roy Taylor, Imperial College London (United Kingdom)
- **Supercontinuum generation in optical fibers and its biomedical applications** (Invited Paper) Paper 8940-34
Govind P. Agrawal, Univ. of Rochester (USA)
- **White light for the fast lane: supercontinuum generation in all-normal dispersion fibers for ultrafast photonics** (Invited Paper) Paper 8940-35
Alexander M. Heidt, Univ. of Southampton (United Kingdom)
- **Supercontinuum generation in microstructure fiber at the advent of femtosecond combs** (Invited Paper) Paper 8940-36
 Author(s): Steven T. Cundiff, JILA (USA)
- **Collapsing light really shines** (Invited Paper) Paper 8940-37
Alexander L. Gaeta, Cornell Univ. (USA)
- **Cross-phase modulation in optical Kerr media: from early discovery works to recent all-optical applications** (Invited Paper) Paper 8940-38
Patrice L. Baldeck, Univ. Joseph Fourier (France)

SPIE provided \$3.2 million in support of education and outreach programs in 2013

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- ▶ Education and Training in Optics and Photonics Conference (ETOP)
- ▶ Student Outreach
- ▶ Science Fairs
- ▶ Optics Education Directory
- ▶ Free SPIE Journal Access in developing nations
- ▶ Active Learning in Optics and Photonics (ALOP): Teacher Training
- ▶ International Centre for Theoretical Physics (ICTP) Winter College
- ▶ Visiting Lecturers Program

www.spie.org/giving



BiOS 2014 Best Paper Awards

PicoQuant Young Investigator Award

Part of: Single Molecule Spectroscopy and Superresolution Imaging VII (Conf. 8950)

Sunday 2 February · 3:20 to 3:30 pm · Location: Room 307

We are pleased to announce that a prize will be awarded to the best oral presentation by a presenter under the age of 32 within Conference 8950: Single Molecule Spectroscopy and Imaging VII. Participants must be both the primary author and presenter of an accepted abstract to be eligible.

Prize donated by **PicoQuant GmbH Berlin (Germany)**

Pascal Rol Award 2014

Part of: Ophthalmic Technologies XXIV (Conf. 8930)

Sunday 2 February · 4:45 to 5:00 pm · Location: Room 305

Outstanding extended abstracts submitted to the Ophthalmic Technologies conference will be nominated for the Pascal Rol Award for Best Paper in Ophthalmic Technologies. The award and prize will be presented after the last scientific session of the conference to recognize the best paper and presentation. The 2013 recipient of the Pascal Rol Award was Dr. Yosi Mandel from Stanford University (see www.pascal-rolfoundation.org).

Prize donated by **Brien Holden Vision Institute (Australia)**

JenLab Young Investigator Award

Part of: Multiphoton Microscopy in the Biomedical Sciences XIV (Conf. 8948)

Monday 3 February · 2:45 to 3:00 pm · Location: Room 308

We encourage graduate students, postdocs, or scientists who are not more than 32 years old to apply for the Jen Lab Young Investigator Award. To receive this \$2000 cash award, (1) participants must be both the primary author and presenter of an accepted abstract, and (2) the associated proceedings paper must be submitted at least 2 weeks prior to the meeting start dates for review by the selection committee.

Prize donated by **JenLab GmbH (Germany)**

Student Poster Session Competition

Part of: Multiphoton Microscopy in the Biomedical Sciences XIV (Conf. 8948)

Monday 3 February · 2:45 to 3:00 pm · Location: Room 308

Graduate Students and postdoctoral fellows with accepted posters can participate in the poster session competition of the conference on Multiphoton Microscopy in the Biomedical Sciences. There is a cash award for the winner(s). The participants should mention that their submission is for the "Students Poster Session Competition (SPSCMP)." The participants should follow the rules and regulations of SPIE for submission of their abstract and manuscript.

Prize donated by **Becker and Hickl/Boston Electronics, Carl Zeiss Microscopy LLC, Chromas Tech, Coherent Inc., ISS Inc., Leica Microsystems, Newport Corporation, Princeton Instruments, Semrock**

Ocean Optics Young Investigator Award

Part of: Colloidal Nanocrystals for Biomedical Applications IX (Conf. 8955)

Tuesday 4 February · 12:00 to 12:15 pm · Location: Room 112

Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$2,000 Ocean Optics equipment credit to the laboratory where the work was performed.

Prize donated by **Ocean Optics (USA)**

Seno Medical Best Paper Awards

Part of: Photons Plus Ultrasound: Imaging and Sensing 2014 (Conf. 8943)

Wednesday 5 February · 5:00 to 5:30 pm · Location: Room 306

Seno Medical Instruments of San Antonio, Texas, will sponsor two Awards for this Conference: Best Paper and Best Poster presented. Authors to compete for the two awards must email a 1-page Summary of their research to Ms. Marina Shipova (mshipova@WUSTL.edu) and copy both conference chairs by January 7, 2014. The chairs' email addresses are Alexander A. Oraevsky (aao@tomowave.com) and Lihong V. Wang (LHWang@WUSTL.edu).

Prize donated by **Seno Medical (USA)**

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LASE Special Events



LASE

SPIE Photonics West

PLENARY SESSION

Wednesday 5 February · 10:20 am to 12:30 pm · Location: Room 134 (Exhibit Level)

Attend the plenary session and hear the latest from worldwide experts.
Access included with your conference registration.

10:20 am

Welcome and Opening Remarks

Session Chairs:



Bo Gu
Bos Photonics
(USA)



Andreas Tünnermann
Fraunhofer-Institut für
Angewandte Optik und
Feinmechanik (Germany) and
Friedrich-Schiller-Univ. Jena
(Germany)

10:25 am

Announcement of the Green Photonics Award



Stephen J. Eglash
Executive Director
Energy and Environment Affiliates
Program, Stanford Univ. (USA)

10:30 am

Photonics21 and the Perspectives from the European Photonics Industry



Michael Mertin
JENOPTIK AG (Germany)

Photonics provide indispensable technology building bricks that enable a wide range of products as well as driving the development of entirely new industries. The European Commission recognized the potential of photonics to strengthen Europe's industrial and innovation capacity and consequently declared photonics as a Key Enabling Technology. Photonics21 as partner of the European Commission developed a Multiannual Strategic Roadmap which aims at boosting European photonics along the whole innovation chain with special focus on the gap between generating knowledge and products. The roadmap will be realized in a Public Private Partnership between the European photonics industry and the European Commission until 2020. In this PPP it is intended that the industry commits to leverage the public funds by the factor of 4.

Dr. Michael Mertin was born in Cologne in 1966. From 1986 to 1992 he studied physics at the RWTH Aachen and subsequently gained his PhD in Engineering at the Fraunhofer Institute for Laser Technology (FHG-ILT). After a ten-year management career with Carl Zeiss, Michael Mertin joined JENOPTIK AG as COO in October 2006. Since July 1st, 2007 Michael Mertin is President and CEO of JENOPTIK AG. Among other positions in various economic committees and technology associations Michael Mertin is President of the European Technology Platform Photonics21.

11:10 am

Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication



Koji Sugioka
RIKEN (Japan)

Femtosecond lasers have opened up new avenues in materials processing due to their unique characteristics of ultrashort pulse widths and extremely high peak intensities that induce strong absorption in even transparent materials due to nonlinear multiphoton absorption. Then, the femtosecond laser can directly fabricate three-dimensional microfluidic, micromechanic, microelectronic, and micro-optical components in glass. These microcomponents can be easily integrated in a single glass microchip, which enable us to fabricate functional biochips quickly screening large number of biological analytes. In this talk, the detailed fabrication procedure of biochips using the femtosecond laser and applications of the fabricated biochips to material synthesis, analysis of biochemical samples, and determination of functions of microorganisms are introduced.

Koji Sugioka received his B. S. degree, Ms. Eng., and Dr. Eng. from Waseda University in 1984, 1986, and 1993, respectively. He is now a senior research scientist in RIKEN and a guest professor at Tokyo University of Science and Tokyo Denki University. He is currently a member of the board of director for Laser Institute of America and Japan Laser Processing Society, and an SPIE Fellow.

11:50 am

A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel



Michel Meunier
Ecole Polytechnique de Montréal (Canada)

A new technique is introduced to perform nanosurgery in living cells using a laser multi-nanoscapel. Irradiating plasmonics nanostructures by an ultrafast laser beam produces highly localised processes on the nanoscale in the biological surrounding medium, yielding to the nanosurgery of cells. These nanoparticles could be functionalised to target specific biological entities, thus performing multiple targeted surgeries on the nanoscale. As an example, the laser multi-nanoscapel was employed to perform gene transfection in living cell with an optoration efficiency as high as 70%. Complete physical model was developed to determine the basic mechanism underlying this new nanosurgery process. Our laser multi-nanoscapel shows promises as an innovative tool for fundamental research in biology and medicine as well as an efficient alternative nanosurgery technology that could be adapted to therapeutic tools in the clinic.

Michel Meunier obtained his PhD in Materials Science from MIT in 1984 and is Professor of Engineering Physics at École Polytechnique de Montréal since 1986. He was awarded in 2001 a Canadian Research Chair to perform research and innovation in laser micro/nano-engineering of materials and plasmonics for nanotechnology and biomedical applications. He is Fellow of SPIE, OSA and the Canadian Academy of Engineering. He has a research group of ~20 people and has published over 330 papers.

LASE 2014 Best Paper Awards

Best Student Presentation Award

Vertical External Cavity Surface Emitting Lasers (VECSELs) IV (Conf. 8966)

Monday 3 February · Location: Room 123 (Exhibit Level)

Award Ceremony · 5:40 to 6:00 pm

Throughout the conference, qualifying student oral presentations will be evaluated. Student presentations will be judged based on scientific merit, impact, and clarity of the presentation. While the award is not judged by the manuscript, a manuscript must be submitted.

Award Sponsor: **Coherent**

Best Student Paper Competition

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XIV (Conf. 8972)

Wednesday 5 February · Location: Room 130 (Exhibit Level)

Competition · 8:00 to 9:00 am

Award Ceremony · 9:40 to 10:00 am

For conference 8972, Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XIV, we are pleased to announce that a cash prize will be awarded to the best student presentation in this conference (both poster and oral papers considered). Papers submitted by graduate and undergraduate students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief 5-minute summary of their original talk or poster presented at the conference. Following the student competition, the judges will meet and decide on the winner. The winner and runner-up will be announced during the award ceremony and awarded a cash prize.

Award Sponsors: **Amplitude Systèmes**

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Best Student Oral Paper Competition

Fiber Lasers XI: Technology, Systems, and Applications (Conf. 8961)

Thursday 6 February · Location: Room 131 (Exhibit Level)

Award Ceremony · 5:00 to 5:20 pm

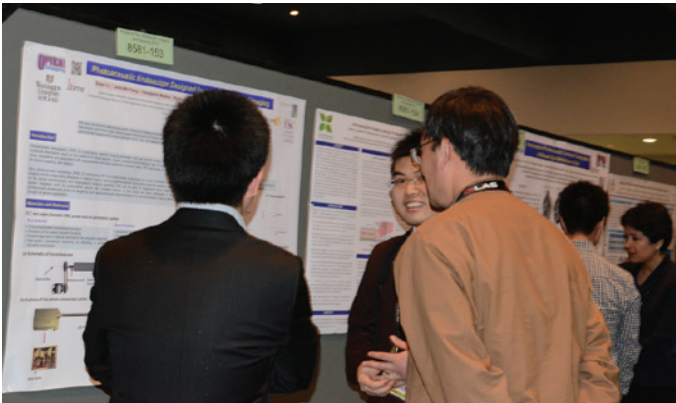
For conference 8961, Fiber Lasers XI: Technology, Systems, and Applications, we are pleased to announce that a cash prize will be awarded to the best student oral presentation in the conference.

Throughout the conference, qualifying student oral presentations will be evaluated by the conference committee, and the results will be announced in this session. Student presentations will be judged based on scientific merit of the work, and clarity of the presentation. While the award is not judged by the manuscript, a manuscript must be submitted.

To be eligible for consideration, the student must be the first author on an accepted paper, and must make the oral presentation.

Award Sponsors: **NKT Photonics A/S**

PolarOnyx, Inc.



LASE Interactive Poster Session

Tuesday 4 February · 6:00 to 8:00 pm

Location: Room 103 (Exhibit Level)

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors: view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>

TECHNICAL EVENT

Laser Communications

Tuesday 4 February · 7:30 to 9:00 pm

Location: InterContinental Hotel, Fremont

Session Chairs:

Hamid Hemmati

Jet Propulsion Lab. (USA)

Don Boroson

MIT Lincoln Lab. (USA)

This technical event on Laser Communications will hold its informal annual meeting in conjunction with the Free-Space Laser Communication and Atmospheric Propagation conference. All professionals involved in theory and applications of free-space laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

MOEMS-MEMS Special Events



MOEMS- MEMS

SPIE Photonics West

PLENARY SESSION

Monday 3 February · 9:00 am to 12:00 pm · Location: Room 130 (Exhibit Level)

Hear the latest insights from worldwide experts in the field at the MOEMS-MEMS Plenary Session

9:00 am

Welcome and Announcement of MOEMS-MEMS Best Paper and Best Student Paper Awards

Session Chairs:



David L. Dickensheets
Montana State Univ.
(USA)



Holger Becker
microfluidic ChipShop
GmbH (Germany)

9:15 am

Electrostatic Nano Electromechanical Switches (NEMS) for Energy-Efficient Digital Systems



Roger T. Howe
Stanford Univ. (USA)

Micro- and nano-fabricated sensors and actuators have become commonplace in recent years and have transformed the interfaces between the physical world and the Internet.

Nano electromechanical switches (NEMS), by contrast, are intended for augmenting the performance of digital systems at the core of information technology. This talk will summarize recent research in NEMS, with a focus on designs using electrostatic actuation. At Stanford, we have developed processes for fabricating lateral (in-plane) electrostatically actuated multi-terminal switches above CMOS. Given the performance characteristics of NEMS, we identified a promising system application—implementing the programmable routing in field-programmable gate arrays (FPGAs). I will review the fabrication challenges, contact phenomena, and scaling of lateral NEMS, as well as their micro-encapsulation and potential applications in sensing systems.

Roger T. Howe is the William E. Ayer Professor in Engineering at Stanford University. He received the B.S. degree in physics from Harvey Mudd College and the M.S. and Ph.D. in electrical engineering from the University of California, Berkeley in 1981 and 1984. After faculty positions at CMU and MIT from 1984-1987 and Berkeley from 1987-2005, he joined Stanford's Electrical Engineering Department. His research interests include nano/micro electromechanical system design and fabrication technologies, with applications in energy conversion and biomolecular sensing. He is the Faculty Director of the Stanford Nanofabrication Facility (SNF).

10:00 to 10:30 am: Coffee Break

10:30 am

Tailoring Light for Optically-Guided Nano- and Microassembly: From Bio-Hybrid Robots to Droplet Cages



Cornelia Denz
Westfälische Wilhelms-Univ. Münster (Germany)

With the utilization of holographic beam shaping techniques in optical tweezers, complex trapping configurations based on tailored light fields have been realized to overcome current challenges in applications in fluidic and biomedical systems. Holographically generated higher-order light modes, for example, can induce highly structured and ordered three-dimensional optical potential landscapes allowing optically-guided assembly of nanocontainers or bio-hybrid nano robots, and can be used as a tool to explore the inner cell, paving the way to optically-assisted analysis of diseases.

Tailored light fields can also be implemented to induce non-optical forces. Optoelectronic tweezers take advantage of dielectrophoretic forces to trap microstructures in an adaptive and flexible, massively parallel way. Photophoretic trapping makes use of thermal forces and by this means is perfectly suited for trapping absorbing particles in dynamic light cages or to guide droplets. Hence the combination of holographically tailored light fields with complementary dielectrophoretic and photophoretic trapping provides a holistic approach to novel optical nano- and microassembly scenarios of bio-hybrid or fluidic matter.

Cornelia Denz has pioneered linear and nonlinear optical structuring of light for light-matter interaction starting from holographic optical data storage over dynamic nonlinear microscopy up to nonlinear photonic lattices. Recently, she connected complex light-based optical tweezers with biomedical and microfluidic applications. Cornelia received her PhD in physics 1992 from Darmstadt University of Technology, Germany. She received the Lise-Meitner award for the development of components for optical neural networks in 1992, and the Adolf-Messer-Award for the creation of nonlinear dynamic phase contrast microscopy in 1999. Since 2001, she is a professor for nonlinear photonics at Münster University, Germany, leading a group of about 25. Since 2010, she is also a vice rector for international affairs and young researchers at Muenster University. In 2012, she was awarded "teacher of the year" in Natural Sciences in Germany. She has published more than 180 publications, written three books and edited many more. Cornelia is a fellow of the Optical Society of America and the European Optical Society.

MOEMS-MEMS PLENARY SESSION CONTINUED

11:15 am

Bio-Integrated and Bio-Inspired Optical Microsystems



John A. Rogers

Univ. of Illinois at Urbana-Champaign (USA)

Recent advances in materials and fabrication techniques enable construction of high performance optical microsystems that can flex, bend, fold and stretch, with ability to accommodate large ($\ll 1\%$) strain deformation, reversibly and in a purely elastic fashion. Such systems open up new engineering opportunities in bio-inspired device design and in intimate, multifunctional interfaces to biology. This talk summarizes two examples: (1) hemispherical digital imagers that incorporate essential design features found in the arthropod eye and (2) injectable, cellular-scale light emitting diodes for wireless control of complex behaviors in animal models, via the techniques of optogenetics.

Professor John A. Rogers obtained BA and BS degrees in chemistry and in physics from the University of Texas, Austin, in 1989. From MIT, he received SM degrees in physics and in chemistry in 1992 and the PhD degree in physical chemistry in 1995. From 1995 to 1997, Rogers was a Junior Fellow in the Harvard University Society of Fellows. He joined Bell Laboratories as a Member of Technical Staff in the Condensed Matter Physics Research Department in 1997, and served as Director of this department from the end of 2000 to 2002. He is currently Swanlund Chair Professor at University of Illinois at Urbana/Champaign, with a primary appointment in the Department of Materials Science and Engineering. He is also Director of the Seitz Materials Research Laboratory. Rogers' research includes fundamental and applied aspects of materials and patterning techniques for unusual electronic and photonic devices, with an emphasis on bio-integrated and bio-inspired systems. He has published more than 400 papers and is inventor on over 80 patents, more than 50 of which are licensed or in active use. Rogers is a Fellow of the IEEE, APS, MRS and AAAS, and he is a member of the National Academy of Engineering. His research has been recognized with many awards, including a MacArthur Fellowship in 2009, the Lemelson-MIT Prize in 2011 and the MRS Mid-Career Researcher Award in 2013.

PANEL DISCUSSION

Prospects and Future of Microfluidics

Monday 3 February 2014 · 5:30 to 7:00 pm

Location: Room 232 (Mezzanine)

Moderator:

Holger Becker

microfluidic ChipShop GmbH (Germany)

The commercialization of microfluidic devices and systems is rapidly progressing. However not all promising approaches have become an economic success and investor's payback often has not met initial expectations. The discussion will look upon experiences made in the product development and market introduction phase of microfluidics enabled devices and will present lessons learned from various perspectives, from device performance to commercial organization. It tries to identify trends and will present case studies from different applications.

MOEMS-MEMS Interactive Poster Session

Tuesday 4 February 2014 · 6:00 to 8:00 pm

Location: Room 103 (Exhibit Level)

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors: view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>

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MOEMS-MEMS Special Events

MOEMS-MEMS 2014 Awards

MOEMS-MEMS Best Paper Award and Best Student Paper Award

Monday 3 February · 9:00 am
Location: Room 130 (Exhibit Level)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in MOEMS-MEMS.

The winner will be announced during the plenary session.

Award Sponsor: **Samsung Advanced Institute of Technology**

Best Paper Award and Best Student Paper Award

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics (Conf. 8974)

Location: Room 234 (Mezzanine)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in this conference.

The winner will be announced during the session in which their paper will be presented, and they will also be awarded a cash prize.

Award Sponsor: **Nanoscribe GmbH**

Best Student Paper Award

Microfluidics, BioMEMS, and Medical Microsystems (Conf. 8976)

We are pleased to announce that a cash prize will be awarded to the best student paper in this conference.

Qualifying papers and presentations will be evaluated by the awards committee. The winner will be notified after the meeting.

Award Sponsors: **microfluidic ChipShop GmbH**
The Ohio Center for Microfluidic Innovation

Best Paper Award and Best Student Paper Award

MOEMS and Miniaturized Systems (Conf. 8977)

Location: Room 222 (Mezzanine)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in this conference.

The winner will be announced during the session in which their paper will be presented, and they will also be awarded a cash prize.

Award Sponsor: **Samsung Advanced Institute of Technology**

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OPTO

SPIE Photonics West

PLENARY SESSION

Tuesday 4 February · 8:30 to 10:00 am · Location: Room 134 (Exhibit Level)

Hear the latest insights from worldwide experts in the field.

8:30 am

Welcome and Opening Remarks



Symposium Chair
David L. Andrews
Univ. of East Anglia Norwich
(United Kingdom)



Symposium Chair
Alexei L. Glebov
OptiGrate Corp. (USA)

8:35 am

Announcement of the Green Photonics Awards



Stephen J. Eglash
Executive Director
Energy and Environment Affiliates Program,
Stanford Univ. (USA)

8:40 am

Pushing the Boundaries of Silicon Photonics



Michal F. Lipson
Cornell Univ. (USA)

Photonics on chip enables monolithic integration of optics and microelectronics for applications such as optical interconnects in which high data streams are required in a small footprint. I will provide an overview of recent advances and challenges in the field. As an example of silicon photonics unique capabilities, I will describe ultrahigh speed devices that enable one to change the structure's optical properties on a time scale that is shorter than the photonic time of flight, leading to novel applications such as optical isolators on a silicon chip.

Michal Lipson is a professor at the School of Electrical and Computer Engineering at Cornell University. Her research focuses on novel on-chip Nanophotonics devices. She holds numerous patents on novel micron-size photonic structures for light manipulation, and is the author of over 150 technical papers in journals in Physics and Optics. She has pioneered several of the critical building blocks for silicon photonics including the GHz silicon modulators. Professor Lipson's honors and awards include the MacArthur Fellow, OSA Fellow, IEEE Fellow, IBM Faculty Award, and NSF Early Career Award.

9:20 am

The Previously Unbelievable Performance of Ultrafast Thin Disk Lasers



Ursula Keller
ETH Zurich (Switzerland)

Average power scaling in a thin disk geometry supports more than <10 kW from Yb-doped solid-state and <100 W from vertical emitting semiconductor lasers. Both lasers can be passively mode-locked with SESAMs pushing the performance frontier into a regime previously assumed to be impossible. A Yb-YAG thin disk laser generates femtosecond pulses with more than $80 \mu\text{J}$ pulse energy without any external pulse amplification. With semiconductor thin disk lasers (also referred to as VECSELS and MIXSELS) we can obtain <1 W average power with both femtosecond and picosecond pulses and a pulse repetition rates ranging between 100 MHz to 100 GHz.

Ursula Keller joined ETH as a tenured professor in physics in 1993 and currently serves as a director of large Swiss national research program (i.e. NCCR MUST). She received the Ph.D. in Applied Physics from Stanford University in 1989 and the Physics "Diplom" from ETH in 1984. She was a Member of Technical Staff (MTS) at AT&T Bell Laboratories in New Jersey from 1989 to 1993.

WORKSHOP

The Nature of Light: What Are Photons?

Tuesday 4 February 2014 · 7:30 to 9:00 pm
 Location: InterContinental Hotel, Ballroom A

Session Chair:

Narasimha S. Prasad

NASA Langley Research Ctr. (USA)

The purpose of this workshop is to stimulate optical engineers to become more effective innovators by paying closer attention to visualize the invisible interaction processes that go on between light and matter in instruments. Specifically one should explore the physical processes behind the emergence of superposition effect as interference fringes in our detectors. The participants will be able to appreciate the universal property of all waves: the NIW-property (or, Non-Interaction of Waves). Although, neglected for centuries, waves in the linear domain do not interact (interfere) with each other to create fringes. In the real world, superposition effect becomes manifest through transformation experienced by detecting dipoles based on their (i) intrinsic quantum properties and (ii) the device time constant, after being simultaneously stimulated by multiple superposed waves. The following optical observations will help one to appreciate the significance of this workshop. In a two beam interferometer, two superposed coherent light beams help generate fringes of visibility unity when polarizations are parallel; but they give zero visibility when one of the beams is rotated to become orthogonal. Only a slow detector system can carry out Michelson's Fourier transform spectrometry; a fast detector will produce confusing heterodyne current. Thus, detectors determine the superposition effects. Light beams do not interact or interfere by themselves. These examples will be elaborated to better appreciate the physical processes behind the emergence of superposition effects in diverse optical phenomena (instruments).

This presentation will be given by Prof. Chandrasekhar (Chandra) Roychoudhuri of the Univ. of Connecticut. Chandra will explain the basic optical phenomena (interference, diffraction, polarization, spectrometry, mode locking, and basic photon counting) in view of the hitherto neglected NIW-property.

TECHNICAL EVENT

Holography

Tuesday 4 February 2014 · 7:30 to 9:00 pm
 Location: InterContinental Hotel, Ballroom B

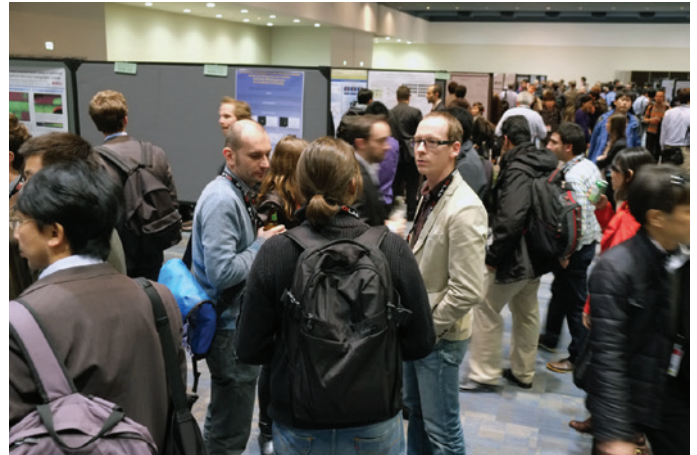
Session Chair:

Hans I. Bjelkhagen

Glyndŵr Univ. (United Kingdom) and Hansholo Consulting Ltd. (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNNT), computer-generated holography (CGH), electro and digital holography, holographic microscopy, and holographic data storage (HDS).

This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

**OPTO Interactive Poster Session**

Wednesday 5 February · 6:00 to 8:00 pm
 Location: Room 103

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors: view poster presentation guidelines and set-up instructions at <http://spie.org/PWPoster-Guidelines>.

OPTO 2014 Best Paper Awards**Best Student Paper Award Presentation**

Ultrafast Phenomena and Nanophotonics XVIII
 (Conf. 8984)

Wednesday 5 February · 3:30 to 3:40 pm
 Location: Room 270

For Conference 8984: A generous sponsorship of Femtolasers allows us to award one or two presentations with a Best Student Paper Award. All contributed papers of the conference 8984 given by a young scientist (PhD student or postdoc within the first two years after graduation) are eligible for the award. Note that this award is for contributed papers only. Invited papers and contributions to other symposia do not qualify. Join us on Wed 5 February as we award the winners.

Award Sponsor: **FEMTOLASERS, Inc.**

Industry Events

Explore the business side of Photonics West. These important sessions provide valuable information and networking opportunities needed to succeed in business.

FREE - Open to all conference attendees, exhibitors, and exhibition visitors.



PANELS

- Financing Life Sciences and Healthcare Ventures
- Accelerator Forum: What Startups Need to be Successful
- The Science of Financing Start-ups
- Silicon Photonics and Photonic Integrated Circuits
- Green Photonics: A Solar Revolution
- Executive Perspectives on the World of Optics and Photonics
- Technology-Transfer Showcase: Commercialization Opportunities
- Getting Hired in 2014 and Beyond
- Career Advancement through SPIE Involvement

PROFESSIONAL DEVELOPMENT SPEAKER SERIES

- Charting a Course in the Photonics Industry

SPECIAL EVENTS

- Cluster Reception - all leaders from regional optics and photonics clusters are welcome. Includes "Photonics Industry Update" Keynote Presentation. * Tickets required in advance.
- Startup Challenge - Watch entrepreneurs pitch their new photonics business and compete for \$10,000 cash and \$5,000 in product.
- Prism Awards - the most innovative products on the photonics market are recognized. * Tickets required in advance.
- Photonics Industry Update: Measuring the Market presentation (after the SPIE Exhibitor Breakfast)

WORKSHOPS

- ITAR and Other International Trade Regulations
- Magnifying Your IP IQ: Topics for the Savvy Optics Intellectual Property Manager
- Inbound Marketing—How to Bring Customers to You
- Commercialization of Photonics Technology
- Marketing Roundtable: Wins and Lessons Learned in Our Industry

JOB FAIR

- Meet over 40 recruiters on the exhibition floor.

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- BiOS Expo
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SATURDAY

BiOS Expo

Saturday 1 February 2014 · Noon to 5:00 pm

Location: South Hall A

The world's largest biomedical optics and biophotonics exhibition. BiOS Expo, held Saturday and Sunday, kicks off the Photonics West week. Find the latest technologies from 210 suppliers in the thriving biomedical optics and photonics sector.

Financing Life Sciences and Healthcare Ventures

Saturday 1 February 2014 · 3:30 to 5:00 pm

Location: Room 130 (Exhibit Level)

Panel Moderator:

Linda Smith
CERES TECH ADVISORS

Panel Members:

Omar Amirana, Managing Dir. of Life Sciences
ALLIED MINDS

Faz Bashi, Life Science Syndication Chair
ANGEL CAPITAL ASSOCIATION

Jeremy R. Salesin, Vice President of Acquisitions
INTELLECTUAL VENTURES

Jonathan Wyler, Principal
SV LIFE SCIENCES ADVISERS

Life Sciences and Healthcare ventures are addressing markets with an inherently interdisciplinary mix of technologies. Today, biophotonics is a key enabling technology. Life Sciences and Healthcare markets are highly regulated, have high customer acquisition costs, and are characterized by strategic cooperation among competitors. Intellectual property landscapes are complex. Whether the venture is a start-up or an established player launching a new product, access to capital is paramount to success. Join us for a panel workshop dedicated to financing life science and healthcare businesses. The panel's expertise crosses early to late stage venture capital and private equity, strategic corporate investing, licensing, venture debt, and crowd sourcing. Learn about financing and exit strategies, as well as micro and macro trends influencing competition for capital and valuations.

SUNDAY**BiOS Expo**

Sunday 2 February 2014 · 10:00 am to 5:00 pm
Location: South Hall A

The world's largest biomedical optics and biophotonics exhibition. BiOS Expo, held Saturday and Sunday, kicks off the Photonics West week. Find the latest technologies from 210 suppliers in the thriving biomedical optics and photonics sector.

**Professional Development Speaker Series:
Charting a Course in the Photonics Industry**

Sunday 2 February 2014 · 1:30 to 3:30 pm
Location: Room 130 (Exhibit Level)

Moderator:
Dirk Fabian
SPIE

This speaker series will help you explore potential career pathways in the world of photonics outside of academia. Get solid advice on how you can translate your knowledge, abilities, and interests into meaningful work. Whether you work for an existing company, or start your own, getting a clear picture of the options from experienced leaders will help you better manage your career trajectory. The series will conclude with a question-and-answer session (with all speakers) and a light refreshment reception.

Speakers:
James Fisher, VP, Optical Components and
Vibration Control Group
NEWPORT

How to shape yourself for a future in photonics.

Simon Poole, Director New Business Ventures
FINISAR AUSTRALIA

**Confessions of a Serial Entrepreneur:
30 years of photonic start-ups in academia and industry**

Andrea Belz, CEO
BELZ CONSULTING

**How do you create and validate technology-based
business opportunities?**

MONDAY**Accelerator Forum:
What Startups Need to be Successful**

Monday 3 February 2014 · 2:30 to 4:00 pm
Location: Room 130 (Exhibit Level)

Moderator:
Andrea Belz
BELZ CONSULTING

“Who is the right lawyer to help me officially form my start-up and create an equity pool to incentivize new employees?” “Which accountant can guide me through the early days of financial reports, cash management and tax issues?” “Is there an IP attorney who understands my unique financial constraints as a start-up?” “Should I hire someone to guide my company’s strategy or marketing efforts?” This select panel of entrepreneurs and service providers will share their advice about critical business management aspects of launching a tech-startup.

Introduction:
Arun Chhabra
CO-FOUNDER AT 8TREE

Panel Members:
CPA / MBA
James Schaefer
MARK SCHAEFER ASSOCIATES

IP Law
Liz Nevis
INTERMOLECULAR, INC.

General Law
Ken Itrato
FABER GROUP

Strategy
Ellen McGuirk
MASTERPLAN CONSULTING

The Science of Financing Start-ups

Monday 3 February 2014 · 4:00 to 5:00 pm
Location: Room 130 (Exhibit Level)

Presenter:
John Dexheimer
LIGHTWAVE ADVISORS

Learn key lessons from one of the industry’s most experienced business advisors. INTENDED AUDIENCE: This presentation is for anyone interested in business creation/alliances funding for photonic technologies. There will be case study summaries of 33 photonics startups, the state of VC and Angel funding and trends, and themes for companies like “lean launch”. Many interesting messages and lessons will be discussed.

**Cluster Reception and “Photonics Industry
Update” Presentation**

Monday 3 February 2014 · 5:00 to 6:30 pm
Location: InterContinental Hotel, Ballroom A

Keynote Presentation:
Stephen G. Anderson
Industry and Market Strategist
SPIE

All leaders from regional optics and photonics clusters are invited to join this SPIE-hosted reception. Connect with your peers while enjoying drinks and appetizers, compare notes, and hear an update from Stephen Anderson on the “Photonics Industry Update” in the US and worldwide. Dress is business attire. Please RSVP: email Pamela (pamelar@spie.org).

TUESDAY

Photonics West Exhibition

Tuesday 4 February 2014 · 10:00 am to 5:00 pm
Location: South Hall ABC and North Hall D

Photonics West is the premier photonics and laser event. With more than 1,225 companies, this exhibition continues to be the flagship event to find the latest products, tools, and applications for your research and business needs.

ITAR and Other International Trade Regulations: Strategies for Navigating U.S. Export Controls and International Trade Issues for the Optics and Photonics Industry

Tuesday 4 February 2014 · 10:30 am to 12:30 pm
Location: Room 101 (Exhibit Level)

Instructor:
Kerry Scarlott
GOULSTON & STORRS

If your company's sales activities, products or services come into contact with foreign jurisdictions, this is a must-attend program. The stakes have never been higher. Anyone who wants to answer questions such as, "How do U.S. export controls apply to me?" or "What are the legal pitfalls of doing business internationally?" or "What are best practices for engaging in global trade?" will benefit from attending this workshop. INTENDED AUDIENCE: Owners, executives, product managers who wish to learn how to grow business while effectively and efficiently navigating U.S. international trade laws and regulations.

Magnifying Your IP IQ: Topics for the Savvy Optics Intellectual Property Manager

Tuesday 4 February 2014 · 1:00 to 5:00 pm
Location: Room 101 (Exhibit Level)

Instructor:
Mark Gallagher
KNOBBE MARTENS

This course covers key topics for those with responsibilities for overseeing an intellectual property portfolio. The topics include the key provisions of non-disclosure and licensing agreements, what to know when dealing with venture capitalists and other prospective investors, methods of accelerating the passage of applications through the U.S. Patent and Trademark Office, selection and protection of trademarks, and how to prepare for offensive or defensive patent litigation. INTENDED AUDIENCE: Any individual whose responsibilities include oversight and protection of their company's intellectual property. Basic familiarity with intellectual property management issues is assumed.

Silicon Photonics and Photonic Integrated Circuits: An Industry Perspective

Tuesday 4 February 2014 · 2:00 to 3:00 pm
Location: Room 130 (Exhibit Level)

Panel Moderator:
Peter Hallett
Director of Marketing and Industry Relations
SPIE

Panel Members:
Radha Nagarajan, Dir. of Engineering in the Photonics, Integrated Circuits Group, Infinera Fellow
INFINERA

Mario J. Paniccia, Intel Fellow, GM Silicon Photonics Operation
INTEL

Vladimir Kozlov, Founder and Chief Analyst
LIGHTCOUNTING

Peter De Dobbelaere, VP of Engineering
LUXTERA

Ashok Krishnamoorthy, Architect & Chief Technologist, Photonics
ORACLE

Demand for smaller and cheaper optical interconnections inside networks and computers will create a new market of miniaturized, low-cost photonic components that can leverage the scale of CMOS manufacturing. Learn what industry leaders have developed at the frontier of the silicon photonics market. INTENDED AUDIENCE: Technology and business development professionals who would like to gain insight to the new markets enabled by silicon photonics and PICs.

Green Photonics: a Solar Revolution

Tuesday 4 February 2014 · 3:30 to 4:30 pm
Location: Room 130 (Exhibit Level)

Panel Moderator:
Stephen J. Eglash, Executive Director
ENERGY AND ENVIRONMENT AFFILIATES PROGRAM,
STANFORD UNIV.

Panel Members:
Homer Antoniadis, Global Technology Director
DUPONT PHOTOVOLTAIC SOLUTIONS

Raffi Garabedian, Chief Technology Officer
FIRST SOLAR, INC.

Martin Green, Scientia Professor, University of New South Wales
AUSTRALIAN CENTRE FOR ADVANCED PHOTOVOLTAICS

The solar industry is stronger than ever. Really. It turns out the solar industry never died, despite the Cassandra warnings of the popular press. Companies up and down the photovoltaic food chain have figured out how to make money, and disruptive innovations promise a new generation of technologies. Even venture capitalists, those most conservative and risk-averse animals, are coming back to solar. Our panelists will examine in detail all of these claims. How companies like DuPont with superior products and proprietary technology are making money selling those products to module manufacturers worldwide. How companies like First Solar with the right combination of module efficiency and cost are continuing to get business in a challenging market. And how leading researchers are developing technologies that will lead to even higher efficiencies, lower manufacturing costs, and lower installation and balance of system costs.



8 FINALISTS, 3 MINUTES
\$10,000

WEDNESDAY

3:30 TO 6PM



CONVENTION CTR.

ROOM 130

EIGHT PRE-REVENUE PHOTONICS ENTREPRENEURS HAVE 3 MINUTES
TO PITCH THEIR BUSINESS IDEAS AND A CHANCE TO WIN
\$10,000 CASH AND \$5,000 WORTH OF EQUIPMENT

WWW.SPIE.ORG/STARTUP

SPONSORS



LEAD SPONSOR



WEDNESDAY

Photonics West Exhibition

Wednesday 5 February 2014 · 10:00 am to 5:00 pm
Location: South Hall ABC and North Hall D

Photonics West is the premier photonics and laser event. With more than 1,225 companies, this exhibition continues to be the flagship event to find the latest products, tools, and applications for your research and business needs.

Inbound Marketing— How to Bring Customers to You

Wednesday 5 February 2014 · 10:30 am to 11:30 am
Location: Room 101 (Exhibit Level)

Instructor:
Michele Nichols
PLS LAUNCH SOLUTIONS

Your customer is changing, and your strategy must, too. You may have heard a lot of talk about inbound marketing, but how does it translate to our industry? Engineers, scientists and program managers want to come to their own conclusion, and do their own research before they engage with you. Learn from others in the industry about what works in attracting and engaging with the new customer. **INTENDED AUDIENCE:** CEOs, VP of Marketing or Sales, product managers, marketing staff, and others in “customer development” with responsibility for ensuring a healthy pipeline.

Commercialization of Photonics Technology

Wednesday 5 February 2014 · 1:00 to 2:00 pm
Location: Room 101 (Exhibit Level)

Instructor:
David Krohn
LIGHT WAVE VENTURE

The course outlines a proven approach to move advanced technology into successful commercial products. The elements of commercialization will be defined including: Identification of market opportunities and potential; competitive environment related to both technology and companies; manufacturing encompassing discussion of source, quality, cost, cost reduction, and standards; barriers to entry; value proposition including product differentiation; strategy and funding.

INTENDED AUDIENCE: The course is intended for anyone who is involved with technology development, as well as business development opportunities in the photonics area.

Executive Perspectives on the World of Optics and Photonics

Wednesday 5 February 2014 · 1:30 to 2:30 pm
Location: Room 130 (Exhibit Level)

Panel Moderator:
Stephen G. Anderson, Industry and Market Strategist
SPIE

Panel Members:
Tim Day, CEO
DAYLIGHT SOLUTIONS

David Nislick, CEO
EXCELITAS

Jerry Jurkiewicz, President,
Optics & Photonics
IDEX

Dirk Rothweiler, Executive VP,
Optical Systems
JENOPTIK

Dennis Werth, Senior VP,
Photonics Group
NEWPORT

Rick Plympton, CEO
OPTIMAX

Christof Lehner,
General Manager, North America
TRUMPF

Top executives, representing different aspects of the marketplace, will share their insight and hard-fought lessons regarding trends and opportunities in optics and photonics. Weathering the last few years has required extraordinary skills and experience to successfully reset goals and allocate resources. Listening to and questioning these executives will help you understand the current environment better and set priorities for your business.

Marketing Roundtable: Wins and Lessons Learned in Our Industry. An Open Discussion

Wednesday 5 February 2014 · 3:30 to 4:30 pm
Location: Room 101 (Exhibit Level)

Instructor:
Michele Nichols
PLS LAUNCH SOLUTIONS

Looking to improve the ROI on your marketing and sales? Compare notes with your peers in this open discussion. Speaker Michele Nichols will share successes and lessons learned across many of the optics and photonics companies she works with, and will facilitate this roundtable session.

INTENDED AUDIENCE: CEOs, VP of Sales, marketing staff, and others with responsibility for ensuring a healthy pipeline.

THURSDAY

Startup Challenge

Wednesday 5 February 2014 · 3:30 to 6:00 pm
Location: Room 130 (Exhibit Level)

See and hear pitches for the “best of the best” new photonics businesses. This pitch competition is a lively, interactive event showcasing the power of entrepreneurs to move photonics technology to the global marketplace. New entrepreneurs in photonics will have just 3 minutes each to pitch their business to a team of expert judges.

The top pitch presenter will go home with \$10,000 cash and \$5,000 worth of equipment! Join fellow business development, investment, and product managers to scout new talent and see what the future of entrepreneurship in photonics looks like. The event will conclude with a networking reception from 5:00 to 6:00 pm where you can meet the presenters and investors involved in photonics entrepreneurship. See the Startup Challenge webpage for more details on presenters, logistics, prizes, and sponsors: www.spie.org/startup

Judges:

Jason Eichenholz, OpenPhotonics
Bruce Itchkawitz, Knobbe Martens
Jay Kumler, JENOPTIK
Sam Sadoulet, Edmund Optics
Adam Wax, Duke University

Founding Sponsor: **JENOPTIK**

Sponsors: **TRUMPF Inc., Edmund Optics, Open Photonics Inc., Knobbe Martens**

Prism Awards Ceremony and Banquet

Wednesday 5 February 2014 · 6:00 to 10:00 pm
Location: Marriott Marquis Hotel, Yerba Buena Ballroom
Seating Limited. Ticket Required in Advance.

Join this gala event in which SPIE and Photonics Media recognize the most innovative new photonic products on the market. Network with industry leaders at this VIP event. The evening begins with a reception, followed by an elegant dinner and award ceremony. Please bring tickets to the door. Dress is business and formal attire. Go to the SPIE Cashier onsite for ticket information. For more information, go to the Prism Awards: www.prismawards.org

Presented by: **SPIE**
Photonics Media



“It’s amazing to work in the field of optics. It’s amazing to have an idea at a university and to see it installed at a BP refinery and to make one place in the world a little bit safer.”

–Allison Lami Sawyer, Rebellion Photonics CEO
2013 Wall Street Journal Startup of the Year
2013 Prism Award Presenter
2012 Prism Finalist

Photonics Industry Update: Measuring the Market Keynote Presentation

Thursday 6 February 2014 · 9:15 to 9:45 am
Location: Room 134 (Exhibit Level)

Keynote Presentation:

Stephen G. Anderson
Industry and Market Strategist
SPIE

Photonics West Exhibition

Thursday 6 February 2014 · 10:00 am to 5:00 pm
Location: South Hall ABC and North Hall D

Photonics West is the premier photonics and laser event. With more than 1,225 companies, this exhibition continues to be the flagship event to find the latest products, tools, and applications for your research and business needs.

Technology-Transfer Showcase: Commercialization Opportunities

Thursday 6 February 2014 · 10:30 am to 1:00 pm
Location: North Hall D, Exhibition Demo Area

Panel Moderator:

David Wick
Licensing Executive,
SANDIA NATIONAL LABS

Billions invested in research have created a deep reservoir of ideas, inventions, and intellectual property. Which concepts are exciting enough to attract significant, recurring investment necessary to launch a product and win customers? In this session you will hear the “best of the best” from top universities and laboratories that are actively seeking commercialization partners. If you are looking for new opportunities for growth, potential new products, new markets, and new technology to disrupt current markets, don’t miss this event.

Speakers:

Bethany Acampora, Technology Commercialization Officer
CLEMSON UNIVERSITY

David Wick, Licensing Executive
SANDIA NATIONAL LABS

Robert Bernath, Business Development Mgr,
Office of Technology Transfer
UNIV. OF CENTRAL FLORIDA, CREOL

Amy Phillips, Senior Licensing Manager
UNIV. OF ARIZONA

Matthew R Martin, Assistant Director
UNIV. OF CHICAGO

Patrick Emmerling, Licensing Manager in UR Ventures
UNIV. OF ROCHESTER



PRISM AWARDS

Winners Announced
at Photonics West

Award Ceremony

Wednesday 5 February
6:00 pm
Formal or business attire

For ticket information,
go to the SPIE Cashier

“If Google was a country it would be the fifth largest country in terms of energy consumption. But today, using photonics, we made our data storage centers 50% more energy efficient. That’s what drew me to photonics—the idea that things are so tiny but can do so much.”

—Bikash Koley
Google, Principal Architect and Manager,
Network Architecture
2013 Prism Award Presenter

Congratulations to the 2014 finalists.

Category of Advanced Manufacturing

Haas Laser
Technologies
Innolite
Nanoscribe

Category of Defense and Security

HÜBNER
InfraSign
Ocean Optics

Category of Detectors, Sensing, Imaging, and Cameras

BaySpec
Stanford Computer
Optics
Tornado Spectral
Systems

Category of Industrial Lasers

DILAS
PolarOnyx Laser
V-Gen

Category of Life Sciences and Biophotonics

AccuVein
Holomic
Optofluidics

Category of Optics and Optical Components

Arrayed Fiberoptics
Corporation
Compass-EOS
Si-Ware Systems

Category of Other Light Sources

CoolLED
Necsel
QD Laser

Category of Scientific Lasers

Amplitude
Technologies
HÜBNER
Lockheed Martin

Category of Test, Measurement, Metrology

Pie Photonics
Si-Ware Systems
Zygo

Professional Development

Spend some time focusing on your career development while you're at Photonics West. Workshops and presentations will help you hone valuable job skills.

Some events open to all attendees; some require registration and payment. See individual event descriptions for details.

Professional Development Seminar Series

Charting a Course in the Photonics Industry

Sunday 2 February 2014 · 1:30 to 3:30 pm

Location: Room 130

This seminar series will present perspectives on the optics and photonics industry of interest to students and Early Career Professionals. The event will conclude with a panel discussion.

Speakers:

James Fisher

Newport Corp.

How to shape yourself for a future in Photonics

Simon Poole

Finisar Australia

Confessions of a Serial Entrepreneur:

30 years of photonic start-ups in academia and industry

Andrea Belz

Belz Consulting LLC

How do you create and validate a technology-based business opportunity?

Job Fair

Tuesday 4 February 2014 · 10:00 am to 5:00 pm

Wednesday 5 February 2014 · 10:00 am to 5:00 pm

Location: South Hall C (2700 Aisle)

Whether you're looking for a better job, re-entering the workforce or just starting out, plan to visit the Job Fair at Photonics West - come prepared to discuss your skills and talents with industry leaders.

All SPIE services are free to individuals seeking employment. Post your resume today! Visit the Career Center: www.SPIECareerCenter.org

More information: www.spie.org/PWJobFair

PANEL DISCUSSION

Getting Hired in 2014 and Beyond

Tuesday 4 February 2014 · 3:30 to 4:30 pm

Location: North Hall D, Exhibition Demo Area

Join us for a panel discussion on careers in optics and photonics outside the academic world. Learn about getting hired at tech-based companies and non-academic jobs directly from human resource professionals in the optics and photonics sector.

Career Advancement through SPIE Involvement

Wednesday 5 February 2014 · 10:30 to 11:15 am

Location: South Hall A, Exhibition Demo Area

Get plugged in to the SPIE community! SPIE has volunteer opportunities at all levels of the organization. Come to this informal session to learn what opportunities best match your interests and career plans.

Workshops

Registration required for the workshops below. These workshops are free to SPIE Student Members, but you must register to attend—see SPIE Cashier.



Research Proposals: Improving Your Odds for Success

NEW

WS1124 · Course Level: Introductory
CEU: 0.35 \$150 Members | \$200 Non-Members USD
Sunday 8:30 am to 12:30 pm

This course discusses how you can improve the writing of your research proposals. First, the course looks at the overall approach to writing a research proposal: analysis of audience, purpose, and occasion; and the decision on whether to go or not go. Second, the course analyzes the organization of research proposals. Finally, the course looks at winning strategies.

Michael Alley holds a master of science in electrical engineering and a master of fine arts in writing, and is an associate professor of engineering communication at Penn State. He is the author of three textbooks, including *The Craft of Scientific Writing*, 3rd ed. (Springer, 1996). Over the past twenty years, he has taught technical writing to scientists and engineers across the United States and in Europe, Asia, and South America. He has also contributed to the writing of several winning proposals of more than \$500,000. Alley's website on writing is the first Google.com listing for the topic of engineering writing.

This workshop is **free** to SPIE Student Members. **You must register to attend.**

Resumes to Interviews: Strategies for a Successful Job Search

WS1059 · Course Level: Introductory
CEU: 0.25 \$125 Members | \$175 Non-Members USD
Tuesday 8:30 am to 12:30 pm

This course reviews effective strategies and techniques for a successful job search such as: compiling resumes, writing cover letters, and interviewing tips. The primary goal of the course is to provide creative and proven techniques for new college graduates and professionals to plan and conduct their job search and secure a job.

Creative and comprehensive job search techniques will be discussed as well as actual resume and interviewing examples and tips. Anyone who is getting ready to enter the work force who wants to answer questions such as, "when and how do I start my job search?", "what kind of cover letter and resume gets noticed?" or "how do I sell myself in an interview?" will benefit from taking this course.

Instructor: **Paige Lawson** has been in professional recruiting for more than 20 years. She has extensive experience with both in-house corporate environments as well as outside agency/consulting environments. Paige is currently the Executive Recruiter for Exotic Electro Optics in Murrieta, CA, and a member of the local networking group Professionals in Human Resources (PHIRA).

Suzanne Krinsky has been in human resources and corporate recruiting for more than 15 years. She has extensive experience with both in-house corporate environments as well as outside agency/consulting environments. Suzanne is currently the Human Resource Director for Daylight Solutions in San Diego, and also a long-time Board member for the Biotech Human Resource Development Coalition (BEDC) and Human Resource Roundtable member.

This workshop is **free** to SPIE Student Members. **You must register to attend.**

The Craft of Scientific Presentations: A Workshop on Technical Presentations

WS667 · Course Level: Introductory
CEU: 0.35 \$150 Members | \$200 Non-Members USD
Monday 8:30 am to 12:30 pm

This course provides attendees with an overview of what distinguishes the best scientific presentations. The course introduces a new design for presentation slides that is both more memorable and persuasive from what is typically shown at conferences.

Michael Alley teaches writing and speaking to engineering students at Penn State. Alley has taught this workshop to researchers at the Army Research Laboratory, Lawrence Livermore National Laboratory, United Technologies, the University of Illinois, the University of Oslo, and Virginia Tech.

COURSE PRICE INCLUDES the text *The Craft of Scientific Presentations* (Springer, 2003) by Michael Alley.

This workshop is **free** to SPIE Student Members. **You must register to attend.**

The Craft of Scientific Writing: A Workshop on Technical Writing

WS668 · Course Level: Introductory
CEU: 0.35 \$75 Members | \$125 Non-Members USD
Monday 1:30 pm to 5:30 pm

This course provides an overview on writing a scientific paper. The course focuses on the structure, language, and illustration of scientific papers.

Michael Alley teaches writing and speaking to engineering students at Penn State. Alley has taught this workshop to researchers at the Army Research Laboratory, Lawrence Livermore National Laboratory, United Technologies, the University of Illinois, the University of Oslo, and Virginia Tech.

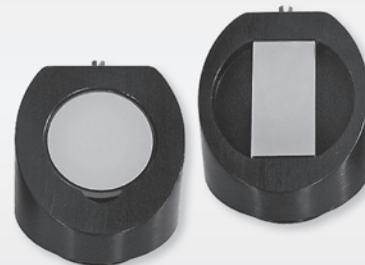
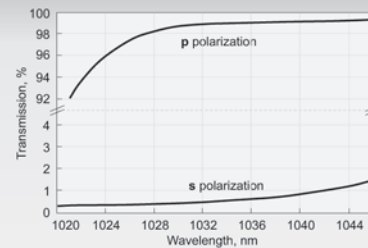
COURSE PRICE INCLUDES the text *The Craft of Scientific Writing* (Springer, 2003) by Michael Alley.

This workshop is **free** to SPIE Student Members. **You must register to attend.**

EKSMA
OPTICS

High Transmission Thin Film Laser Polarizers

$T_p > 99.5\%$
 $R_s > 99.5\%$



Check this
product
online



Contacts:

EKSMA
OPTICS

Europe & Asia
EKSMA OPTICS
c/o Optolita UAB
Lithuania

ALLOS
PHOTONICS

North America
Altos Photonics Inc.
USA

Network

Networking Receptions · Student Social Events · SPIE Member Events

Some events open to all attendees; some require tickets or invitations. See individual event descriptions for details.

Join your colleagues and develop new relationships at these relaxed networking events.



Lunch with the Experts

A BIOS STUDENT NETWORKING EVENT

Sunday 2 February 2014 · 12:30 to 1:30 pm

Location: Room 131

Open to BIOS Student Attendees

Enjoy a casual meal with colleagues at this engaging networking opportunity, hosted by SPIE Student Services. This event features experts willing to share their experience and wisdom on career paths in biomedical optics and an award presentation for SPIE scholarships. Seating is limited and will be granted on a first-come, first-served basis.

Student Chapter Meeting

Sunday 2 February 2014 · 6:00 to 9:00 pm

Location: InterContinental Hotel, Ballroom C

Open to All Student Chapter Members

Get the latest news on the Student Chapter program direct from SPIE Student Services. Join us for dinner, professional development and networking with chapter members from around the world. Please email students@spie.org for more information and to sign up for this event.

SPIE Fellows Luncheon

Monday 3 February 2014 · 12:00 to 1:30 pm

Location: InterContinental Hotel, Ballroom A-C

All Fellows of SPIE are invited to join your colleagues for an SPIE-hosted lunch. The new SPIE Fellows attending Photonics West will be introduced and recognized. Please join us for this informal gathering and a chance to interact with other Fellows. Fellows planning to attend are asked to RSVP to Brent Johnson (brentj@spie.org).



FELLOWS LUNCHEON PRESENTATION:

Update on Silicon Photonics for High-Efficiency Computing

Dr. Ashok Krishnamoorthy
Chief Technologist - Photonics, Oracle

Women in Optics Panel and Reception

Monday 3 February 2014 · 5:00 to 6:30 pm

Location: InterContinental Hotel, Ballroom B

Open to all conference attendees.

Light refreshments will be served.

Transitions: Graduating from Academia to Industry

Moderator: **Sonia Garcia-Blanco**, University of Twente, Netherlands

Panelists: **Christina C. C. Willis**, Vision Engineering Solutions, LLC; **Michelle Xu**, Intel Corp.; **Diana Warren**, Newport Corp.; **Anna-Britt Mahler**, Aerospace Corp.; **Jessica DeGroot Nelson**, Optimax Systems, Inc.; **Garam Young**, Synopsys, Inc.

Join us for this panel discussion featuring recent graduates now working in industry. They will share their experiences of this transition and take questions from the audience. A networking reception will follow.



Photonics West Welcome Reception

Monday 3 February 2014 · 7:00 to 8:30 pm

Location: Marriott Marquis Hotel, Yerba Buena Ballroom

A Night at the Movies

Come and celebrate the technologies that drive innovations throughout the entertainment world. All attendees are invited to relax, socialize, and enjoy refreshments. Please remember to wear your conference badge. Dress is casual.

Social and Networking Events

SPIE Senior Member Breakfast

Tuesday 4 February 2014 · 8:00 to 9:00 am
Location: InterContinental Hotel, Ballroom C

All SPIE Senior Members are invited to join your colleagues for this SPIE-hosted buffet breakfast. Please join us for this informal gathering and a chance to interact with other Senior Members. Please plan to wear your yellow Senior Member ribbon for entry into this event.

Lunch with the Experts

A STUDENT NETWORKING EVENT

Tuesday 4 February 2014 · 12:30 to 1:30 pm
Location: InterContinental Hotel, Ballroom A/B

Open to Student Attendees

Enjoy a casual meal with colleagues at this engaging networking opportunity. This event features experts willing to share their experience and wisdom on career paths in optics and photonics. Seating is limited and will be granted on a first-come, first-served basis.

Sponsored by: **Newport Corporation**

Newport Research Excellence Travel Awards

The Newport Research Excellence Travel Awards Program provides financial support for university students to attend the two largest SPIE meetings in order to present their research. These travel grants are open to any student who has an accepted paper for presentation at Photonics West or Optics + Photonics. Recipients will be selected based on both the quality of the original research described in the submitted paper(s) and financial need.

For application information for this and other SPIE travel grants visit Scholarships and Grants online at spie.org/scholarships

Student Chapter Info Session

Tuesday 4 February 2014 · 1:45 to 2:30 pm
Location: InterContinental Hotel, Russian Hill

Open to All Attendees

Interested in starting a Student Chapter or just want to learn more about the program and its benefits? Get your questions answered at this informal information session hosted by SPIE Student Services.

Speed Networking Social

Tuesday 4 February 2014 · 4:30 to 6:00 pm
Open to All Attendees

Thirsty Bear Brewing Co.
661 Howard Street

Join us for the next generation of networking. Add a new contact to your network every three minutes while enjoying appetizers at an off-site venue. Bring plenty of business cards, practice your pitch, and prepare to expand your network.



SPIE Member Reception

Tuesday 4 February 2014 · 8:00 to 9:30 pm
For SPIE Members Only

ROE Restaurant
651 Howard Street

SPIE Members are invited to the ROE Restaurant for an after dinner reception in their honor. Come relax and talk with your colleagues while enjoying dessert and coffee. Please note: this reception is limited to SPIE Members only. Membership cards or invitations will be requested at the entrance. If you join SPIE on-site, please bring your registration receipt. Dress is casual or business attire.

Prism Awards Ceremony and Banquet

Wednesday 5 February 2014 · 6:00 to 10:00 pm
Seating Limited. Ticket Required in Advance.

Join this gala event in which SPIE and Photonics Media recognize the most innovative new photonic products on the market. Network with industry leaders at this VIP event. The evening begins with a reception, followed by an elegant dinner and award ceremony. Please bring tickets to the door. Dress is business and formal attire. Go to the SPIE Cashier onsite for ticket information.

Award Sponsors: **SPIE**
Photonics Media

“No Ties” Student Social

Wednesday 5 February 2014 · 8:00 to 10:00 pm
Student Conference Attendees Only.

Jillian’s Billiards Club
175 4th Street

Relax and hang out with new friends and peers while enjoying the atmosphere of a great off-site venue. No ties required but please bring photo ID.



See maps pp. 2–4.

SPIE Photonics West

JOB FAIR

Positions available for engineers, scientists, researchers,
and technical sales professionals

Sponsored by SPIE Career Center

Meet. Discuss. Impress.

Visit us in the South Exhibition Hall

Free Admission

Part of SPIE Photonics West Exhibition and Conference.
Exhibition registration required for entrance.

Tuesday 4 February, 10:00 am to 5:00 pm

Wednesday 5 February, 10:00 am to 5:00 pm

Moscone Center
San Francisco, California, USA

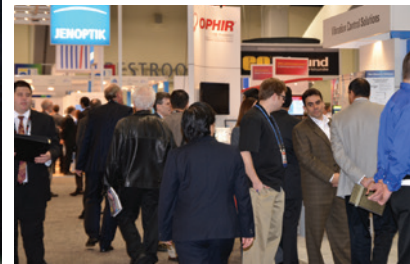
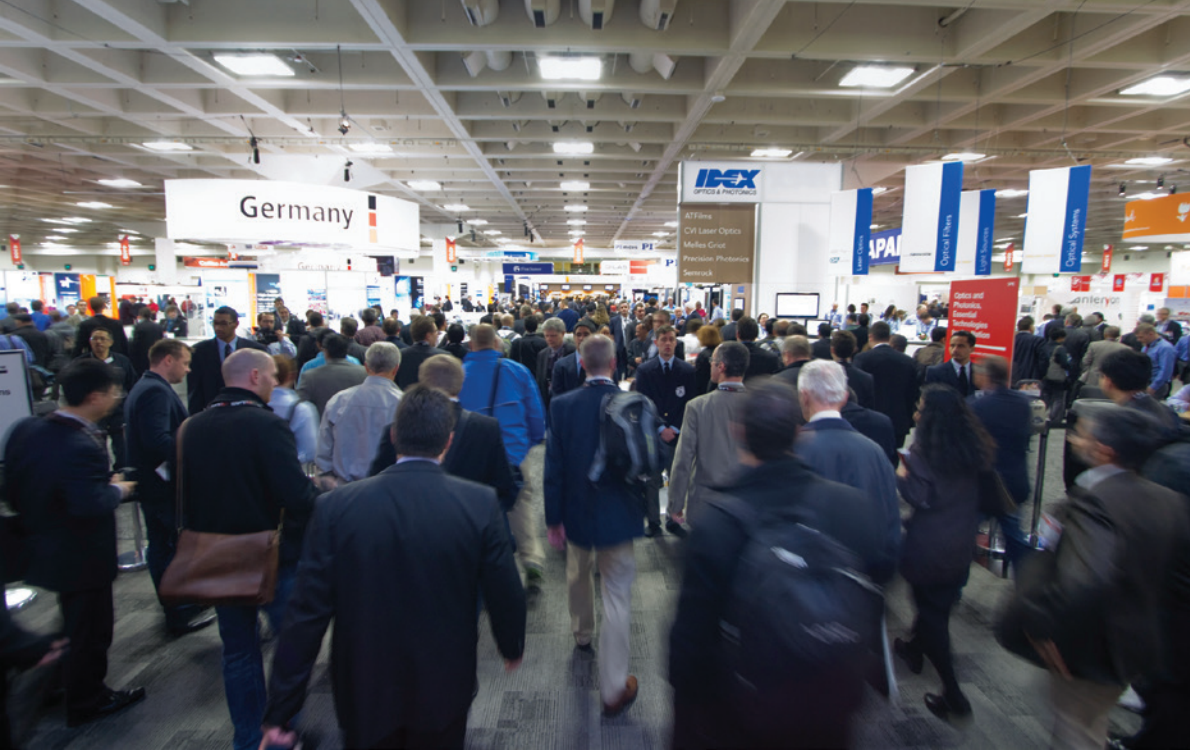
Visit the **SPIE Career Center booth #917**
for more information.

Participating companies:



Be Found. Get Hired. It's Free.

Post your resume today!
www.SPIECareerCenter.org



Discover new possibilities at two free world-class exhibitions

BiOS Expo

Saturday 1 February · Noon to 5:00 pm
 Sunday 2 February · 10:00 am to 5:00 pm

210 suppliers

The world's largest biomedical optics and biophotonics exhibition. BiOS Expo, held Saturday and Sunday, kicks off the Photonics West week. Find the latest technologies from 210 suppliers in biomedical optics and photonics.

Technologies you will see:

- Biomedical optics components, systems, instrumentation, and applications
- Ultrafast lasers
- Molecular imaging
- Therapeutic lasers
- Nano/biophotonics
- Biosensors
- Spectroscopic/microscopic imaging

Photonics West

Tuesday 4 February · 10:00 am to 5:00 pm
 Wednesday 5 February · 10:00 am to 5:00 pm
 Thursday 6 February · 10:00 am to 4:00 pm

1,225 suppliers

Photonics West is the premier photonics and laser event. With more than 1,225 companies, this exhibition is the best place to find the latest products, tools, and devices.


Technologies you will see:

- Lasers
- Laser accessories
- Laser systems
- Cameras and CCD components
- Fiber optic components, equipment, systems
- Optical components
- Optical communication
- Optical detectors
- Other light sources
- High-speed imaging and sensing
- Optical materials and substrates
- IR sources and detectors
- Electronic imaging components
- Optical coatings
- Lenses and filters
- Positions and mounts
- Metrology equipment

Product Demonstrations

Product Demonstrations are open to all attendees. Exhibiting companies will be showcasing products in half-hour demonstrations.

**Don't miss these
FREE Demonstrations**

	Saturday 1 February	Sunday 2 February
TIME	South Hall A	South Hall A
11:30 am		SCHOTT Eye-safe Laser Glass for Medical Applications Simi George, SCHOTT North America
12:30 pm	BeamWise - Automating the Design of Biophotonic Systems Giacomo Vacca, Kinetic River Corp.	
1:30 pm	Multispectral Sensing Innovations & Applications Dave Fish, Pixelteq, Inc.	New SWIR camera: high resolution, high performance, small, and versatile Luc DeBrouckere, Xenics NV
2:30 pm	SCHOTT Ultra-thin glass for Electronics & Biotech applications Dr. Ulrich Peukert, SCHOTT North America	

Tuesday 4 February		
TIME	Demo Area 1 South Hall A	Demo Area 2 North Hall D
10:30 am	High Power Pump laser for Fiber Laser Application Tom Yang, BWT Beijing Ltd.	Announcing Zemax OpticStudio 14 Optical and Illumination Design Software Mark Nicholson, Radiant Zemax
11:30 am	Advances in High-Volume Optical Filter Manufacturing Neil Anderson, Semrock	FPSensor – An Ultra-compact, Non-invasive, Fiber Based Interferometric Displacement sensor System from Attocube Florian Ponnath, attocube systems Inc.
12:30 pm	Implementation of Advanced Spectroscopy in Performance Validation Mark Ziter, Omega Optical Filters	2 Micron Mode-Locked Fiber Laser Shibin Jiang, AdValue Photonics, Inc.
1:30 pm	Optical and Interference Filters for All Spectral Applications Ralf Jedamzik, Schott AG	State-of-the-Art High Power Fiber Isolator at 1 Micron Shibin Jiang, AdValue Photonics Inc.
2:30 pm	SCHOTT Eye-safe Laser Glass Marc Clement, Schott AG	
3:30 pm	PANEL DISCUSSION Get	Multispectral Imaging Innovations & Applications Dave Fish, Pixelteq
4:30 pm	Near Infrared Spectrometer Using DLP(R) Technology Dylan Thomas, Texas Instruments Incorporated	Adapting CMOS Technology for Low Light Imaging Margaret Cooley, PHOTONIS USA

Wednesday 5 February		
TIME	Demo Area 1 South Hall A	Demo Area 2 North Hall D
10:30 am	The new Optical Glass Catalog: from tightest tolerances to highest homogeneity Ralf Jedmzik, Schott AG	Career Advancement with SPIE Involvement Dirk Fabian, SPIE
11:30 am	Linear Variable Filters for Color and Hyperspectral Imaging Applications Oliver Pust, DELTA Optical Thin Film	Novel Ultrafast Lasers Boost Quality of Imaging Applications Andreas Stingl, FEMTOLASERS
12:30 pm	New High Efficiency Transmission Grating Based Spectrometers for UV-VIS-NIR and Raman Spectroscopy Dr. Thomas P. Rasmussen, Ibsen Photonics	Modern Technologies in Motion Control Michail Berba, Standa
1:30 pm	Advances in Molded Optics, Plastics, and Glass John Rauseo, Nalux Co. Ltd	Introduction of the Industry's Broadest Tunable Quantum Cascade Lasers Dr. Erik Deutsch, Block Engineering
2:30 pm	Real-time Coating Thickness Measurements with Portable Terahertz Systems Albert Redo-Sanchez, Zomega Terahertz Corporation	Liquid Lens Auto Focus Solutions Oliver Jacques-Sermet, Varioptic – A BU of Parrot SA
3:30 pm	L³ LIMO Line Laser – The Allrounder for Homogeneous Process Results Maja Thies, LIMO GmbH	Fast Infrared Imaging! See it in action! Vincent Farley, Telops
4:30 pm	New Fujikura 70S Fusion Splicer Doug Duke, AFL	Spatiotemporal Modeling of Femtosecond Pulses with VirtualLab™ Dr. Michael Kuhn, LightTrans VirtualLab UG

Thursday 6 February		
10:30 am	Next Generation Multi-spectral Materials Marc Clement, Schott AG	Technology-Transfer Showcase: Commercialization Opportunities <i>Speakers:</i> CLEMSON UNIVERSITY, Bethany Acampora , Technology Commercialization Officer SANDIA NATIONAL LABS, David Wick , Licensing Executive UNIV. OF CENTRAL FLORIDA, CREOL, Robert Bernath , Business Development Mgr, Office of Technology Transfer UNIVERSITY OF ARIZONA, Amy Phillips , Senior Licensing Manager UNIVERSITY OF CHICAGO, Matthew R Martin , Assistant Director UNIVERSITY OF ROCHESTER, Patrick Emmerling , Licensing Manager in UR Ventures
11:30 am	Femtosecond Fiber Engine for Efficient THz Generation Jason Reeves, PhD, Menlo Systems	
1:30 pm	New SWIR Camera: High Resolution, High Performance, Small, and Versatile Luc DeBrouckere, Xenics	
2:30 pm		
		Engineered Filter Glass Solutions: Custom Molded Shapes and Tailored Glass Formulations Adam Willsey, Kopp Glass, Inc

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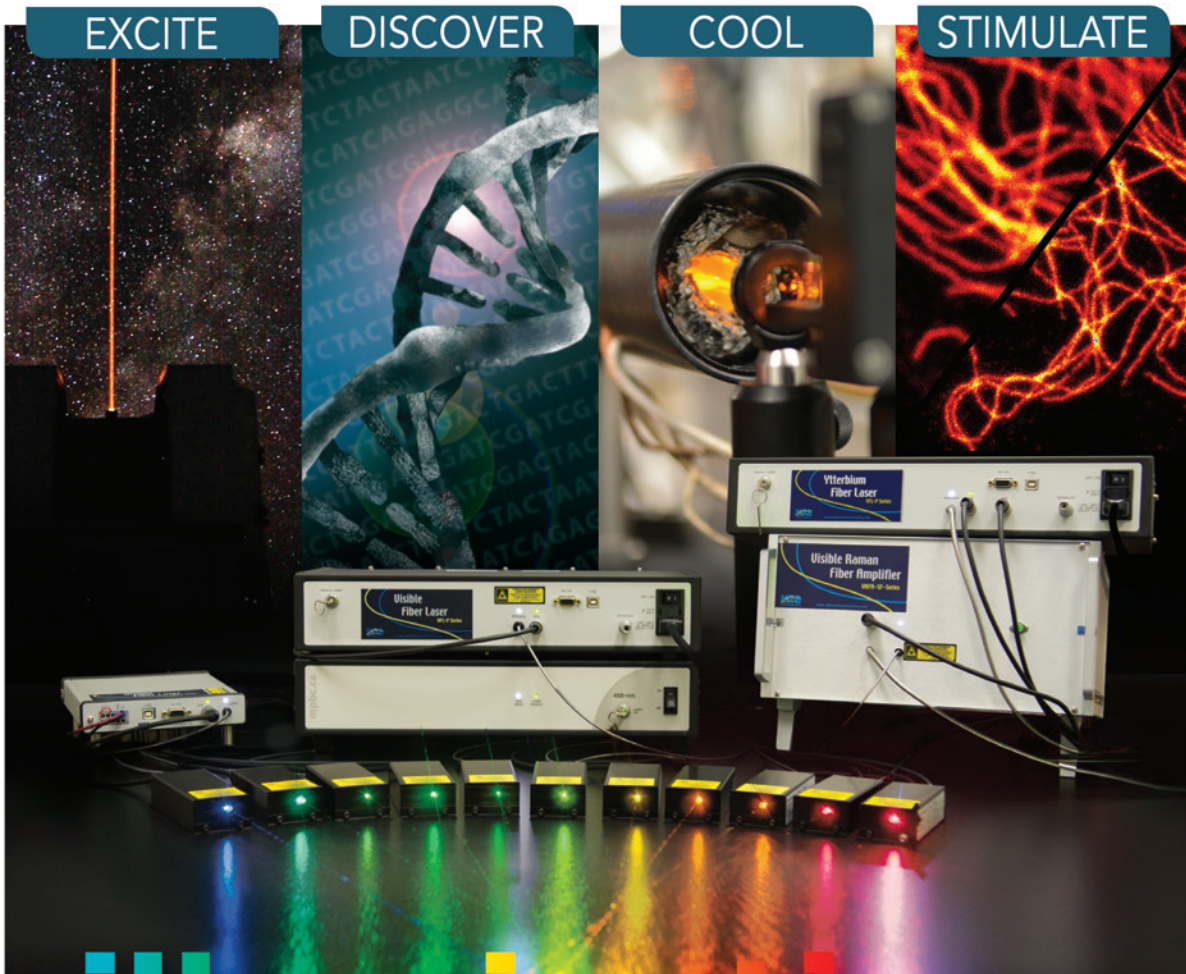
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SPIE reserves the right to cancel a course due to insufficient advance registration.

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Advanced Quantum and Optoelectronic Applications					
			SC1080 Modeling and Simulation with Computational Fourier Optics (Voelz) 8:30 am to 5:30 pm, \$655 / \$765		
Biomedical Spectroscopy, Microscopy, and Imaging					
SC1072 Statistics for Imaging and Sensor Data (Bajorski) 8:30 am to 5:30 pm, \$735 / \$845	SC1122 Applying Freeform Optical Surfaces in Imaging Optics (Rolland, Rolland-Thompson) 8:30 am to 5:30 pm, \$600 / \$710 NEW	SC952 Application of Detection Theory (Carrano) 8:30 am to 5:30 pm, \$600 / \$710 NEW	SC868 Optical Design for Biomedical Imaging (Liang) 8:30 am to 12:30 pm, \$455 / \$510		
	SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications (Wang) 8:30 am to 12:30 pm, \$375 / \$430	SC1053 Introduction to Ultrafast Pulse Shaping - Principles and Applications (Dantus) 8:30 am to 12:30 pm, \$375 / \$430	SC309 Fluorescent Markers: Usage and Optical System Optimization (Levi) 1:30 pm to 5:30 pm, \$375 / \$430		
	SC1121 Understanding Laser Beam Formation and Propagation Characteristics (Soskind) 8:30 am to 12:30 pm, \$375 / \$430 NEW		SC746 Introduction to Ultrafast Optics (Trebino) 1:30 pm to 5:30 pm, \$375 / \$430		
	SC1054 Bio-Interferometry: Fundamentals and Applications to Biosensors, Drug Discovery, Microscopy and Biomedical Imaging (Nolte) 1:30 pm to 5:30 pm, \$375 / \$430		SC1123 The Building Blocks of IR Instrument Design (Grant) 1:30 pm to 5:30 pm, \$375 / \$430 NEW		
	SC981 Biomedical Fiber Optic Sensors and Applications (Mendez, McLaughlin) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC1126 Neurophotonics (Levi, Dufour) 1:30 pm to 5:30 pm, \$375 / \$430 NEW				

Registration Required

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Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Clinical Technologies and Systems					
SC1072 Statistics for Imaging and Sensor Data (<i>Bajorski</i>) 8:30 am to 5:30 pm, \$735 / \$845,	SC1122 Applying NEW Freeform Optical Surfaces in Imaging Optics (<i>Rolland, Rolland-Thompson</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC952 Application NEW of Detection Theory (<i>Carrano</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC868 Optical Design for Biomedical Imaging (<i>Liang</i>) 8:30 am to 12:30 pm, \$455 / \$510		
	SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications (<i>Wang</i>) 8:30 am to 12:30 pm, \$375 / \$430		SC1123 The NEW Building Blocks of IR Instrument Design (<i>Grant</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
	SC1054 Bio-Interferometry: Fundamentals and Applications to Biosensors, Drug Discovery, Microscopy and Biomedical Imaging (<i>Nolte</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC981 Biomedical Fiber Optic Sensors and Applications (<i>Mendez, McLaughlin</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (<i>Thomas</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC1126 NEW Neurophotonics (<i>Levi, Dufour</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC312 Principles and Applications of Optical Coherence Tomography (<i>Fujimoto</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
Displays and Holography					
	SC790 Liquid Crystals: From Fundamentals to Applications (<i>Smalyukh</i>) 8:30 am to 5:30 pm, \$600 / \$710		SC011 Design of Efficient Illumination Systems (<i>Cassarly</i>) 8:30 am to 12:30 pm, \$375 / \$430		
Laser Applications					
			SC746 Introduction to Ultrafast Optics (<i>Trebino</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
			SC1089 Laser Safety for Engineers (<i>Lieb</i>) 8:30 am to 12:30 pm, \$375 / \$430		

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Laser Micro-/Nanoengineering					
	SC1121 Under-standing Laser Beam Formation and Propagation Characteristics (Soskind) 8:30 am to 12:30 pm, \$375 / \$430 NEW	SC743 Micromachining with Femtosecond Lasers (Nolte, Schaffer) 1:30 pm to 5:30 pm, \$375 / \$430	SC746 Introduction to Ultrafast Optics (Trebino) 1:30 pm to 5:30 pm, \$375 / \$430	SC818 Laser Beam Quality (Paschotta) 1:30 pm to 5:30 pm, \$375 / \$430	
			SC689 Precision Laser Micromachining (Schaeffer) 1:30 pm to 5:30 pm, \$375 / \$430		
			SC1089 Laser Safety for Engineers (Lieb) 8:30 am to 12:30 pm, \$375 / \$430		
Laser Source Engineering					
SC752 Solid State Laser Technology (Hodgson) 8:30 am to 5:30 pm, \$600 / \$710	SC748 High-Power Fiber Sources (Nilsson) 8:30 am to 5:30 pm, \$600 / \$710	SC931 Applied Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$600 / \$710	SC746 Introduction to Ultrafast Optics (Trebino) 1:30 pm to 5:30 pm, \$375 / \$430	SC972 Basic Laser Technology (Sukuta) 8:30 am to 12:30 pm, \$375 / \$430	
	SC012 Miniature Optics for Diode Lasers and Beam Shaping (Tkaczyk) 8:30 am to 5:30 pm, \$600 / \$710	SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) 8:30 am to 12:30 pm, \$375 / \$430	SC1089 Laser Safety for Engineers (Lieb) 8:30 am to 12:30 pm, \$375 / \$430	SC977 Fundamentals of Laser Beam Profile Measurements (Rypma) 8:30 am to 12:30 pm, \$375 / \$430	
	SC860 Resonator Design for Solid State Lasers (Paschotta) 8:30 am to 5:30 pm, \$600 / \$710	SC1053 Introduction to Ultrafast Pulse Shaping - Principles and Applications (Dantus) 8:30 am to 12:30 pm, \$375 / \$430		SC818 Laser Beam Quality (Paschotta) 1:30 pm to 5:30 pm, \$375 / \$430	
	SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications (Wang) 8:30 am to 12:30 pm, \$375 / \$430				
	SC744 Ultrafast Fiber Lasers (Fermann) 8:30 am to 12:30 pm, \$375 / \$430				
	SC1121 Under-standing Laser Beam Formation and Propagation Characteristics (Soskind) 8:30 am to 12:30 pm, \$375 / \$430 NEW				
	SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) 1:30 pm to 5:30 pm, \$375 / \$430				
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (Thomas) 1:30 pm to 5:30 pm, \$375 / \$430				

Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Metrology & Standards					
		SC1113 Funda- NEW mental and Applications of Spectroscopic Ellipsometry (<i>Synowicki, Tiwald</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC1089 Laser Safety for Engineers (<i>Lieb</i>) 8:30 am to 12:30 pm, \$375 / \$430	SC700 Understanding Scratch and Dig Specifications (<i>Aikens</i>) 8:30 am to 12:30 pm, \$445 / \$500	
		SC1003 Optical Scatter Metrology (<i>Stover</i>) 1:30 pm to 5:30 pm, \$445 / \$500, p.25		SC212 Modern Optical Testing (<i>Wyant</i>) 1:30 pm to 5:30 pm, \$410 / \$465	
				SC1017 Optics Surface Inspection Workshop (<i>Aikens</i>) 1:30 pm to 5:30 pm, \$455 / \$510	
Micro/Nanofabrication					
	SC012 Miniature Optics for Diode Lasers and Beam Shaping (<i>Tkaczyk</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC743 Micromachining with Femtosecond Lasers (<i>Nolte, Schaffer</i>) 1:30 pm to 5:30 pm, \$375 / \$430	SC454 Fabrication Technologies for Micro- and Nano-Optics (<i>Suleski</i>) 8:30 am to 12:30 pm, \$375 / \$430	SC818 Laser Beam Quality (<i>Paschotta</i>) 1:30 pm to 5:30 pm, \$375 / \$430	
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (<i>Thomas</i>) 1:30 pm to 5:30 pm, \$375 / \$430		SC1125 Design NEW Techniques for Micro-optics (<i>Kress</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
			SC689 Precision Laser Micromachining (<i>Schaeffer</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
Nano/Biophotonics					
			SC309 Fluorescent Markers: Usage and Optical System Optimization (<i>Levi</i>) 1:30 pm to 5:30 pm, \$375 / \$430	SC727 Nanoplasmonics (<i>Stockman</i>) 8:30 am to 5:30 pm, \$600 / \$710	
Nanotechnologies in Photonics					
	SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (<i>Johnson</i>) 8:30 am to 12:30 pm, \$420 / \$475	SC1113 Funda- NEW mentals and Applications of Spectroscopic Ellipsometry (<i>Synowicki, Tiwald</i>) 8:30 am to 5:30 pm, \$600 / \$710			

Registration Required

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Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Nonlinear Optics					
	SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications (Wang) 8:30 am to 12:30 pm, \$375 / \$430	SC931 Applied Nonlinear Frequency Conversion (Paschotta) 8:30 am to 5:30 pm, \$600 / \$710			
	SC1012 Coherent Mid-Infrared Sources and Applications (Vodopyanov) 1:30 pm to 5:30 pm, \$375 / \$430	SC974 Interconnection and Splicing of High-Power Optical Fibers (Yablon) 8:30 am to 12:30 pm, \$375 / \$430			
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (Thomas) 1:30 pm to 5:30 pm, \$375 / \$430	SC1053 Introduction to Ultrafast Pulse Shaping - Principles and Applications (Dantus) 8:30 am to 12:30 pm, \$375 / \$430			
Optical Engineering & Fabrication					
		SC1113 Fundamentals and Applications of Spectroscopic Ellipsometry (Synowicki, Tiwald) 8:30 am to 5:30 pm, \$600 / \$710 NEW	SC454 Fabrication Technologies for Micro- and Nano-Optics (Suleski) 8:30 am to 12:30 pm, \$375 / \$430	SC972 Basic Laser Technology (Sukuta) 8:30 am to 12:30 pm, \$375 / \$430	
		SC017 Principles of Fourier Optics and Diffraction (Gaskill) 8:30 am to 5:30 pm, \$735 / \$845	SC1080 Modeling and Simulation with Computational Fourier Optics (Voelz) 8:30 am to 5:30 pm, \$655 / \$765	SC1039 Evaluating Aspheres for Manufacturability (Hall) 8:30 am to 12:30 pm, \$375 / \$430	
		SC321 Thin Film Optical Coatings (MacLeod) 8:30 am to 5:30 pm, \$600 / \$710	SC1086 Optical Materials, Fabrication and Testing for the Optical Engineer (DeGroote Nelson) 8:30 am to 12:30 pm, \$375 / \$430	SC700 Understanding Scratch and Dig Specifications (Aikens) 8:30 am to 12:30 pm, \$445 / \$500	
		SC1003 Optical Scatter Metrology (Stover) 1:30 pm to 5:30 pm, \$445 / \$500	SC206 Polarized Light: What Your College Instructor Forgot to Tell You (Fisher) 8:30 am to 5:30 pm, \$600 / \$710	SC1017 Optics Surface Inspection Workshop (Aikens) 1:30 pm to 5:30 pm, \$455 / \$510	
		SC1114 The Proper Care of Optics: Cleaning, Handling, Storage and Shipping (Schalck) 1:30 pm to 5:30 pm, \$420 / \$475 NEW		SC1071 Understanding Diffractive Optics (Soskind) 1:30 pm to 5:30 pm, \$410 / \$465	

Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Optical Systems & Lens Design					
	SC1122 Applying NEW Freeform Optical Surfaces in Imaging Optics (Rolland, Rolland-Thompson) 8:30 am to 5:30 pm, \$600 / \$710	SC156 Basic Optics for Engineers (Boreman) 8:30 am to 5:30 pm, \$640 / \$750	SC011 Design of Efficient Illumination Systems (Cassarly) 8:30 am to 12:30 pm, \$375 / \$430	SC1039 Evaluating Aspheres for Manufacturability (Hall) 8:30 am to 12:30 pm, \$375 / \$430	SC003 Practical Optical System Design (Youngworth) 8:30 am to 5:30 pm, \$690 / \$800
	SC690 Optical System Design: Layout Principles and Practice (Greivenkamp) 8:30 am to 5:30 pm, \$720 / \$830	SC935 Introduction to Lens Design (Bentley) 8:30 am to 5:30 pm, \$600 / \$710	SC1125 Design NEW Techniques for Micro-optics (Kress) 1:30 pm to 5:30 pm, \$375 / \$430	SC1052 Optical Systems Engineering (Kasunic) 8:30 am to 5:30 pm, \$680 / \$790	
			SC1123 The NEW Building Blocks of IR Instrument Design (Grant) 1:30 pm to 5:30 pm, \$375 / \$430	SC609 Basic Optics for Non-Optics Personnel (Harding) 10:00 am to 12:30 pm, \$175 / \$225	
Optoelectronic Materials and Devices					
SC817 Silicon Photonics (Michel, Saini) 1:30 pm to 5:30 pm, \$375 / \$430	SC747 Semiconductor Photonic Device Fundamentals (Linden) 8:30 am to 5:30 pm, \$600 / \$710	SC547 Terahertz Wave Technology and Applications (Zhang) 1:30 pm to 5:30 pm, \$375 / \$430	SC1091 Fundamentals of Reliability Engineering for Optoelectronic Devices (Leisher) 8:30 am to 5:30 pm, \$600 / \$710		
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (Thomas) 1:30 pm to 5:30 pm, \$375 / \$430		SC1080 Modeling and Simulation with Computational Fourier Optics (Voelz) 8:30 am to 5:30 pm, \$655 / \$765		
			SC1125 Design NEW Techniques for Micro-optics (Kress) 1:30 pm to 5:30 pm, \$375 / \$430		
Optomechanics					
	SC014 Introduction to Optomechanical Design (Vukobratovich) 8:30 am to 5:30 pm, \$1,075 / \$1,330		SC1120 Finite NEW Element Analysis of Optics (Doyle, Genberg) 8:30 am to 5:30 pm, \$600 / \$710		
		SC1085 Optomechanical Systems Engineering (Kasunic) 8:30 am to 5:30 pm, \$610 / \$710	SC010 Introduction to Optical Alignment Techniques (Castle) 8:30 am to 5:30 pm, \$600 / \$710		
		SC015 Structural Adhesives for Optical Bonding (Daly) 8:30 am to 12:30 pm, \$375 / \$430	SC781 Optomechanical Analysis (Hatheway) 8:30 am to 5:30 pm, \$600 / \$710		

Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Photonic Integration					
SC817 Silicon Photonics (<i>Michel, Saini</i>) 1:30 pm to 5:30 pm, \$375 / \$430	SC608 Photonic Crystals: A Crash Course, from Bandgaps to Fibers (<i>Johnson</i>) 8:30 am to 12:30 pm, \$420 / \$475	SC1113 Fundamentals and Applications of Spectroscopic Ellipsometry (<i>Synowicki, Tiwald</i>) 8:30 am to 5:30 pm, \$600 / \$710 NEW	SC1091 Fundamentals of Reliability Engineering for Optoelectronic Devices (<i>Leisher</i>) 8:30 am to 5:30 pm, \$600 / \$710		
	SC747 Semiconductor Photonic Device Fundamentals (<i>Linden</i>) 8:30 am to 5:30 pm, \$600 / \$710		SC1080 Modeling and Simulation with Computational Fourier Optics (<i>Voelz</i>) 8:30 am to 5:30 pm, \$655 / \$765		
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (<i>Thomas</i>) 1:30 pm to 5:30 pm, \$375 / \$430		SC1125 Design Techniques for Micro-optics (<i>Kress</i>) 1:30 pm to 5:30 pm, \$375 / \$430 NEW		
Photonic Therapeutics and Diagnostics					
SC1072 Statistics for Imaging and Sensor Data (<i>Bajorski</i>) 8:30 am to 5:30 pm, \$735 / \$845	SC1126 Neurophotonics (<i>Levi, Dufour</i>) 1:30 pm to 5:30 pm, \$375 / \$430 NEW	SC702 Optics and Optical Quality of the Human Eye (<i>Roorda</i>) 8:30 am to 12:30 pm, \$375 / \$430			
Semiconductor Lasers and LEDs					
	SC012 Miniature Optics for Diode Lasers and Beam Shaping (<i>Tkaczyk</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC974 Interconnection and Splicing of High-Power Optical Fibers (<i>Yablon</i>) 8:30 am to 12:30 pm, \$375 / \$430	SC011 Design of Efficient Illumination Systems (<i>Cassarly</i>) 8:30 am to 12:30 pm, \$375 / \$430	SC977 Fundamentals of Laser Beam Profile Measurements (<i>Rypma</i>) 8:30 am to 12:30 pm, \$375 / \$430	
	SC747 Semiconductor Photonic Device Fundamentals (<i>Linden</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC052 Light-Emitting Diodes (<i>Schubert</i>) 1:30 pm to 5:30 pm, \$450 / \$505	SC1125 Design Techniques for Micro-optics (<i>Kress</i>) 1:30 pm to 5:30 pm, \$375 / \$430 NEW		
	SC1020 Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications (<i>Wang</i>) 8:30 am to 12:30 pm, \$375 / \$430		SC1089 Laser Safety for Engineers (<i>Lieb</i>) 8:30 am to 12:30 pm, \$375 / \$430		
	SC1012 Coherent Mid-Infrared Sources and Applications (<i>Vodopyanov</i>) 1:30 pm to 5:30 pm, \$375 / \$430				

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Daily Course Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering					
SC1072 Statistics for Imaging and Sensor Data (<i>Bajorski</i>) 8:30 am to 5:30 pm, \$735 / \$845	SC312 Principles and Applications of Optical Coherence Tomography (<i>Fujimoto</i>) 1:30 pm to 5:30 pm, \$375 / \$430		SC868 Optical Design for Biomedical Imaging (<i>Liang</i>) 8:30 am to 12:30 pm, \$455 / \$510		
	SC029 Tissue Optics (<i>Jacques</i>) 1:30 pm to 5:30 pm, \$375 / \$430				
Laser-assisted Manufacturing and Micro/ Nano Fabrication					
	SC012 Miniature Optics for Diode Lasers and Beam Shaping (<i>Tkaczyk</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC743 Micromachining with Femtosecond Lasers (<i>Nolte, Schaffer</i>) 1:30 pm to 5:30 pm, \$375 / \$430	SC454 Fabrication Technologies for Micro- and Nano-Optics (<i>Suleski</i>) 8:30 am to 12:30 pm, \$375 / \$430	SC818 Laser Beam Quality (<i>Paschotta</i>) 1:30 pm to 5:30 pm, \$375 / \$430	
	SC1121 Under-standing Laser Beam Formation and Propagation Characteristics (<i>Soskind</i>) 8:30 am to 12:30 pm, \$375 / \$430 NEW		SC1125 Design Techniques for Micro-optics (<i>Kress</i>) 1:30 pm to 5:30 pm, \$375 / \$430 NEW		
	SC1087 Fiber Bragg Gratings: Production, Modeling and Applications (<i>Thomas</i>) 1:30 pm to 5:30 pm, \$375 / \$430		SC1089 Laser Safety for Engineers (<i>Lieb</i>) 8:30 am to 12:30 pm, \$375 / \$430		
			SC746 Introduction to Ultrafast Optics (<i>Trebino</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
			SC689 Precision Laser Micromachining (<i>Schaeffer</i>) 1:30 pm to 5:30 pm, \$375 / \$430		
Solid State Lighting and Displays					
	SC790 Liquid Crystals: From Fundamentals to Applications (<i>Smalyukh</i>) 8:30 am to 5:30 pm, \$600 / \$710	SC052 Light-Emitting Diodes (<i>Schubert</i>) 1:30 pm to 5:30 pm, \$450 / \$505	SC011 Design of Efficient Illumination Systems (<i>Cassarly</i>) 8:30 am to 12:30 pm, \$375 / \$430, p.31		
Professional Development Workshops					
	Sun WS1124 Re-search Proposals: Improving Your Odds for Success (<i>Alley</i>) 8:30 am to 12:30 pm, \$150 / \$200 NEW	Mon WS667 The Craft of Scientific Presentations: A Workshop on Technical Presentations (<i>Alley</i>) 8:30 am to 12:30 pm, \$150 / \$200	Tue WS1059 Resumes to Interviews: Strategies for a Successful Job Search (<i>Lawson, Krinsky</i>) 8:30 am to 12:30 pm, \$125 / \$175		
		Mon WS668 The Craft of Scientific Writing: A Workshop on Technical Writing (<i>Alley</i>) 1:30 pm to 5:30 pm, \$150 / \$200			

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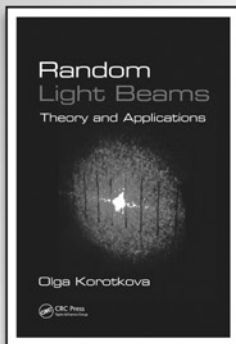
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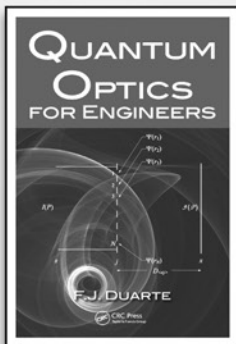
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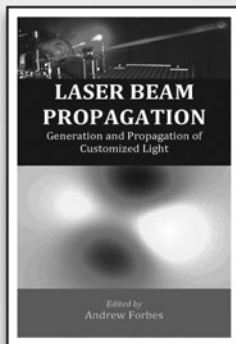
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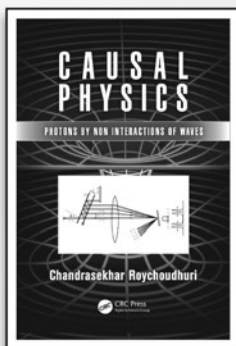
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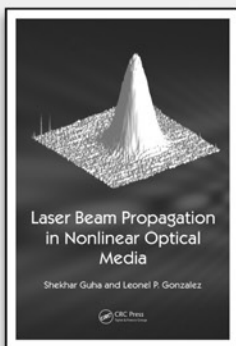
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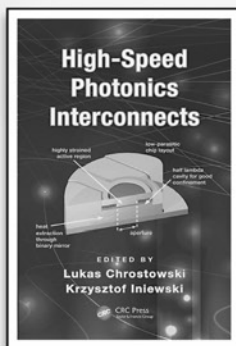
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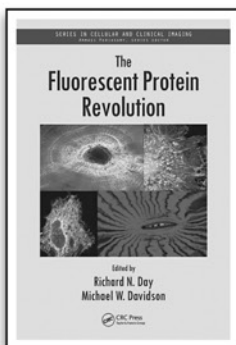
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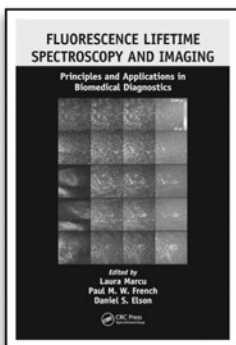
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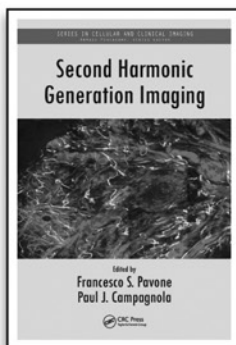
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Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong**, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

8926A	Photonics in Dermatology and Plastic Surgery (Choi, Kollias, Zeng)	65
8926B	Therapeutics and Diagnostics in Urology (Kang)	68
8926C	Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology (Wong, Ilgner)	70
8926D	Diagnostic and Therapeutic Applications of Light in Cardiology (Tearney, Gregory, Marcu)	72
8926E	Optics in Bone Surgery and Diagnostics (Mandelis, Morris)	75
8927A	Endoscopic Microscopy IX (Tearney, Wang)	76
8927B	Optical Techniques in Pulmonary Medicine (Suter, Lam, Brenner)	78
8928A	Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology (Hirschberg, Madsen)	80
8928B	Neurophotonics (Jansen, Luo, Ding, Roe)	82
8928C	Optogenetics and Optical Control of Cells (Mohanty, Thakor)	85
8929	Lasers in Dentistry XX (Rechmann, Fried)	87
8930	Ophthalmic Technologies XXIV (Manns, Söderberg, Ho)	89
8931	Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII (Kessel, Hasan)	92
8932	Mechanisms for Low-Light Therapy IX (Hamblin, Carroll, Arany)	95
8933	Frontiers in Biological Detection: From Nanosensors to Systems (Miller, Fauchet, Cunningham)	97

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh**, Fitzpatrick Institute for Photonics, Duke Univ. (USA) and **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

8934	Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII (Izatt, Fujimoto, Tuchin)	99
8935	Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII (Vo-Dinh, Mahadevan-Jansen, Grundfest)	104
8936	Design and Quality for Biomedical Technologies VI (Raghavachari, Liang, Pfefer)	108
8937	Multimodal Biomedical Imaging IX (Azar, Intes)	111
8938	Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XIV (Gannot)	113
8939	Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry (Mahadevan-Jansen, Petrich)	116
8940	Optical Biopsy XII (Alfano, Demos)	118

8972	Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications XIV (Heisterkamp, Herman, Meunier, Nolte)	235
8976	Microfluidics, BioMEMS, and Medical Microsystems XII (Gray, Becker)	248

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **William P. Roach**, Air Force Office of Scientific Research (USA)

8941A	Optical Interactions with Tissue and Cells XXV (Jansen, Thomas)	120
8941B	Terahertz and Ultrashort Electromagnetic Pulses for Biomedical Applications (Wilmink, Ibey)	123
8942	Dynamics and Fluctuations in Biomedical Photonics XI (Tuchin, Larin, Leahy, Wang)	125
8943	Photons Plus Ultrasound: Imaging and Sensing 2014 (Oraevsky, Wang)	127
8944	Biophotonics and Immune Responses IX (Chen)	135
8945	Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VI (Nordstrom, Bouchard, Allen)	137
8946	Optical Elastography and Tissue Biomechanics (Larin, Sampson)	139

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA); **Daniel L. Farkas**, Univ. of Southern California (USA)

8947	Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII (Farkas, Nicolau, Leif, Leary, Tarnok, Richards-Kortum)	141
8948	Multiphoton Microscopy in the Biomedical Sciences XIV (Periasamy, So, König)	145
8949	Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI (Brown, Cogswell, Wilson)	150
8950	Single Molecule Spectroscopy and Superresolution Imaging VII (Enderlein, Gregor, Gryczynski, Erdmann, Koberling)	153
8951	Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics (Coté)	156
8952	Biomedical Applications of Light Scattering IX (Wax, Backman)	158
8953	Optical Methods in Developmental Biology II (Rollins, Lo, Fraser)	161

Nano/Biophotonics

Program Chairs: **Paras Prasad**, SUNY/Univ. Buffalo (USA); **Dan V. Nicolau**, McGill Univ. (Canada)

8954	Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X (Cartwright, Nicolau)	163
8955	Colloidal Nanoparticles for Biomedical Applications IX (Parak, Osiriński, Yamamoto)	165
8956	Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications (Achilefu, Raghavachari)	169
8957	Plasmonics in Biology and Medicine XI (Vo-Dinh, Lakowicz)	172
8958	Bioinspired, Biointegrated, Bioengineered Photonic Devices II (Lee, Rogers, Yun)	174

SPiE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, session chairs, and authors who have so generously given their time and advice to make this symposium possible.

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BiOS Daily Conference Schedule



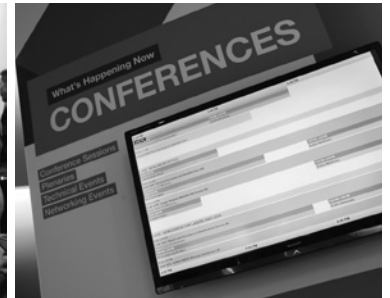
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BiOS Hot Topics 7:00 to 9:00 pm					

Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong**, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

8926E Optics in Bone Surgery and Diagnostics <i>(Mandelis, Morris)</i>	8929 Lasers in Dentistry XX <i>(Rechmann, Fried)</i>	8928B Neurophotonics <i>(Jansen, Luo, Ding, Roe)</i>
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8939 **Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry**
(Mahadevan-Jansen, Petrich)

8940 **Optical Biopsy XII** *(Alfano, Demos)*

SPECIAL SESSION

45th Anniversary

The discovery of supercontinuum generation and applications

1:30 to 5:30 pm

Organized by **Robert Alfano**,
The City College New York (USA)

Join an afternoon of special sessions commemorating the 45th anniversary of the discovery of supercontinuum generation and applications.

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(Wilmink, Ibey)

8941A **Optical Interactions with Tissue and Cells XXV**
(Jansen, Thomas)

SPECIAL SESSION
25 Years of
Laser-Tissue Interaction
Mon. 8:30 to 12:30 am

Organized by: **E. Duco Jansen**, Vanderbilt Univ. (USA)

Join a morning of sessions commemorating the 25th anniversary of the conference Optical Interactions with Tissue and Cells (8941).

8942 **Dynamics and Fluctuations in Biomedical Photonics XI** (Tuchin, Larin, Leahy, Wang)

8943 **Photons Plus Ultrasound: Imaging and Sensing 2014** (Oraevsky, Wang)

8945 **Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VI**
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8944 **Biophotonics and Immune Responses IX**
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Nano/Biophotonics

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8957 **Plasmonics in Biology and Medicine XI**
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(Lee, Rogers, Yun)

8956 **Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications** (Achilefu, Raghavachari)

Photonics in Dermatology and Plastic Surgery

Conference Chairs: **Bernard Choi**, Beckman Laser Institute and Medical Clinic (USA); **Nikiforos Kollias**, Consultant (USA); **Haishan Zeng**, The BC Cancer Agency Research Ctr. (Canada)

Program Committee: **Anthony J. Durkin**, Beckman Laser Institute and Medical Clinic (USA); **Iltefat Hamzavi M.D.**, Henry Ford Hospital (USA); **Kristen Marie Kelly M.D.**, Univ. of California, Irvine School of Medicine (USA); **Jessica C. Ramella-Roman**, The Catholic Univ. of America (USA); **Lise Lyngsnes Randeberg**, Norwegian Univ. of Science and Technology (Norway); **Tsung-Hua Tsai**, Far Eastern Memorial Hospital (Taiwan)

Saturday 1 February

KEYNOTE I

Location: Room 303 (Esplanade) 8:00 am to 8:30 am

Session Chair: **Bernard Choi**,
Beckman Laser Institute and Medical Clinic (USA)

8:00 am: **Assessing the colors of human skin** (*Keynote Presentation*),
Nikiforos Kollias, Consultant (USA) and Univ. of British Columbia
(Canada) [8926-1]

SESSION 1

Location: Room 303 (Esplanade) Sat 8:30 am to 10:30 am

Optical Monitoring of Wounds

Session Chair: **Bernard Choi**,
Beckman Laser Institute and Medical Clinic (USA)

8:30 am: **Transparent polymer-based oxygen sensing wound dressing**,
Zongxi Li, Emmanouil Rousakis, Conor L. Evans, Massachusetts General
Hospital (USA) [8926-2]

8:50 am: **Irradiation with EMOLED improves the healing process in
superficial skin wounds**, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy);
Francesca Rossi, Francesca Tatini, Istituto di Fisica Applicata Nello Carrara
(Italy); Stefano Bacci, Gaetano De Siena, Univ. degli Studi di Firenze (Italy);
Domenico Alfieri, Light4Tech Firenze S.r.l. (Italy); Roberto Pini, Istituto di Fisica
Applicata Nello Carrara (Italy); Francesco S. Pavone, European Lab. for Non-
linear Spectroscopy (Italy) [8926-3]

9:10 am: **Quantitative assessment of graded burn wounds in a porcine model
using spatial frequency domain imaging (SFDI) and laser speckle imaging
(LSI)**, Adrien Ponticorvo, Bruce Yang, Beckman Laser Institute and Medical Clinic
(USA); David M. Burmeister, Robert J. Christy, U.S. Army Institute of Surgical
Research (USA); Bernard Choi, Anthony J. Durkin, Beckman Laser Institute and
Medical Clinic (USA) [8926-4]

9:30 am: **Monitoring the influence of compression therapy on
pathophysiology and structure of a swine scar model using multispectral
imaging system**, Pejman Ghassemi, The Catholic Univ. of America (USA) and
MedStar Health Research Institute (USA); Taryn E. Travis, Lauren T. Moffatt,
MedStar Health Research Institute (USA); Jeffrey W. Shupp, MedStar Health
Research Institute (USA) and The Catholic Univ. of America (USA); Jessica
C. Ramella-Roman, The Catholic Univ. of America (USA) and MedStar Health
Research Institute (USA) [8926-6]

9:50 am: **Hyperspectral characterization of an in vitro wound model**, Lise L.
Randeberg, Janne-Lise Hegstad, Lukasz A. Paluchowski, Norwegian Univ. of
Science and Technology (Norway); Brita S. Pukstad, Norwegian Univ. of Science
and Technology (Norway) and St. Olavs Hospital (Norway) [8926-7]

10:10 am: **Prognostic prospective of laser induced fluorescence as an
objective tool to evaluate collagen deposition in thermal wounds: an ex vivo
study**, Vijendra Prabhu, Anusha Acharya, Satish Bola Sadashiva Rao, Pramod
Kumar, Anurag Sharan, Krishna K. Mahato, Manipal Univ. (India) [8926-5]

Coffee Break Sat 10:30 am to 11:00 am

SESSION 2

Location: Room 303 (Esplanade) . . . Sat 11:00 am to 12:10 pm

Optical Therapeutics

Session Chair: **Iltefat Hamzavi M.D.**, Henry Ford Hospital (USA)

11:00 am: **Imaging guided photothermolysis through two-photon absorption
demonstrated on mouse skin: a potential tool for highly targeted skin
treatment**, Hequn Wang, The BC Cancer Agency Research Ctr. (Canada);
Soodabeh Zandi, The Univ. of British Columbia (Canada); Anthony M. Lee,
Jianhua Zhao, The BC Cancer Agency Research Ctr. (Canada); Harvey Lui M.D.,
David I. McLean M.D., The Univ. of British Columbia (Canada); Haishan Zeng,
The BC Cancer Agency Research Ctr. (Canada) and Univ. of British Columbia
(Canada) [8926-8]

11:20 am: **Fractional laser technologies and applications in dermatology**
(*Invited Paper*), Dieter Manstein, Wellman Ctr. for Photomedicine (USA) . . [8926-9]

11:50 am: **Heat profiles in laser irradiated nails**, Uwe Paasch,
Universitätsklinikum Leipzig (Germany) [8926-10]

Lunch/Exhibition Break Sat 12:10 pm to 1:30 pm

SESSION 3

Location: Room 303 (Esplanade) Sat 1:30 pm to 3:20 pm

Confocal Microscopy

Session Chair: **Haishan Zeng**,
The BC Cancer Agency Research Ctr. (Canada)

1:30 pm: **Latest advances in confocal microscopy of skin cancers: early
signs of impact on patient care** (*Invited Paper*), Milind Rajadhyaksha, Memorial
Sloan-Kettering Cancer Ctr. (USA) [8926-11]

2:00 pm: **Computer based algorithm for estimating stratum corneum
thickness from reflectance confocal microscopy (RCM) images**, Alican
Bozkurt, Bilkent Univ. (Turkey); Kivanc Kose, Memorial Sloan-Kettering Cancer
Ctr. (USA); Jamshid Sourati, Northeastern Univ. (USA); Christi Alessi-Fox,
Caliber Imaging & Diagnostics, Inc. (USA); Jennifer G. Dy, Dana H. Brooks,
Northeastern Univ. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering
Cancer Ctr. (USA) [8926-12]

2:20 pm: **Image analysis based automated detection of dermal-epidermal
junction in reflectance confocal microscopy images of skin**, Kivanc Kose,
Memorial Sloan-Kettering Cancer Ctr. (USA); Christi Alessi-Fox, Caliber Imaging
& Diagnostics, Inc. (USA); Jamshid Sourati, Jennifer G. Dy, Dana H. Brooks,
Northeastern Univ. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering
Cancer Ctr. (USA) [8926-13]

2:40 pm: **Feasibility of intraoperative imaging during Mohs surgery with
reflectance confocal microscopy**, Eileen S. Flores, Miguel Cordova, William
Phillips, Kishwer S. Nehal, Milind Rajadhyaksha, Memorial Sloan-Kettering
Cancer Ctr. (USA) [8926-14]

3:00 pm: **Laser ablation of basal cell carcinoma guided by confocal
microscopy: effect of fluence, number of passes, contrast agent and
residual thermal damage on imaging quality**, Heidi Sierra, Jason Chih-Shan
Jason Chen, Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr.
(USA) [8926-15]

Coffee Break Sat 3:20 pm to 3:50 pm

Conference 8926A · Location: Room 303 (Esplanade)

SESSION 4

Location: Room 303 (Esplanade) Sat 3:50 pm to 5:10 pm

Optical Spectroscopy

Session Chair: **Lise Lyngsnes Randeberg**,
Norwegian Univ. of Science and Technology (Norway)

3:50 pm: **Integrated multiphoton microscopy and micro-Raman spectroscopy system for accurate targeting and biochemical analysis of microstructures in human skin In vivo**, Hequn Wang, Anthony M. Lee, The BC Cancer Agency Research Ctr. (Canada); Harvey Lui M.D., David I. McLean M.D., The Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada) and Univ. of British Columbia (Canada) [8926-16]

4:10 pm: **Sensing vascularization of ex vivo produced oral mucosal equivalent (EVPOME) skin grafts in nude mice using optical spectroscopy**, Karthik Vishwanath, Rajan Gurjar, Radiation Monitoring Devices, Inc. (USA); Shiuhyang Kuo, Anthony Fasi, Roderick Kim, Stephen E. Feinberg, Univ. of Michigan (USA); David E. Wolf, Radiation Monitoring Devices, Inc. (USA) [8926-17]

4:30 pm: **Axicon lenses based cone shell configuration for depth sensitive fluorescence measurements in turbid media**, Yi Hong Ong, Quan Liu, Nanyang Technological Univ. (Singapore) [8926-18]

4:50 pm: **Using parallel factor analysis (PARAFAC) for decomposing excitation and emission matrix (EEM) spectra of healthy skin according to body site**, Wenbo Wang, Jianhua Zhao, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Harvey Lui M.D., The Univ. of British Columbia (Canada) [8926-19]

Sunday 2 February

KEYNOTE II

Location: Room 303 (Esplanade) 8:30 am to 9:00 am

Session Chair: **Nikiforos Kollias**, Consultant (USA)

8:30 am: **Optical treatment strategies for unsolved skin problems: pros, cons, and some whacky ideas (Keynote Presentation)**, R. Rox Anderson M.D., Massachusetts General Hospital (USA) [8926-20]

SESSION 5

Location: Room 303 (Esplanade) Sun 9:00 am to 10:10 am

Photodynamic Therapy

Session Chair: **Nikiforos Kollias**, Consultant (USA)

9:00 am: **New ways to deliver PDT with daylight and fractional lasers: emerging techniques and protocols (Invited Paper)**, Merete Haedersdal M.D., Bispebjerg Hospital (Denmark) [8926-21]

9:30 am: **Photodynamic therapy improves the ultraviolet-irradiated hairless mice skin**, Ana Elisa S. Jorge, Univ. de São Paulo (Brazil) and Wellman Ctr. for Photomedicine (USA); Nivaldo A. Parizotto, Univ. Federal de São Carlos (Brazil); Cristina Kurachi, Vanderlei S. Bagnato, Univ. de São Paulo (Brazil); Michael R. Hamblin, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Harvard-MIT (USA) [8926-22]

9:50 am: **Preclinical in-vivo evaluation of Hemoporphin-mediated photodynamic therapy on normal vasculature**, Wesley Moy, Beckman Laser Institute and Medical Clinic (USA); Gang Ma, Shanghai Ninth People's Hospital (China); Kristen M. Kelly M.D., Bernard Choi, Beckman Laser Institute and Medical Clinic (USA) [8926-23]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 6

Location: Room 303 (Esplanade) . . . Sun 10:40 am to 11:40 am

Optical Microscopy and Optical Coherence Tomography

Session Chairs: **Kristen M. Kelly M.D.**,
Univ. of California, Irvine School of Medicine (USA);
Tsung-Hua Tsai, Far Eastern Memorial Hospital (Taiwan)

10:40 am: **High resolution in vivo imaging of skin with full field optical coherence tomography**, Eugénie Dalimier, Alexis Bruhat, LLTECH SAS (France); Kate Grieve, Institut Langevin (France); Fabrice Harms, Institut Langevin (France) and LLTECH SAS (France); Franck Martins, LLTECH SAS (France); Amir Nahas, A. Claude Boccara, Institut Langevin (France) and LLTECH SAS (France) [8926-24]

11:00 am: **Noninvasive monitoring and differentiation of cell death processes of human keratinocytes in living engineered skin tissue**, Youbo Zhao, Marina Marjanovic, Eric J. Chaney, Benedikt W. Graf, Ziad Mahmassani, Marni D. Boppert, Stephen A. Boppert, Univ. of Illinois at Urbana-Champaign (USA) [8926-25]

11:20 am: **Clinical CARS tomography**, Karsten König, Hans Georg Breunig, Univ. des Saarlandes (Germany); Martin Weinigel, JenLab GmbH (Germany); Jürgen M. Lademann, Charité Universitätsmedizin Berlin (Germany) . . . [8926-26]

Lunch/Exhibition Break Sun 11:40 am to 1:00 pm

SESSION 7

Location: Room 303 (Esplanade) Sun 1:00 pm to 3:00 pm

Model-Based Analysis of Optical Data

Session Chair: **Anthony J. Durkin**,
Beckman Laser Institute and Medical Clinic (USA)

1:00 pm: **Estimation of skin optical parameters for real-time hyperspectral imaging applications**, Asgeir Bjorgan, Matija Milanić, Lukasz A. Paluchowski, Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway) [8926-27]

1:20 pm: **Quantitative fluorescence molecular imaging in highly light-absorbing melanomas using a dual-tracer kinetic modeling normalization method**, Kenneth M. Tichauer, Illinois Institute of Technology (USA); Stephen C. Kanick, Thayer School of Engineering at Dartmouth (USA); Sophie J. Deharvengt, Geisel School of Medicine (USA); Kimberley S. Samkoe, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine (USA); Marcus Bosenberg, Yale Univ. (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Radu V. Stan, Geisel School of Medicine (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine (USA) . . [8926-28]

1:40 pm: **Combining the diffusion approximation and Monte Carlo modeling in analysis of diffuse reflectance spectra from human skin**, Peter Naglic, Luka Vidovič, Matija Milanić, Jožef Stefan Institute (Slovenia); Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Boris Majaron, Jožef Stefan Institute (Slovenia) [8926-29]

2:00 pm: **Monte Carlo modeling of pigmented skin lesions**, Daniel S. Gareau, The Rockefeller Univ. (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA); James G. Krueger, The Rockefeller Univ. (USA) [8926-30]

2:20 pm: **In vivo validation of a method to isolate the effects of melanin from underlying hemodynamics across skin types using spatially modulated quantitative spectroscopy (SMoQS)**, Rolf B. Saager, Seyed A. Sharif, Kristen M. Kelly M.D., Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA) [8926-31]

2:40 pm: **Enhanced diagnostic of skin conditions by polarized laser speckles: phantom studies and computer modeling**, Lioudmila Tchvialeva, Tim K. Lee, Igor Markhvida, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Alexander Doronin, Igor V. Meglinski, Univ. of Otago (New Zealand) [8926-32]

POSTER SESSION AND COFFEE BREAK

Location: South Hall A Sun 3:00 pm to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Sunday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Fractal feature of basal cell carcinoma caused by excessive ultraviolet radiation, Shulian Wu, Hui Li, Yuxia Wang, Xiaoxiao Zheng, Fujian Normal Univ. (China) [8926-33]

Development of a widefield imaging fluorescence system for detection of porphyrins in dermatology, Mardoqueu Martins da Costa, Michel Bessani, Univ. de São Paulo (Brazil); Emery C. Lins, Univ. Federal do ABC (Brazil); Liliane Ventura, Univ. de São Paulo (Brazil) [8926-34]

Uniformity of surface PpIX in vivo using porcine skin model applying microneedle rollers, Phamilla G. Sousa Rodrigues, Priscila F. C. Menezes, Alessandra K. Fujita, Michelle B. Requena, Angelo B. Govone, Andriago B. de Nardi, Cristina Kurachi, Vanderlei S. Bagnato, Univ. de São Paulo (Brazil) [8926-35]

Raman spectroscopy could measure the differences in the biochemical constitution of human skin in different regions of the body, Fabricio L. Silveira, Marcos T. Pacheco, Univ. Camilo Castelo Branco (Brazil); Benito Bodanese M.D., UNOCHAPECO (Brazil); Renato Amaro Zângaro, Landulfo Silveira Jr., Univ. Camilo Castelo Branco (Brazil) [8926-36]

Using infrared imaging polarization imaging to detect skin cancer, Joseph A. Peller, Susan R. Trammell, The Univ. of North Carolina at Charlotte (USA) [8926-37]

SESSION 8

Location: Room 303 (Esplanade) Sun 4:00 pm to 5:20 pm

Wide-Field Functional Imaging

Session Chair: **Jessica C. Ramella-Roman,**
The Catholic Univ. of America (USA)

4:00 pm: **Photothermal laser speckle imaging,** Julio C. Ramirez-San-Juan, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Caitlin Regan, Cecilia Osorio, Univ. of California, Irvine (USA); Bernard Choi, Beckman Laser Institute and Medical Clinic (USA) [8926-38]

4:20 pm: **Tumor site prediction using spatiotemporal detection of subclinical hyperemia in experimental photocarcinogenesis,** Young L. Kim, Purdue Univ. (USA); Raymond L. Konger, Indiana Univ. School of Medicine (USA); Zhengbin Xu, Purdue Univ. (USA); Ravi P. Sahu, Indiana Univ. School of Medicine (USA) [8926-39]

4:40 pm: **Polarization enhanced multispectral wide-field imaging for evaluating dermal structural changes caused by non-ablative fractional laser treatment,** Xin Feng, Univ. of Massachusetts Lowell (USA); Sean Doherty, Boston Plastic Surgery Associates (USA); Ilya V. Yaroslavsky, Cynosure Inc. (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8926-40]

5:00 pm: **Hyperspectral imaging for melanoma screening,** Justin Martin, James G. Krueger M.D., Daniel S. Gareau, The Rockefeller Univ. (USA) . [8926-41]

Therapeutics and Diagnostics in Urology

Conference Chair: **Hyun Wook Kang**, Pukyong National Univ. (Korea, Republic of)

Program Committee: **Geoffrey N. Box M.D.**, The Ohio State Univ. (USA); **Kim Foong Chan**, Dermira, Inc. (USA); **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte (USA); **Ronald Sroka**, Laser-Forschungslabor (Germany); **Joel M. Teichman M.D.**, St. Paul's Hospital (Canada); **Rudolf M. Verdaasdonk**, Vrije Univ. Medical Ctr. (Netherlands)

Saturday 1 February

SESSION 9

Location: Room 238 (Mezzanine) Sat 9:15 am to 10:00 am

Tissue Imaging I

Session Chairs: **Rudolf M. Verdaasdonk**, Vrije Univ. Medical Ctr. (Netherlands); **Hyun Wook Kang**, Pukyong National Univ. (Korea, Republic of)

9:15 am: **Polarized light imaging for localizing the bladder morphological complications in outlet obstruction disease**, Sanaz Alali, Univ. of Toronto (Canada); Karen J. Aitken, The Hospital for Sick Children (SickKids) (Canada); Adam Gribble, Univ. of Toronto (Canada); I. Alex Vitkin, Univ. Health Network (Canada); Darius J. Bagli, The Hospital for Sick Children (SickKids) (Canada) [8926-43]

9:30 am: **Differentiation of testicular tissue and in situ localisation of vital spermatozoa by probe-based confocal laser endomicroscopy (pCLE)**, Matthias Trottmann, Klinikum der Univ. München (Germany); Bernhard Liedl, Clinics for Surgery Munich-Bogenhausen GmbH (Germany); Herbert Stepp, Univ. Hospital München (Germany); Regina Leeb, Klinikum der Univ. München (Germany); Michael Heide, Laser-Forschungslabor (Germany); Armin J. Becker, Christian G. Stief, Klinikum der Univ. München (Germany); Sabine Koelle, Klinikum der Univ. München (Germany) and Univ. College Dublin (Ireland) [8926-44]

9:45 am: **Optical diagnosis of testicular torsion in children**, Babak Shadgan, The Univ. of British Columbia (Canada); Mehdi Fareghi, Tehran Univ. of Medical Sciences (Iran, Islamic Republic of); Lynn Stothers, Andrew J. Macnab M.D., The Univ. of British Columbia (Canada); A. M. Kajbafzadeh, Tehran Univ. of Medical Sciences (Iran, Islamic Republic of) [8926-45]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 10

Location: Room 238 (Mezzanine) . . . Sat 10:30 am to 12:00 pm

Tissue Therapeutics

Session Chairs: **Nathaniel M. Fried**, The Univ. of North Carolina at Charlotte (USA); **Ronald Sroka**, Laser-Forschungslabor (Germany)

10:30 am: **Rapid infrared laser sealing and cutting of porcine renal vessels, ex vivo**, Nicholas C. Giglio, Thomas C. Hutchens, William Perkins, The Univ. of North Carolina at Charlotte (USA); Cassandra Latimer, Arlen K. Ward, William H. Nau, Covidien (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8926-46]

10:45 am: **Blood coagulation using high intensity focused ultrasound (HIFU)**, Phuc Van Nguyen, Hyun Wook Kang, Jung Hwan Oh, Pukyong National Univ. (Korea, Republic of) [8926-47]

11:00 am: **Ex vivo evaluation of safety and efficacy of vaporization of the prostate using a 300 W high-power laser diode with the wavelength of 980 nm**, Junya Takada, Norihiro Honda, Hisanao Hazama, Kunio Awazu, Osaka Univ. (Japan) [8926-48]

11:15 am: **Intraluminal occlusion of the seminal duct by laser and histoacryl: two non-invasive alternatives for vasectomy**, Benjamin Freitag, Klinikum der Univ. München (Germany); Ronald Sroka, Laser-Forschungslabor (Germany); Sabine Koelle, Univ. College Dublin (Ireland); Armin J. Becker, Wael Khoder, Klinikum der Univ. München (Germany); Thomas Pongratz, Laser-Forschungslabor (Germany); Christian G. Stief, Matthias Trottmann, Klinikum der Univ. München (Germany) [8926-49]

11:30 am: **Investigation on the smoke development during laparoscopic surgery**, Ronald Sroka, Sebastian Fiedler, Thomas Pongratz, Georg Hennig, Wolfgang Beyer, Adrian Rühm, Laser-Forschungslabor (Germany); Wael Khoder, Klinikum der Univ. München (Germany) [8926-50]

11:45 am: **A compact, low cost infrared laser system for optical stimulation of the rat prostate cavernous nerves**, William Perkins, The Univ. of North Carolina at Charlotte (USA); Gwen A. Lagoda, Arthur L. Burnett M.D., Johns Hopkins Medical Institutions (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8926-51]

Lunch/Exhibition Break Sat 12:00 pm to 1:30 pm

SESSION 11

Location: Room 238 (Mezzanine) Sat 1:30 pm to 3:00 pm

Laser Lithotripsy

Session Chairs: **Joel M. Teichman M.D.**, St. Paul's Hospital (Canada); **Hyun Wook Kang**, Pukyong National Univ. (Korea, Republic of)

1:30 pm: **Characterization of a 50-um-core optical fiber for use in thulium fiber laser lithotripsy**, Richard L. Blackmon, Thomas C. Hutchens, Luke Hardy, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8926-52]

1:45 pm: **Investigation on the impact of pulse duration for laser induced lithotripsy**, Ronald Sroka, Thomas Pongratz, Tugba Kiris, Sebastian Fiedler, Laser-Forschungslabor (Germany) [8926-53]

2:00 pm: **Rapid vaporization of kidney stones, ex vivo, using a thulium fiber laser operated at pulse rates up to 500 Hz**, Christopher R. Wilson, Luke Hardy, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8926-54]

2:15 pm: **Characterization of calculus migration during Ho:YAG laser lithotripsy by high speed camera using suspended pendulum method**, James J. Zhang, Danop Rajabhandharaks, Jason R. Xuan, Ray W. Chia, Tom Hasenberg, American Medical Systems (USA) [8926-55]

2:30 pm: **A permanently integrated fiber and stone basket for thulium fiber laser lithotripsy**, Christopher R. Wilson, Thomas C. Hutchens, Luke Hardy, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) [8926-56]

2:45 pm: **Visualizing mechanical stress, pressure waves and liquid flow during laser lithotripsy**, Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands); Jivan Wassenaar, Vrije Univ. Medical Ctr. (Netherlands); Albert J. van der Veen, Vrije Univ. Medical Ctr. (Netherlands); John H. Klaessens, Vrije Univ. Medical Ctr. (Netherlands) [8926-57]

POSTER SESSION AND COFFEE BREAK

Location: South Hall A Sat 3:00 pm to 4:00 pm

Poster Session and Coffee Break

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

In vitro evaluation of the effect of laser irradiation time on tissue ablation depth, Aditi Ray, Thuy T. Nguyen, Danop Rajabhandharaks, Hui Wang, Ray W. Chia, Tom Hasenberg, American Medical Systems (USA) [8926-58]

Effect of working distance on soft tissue in vitro during 532nm and 2.1µm laser prostatectomy, Danop Rajabhandharaks, Thuy T. Nguyen, Aditi Ray, Hui Wang, James J. Zhang, Ray W. Chia, Tom Hasenberg, American Medical Systems (USA) [8926-59]

A quantitative study on ICG-conjugated single-walled carbon nanotubes for photoacoustic imaging of vesicoureteral reflux, Phuc V. Nguyen, Nhat Quang Bui, Trung Hau Nguyen, Hyun Wook Kang, Pukyong National Univ. (Korea, Republic of); Jung Hwan Oh, Pukyong National Univ. (Korea, Republic of) and Nano Biomedicine LAB, Biomedical Engineering Department, Pukyong National University. (Korea, Republic of) [8926-60]

Multimodal evaluation of the efficacy of ICG-photodynamic therapy to tumors in rabbit, Sang Seok Hwang, Pukyong National Univ. (Korea, Republic of); Y. Chae, Pukyong National Univ. (Korea, Republic of) and Kosin Univ. (Korea, Republic of); Bong-Kwon Chun, Eun-Kee Park, Mannhohng Jung, Sang-Joon Lee, Gwang Myung Noh, Chulho Oak, Kosin Univ. (Korea, Republic of); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) [8926-150]

SESSION 12

Location: Room 238 (Mezzanine) Sat 4:00 pm to 5:15 pm

Tissue Imaging II

Session Chairs: **Kin Foong Chan; Geoffrey N. Box M.D.**,
The Ohio State Univ. (USA)

4:00 pm: **Quick and non-destructive qualification of prostate biopsies with full-field OCT**, Eugénie Dalimier, LLTECH SAS (France); Jonathan Lopater, Pierre Colin, Frédéric Beuvon, Mathilde Sibony, Hôpital Cochin (France); A. Claude Boccara, Fabrice Harms, LLTECH SAS (France) and Institut Langevin (France); Nicolas B. Delongchamps, Hôpital Cochin (France) [8926-61]

4:15 pm: **Native excitation and emission matrix fluorescence spectroscopy for quantification of tissue native fluorophores and cancer diagnosis**, Binlin Wu, Swapan K. Gayen, The City College of New York (USA); Min Xu, Fairfield Univ. (USA) [8926-63]

4:30 pm: **Volumetric in-vivo visualization of upper urinary tract tumors using optical coherence tomography**, Daniel M. de Bruin, Academisch Medisch Ctr. (Netherlands) [8926-64]

4:45 pm: **Method for improving photodynamic diagnosis and surgery of bladder tumours in flexible cystoscopes**, Lars R. Lindvold, Technical Univ. of Denmark (Denmark); Gregers G. Hermann, Frederiksberg Hospital (Denmark) [8926-65]

5:00 pm: **Volumetric mosaicing for optical coherence tomography for large area bladder wall visualization**, Kristen L. Lurie, Audrey K. Ellerbee, Stanford Univ. (USA) [8926-42]



Saturday - Sunday 1 - 2 February 2014 •
Part of Proceedings of SPIE Vol. 8926

Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology

Conference Chairs: **Brian J. F. Wong M.D.**, Beckman Laser Institute and Medical Clinic (USA); **Justus F. Ilgner M.D.**, Univ. Hospital Aachen (Germany)

Program Committee: **Christian S. Betz**, Ludwig-Maximilians-Univ. München (Germany); **Waseem K. Jerjes**, Univ. College London (United Kingdom); **Milind Rajadhyaksha**, Memorial Sloan-Kettering Cancer Ctr. (USA); **Chung-Ku Rhee M.D.**, Dankook Univ. Hospital (Korea, Republic of); **Jennifer E. Rosen**, Boston Univ. (USA); **Henricus J. C. M. Sterenberg**, Erasmus MC (Netherlands)

Saturday 1 February

SESSION 1

Location: Room 234 (Mezzanine) Sat 8:20 am to 10:00 am

Advanced Imaging and Novel Treatment Strategies in Otolaryngology

Session Chairs: **Justus F. Ilgner M.D.**, Univ. Hospital Aachen (Germany); **Chung-Ku Rhee M.D.**, Dankook Univ. Hospital (Korea, Republic of)

8:20 am: **Quantitative pneumatic otoscopy using low-coherence interferometry in a handheld device**, Ryan L. Shelton, Guillermo L. Monroy, Ryan M. Nolan, Univ. of Illinois at Urbana-Champaign (USA); Michael A. Novak M.D., Malcolm Hill M.D., Carle Foundation Hospital (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA). [8926-118]

8:40 am: **Differentiating acute and chronic otitis media with optical coherence tomography in a primary care imaging system**, Guillermo L. Monroy, Ryan L. Shelton, Ryan M. Nolan, Cac T. Nguyen, Univ. of Illinois at Urbana-Champaign (USA); Michael A. Novak M.D., Malcolm Hill M.D., Carle Foundation Hospital (USA); Daniel T. McCormick, Advanced MEMS (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8926-119]

9:00 am: **Fast broadband vibration measurement of the human tympanic membrane ex vivo by optical coherence tomography**, Anke Burkhardt, Univ. Carl Gustav Carus Dresden (Germany); Lars Kirsten, Technische Univ. Dresden (Germany); Julia Walther, Matthias Bornitz, Thomas Zahnert, Edmund Koch, Univ. Carl Gustav Carus Dresden (Germany). [8926-120]

9:20 am: **Effect of LLLT on the level of ATP and ROS from organ of corti cells**, Chung-Ku Rhee M.D., So-Young Chang, Jin-Chul Ahn M.D., Dankook Univ. Hospital (Korea, Republic of); Myung-Whan Suh, Seoul National Univ. (Korea, Republic of); Jae Yun Jung, Dankook Univ. (Korea, Republic of). [8926-121]

9:40 am: **3D optical coherence tomography image registration for guiding cochlear implant insertion**, Gyeong Woo Cheon, Preetham Chalasani, Wade W. Chien, Iulian Iordachita, Russell Taylor, John Niparko, Jin U. Kang, Johns Hopkins Univ. (USA). [8926-122]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 2

Location: Room 234 (Mezzanine) . . . Sat 10:30 am to 11:10 am

OCT for Functional Laryngeal Imaging

Session Chairs: **Krzysztof Izdebski**, Pacific Voice and Speech Foundation (USA); **Brian J. F. Wong M.D.**, Beckman Laser Institute and Medical Clinic (USA)

10:30 am: **A study of pediatric vocal fold maturation using optical coherence tomography**, Fouzi Benboujja, Ecole Polytechnique de Montréal (Canada); Derek Rogers M.D., Massachusetts Eye and Ear Infirmary (USA); Scott Infusino, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Hospital Research Ctr. (Canada); Christopher J. Hartnick M.D., Massachusetts Eye and Ear Infirmary (USA); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada). [8926-123]

10:50 am: **Automated working distance adjustment for a handheld OCT-laryngoscope**, Sabine Donner, Sebastian Bleeker, Tammo Ripken, Alexander Krueger, Laser Zentrum Hannover e.V. (Germany). [8926-124]

Lunch/Exhibition Break Sat 12:30 pm to 1:40 pm

SESSION 3

Location: Room 234 (Mezzanine) Sat 1:40 pm to 3:00 pm

Basic Research and Engineering Concepts for Advanced Head and Neck Imaging

Session Chairs: **Brian J. F. Wong M.D.**, Beckman Laser Institute and Medical Clinic (USA); **Justus F. Ilgner M.D.**, Univ. Hospital Aachen (Germany)

1:40 pm: **Self-motion-tracking probe for long range optical coherence tomography using micro beam splitter**, Jiawen Li, Jun Zhang, Alex Wang, Joseph Jing, Zhongping Chen, Univ. of California, Irvine (USA). [8926-125]

2:00 pm: **Multi-scale and functional microscopy for head and neck tissue identification**, Etienne De Montigny, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Hospital Research Ctr. (Canada); Nadir Goulamhousen, Wendy-Julie Madore, Ecole Polytechnique de Montréal (Canada); Tarek Ayad M.D., Ctr. Hospitalier de l'Univ. de Montréal (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) and Ctr. Hospitalier de l'Univ. de Montréal (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Hospital Research Ctr. (Canada) [8926-126]

2:20 pm: **Miniaturization does not impair the diagnostic value of ESS in human thyroid nodules**, Jennifer E. Rosen, Nicholas J. Giordano, Faris Azar, Eladio Rodriguez-Diaz, Ousama M. A'Amar, Irving J. Bigio, Stephanie L. Lee, Boston Univ. (USA). [8926-127]

2:40 pm: **Characterizing fluorescent imaging properties of antibodies conjugated to IRDye800CW for use in imaging of head and neck cancer**, Robert C. Foster, Asher M. Krell, Thomas K. Chung, Jason M. Warram, Kurt R. Zinn, Eben L. Rosenthal, The Univ. of Alabama at Birmingham (USA). . . [8926-128]

Coffee Break Sat 3:00 pm to 3:30 pm

SESSION 4

Location: Room 234 (Mezzanine) Sat 3:30 pm to 5:30 pm

Practical Results of Novel Imaging Technology in Head and Neck Lesions

Session Chairs: **Christian Stephan Betz**, Ludwig-Maximilians-Univ. Hospital München (Germany); **Waseem K. Jerjes**, Univ. College London (United Kingdom)

3:30 pm: **Optical biopsy on head and neck tissue using full-field OCT: a pilot study**, Frédéric De Leeuw, Institut Gustave Roussy (France); Anne Latrive, LLTECH SAS (France); Odile Casiraghi, Malek Ferchiou, Institut Gustave Roussy (France); Fabrice Harms, LLTECH SAS (France) and ESPCI ParisTech (France); Claude A. Boccara, ESPCI ParisTech (France) and LLTECH SAS (France); Corinne Laplace-Builhé, Institut Gustave Roussy (France). [8926-129]

3:50 pm: **Widefield fluorescence imaging as an auxiliary tool to select the biopsy site for actinic cheilitis diagnosis**, Cristina Kurachi D.D.S., Alessandro Cosci, Univ. de São Paulo (Brazil); Ademar Takahama Jr., Karla B. F. da Costa Fontes, Rebeca Aouza Azevedo, Univ. Federal Fluminense (Brazil). . . [8926-130]

4:10 pm: **Multimodal optical imaging approach for in vivo diagnosis of oral cancer**, Paritosh Pande, Sebina Shrestha, Jesung Park, Michael J. Serafino, Texas A&M Univ. (USA); Irma Gimenez-Conti, Jimi L. Brandon, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Brian E. Applegate, Javier A. Jo, Texas A&M Univ. (USA). [8926-131]

4:30 pm: **Diagnosing indeterminate thyroid nodules with ESS: in vivo measurement improves diagnostic value of fine-needle aspiration biopsy**, Jennifer E. Rosen, Nicholas J. Giordano, Ousama M. A'Amar, Eladio Rodriguez-Diaz, Irving J. Bigio, Stephanie L. Lee, Boston Univ. (USA). [8926-132]

4:50 pm: **Combination of multimodal nonlinear microscopy and conventional histopathology for the assessment of head and neck squamous cell carcinoma**, Tobias Meyer, Sandro Heuke, Institut für Photonische Technologien e.V. (Germany); Olaf Dirsch, Universitätsklinikum Jena (Germany); Iver Petersen, Friedrich-Schiller-Univ. Jena (Germany); Orlando Guntinas-Lichius, Universitätsklinikum Jena (Germany); Benjamin Dietzek, Institut für Photonische Technologien e.V. (Germany); Michael Schmitt, Friedrich-Schiller-Univ. Jena (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany)[8926-133]
 5:10 pm: **Reducing insufficiency in thyroid biopsies: improving the diagnostic value of a gold standard, an integrated spectroscopy syringe**, Jennifer E. Rosen, Nicholas J. Giordano, Eladio Rodriguez-Diaz, Ousama M. A'Amar, Irving J. Bigio, Stephanie L. Lee, Boston Univ. (USA)[8926-134]

11:10 am: **New photodynamic therapy dosimetry model for head and neck cancer** (*Invited Paper*), Gal Shafirstein, Heinz Baumann, David A. Bellnier, Greg Wilding, Nestor R. Rigual, Hassan Arshad, Sandra O. Gollnick, Roswell Park Cancer Institute (USA)[8926-140]
 11:40 am: **Efficient tissue ablation using a laser tunable in the water absorption band at 3 microns with little collateral damage**, A. Nierlich, Northwestern Univ. (USA); D. Chuchumishev, K. Marinova, Philip Philipov, Sofia Univ. (Bulgaria); T. Fiebig, Northwestern Univ. (USA); Ivan Buchvarov, Northwestern Univ. (USA) and Sofia Univ. (Bulgaria); Claus-Peter Richter, Northwestern Univ. (USA)[8926-141]
 Lunch/Exhibition Break Sun 12:00 pm to 1:00 pm

SESSION 7

Location: Room 234 (Mezzanine) Sun 1:00 pm to 3:30 pm

Upper Airway OCT and Spectroscopy

Session Chair: **Brian J. F. Wong M.D.**,
 Beckman Laser Institute and Medical Clinic (USA)

1:00 pm: **Optical screening in upper aerodigestive tract (pre)malignancies: an overview**, Christian Stephan Betz, Ludwig-Maximilians-Univ. Hospital München (Germany); Veronika Volgger, Ludwig-Maximilians-Univ. München (Germany); Anna S Enghard, Klinikum der Univ. München (Germany); Herbert Stepp, Univ. Hospital Munich (Germany); Susanne Girschick, Klinikum der Univ. München (Germany); Andreas Leunig, Ludwig-Maximilians-Univ. Hospital München (Germany)[8926-142]
 1:20 pm: **Digital 3-D modeling of the pediatric subglottis based on optical coherence tomography: a preliminary investigation** (*Invited Paper*), Giriraj K. Sharma M.D., Ashley Hamamoto, Alex Wang, Joseph C. Jing, Gurpreet S. Ahuja, Zhongping Chen, Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA)[8926-143]
 1:50 pm: **Shrinkage of porcine cutaneous specimen after formalin fixation and histopathology preparation: utilising OCT for dimensional change measurements**, Dara B. Rashed, Stefano Fedele, Colin Hopper, Univ. College London (United Kingdom); Richard J. Cook, King's College London (United Kingdom)[8926-144]
 2:10 pm: **Transitioning long-range optical coherence tomography of the pediatric upper airway from the operating room to the clinic**, Frances B. Lazarow, Beckman Laser Institute and Medical Clinic (USA); Gurpreet S. Ahuja, Univ. of California, Irvine (USA); Giriraj K. Sharma M.D., Alex Wang, Erica Su, Beckman Laser Institute and Medical Clinic (USA); Thanh Nguyen, Joseph C. Jing, Univ. of California, Irvine (USA); Zhongping Chen, Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA)[8926-145]

2:30 pm: **Evaluation of optical coherence tomography and probe-based confocal laser endomicroscopy to discriminate lesions of the upper aerodigestive tract**, Anna S Enghard, Klinikum der Univ. München (Germany); Susanne Girschick, Laser-Forschungslabor (Germany); Veronika Volgger, Ludwig-Maximilians-Univ. München (Germany); Herbert Stepp, Univ. Hospital Munich (Germany); Stephan Ihrler, Universitätsklinikum Münster (Germany); Christian Stephan Betz, Ludwig-Maximilians-Univ. Hospital München (Germany)[8926-146]
 2:50 pm: **Raman spectroscopy and oral exfoliative cytology**, Aditi Sahu, Nupur Shah, Manoj Mahimkar, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Mandavi Garud, Sandeep Pagare, D. Y. Patil Dental College (India); C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India)[8926-147]
 3:10 pm: **Raman spectroscopy of oral tissues: correlation of spectral and biochemical markers**, S. P. Singh, C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India)[8926-148]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Probe-based confocal laser endomicroscopy in head and neck malignancies using tumor-specific contrast agents: early preclinical experience, Susanne Girschick, Anna S Enghard, Alexander Palaras, Klinikum der Univ. München (Germany); Veronika Volgger, Ludwig-Maximilians-Univ. München (Germany); Herbert Stepp, Univ. Hospital Munich (Germany); Oliver Gires, Brigitte Mack, Klinikum der Univ. München (Germany); Christian Stephan Betz, Ludwig-Maximilians-Univ. Hospital München (Germany)[8926-149]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT
Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm
 Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award
 The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

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 The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 234 (Mezzanine) Sun 8:30 am to 9:10 am

PDT and Related Technology for Malignant and Pre-Malignant Head and Neck Lesions

Session Chairs: **Henricus J. C. M. Sterenberg**, Erasmus MC (Netherlands); **Milind Rajadhyaksha**, Memorial Sloan-Kettering Cancer Ctr. (USA)

8:30 am: **Determination of tissue optical properties in ALA-mediated Head and Neck PDT treated patients**, Andreea Dimofte, Jarod C. Finlay, Anna V. Sharikova, The Univ. of Pennsylvania Health System (USA); Keith A. Cengel, Univ. of Pennsylvania School of Medicine (USA); Peter Ahn, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA)[8926-135]
 8:50 am: **Plasmonic nanobubble theranostics for intra-operative and preventive treatment of head and neck squamous cell carcinoma**, Ekaterina Y. Lukianova-Hleb, Rice Univ. (USA); Xiaoyang Ren, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Rupa R. Sawant, Northeastern Univ. (USA); Ann M. Gillenwater M.D., Michael Kupferman, Ehab Y. Hanna, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Joseph A. Zasadzinski, Univ. of Minnesota (USA); Xiangwei Wu, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Vladimir P. Torchilin, Northeastern Univ. (USA); Dmitri O. Lapotko, Rice Univ. (USA)[8926-136]
 Coffee Break Sun 10:00 am to 10:30 am

SESSION 6

Location: Room 234 (Mezzanine) . . . Sun 10:30 am to 12:00 pm

Current Concepts in Laser Surgery and Optical Tracking

Session Chairs: **Justus F. Ilgner M.D.**, Univ. Hospital Aachen (Germany); **Christian Stephan Betz**, (Germany)

10:30 am: **Investigation on laser induced salivary stone fragmentation**, Ronald Sroka, Thomas Pongratz, Matthias Eder, Mona Domes, Laser-Forschungslabor (Germany); Michael Vogeser, Thorsten Johnson, Vanessa Siedeck, Florian Schroetzlmair, Pamela Zengel, Ludwig-Maximilians-Univ. München (Germany)[8926-137]
 10:50 am: **Accuracy of optical navigation systems for automatic head surgery: optical tracking versus optical coherence tomography**, Jesús Díaz Díaz, Leibniz Univ. Hannover (Germany); Mauro H. Riva, Leibniz Univ Hannover (Germany); Omid Majdani M.D., Medizinische Hochschule Hannover (Germany); Tobias Ortmaier, Leibniz Univ. Hannover (Germany)[8926-138]

Diagnostic and Therapeutic Applications of Light in Cardiology

Conference Chairs: **Guillermo J. Tearney M.D.**, Wellman Ctr. for Photomedicine (USA); **Kenton W. Gregory M.D.**, Oregon Medical Laser Ctr. (USA); **Laura Marcu**, Univ. of California, Davis (USA)

Program Committee: **Gijs van Soest**, Erasmus MC (Netherlands); **Carlo Di Mario**, Univ. College London (United Kingdom); **Stanislav Y. Emelianov**, The Univ. of Texas at Austin (USA)

Saturday 1 February

SESSION 13

Location: Room 301 (Esplanade) Sat 8:00 am to 10:15 am

Invited Talks

Session Chair: **Guillermo J. Tearney M.D.**, Wellman Ctr. for Photomedicine (USA)

8:00 am: **Optical methods to analyze blood clotting** (*Invited Paper*), Seemantini K. Nadkarni, Harvard Medical School (USA) [8926-66]

8:45 am: **Intravascular NIRS** (*Invited Paper*), James Goldstein, Beaumont Hospital (USA) [8926-67]

9:30 am: **TBD** (*Invited Paper*), Jeffrey Southard, Univ. of California, Davis (USA) [8926-68]

Coffee Break Sat 10:15 am to 10:45 am

SESSION 14

Location: Room 301 (Esplanade) . . . Sat 10:45 am to 11:45 am

Spectroscopy

Session Chair: **Laura Marcu**, Univ. of California, Davis (USA)

10:45 am: **Performance improvement by a broadband super-luminescent diode light source in 1.7- μ m spectroscopic spectral-domain optical coherence tomography for lipid distribution imaging in a coronary artery**, Masato Tanaka, Toshiaki Okuno, Hiroshi Obi, Issei Hattori, Mitsuharu Hirano, Takahiro Ueno, Shozo Tonosaki, Kiyotaka Murashima, Ryo Yamaguchi, Takemi Hasegawa, Sumitomo Electric Industries, Ltd. (Japan) [8926-69]

11:05 am: **Application of autofluorescence lifetime metrology as a label-free technique to assess heart disease**, Benjamin T. Dyer, Joao Lagarto, Markus B. Sikkell, Clifford B. Talbot, N. S. Peters, A. R. Lyon, P. M. French, C. Dunsby, Imperial College London (United Kingdom) [8926-71]

11:25 am: **Quantitative evaluation of atherosclerotic plaque phantom by near-infrared multispectral imaging with three wavelengths**, Ryo Nagao, Katsunori Ishii, Kunio Awazu, Osaka Univ. (Japan) [8926-72]

Lunch/Exhibition Break Sat 11:45 am to 1:35 pm

SESSION 15

Location: Room 301 (Esplanade) Sat 1:35 pm to 3:15 pm

Myocardium and Therapy

Session Chair: **Kenton W. Gregory M.D.**, Oregon Medical Laser Ctr. (USA)

1:35 pm: **Calcium and voltage imaging in arrhythmia models by high-speed microscopy**, Claudio de Mauro, Domenico Alfieri, Carlo A. Cecchetti, Light4Tech Firenze S.r.l. (Italy); Giulia Borile, Andrea Urbani, Marco Mongillo, Venetian Institute of Molecular Medicine (Italy); Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) [8926-73]

1:55 pm: **Prediction of myocardial damage depth induced by extracellular photosensitization reaction using fluorescence measurement *in vivo***, Mei Takahashi, Emiyu Ogawa, Tetsuya Nakamura, Hiroshige Kawakami, Naoki Machida, Masahiro Yajima, Mariko Kurotsu, Arisa Ito, Takehiro Kimura, Tsunenori Arai, Keio Univ. (Japan) [8926-74]

2:15 pm: **Three-dimensional quantification of myofiber orientation and tractography using optical coherence tomography**, Yu Gan, Christine P. Hendon, Columbia Univ. (USA) [8926-75]

2:35 pm: **Is it possible to prevent morbidity on post cardiovascular surgery applying low level laser therapy?**, Nathali C. Pinto, Univ. de São Paulo (Brazil); Ivany M. C. Baptista, Univ. Federal de São Paulo (Brazil); Suely Tomimura, Univ. Nove de Julho (Brazil); Mara H. C. Pereira, Univ. de São Paulo (Brazil); Nelson F. Serrão Jr., Faculty Sudoeste Paulista (Brazil); Pablo M. A. Pomerantzeff, Univ. de São Paulo (Brazil); Maria Cristina Chavantes M.D., Univ. de São Paulo (Brazil) and Univ. Nove de Julho (Brazil) [8926-76]

2:55 pm: **Study's significance from arterial elasticity and variation in arterial blood pressure for normotensive and hypertensive patients applying pre and post lasertherapy: preliminary results**, Maria Cristina Chavantes M.D., Univ. de São Paulo (Brazil) and Univ. Nove de Julho (Brazil); Tercio L. Morais, Univ. de São Paulo (Brazil); Suely Tomimura, Bianca P. Assunção, Marina Canal, Univ. Nove de Julho (Brazil); Nathali C. Pinto, Univ. de São Paulo (Brazil); Leticia S. Nakata, Iris Callado, Heno Lopes, Fernanda C. Colombo, Univ. Nove de Julho (Brazil) [8926-77]

Coffee Break Sat 3:15 pm to 3:45 pm

SESSION 16

Location: Room 301 (Esplanade) Sat 3:45 pm to 5:05 pm

Multimodality OCT

Session Chair: **Hongki Yoo**, Hanyang Univ. (Korea, Republic of)

3:45 pm: **Fiber-based combined OCT and two-photon luminescence imaging system for detection of thin-cap fibroatheroma**, Tianyi Wang, Jordan Dwell, Austin McElroy, The Univ. of Texas at Austin (USA); David Halaney, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Derek Ho, The Univ. of Texas at Austin (USA); Marc D. Feldman, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA) . . . [8926-78]

4:05 pm: **Multi-functional intravascular imaging system for vulnerable plaque diagnosis**, Shanshan Liang, Alex Wang, Beckman Laser Institute and Medical Clinic (USA); Teng Ma, The Univ. of Southern California (USA); Jiawen Li, Joseph Jing, Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Xiang Li, Koping Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8926-79]

4:25 pm: **Dual-modality optical frequency-domain (OFDI) and near-infrared fluorescence (NIRF) intravascular imaging: automated distance-based correction of NIRF signal intensity for quantitative molecular imaging**, Giovanni J. Ughi, Harvard Medical Sch [8926-81]

4:45 pm: **OCT Paper**, [8926-81]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

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See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 17

Location: Room 301 (Esplanade) Sun 8:00 am to 10:00 am

Light and Sound

Session Chair: **Stanislav Y. Emelianov**,
The Univ. of Texas at Austin (USA)

8:00 am: **Comparison of spectroscopic photoacoustic imaging of human coronary atherosclerosis in two spectral bands**, Krista Jansen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of The Netherlands (Netherlands); Min Wu, Erasmus MC (Netherlands); Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Delft Univ. of Technology (Netherlands) and Interuniversity Cardiology Institute of The Netherlands (Netherlands); Gijs van Soest, Erasmus MC (Netherlands) [8926-82]

8:20 am: **Diagnostic accuracy of integrated optical coherence tomography and intravascular ultrasound (OCT-IVUS) system for coronary plaque characterization**, Jiawen Li, Univ. of California, Irvine (USA); Teng Ma, Adrian Correa, The Univ. of Southern California (USA); Dilbahar Mohar, Univ. of California, Irvine School of Medicine (USA); Koping Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA); Pranav Patel, Univ. of California, Irvine School of Medicine (USA); Zhongping Chen, Univ. of California, Irvine (USA) . . . [8926-83]

8:40 am: **Intravascular ultrasound and photoacoustic imaging for atherosclerotic plaque characterization and local therapy guidance**, Doug Yeager, Yun-Sheng Chen, Christian Preihs, The Univ. of Texas at Austin (USA); Silvio Litovsky, The Univ. of Alabama at Birmingham (USA); Jonathan Sessler, Stanislav Emelianov, The Univ. of Texas at Austin (USA) [8926-84]

9:00 am: **Bimodal imaging of ex-vivo human coronaries using a hybrid catheter combining fluorescence lifetime imaging (FLIm) and intravascular ultrasound (IVUS)**, Hussain Fatakawala, Dimitris Gorpas, Julien Bec, Dinglong Ma, Diego R. Yankelevich, Univ. of California, Davis (USA); Jeffrey Southard, UC Davis Medical Ctr. (USA); John W. Bishop, Laura Marcu, Univ. of California, Davis (USA) [8926-85]

9:20 am: **Bimodal imaging of atherosclerotic plaques: automated method for co-registration between fluorescence lifetime imaging and intravascular ultrasound data**, Dimitris Gorpas, Hussain Fatakawala, Julien Bec, Dinglong Ma, Diego R. Yankelevich, John W. Bishop, Jinyi Qi, Laura Marcu, Univ. of California, Davis (USA) [8926-86]

9:40 am: **Confocal acoustic radiation force optical coherence elastography for cardiovascular imaging**, Rui Li, Wenjuan Qi, Beckman Laser Institute and Medical Clinic (USA); Teng Ma, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8926-87]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 18

Location: Room 301 (Esplanade) . . . Sun 10:30 am to 11:50 am

Advanced OCT

Session Chair: **Gijs van Soest**, Erasmus MC (Netherlands)

10:30 am: **Validation of intracoronary OCT-Derived FFR for assessment of intermediate coronary lesions**, Sun-Joo Jang, KAIST (Korea, Republic of); Jung-Min Ahn, Seung-Jung Park, Asan Medical Ctr. (Korea, Republic of); Wang-Yuhl Oh, KAIST (Korea, Republic of) [8926-88]

10:50 am: **Intracoronary polarization sensitive OCT**, Martin L. Villiger, Ellen Z. Zhang, Wellman Ctr. for Photomedicine (USA); Wang-Yuhl Oh, KAIST (Korea, Republic of); Gijs van Soest, Heleen M. M. van Beusekom, Evelyn Regar, Erasmus MC (Netherlands); Benjamin J. Vakoc, Seemantini K. Nadkarni, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8926-89]

11:10 am: **Intensity-based multidimensional flow measurements using intravascular optical frequency-domain imaging**, Néstor Uribe-Patarroyo, Martin L. Villiger, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8926-90]

11:30 am: **Analysis of intravascular OCT stent images using machine learning**, David L. Wilson, Hong Lu, Zhao Wang, Case Western Reserve Univ. (USA); Daniel Chamie, Case Western Reserve Univ. (USA) and Univ. Hospitals of Cleveland (USA); Tomoaki Kanaya, Univ. Hospitals of Cleveland (USA); Soumya Ray, Ronny Shalev, Case Western Reserve Univ. (USA); Marco A. Costa, Univ. Hospitals of Cleveland (USA) and Case Western Reserve Univ. (USA); Andrew M. Rollins, Case Western Reserve Univ. (USA); Hiram G. Bezerra, Univ. Hospitals of Cleveland (USA) [8926-91]

Lunch/Exhibition Break Sun 11:50 am to 1:20 pm

SESSION 19

Location: Room 301 (Esplanade) Sun 1:20 pm to 3:00 pm

Tissue Characterization

Session Chair: **Jennifer E. Phipps**,
The Univ. of Texas Health Science Ctr. at San Antonio (USA)

1:20 pm: **Intravascular optical coherence tomography: automatic characterization of neointimal tissue maturity after stent implantation**, Giovanni J. Ughi, Katholieke Univ. Leuven (Belgium); Kristin Steigerwald, Deutsches Herzzentrum München (Germany); Tom Adriaenssens, Walter Desmet, Katholieke Univ. Leuven (Belgium); Giulio Guagliumi, Ospedale Papa Giovanni XXIII (Italy); Michael Joner, Deutsches Herzzentrum München (Germany); Jan D'Hooge, Katholieke Univ. Leuven (Belgium) [8926-92]

1:40 pm: **Optical coherence tomography tissue type (OCT) imaging: clinical validation**, Takeyoshi Kameyama, Erasmus MC (Netherlands) and Tohoku Univ. (Japan); Muthukaruppan Gnanadesigan, Erasmus MC (Netherlands); Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Delft Univ. of Technology (Netherlands) and Interuniversity Cardiology Institute of the Netherlands (Netherlands); Karen Witberg, Jurgen M. A. Ligthart, Antonios Karanasos, Evelyn Regar, Gijs van Soest, Erasmus MC (Netherlands) [8926-93]

2:00 pm: **In vivo polarization-sensitive optical coherence tomography imaging in a murine model of myocardial infarction**, Sun-Joo Jang, Taejin Park, Wang-Yuhl Oh, KAIST (Korea, Republic of) [8926-94]

2:20 pm: **Foam cells and thin-cap fibroatheroma artifacts: optical coherence tomography versus histology**, Jennifer E. Phipps, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Deborah Vela, The Texas Heart Institute (USA); Taylor Hoyt, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Thomas E. Milner, The Univ. of Texas at Austin (USA); Marc D. Feldman, The Univ. of Texas Health Science Ctr. at San Antonio (USA) [8926-95]

2:40 pm: **Optical properties of atherosclerotic tissue types from computational intravascular OCT**, David L. Wilson, Madhusudhana Gargasha, Ronny Shalev, David Prabhu, Kentaro Tanaka, Andrew M. Rollins, Case Western Reserve Univ. (USA); Marco A. Costa, Hiram G. Bezerra, Case Western Reserve Univ. (USA) and Univ. Hospitals of Cleveland (USA) [8926-96]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 20

Location: Room 301 (Esplanade) Sun 3:30 pm to 4:10 pm

Laser Speckle Imaging

Session Chair: **Seemantini K. Nadkarni**, Harvard Medical School (USA)

3:30 pm: **Design and evaluation of optical fiber bundles for intracoronary laser speckle imaging**, Jing Wang, Seemantini K. Nadkarni, Wellman Ctr. for Photomedicine (USA) [8926-97]

3:50 pm: **Omni-directional viewing catheter for intravascular laser speckle imaging (ILSI)**, Masaki Hosoda, Massachusetts General Hospital (USA) and Canon U.S.A., Inc. (USA); Jing Wang, Diane Tsikudi, Seemantini K. Nadkarni, Massachusetts General Hospital (USA) [8926-98]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

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Development of a fully integrated high-speed intravascular OFDI-NIRF imaging catheter system for detecting inflamed plaques in coronary sized vessels in vivo, Min Woo Lee, Hanyang Univ. (Korea, Republic of); Han Saem Cho, KAIST (Korea, Republic of); Sunki Lee, Sunwon Kim, Korea Univ. Guro Hospital (Korea, Republic of); Sun-Joo Jang, KAIST (Korea, Republic of); Hyunjin Chung, Kyeongsoon Park, Korea Basic Science Institute (Korea, Republic of); Wang-Yuhl Oh, KAIST (Korea, Republic of); Jin Won Kim, Korea Univ. Guro Hospital (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of) [8926-99]

Frequency domain optical coherence tomography for the assessment of functionally significant coronary stenosis, Haroon Zafar, National Univ. of Ireland, Galway (Ireland); Faisal Sharif, Univ. Hospital Galway (Ireland) and National Univ. of Ireland, Galway (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform (Ireland) and Royal College of Surgeons (Ireland) [8926-101]

Cardiac tissue characterization using near-infrared spectroscopy, Rajinder P. Singh-Moon, Yang Zhou, Christine P. Hendon, Columbia Univ. (USA) [8926-102]

Automatic detection of vessel lumen and stent struts in IV-OCT images to quantitatively estimate stent apposition and neointimal growth, Hyeongsoo Nam, Changsoo Kim, Hanyang Univ. (Korea, Republic of); Sunwon Kim, Korea Univ. Guro Hospital (Korea, Republic of); Jong-Min Lee, Hanyang Univ. (Korea, Republic of); Jin Won Kim, Korea Univ. Guro Hospital (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of) [8926-100]

Optics in Bone Surgery and Diagnostics

Conference Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

Conference Co-Chair: **Michael D. Morris**, Univ. of Michigan (USA)

Program Committee: **Robert R. Alfano**, The City College of New York (USA); **Bennett T. Amaechi**, The Univ. of Texas Health Science Ctr. at San Antonio (USA); **Peter Fratzl**, Max-Planck-Institut für Kolloid- und Grenzflächenforschung (Germany); **Huabei Jiang**, Univ. of Florida (USA); **Stephen J. Matcher**, The Univ. of Sheffield (United Kingdom); **Eleftherios P. Paschalis**, Ludwig Boltzmann Institut (Austria); **Rahul Tandon D.D.S.**, Loma Linda Univ. (USA); **Victor X. D. Yang**, Ryerson Univ. (Canada)

Saturday 1 February

SESSION 21

Location: Room 228 (Mezzanine) Sat 8:00 am to 10:10 am

Bone Surgery and Ablation

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

8:00 am: **Efficient bone cutting with a novel diode pumped Er:YAG laser system: in vitro investigation and optimization of the treatment parameters** (*Invited Paper*), Karl Stock, Rolf Diebold, Raimund Hibst, Univ. Ulm (Germany) [8926-103]

8:30 am: **Laser technologies in treatment of degenerative-dystrophic bone diseases in children** (*Invited Paper*), Ivan A. Abushkin, Valery A. Privalov, South Ural State Medical Univ. (Russian Federation); Alexander V. Lappa, Chelyabinsk State Univ. (Russian Federation); Nikolay V. Noskov, Elena A. Neizvestnykh, Alexander N. Kotlyarov, Ulia G. Shekunova, South Ural State Medical Univ. (Russian Federation) [8926-104]

9:00 am: **Bone graft complications: what can we do to prevent them?**, Rahul Tandon D.D.S., Alan S. Herford D.D.S., Loma Linda Univ. (USA) [8926-105]

9:20 am: **RT-PCR standartization and bone mineralization after low-level laser therapy on adult osteoblast cells**, Fernando R. C. Bomfim, Univ. Federal de São Paulo (Brazil) and Herminio Ometto Foundation (Brazil); Valéria R. G. Sella, Univ. Federal de São Paulo (Brazil); Jéssica Q. Zanaga, Nayara S. Pereira, UNIARARAS (Brazil); Viviane L. A. Nouailhetas, Hélio Plapler M.D., Univ. Federal de São Paulo (Brazil) [8926-106]

9:40 am: **Radiofrequency ablation for oral & maxillofacial pathologies: a description of the technique** (*Invited Paper*), Timothy W. Stevens D.D.S., Rahul Tandon D.D.S., Alan S. Herford D.D.S., Loma Linda Univ. (USA) [8926-107]

Coffee Break Sat 10:10 am to 10:40 am

SESSION 22

Location: Room 228 (Mezzanine) . . . Sat 10:40 am to 12:00 pm

Musculoskeletal Imaging and Diagnostics I

Session Chair: **Rahul Tandon D.D.S.**, Loma Linda Univ. (USA)

10:40 am: **Photothermal coherence tomographies for hard tissue imaging** (*Invited Paper*), Andreas Mandelis, Nima Tabatabaei, Univ. of Toronto (Canada) [8926-108]

11:10 am: **Deep tissue imaging of micro-fracture and non-displaced fracture of bone using the three near-infrared therapeutic windows** (*Invited Paper*), Laura A. Sordillo, Yang Pu, Peter P. Sordillo, Yuri Budansky, Robert R. Alfano, The City College of New York (USA) [8926-109]

11:40 am: **Human bone periosteum studied by one: photon and two-photon fluorescence**, Noella Hatak, St. John's Univ. (USA); Nanda Shivnanjappa, Yang Pu, Lingyan Shi, Stephanie Lubicz M.D., Robert R. Alfano, The City College of New York (USA) [8926-110]

Lunch/Exhibition Break Sat 12:00 pm to 1:30 pm

SESSION 23

Location: Room 228 (Mezzanine) Sat 1:30 pm to 3:10 pm

Musculoskeletal Imaging and Diagnostics II

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

1:30 pm: **What can optical techniques tell us about the 3D collagen structure of articular cartilage?** (*Invited Paper*), Stephen J. Matcher, The Univ. of Sheffield (United Kingdom) [8926-111]

2:00 pm: **Infrared fiber optic probes for evaluation of musculoskeletal tissue pathology** (*Invited Paper*), Mugdha Padalkar, Cushla McGovern, Quam Onigbanjo, Temple Univ. (USA); Richard G. Spencer, National Institutes of Health (USA); Nancy Pleshko, Temple Univ. (USA) [8926-112]

2:30 pm: **Photoacoustic and ultrasound backscattering characterization of bone tissue**, Bahman Lashkari, Lifeng Yang, Joel W. Y. Tan, Andreas Mandelis, Univ. of Toronto (Canada) [8926-113]

2:50 pm: **Photonic hydrogel beads for controlled release of risedronate**, Deepak Khajuria, D. Roy Mahapatra, Indian Institute of Science (India) . [8926-114]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 24

Location: Room 228 (Mezzanine) Sat 3:40 pm to 5:10 pm

Bone Spectroscopy and Surgery

Session Chair: **Andreas Mandelis**, Univ. of Toronto (Canada)

3:40 pm: **Attenuated total reflection Fourier transform infrared (ATR-FTIR) spectroscopic analysis of regenerated bone**, Carolina Benetti, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Sergei G. Kazarain, Imperial College London (United Kingdom); Marco A. V. Alves, Alberto Blay, Luciana Correa, Univ. de São Paulo (Brazil); Denise M. Zzell, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8926-115]

4:00 pm: **Spatial frequencies from human bone periosteum at different depths using two-photon microscopic images**, Laura A. Sordillo, Stephen Bhagroo, Theinam Nguyen, Lingyan Shi, Noella Hatak, Stephanie Lubicz M.D., Yang Pu, Robert R. Alfano, The City College of New York (USA) [8926-116]

4:20 pm: **Photoacoustic and ultrasound dual-modality imaging for inflammatory arthritis** (*Invited Paper*), Guan Xu, Univ. of Michigan Medical School (USA); David L. Chamberland, Univ. of Michigan (USA); Gandikota Girish, Xueding Wang, Univ. of Michigan Medical School (USA) [8926-117]

4:50 pm: **Collagen density determines impaired mechanical function of osteogenesis imperfecta: a murine model study**, Hao Ding, Catherine Ambrose, The Univ. of Texas Health Science Ctr. at Houston (USA); Ingo Grafe, Brendan Lee, Baylor Univ. (USA); Xiaohong Bi, The Univ. of Texas Health Science Ctr. at Houston (USA) [8926-139]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Conference 8927A · Location: Room 304 (Esplanade)

Sunday - Monday 2 - 3 February 2014 • Part of Proceedings of SPIE Vol. 8927

Endoscopic Microscopy IX

Conference Chairs: **Guillermo J. Tearney M.D.**, Wellman Ctr. for Photomedicine (USA); **Thomas D. Wang**, Univ. of Michigan (USA)

Program Committee: **David L. Dickensheets**, Montana State Univ. (USA); **Arthur F. Gmitro**, The Univ. of Arizona (USA); **Ralf Kiesslich M.D.**, Johannes Gutenberg Univ. Mainz (Germany); **Francois Lacombe**, Mauna Kea Technologies (France); **Stephen Lam M.D.**, The BC Cancer Agency Research Ctr. (Canada); **Hiroshi Mashimo**, VA Boston Healthcare System (USA); **Kenzi Murakami**, Olympus Corp. (Japan); **Norman S. Nishioka M.D.**, Massachusetts General Hospital (USA); **Wibool Piyawattanametha**, National Electronics and Computer Technology Ctr. (Thailand); **Mark J. Schnitzer**, Stanford Univ. School of Medicine (USA); **Peter T. C. So**, Massachusetts Institute of Technology (USA); **Melissa J. Suter**, Massachusetts General Hospital (USA)

Sunday 2 February

SESSION 1

Location: Room 304 (Esplanade) Sun 8:20 am to 10:20 am

Spectral Encoding I

Session Chair: **Ronit Yelin**, Massachusetts General Hospital (USA)

8:20 am: **Pathology of pediatric GI disorders** (*Invited Paper*), Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA)[8927-1]

9:00 am: **In vivo large-area confocal imaging of esophagus using SECM**, DongKyun Kang, Massachusetts General Hospital (USA); Simon Schlachter, Massachusetts General Hospital (USA) and Nine Point Medical (USA); Robert W. Carruth, Massachusetts General Hospital (USA); Minkyu Kim, Massachusetts General Hospital (USA) and Tokyo Univ. (Japan); Tao Wu, Wellman Ctr. for Photomedicine (USA); Nima Tabatabaei, Massachusetts General Hospital (USA); Paulino Vacas-Jacques, Milen Shishkov, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Kevin Woods, Emory Univ. Hospital (USA); Jenny S. Sauk, John Leung, Norman S. Nishioka M.D., Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA)[8927-2]

9:20 am: **Flow velocity measurements in spectrally encoded flow cytometry**, Tal Elhanan, Lior Golan, Dvir Yelin, Technion-Israel Institute of Technology (Israel)[8927-3]

9:40 am: **Development of tissue marking system for image-guided biopsy in spectrally-encoded confocal endomicroscopy platform**, Nima Tabatabaei, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Minkyu Kim, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and The Univ. of Tokyo (Japan); Tao Wu, Dongkyun Kang, Guillermo J. Tearney M.D., Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA)[8927-4]

10:00 am: **Spectrally-encoded confocal endomicroscopy capsule for diagnosis of eosinophilic esophagitis**, Nima Tabatabaei, Dongkyun Kang, Tao Wu, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Minkyu Kim, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and The Univ. of Tokyo (Japan); Robert W. Carruth, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA)[8927-5]

Coffee Break Sun 10:20 am to 10:50 am

SESSION 2

Location: Room 304 (Esplanade) . . . Sun 10:50 am to 11:50 am

Advanced Microscopy I

Session Chair: **Thomas Duen-Shyr Wang M.D.**, Univ. of Michigan (USA)

10:50 am: **Development and characterisation of wide-field and confocal fluorescence lifetime imaging endoscopes for biomedical applications**, Hugh Sparks, Ian H. Munro, Gordon Thomas Kennedy, Imperial College London (United Kingdom); Eishu Hirata, Cancer Research UK London Research Institute (United Kingdom); Ezra Nigar, The North West London Hospitals NHS Trust (United Kingdom); Sean Warren, Imperial College London (United Kingdom); Erik Sahai, Cancer Research UK London Research Institute (United Kingdom); Taran S. Tatla, Northwick Park Hospital (United Kingdom); Chris Dunsby, Paul M. W. French, Imperial College London (United Kingdom)[8927-7]

11:10 am: **Comparing line-scanned and point-scanned dual-axis confocal microscope performance in phantoms and tissues for high-speed point-of-care pathology**, Danni Wang, Ye Chen, Jonathan T. Liu, Stony Brook Univ. (USA)[8927-8]

11:30 am: **Development and testing of an achromatized miniature objective for in vivo confocal microendoscopy**, Tzu-Yu Wu, Arthur F. Gmitro, College of Optical Sciences, The Univ. of Arizona (USA); Andrew R. Rouse, The Univ. of Arizona (USA)[8927-9]

Lunch Break Sun 11:50 am to 1:40 pm

SESSION 3

Location: Room 304 (Esplanade) Sun 1:20 pm to 3:00 pm

OCT Probes

Session Chair: **Xingde Li**, Johns Hopkins Univ. (USA)

1:20 pm: **Tethered capsule endomicroscopy with an integrated white light camera for navigation in the upper GI tract**, Elena G. Quijano, Michalina J. Gora, Robert W. Carruth, Weina Lu, Drew T. Carlton, Amna R. Soomro, Lorissa A. Moffit, Mireille Rosenberg, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Alessio Fasano M.D., Aubrey J. Katz M.D., Massachusetts General Hospital (USA); Norman S. Nishioka M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Harvard-MIT Health Sciences and Technology (USA)[8927-10]

1:40 pm: **Linear scanning micro-optical coherence tomography probe for imaging of mucociliary transport in airways**, Kengyeh K. Chu, Robert W. Carruth, Kanwarpal Singh, Huan Ma, Massachusetts General Hospital (USA); James Winkelmann, Univ. of Missouri (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney M.D., Massachusetts General Hospital (USA)[8927-12]

2:00 pm: **Forward-viewing endoscopic OCT catheter using asymmetrically resonant fiber scanner**, Hyeon-Cheol Park, Yeong-Hyeon Seo, Ki-Hun Jeong, KAIST (Korea, Republic of)[8927-13]

2:20 pm: **Improved spatial frequency response in optical coherence tomography imaging using a depth-encoded pupil mask**, Kanwarpal Singh, Huan Ma, Tim N. Ford, Kengyeh K. Chu, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA)[8927-14]

2:40 pm: **Tethered capsule endomicroscopy for image-guided biopsy in surveillance of Barrett's esophagus progression**, Michalina J. Gora, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Amna R. Soomro, Wellman Ctr. for Photomedicine (USA); Weina Lu, Robert W. Carruth, Drew T. Carlton, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Lorissa A. Moffitt, Wellman Ctr. for Photomedicine (USA); Mierille Rosenberg, William Puricelli, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Norman S. Nishioka M.D., Guillermo J. Tearney M.D., Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA)[8927-11]

Coffee Break Sun 3:00 pm to 3:30 pm

GRIN lens-based endoscopic micro-optical coherence tomography, JunYoung Kim, Minwoo Lee, Hongki Yoo, Hanyang Univ. (Korea, Republic of)[8927-32]

SESSION 4

Location: Room 304 (Esplanade) Sun 3:30 pm to 4:50 pm

Fluorescence/Spectroscopy

Session Chair: **Mary-Ann Mycek**, Univ. of Michigan (USA)

3:30 pm: **Image quantification for widefield molecular endoscopy to detect esophageal neoplasia**, Xiyu Duan, Bishnu Joshi, Emily Rabinsky, Univ. of Michigan (USA); Chenying Yang, Eric J. Seibel, Univ. of Washington (USA); Danielle K. Turgeon, Thomas D. Wang M.D., Univ. of Michigan (USA). . . [8927-15]

3:50 pm: **Diffuse optical spectroscopy probe for therapy monitoring in colorectal cancer**, Martijn van de Giessen, Leids Univ. Medical Ctr. (Netherlands); Ylenia Santoro, Robert H. Wilson, Univ. of California, Irvine (USA); Soroush Mirzaei Zarandi, Alessio Pigazzi, Univ of California, Irvine (USA); Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA); Bruce J. Tromberg, Univ of California, Irvine (USA). [8927-16]

4:10 pm: **Clinical translation of real-time color and near-infrared fluorescence endoscopy: feasibility study in cholangiopancreatography**, Jürgen Glatz, Pilar Beatriz García-Allende, Helmholtz Zentrum München GmbH (Germany); Valentin Becker, Technische Univ. München (Germany); Maximilian Koch, Helmholtz Zentrum München GmbH (Germany); Alexander Meining, Klinikum Rechts der Isar, Technische Univ München (Germany); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) [8927-17]

4:30 pm: **Multispectral scanning fiber endoscope with concurrent autofluorescence background mitigation for improved target-to-background ratio**, Chenying Yang, Vivian W. Hou, Leonard Y. Nelson, Richard S. Johnston, Charles David Melville, Eric J. Seibel, Univ. of Washington (USA) [8927-18]

Monday 3 February

SESSION 5

Location: Room 304 (Esplanade) . . . Mon 8:40 am to 10:00 am

Spectral Encoding II

Session Chair: **DongKyun Kang**, Massachusetts General Hospital (USA)

8:40 am: **Compound vari-focal objective lens for confocal endomicroscopy**, Minkyu Kim, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and The Univ. of Tokyo (Japan) and Harvard Medical School (USA); Dongkyun Kang, Tao Wu, Nima Tabatabaei, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Robert W. Carruth, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8927-19]

9:00 am: **Double-clad fiber coupler for confocal endomicroscopy at 800 nm**, Wendy-Julie Madore, Etienne De Montigny, Olivier Ouellette, Gabriel Bernard, Mikael Leduc, Nicolas Godbout, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada). [8927-20]

9:20 am: **Image-guided therapy by spectrally encoded endoscopy**, DongKyun Kang, Ehsan Hamidi, Joseph A. Gardecki, Massachusetts General Hospital (USA); Ramses V. Martinez, George M. Whitesides, Harvard Univ. (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [8927-21]

9:40 am: **Miniature, forward-viewing probe for spectrally encoded endoscopy**, Adel Zeidan, Dvir Yelin, Technion-Israel Institute of Technology (Israel) [8927-22]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 304 (Esplanade) . . Mon 10:30 am to 11:30 am

Multiphoton Microscopy

Session Chair: **Peter T. C. So**, Massachusetts Institute of Technology (USA)

10:30 am: **Pulse shaping for optimum pulse delivery through an image guide fiber bundle at 775-nm wavelength**, Dug Young Kim, Yonsei Univ. (Korea, Republic of); Seung Bum Cho, Gwangju Institute of Science and Technology (Korea, Republic of); Byung Hwy So, Yoon Young Ji, Yonsei Univ. (Korea, Republic of) [8927-23]

10:50 am: **Fiber-optic endomicroscopic two-photon fluorescence lifetime imaging**, Wenxuan Liang, Gunnsteinn Hall, Lesan Yan, Johns Hopkins Univ. (USA); Carmen Kut, The Johns Hopkins Hospital (USA); Ming-Jun Li, Corning Inc. (USA); Kristine Glunde, Zaver Bhujwalla, Xingde Li, Johns Hopkins Univ. (USA) [8927-25]

11:10 am: **Development of a miniaturized side-looking probe based two-photon microscopy and optical coherence tomography**, Taejun Wang, Qingyun Li, Pohang Univ. of Science and Technology (Korea, Republic of); Jinhyo Ahn, KAIST (Korea, Republic of); Yeongeun Kim, Minjun Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Miyeoun Song, Kyung Hee Univ. (Korea, Republic of); Euiheon Chung, Gwangju Institute of Science and Technology (Korea, Republic of); Wankyun Chung, G-One Ahn, Pohang Univ. of Science and Technology (Korea, Republic of); Pilhan Kim, KAIST (Korea, Republic of); Seungjae Myung, Asan Medical Ctr. (Korea, Republic of); Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8927-26]

Lunch Break Mon 11:30 am to 1:20 pm

SESSION 7

Location: Room 304 (Esplanade) Mon 1:20 pm to 2:40 pm

Advanced Microscopy II

Session Chair: **Arthur F. Gmitro**, The Univ. of Arizona (USA)

1:20 pm: **Fluorescence microendoscopic system for imaged-guided holographic photostimulation and laser microsurgery**, Anson H. L. Tang, Andy K. S. Lau, Kenneth K. Y. Wong, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) [8927-27]

1:40 pm: **Volume holographic reflection endoscope for in-vivo ovarian cancer clinical studies**, Isela D. Howlett, Michael Gordon, Jennifer K. Barton, Raymond K. Kostuk, College of Optical Sciences, The Univ. of Arizona (USA) [8927-28]

2:00 pm: **The potential for store bought foods/liquids to provide oral contrast for reflectance confocal microscopy of the esophagus**, Tao Wu, Dongkyun Kang, Minkyu Kim, Nima Tabatabaei, Robert W. Carruth, Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [8927-29]

2:20 pm: **Ultrahigh-speed endoscopic swept source optical coherence tomography using a VCSEL light source and micromotor catheter**, Tsung-Han Tsai, Osman O. Ahsen, Hsiang-Chieh Lee, Kaicheng Liang, Michael G. Giacomelli, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs, Inc. (USA); Yuankai K. Tao, Massachusetts Institute of Technology (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Martin F. Kraus, Massachusetts Institute of Technology (USA) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Marisa Figueiredo, Qin Huang, VA Boston Healthcare System (USA); Hiroshi Mashimo, VA Boston Healthcare System (USA) and Harvard Medical School (USA); Alex E. Cable, Thorlabs Inc. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8927-30]

Coffee Break Mon 2:40 pm to 3:30 pm

SESSION 8

Location: Room 304 (Esplanade) Mon 3:30 pm to 4:40 pm

Miniature Instruments for Endoscopic Microscopy

Joint Session with Conferences 8927A and 8977

Session Chair: **Jonathan T. Liu**, Stony Brook Univ. (USA)

3:30 pm: **MEMS endoscopes for advanced biomedical imaging (Invited Paper)**, Ki-Hun Jeong, Hyeon-Cheol Park, Kyungwon Jang, KAIST (Korea, Republic of) [8977-1]

4:00 pm: **A high-resonance-frequency MEMS Fabry-Perot tunable filter with applications in high speed swept-source optical coherence tomography (OCT) imaging**, Vaibhav Mathur, Peter Whitney, Mark Kuznetsov, AXSUN Technologies Inc. (USA) [8977-2]

4:20 pm: **Vertical cross-sectional imaging by multi-spectral handheld dual axes confocal endomicroscope**, Zhen Qiu, Haijun Li, Xiyu Duan, Supang Khondee, Bishnu Joshi, Kenn R. Oldham, Katsuo Kurabayashi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8927-31]

Optical Techniques in Pulmonary Medicine

Conference Chairs: **Melissa J. Suter**, Massachusetts General Hospital (USA); **Stephen Lam M.D.**, The BC Cancer Agency Research Ctr. (Canada); **Matthew Brenner**, Univ. of California, Irvine (USA)

Program Committee: **Johannes de Boer**, Vrije Univ. Amsterdam (Netherlands); **Edmund Koch**, Universitätsklinikum Carl Gustav Carus Dresden (Germany); **David D. Sampson**, The Univ. of Western Australia (Australia); **Luc Thiberville**, Rouen Univ. Hospital (France); **Victor X. D. Yang**, Ryerson Univ. (Canada); **Septimiu D. Murgu M.D.**, The Univ. of Chicago (USA); **Robert A. McLaughlin**, The Univ. of Western Australia (Australia)

Saturday 1 February

SESSION 9

Location: Room 310 (Esplanade) Sat 8:00 am to 10:00 am

Clinical I

Session Chair: **Stephen Lam M.D.**,
The BC Cancer Agency Research Ctr. (Canada)

8:00 am: **Bronchoscopy in asthma, COPD and lung transplant** (*Invited Paper*), Kyle Hogarth M.D., Univ. of Chicago Medicine (USA) [8927-33]

8:40 am: **Co-registered optical coherence tomography and autofluorescence imaging of human lung**, Hamid Pahlevaninezhad, Anthony M. Lee, Rashika Raizada, Lucas Cahill, Stephen Lam, Calum MacAulay, Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) [8927-34]

9:00 am: **Optical coherence tomography (OCT) for management of major airway stenosis**, Tawimas Shaipanich, Anthony M. Lee, Wei Zhang, Rosa M. Lopez Lisbona M.D., Rashika Raizada, Pierre M. Lane, Stephen Lam, The BC Cancer Agency Research Ctr. (Canada) [8927-35]

9:20 am: **Evaluation of airway response to segmental allergen challenge by optical frequency domain imaging**, Alyssa J. Miller, Matthew B. Applegate, Daniel Hamilos, Josalyn L. Cho, R. Scott Harris, Alex Chee, Khay M. Tan, Andrew D. Luster M.D., Benjamin D. Medoff, Melissa J. Suter, Massachusetts General Hospital (USA) [8927-36]

9:40 am: **Sex differences in chronic obstructive pulmonary disease evaluated using optical coherence tomography**, Miranda Kirby, The Univ. of British Columbia (Canada) and St. Paul's Hospital (Canada); Wei Zhang, The BC Cancer Agency Research Ctr. (Canada); Peter K. Laratta, Don D. Sin, St. Paul's Hospital (Canada); Annette M. McWilliams, Stephen Lam, The BC Cancer Agency Research Ctr. (Canada); Harvey O. Coxson, The Univ. of British Columbia (Canada) and St. Paul's Hospital (Canada) [8927-37]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 10

Location: Room 310 (Esplanade) . . . Sat 10:30 am to 12:10 pm

Animal Models

Session Chair: **Matthew Brenner M.D.**, Univ. of California, Irvine (USA)

10:30 am: **Real-time assessment of dynamics in lower airway using high speed endoscopic OCT**, Jiefeng Xi, Rex Yung, Wayne Mitzner, Robert Brown, Xingde Li, Johns Hopkins Univ. (USA) [8927-38]

10:50 am: **Smoke inhalation injury on a sheep animal model using long range optical coherence tomography**, Lidek Chou, Beckman Laser Institute and Medical Clinic (USA); Andriy Batchinsky, U.S. Army Institute of Surgical Research (USA); Joseph Jing, Maximilian Wiedmann, Beckman Laser Institute and Medical Clinic (USA); Matthew Brenner M.D., Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine Medical Ctr. (USA) [8927-39]

11:10 am: **Optical monitoring of physiologic and metabolic effects of sodium sulfide (NaSH) poisoning and treatment with hydroxocobalamin and cobinamide**, Marius C. Viseroi, Beckman Laser Institute and Medical Clinic (USA); Matthew Brenner M.D., Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine Medical Ctr. (USA); Sari Mahon, Jangwoen Lee, Beckman Laser Institute and Medical Clinic (USA); Sebastian Benavides M.D., Univ. of California, Irvine (USA); David Yoon, David Mukai, Beckman Laser Institute and Medical Clinic (USA); Tanya Burney, Univ. of California, Irvine (USA); Adriano Chan M.D., Gerry Boss M.D., Univ. of California, San Diego (USA) [8927-40]

11:30 am: **Electromagnetic optical coherence tomography for assessment of the pulmonary airways**, Yan Wang, Massachusetts General Hospital (USA); Jayender Jagadeesan, Brigham and Women's Hospital (USA); David C. Adams, Alyssa J. Miller, Lida P. Hariri, Massachusetts General Hospital (USA); Kirby Vosburg, Brigham and Women's Hospital (USA); Melissa J. Suter, Massachusetts General Hospital (USA) [8927-41]

11:50 am: **Structural and polarization sensitive optical frequency domain imaging with motorized endoscopic catheter**, Jianan Li, Fabio Feroldi, Vrije Univ. Amsterdam (Netherlands); Johannes M. A. Daniels, Katrien Grünberg, Tom Gani Sutedja M.D., Joop de Langen, Vrije Univ. Medical Ctr. (Netherlands); Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8927-42]

Lunch/Exhibition Break Sat 12:10 pm to 1:40 pm

SESSION 11

Location: Room 310 (Esplanade) Sat 1:40 pm to 3:20 pm

Mucus and Cilia

Session Chair: **Melissa J. Suter**, Massachusetts General Hospital (USA)

1:40 pm: **Depth-resolved imaging of diffusing gold nanorods in airway mucus with polarization-sensitive OCT**, Raghav K. Chhetri, The Univ. of North Carolina at Chapel Hill (USA); Richard Blackmon, The Univ. of North Carolina at Charlotte (USA); David Hill, Brian Button, The Univ. of North Carolina at Chapel Hill (USA); Joseph Tracy, North Carolina State Univ. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8927-43]

2:00 pm: **Imaging the cellular dynamics in the airways by optical coherence microscopy (OCM)**, Gereon Hüttmann, Rehman Ansari, Mario Piper, Christian Myrtus, Hinnerk Schulz-Hildebrandt, Peter König, Univ. zu Lübeck (Germany) [8927-44]

2:20 pm: **Dual-modality μ OCT and fluorescence imaging of the CF airway**, Tim N. Ford, Kengyeh K. Chu, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Susan E. Birket, Steve M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard-MIT (USA) and Massachusetts General Hospital (USA) [8927-45]

2:40 pm: **OCT-based quantification of ciliary flow defects generated by gene knockdown**, Brendan Huang, Yale School of Medicine (USA); Stephan Jonas, RWTH Aachen (Germany); Mustafa K. Khokha, Michael A. Choma, Yale School of Medicine (USA) [8927-46]

3:00 pm: **Micro-optical coherence tomography study of murine trachea explant model of regeneration after injury**, Kengyeh K. Chu, Vladimir Vinarsky, Adam Lam, Massachusetts General Hospital (USA); Andy Wu, Univ. of Tokyo (Japan); Jayaraj Rajagopal, Guillermo J. Tearney, Massachusetts General Hospital (USA) [8927-47]

Coffee Break Sat 3:20 pm to 3:50 pm

SESSION 12

Location: Room 310 (Esplanade) Sat 3:50 pm to 5:30 pm

Novel Assessment and Treatment Techniques

Session Chair: **Robert A. McLaughlin**,
The Univ. of Western Australia (Australia)

3:50 pm: **Photodynamic inactivation of microorganisms which cause pulmonary diseases with infrared light: an in vitro study**, Ilaiali S. Leite, Univ. de São Paulo (Brazil); Mariana C. Geralde, Univ. de São Paulo (Brazil) and Univ. Federal de São Carlos (Brazil); Ana Carolina G. Salina, Alexandra I. Medeiros, Cristina Kurachi, Vanderlei S. Bagnato, Natalia M. Inada, Univ. de São Paulo (Brazil) [8927-48]

4:10 pm: **Photodynamic inactivation of pulmonary decontamination using an extracorporeal illumination device**, Mariana C. Geralde, Univ. de São Paulo (Brazil) and Univ. Federal de São Carlos (Brazil); Ilaiali S. Leite, The BC Cancer Agency Research Ctr. (USA); Natalia M. Inada, Clóvis Grecco, Alexandra I. Medeiros, Univ. de São Paulo (Brazil); Cristina Kurachi, The BC Cancer Agency Research Ctr. (Canada); Vanderlei S. Bagnato, Univ. de São Paulo (Brazil) [8927-49]

4:30 pm: **Automated segmentation and quantification of lung structures from optical coherence tomography images**, Alex M. Pagnozzi, Rodney W. Kirk, Brendan F. Kennedy, David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia) [8927-50]

4:50 pm: **Semi-automated segmentation of porcine airway wall layers using optical coherence tomography: comparison with manual segmentation and histology**, Miranda Kirby, The Univ. of British Columbia (Canada) and St. Paul's Hospital (Canada); Anthony M. Lee, The BC Cancer Agency Research Ctr. (Canada); Tara Candido, The Univ. of British Columbia (Canada); Calum MacAulay, Pierre M. Lane, Stephen Lam, The BC Cancer Agency Research Ctr. (Canada); Harvey O. Coxson, St. Paul's Hospital (Canada) and The Univ. of British Columbia (Canada) [8927-51]

5:10 pm: **Micro-optical coherence tomography assay of leukocyte migration through epithelial monolayers**, Kengyeh K. Chu, Mark E. Kusek, Eric Wilsterman, Bryan P. Hurley, Guillermo J. Tearney, Massachusetts General Hospital (USA) [8927-52]

Sunday 2 February

SESSION 13

Location: Room 310 (Esplanade) Sun 8:40 am to 10:20 am

Clinical II

Session Chair: **Septimiu D. Murgu M.D.**, The Univ. of Chicago (USA)

8:40 am: **Towards the diagnosis of primary lung carcinomas with optical coherence tomography**, Lida P. Hariri, Mari Mino-Kenudson, Michael Lanuti, Alyssa J. Miller, Matthew B. Applegate, Melissa J. Suter, Massachusetts General Hospital (USA) [8927-54]

9:00 am: **Distinguishing tumor from tumor-associated fibrosis in pulmonary nodules with polarization-sensitive optical coherence tomography**, Lida P. Hariri, David C. Adams, Martin L. Villiger, Brett E. Bouma, Alyssa J. Miller, Matthew B. Applegate, Mari Mino-Kenudson, Melissa J. Suter, Massachusetts General Hospital (USA) [8927-55]

9:20 am: **Imaging airway smooth muscle with PS-OFDI**, David C. Adams, Lida P. Hariri, Alyssa J. Miller, Martin L. Villiger, Brett E. Bouma, Melissa J. Suter, Massachusetts General Hospital (USA) [8927-56]

9:40 am: **Validation of micro-optical coherence tomography particle tracking rheology**, Kengyeh K. Chu, Massachusetts General Hospital (USA); Yao Li, Susan E. Birket, The Univ. of Alabama at Birmingham (USA); Eric Wilsterman, Massachusetts General Hospital (USA); Diana Mojahed, Tufts Univ. (USA); Benjamin S. Schuster, Justin Hanes, Johns Hopkins Univ. (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney, Massachusetts General Hospital (USA) [8927-57]

10:00 am: **Optical monitoring of respiratory muscles hemodynamics and oxygenation in response to resistive breathing**, Babak Shadgan, The Univ. of British Columbia (Canada) [8927-58]

Coffee Break Sun 10:20 am to 10:50 am

PANEL DISCUSSION

Location: Room 310 (Esplanade) . . . 10:50 am to 11:50 am

Translating new technologies: challenges in technical development, cultivating clinical adoption, and commercialization

This session will center on a panel discussion including academic researchers, industry engineers, clinicians, and pathologists exploring the hurdles that new technologies must cross on the road to wide-spread application.

Moderator: **Brett Bouma, PhD, Professor**, Harvard Medical School, Harvard-MIT Division of Health Sciences and Technology, Wellman Center for Photomedicine, Massachusetts General Hospital

Panelists:

D. Kyle Hogarth, MD, Assistant Professor of Medicine
Director, Bronchoscopy and Minimally Invasive Diagnostics
The University of Chicago Medicine

Stephen Lam, MD, Professor of Medicine, University of British Columbia
Chair, Provincial Lung Tumor Group, British Columbia Cancer Agency

Lida P. Hariri, MD, PhD, Pulmonary Pathologist, Harvard Medical School
and Massachusetts General Hospital

Eman Namati, PhD, Director of Research and Development, Systems
Engineering, NinePoint Medical

Brian Goldberg, PhD, Principal Systems Engineer, Axsun Technologies

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Conference Chairs: **Henry Hirschberg M.D.**, Beckman Laser Institute and Medical Clinic (USA); **Steen J. Madsen**, Univ. of Nevada, Las Vegas (USA)

Program Committee: **David Abookasis**, Ariel Univ. Ctr. of Samaria (Israel); **Frederic Leblond**, Ecole Polytechnique de Montréal (Canada); **Herbert Stepp**, Ludwig-Maximilians-Univ. München (Germany); **Victor X. D. Yang**, Ryerson Univ. (Canada)

Saturday 1 February

SESSION 1

Location: Room 302 (Esplanade) Sat 8:40 am to 10:00 am

Microscopy and OCT I

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas (USA)

8:40 am: **Microendoscopy of the epileptic brain using combined confocal fluorescence microscopy and Doppler optical coherence tomography**, Emilie Beaulieu-Ouellet, Samuel Bélanger, Romain Deterre, Chloé Gariépy, Étienne De Montigny, Frédéric Leblond, Caroline Boudoux, Frédéric Lesage, Ecole Polytechnique de Montréal (Canada) [8928-1]

9:00 am: **Transparent cranial implant for non-invasive, chronic access to brain for optical diagnostics and therapeutics**, Yasaman Damestani, Javier Garay, B. Hyle Park, Devin Binder, Univ. of California, Riverside (USA); Pedro Cabrales, Univ. of California, San Diego (USA); Guillermo Aguilar, Univ. of California, Riverside (USA) [8928-2]

9:20 am: **Optical coherence microscopy of mouse cortical vasculature surrounding implanted electrodes**, Daniel X. Hammer, Anant Agrawal, Erkinay Abliz, Kevin P. Turner, T. Joshua Pfefer, Victor Krauthamer, Cristin Welle, U.S. Food and Drug Administration (USA) [8928-3]

9:40 am: **Cerebral metabolism in the rodent cortex measured with 2-photon fluorescence-lifetime microscopy of NADH**, Mohammad A. Yaseen, Sava Sakad?ic, Buyin Fu, Weicheng Wu, Massachusetts General Hospital (USA); Wolfgang Becker, Becker & Hickl GmbH (Germany); David A. Boas, Massachusetts General Hospital (USA) [8928-4]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 2

Location: Room 302 (Esplanade) . . . Sat 10:30 am to 11:30 am

Microscopy and OCT II

Session Chair: **Steen J. Madsen**, Univ. of Nevada, Las Vegas (USA)

10:30 am: **Interpreting CARS images of tissue within the C-H-stretching region**, Benjamin Dietzek, Tobias Meyer, Anna Medyukhina, Norbert Bergner, Christoph Krafft, Institut für Photonische Technologien e.V. (Germany); Michael Schmitt, Friedrich-Schiller-Univ. Jena (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8928-5]

10:50 am: **Enhancing contrast of brain neoplasms using dye-enhanced wide-field high-resolution optical imaging**, Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Richard Moser, Rodrigo Aguilar, Thomas Smith, Univ. of Massachusetts Memorial Medical Ctr. (USA); Matija Snuderl, New York Univ. Medical Ctr. (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8928-6]

11:10 am: **Raman spectroscopy of gliomas: an exploratory study**, Mahesh Shenoy, Arti R. Hole, E. Shridhar, Aliasgar V. Moiyadi, C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India) . . . [8928-7]

Lunch/Exhibition Break Sat 11:30 am to 1:10 pm

SESSION 3

Location: Room 302 (Esplanade) Sat 1:10 pm to 2:50 pm

Operative and Post-op Therapy I

Session Chair: **Henry Hirschberg M.D.**, Beckman Laser Institute and Medical Clinic (USA)

1:10 pm: **Quantitative, spectrally-resolved intraoperative imaging system for neurosurgical guidance in brain tumor surgery: pre-clinical and clinical results**, Pablo A. Valdes, Valerie L. Jacobs, Dartmouth College (USA); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada); Brian C. Wilson, Univ. of Toronto (Canada); Keith D. Paulsen, Dartmouth College (USA); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (USA) and Dartmouth College (USA) [8928-8]

1:30 pm: **Through-microscope spectroscopic excitation and emission for fluorescence molecular imaging as a tool to guide neurosurgical interventions**, Yoann Gosselin, Jean-David Grenon, Liane Berstein, Marie-Claude Vallières-Riendeau, Ecole Polytechnique de Montréal (Canada); Pablo A. Valdes, Dartmouth College (USA); Brian C. Wilson, Princess Margaret Cancer Ctr., Univ. of Toronto (Canada); Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (USA); Olivier Daigle, Nüvü Caméras Inc. (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) and Univ. of Montreal Medical Ctr. (Canada) [8928-9]

1:50 pm: **Photochemical internalization (PCI) enhanced nonviral transfection of pro-drug activating genes**, Henry Hirschberg M.D., Frederick Wang, Beckman Laser Institute and Medical Clinic (USA); Kristian Berg, The Norwegian Radium Hospital (Norway); Steen J. Madsen, Univ. of Nevada, Las Vegas (USA) [8928-10]

2:10 pm: **PDT-induced blood-brain barrier disruption facilitates nanoparticle-loaded macrophage migration into the brain**, Steen J. Madsen, Univ. of Nevada, Las Vegas (USA); H. Michael Gach, Univ. of Pittsburgh Medical Ctr. (USA); Seok Jin Hong M.D., Seoul National Univ. (Korea, Democratic Peoples Republic of); Francisco A. Uzal D.V.M., Univ. of California, Davis (USA); Qian Peng, Oslo Univ. Hospital (Norway); Henry Hirschberg M.D., Univ. of California, Irvine (USA) [8928-11]

2:30 pm: **Mid-IR laser system for neurosurgery**, Marc Klosner, Chunbai Wu, Donald Heller, Light Age, Inc. (USA) [8928-12]

POSTER SESSION AND COFFEE BREAK

Location: South Hall A Sat 3:00 pm to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Development of a fiber-less fNIRS system and its application to hair-covered head, Toru Yamada, National Institute of Advanced Industrial Science and Technology (Japan); Mitsuo Ohashi, Spectratech Inc. (Japan); Shinji Umeyama, National Institute of Advanced Industrial Science and Technology (Japan) [8928-27]

Precise spatial co-registration in simultaneous fNIRS and fMRI measurements using markers coaxially fixable to the optodes, Toru Yamada, Keiji Matsuda, Takayuki Iwano, Shinji Umeyama, National Institute of Advanced Industrial Science and Technology (Japan) [8928-28]

Fluorescence micro-optical sectioning tomography (fMOST), Xiaoli Qi, Britton Chance Ctr. for Biomedical Photonics (China) [8928-29]

Photothermal therapy of human glioma spheroids with gold-silica nanoshells and gold nanorods: a comparative study, Suyog Chhetri, Univ. of Nevada, Las Vegas (USA); Henry Hirschberg M.D., Univ. of California, Irvine (USA); Steen J Madsen, Univ. of Nevada, Las Vegas (USA) [8928-30]

Activity-dependent neuronal signals detected by a fiber-coupled fluorescence microscopy, Takashi Sakurai, Kowa Koida, Toyohashi Univ. of Technology (Japan) [8928-31]

Multimodal intraoperative optical spectroscopy probe for tissue characterization during brain tumor resection, Jeanne Mercier, Karl St-Arnaud, Liane Bernstein, Yoann Gosselin, Jean-David Grenon, Audrey Laurence, Ecole Polytechnique de Montréal (Canada); Pablo A. Valdes, Dartmouth College (USA); Kelvin Mok, Mohamad Seyed Sadr, Kevin Petrecca, Montreal Neurological Hospital and Institute (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) [8928-32]

Frontal activation during verbal fluency test using diffuse optical probes, Jing Dong, See Khee Ng, Renzhe Bi, Kijoon Lee, Nanyang Technological Univ. (Singapore) [8928-33]

Targeted principle component analysis: a new motion artifact correction approach for near-infrared spectroscopy, Meryem A. Yucel, Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Juliette Selb, Massachusetts General Hospital (USA); Robert Cooper, Univ. College London (United Kingdom); David A. Boas, Massachusetts General Hospital (USA) [8928-34]

SESSION 4

Location: Room 302 (Esplanade) Sat 4:00 pm to 5:20 pm

Operative and Post-op Therapy II

Session Chair: **Henry Hirschberg M.D.**,
Beckman Laser Institute and Medical Clinic (USA)

4:00 pm: **5-ALA based photodynamic management of glioblastoma**, Adrian Rühm, Klinikum der Univ. München (Germany); Herbert Stepp, Univ. Hospital Munich (Germany); Wolfgang Beyer, Ludwig-Maximilians-Univ. München (Germany); Georg Hennig, Thomas Pongratz, Ronald Sroka, Laser-Forschungslabor (Germany); Oliver Schnell, Klinikum der Univ. München (Germany); Jörg-Christian Tonn, Ludwig-Maximilians-Univ. München (Germany); Friedrich-Wilhelm Kreth, Klinikum der Univ. München (Germany) [8928-13]

4:20 pm: **Ultra-low fluence rate photodynamic therapy: simulation of light emitted by the Cerenkov effect**, Henry Hirschberg M.D., Beckman Laser Institute and Medical Clinic (USA); Laura Marcu, Simon Cherry, Univ. of California, Davis (USA) [8928-14]

4:40 pm: **Integrated optical spectroscopy system to guide brain needle biopsies**, Andreeanne Goyette, Audrey Laurence, Karl St-Arnaud, Wendy-Julie Madore, Mathias Strupler, Amber M. Beckley, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Brian C. Wilson, Ontario Cancer Institute (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) [8928-15]

5:00 pm: **Quantitative optical-sectioning microscopy of 5-ALA-induced PpIX in human low-grade gliomas**, Daphne Meza, Stony Brook Univ. (USA); Nader Sanai, Barrow Neurological Institute (USA); Jonathan T. Liu, Stony Brook Univ. (USA) [8928-16]

Sunday 2 February

SESSION 5

Location: Room 302 (Esplanade) Sun 8:00 am to 10:00 am

Optical Spectroscopy and Tomography: Pre-Clinical

Session Chair: **David Abookasis**, Ariel Univ. (Israel)

8:00 am: **Combining ICA and Granger causality: a novel tool for investigation of brain dynamics and brain oscillations from fNIRS measurements**, Zhen Yuan, Univ. of Macau (Macao, China) [8928-17]

8:20 am: **Monitoring closed head injury induced changes in brain function with orthogonal diffuse near-infrared reflectance spectroscopy**, David Abookasis, Ariel Shochat, Ariel Univ. (Israel) [8928-18]

8:40 am: **Near-infrared diffuse reflectance imaging of infarct core and peri-infarct depolarization in a rat middle cerebral artery occlusion model**, Satoko Kawauchi, National Defense Medical College (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan); Hiroshi Nawashiro, Tokorozawa Central Hospital (Japan); Shunichi Sato, National Defense Medical College (Japan) [8928-19]

9:00 am: **Implantable CMOS imaging device with absorption filters for green fluorescence imaging**, Yoshinori Sunaga, Makito Haruta, Hironari Takehara, Mayumi Motoyama, Yasumi Ohta, Toshihiko Noda, Kiyotaka Sasagawa, Takashi Tokuda, Jun Ohta, Nara Institute of Science and Technology (Japan) . . [8928-20]

9:20 am: **Time-resolved measurement and imaging reconstruction validated by a realistic dynamic optical brain phantom**, Xiaowei Zhou, Ali Hasnain, Mehta Kalpesh Badreshkumar, Trevor B. Penney, Nanguang Chen, National Univ. of Singapore (Singapore) [8928-21]

9:40 am: **In vivo imaging of scattering and absorption properties of exposed rat brain using a digital red-green-blue camera**, Izumi Nishidate, Keiichiro Yoshida, Tokyo Univ. of Agriculture and Technology (Japan); Satoko Kawauchi, Shunichi Sato, National Defense Medical College (Japan); Manabu Sato, Yamagata Univ. (Japan) [8928-22]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 6

Location: Room 302 (Esplanade) . . . Sun 10:30 am to 11:30 am

Optical Spectroscopy and Tomography: Clinical

Session Chair: **Frederic Leblond**,
Ecole Polytechnique de Montréal (Canada)

10:30 am: **Hemodynamic measurements in deep brain tissues of humans by near-infrared time-resolved spectroscopy**, Hiroaki Suzuki, Motoki Oda, Etsuko Yamaki, Toshihiko Suzuki, Daisuke Yamashita, Kenji Yoshimoto, Shu Homma, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan) . . [8928-23]

10:50 am: **Laplace-domain diffuse optical brain imaging system**, Ali Hasnain, Kalpesh Mehta, Xiaowei Zhou, Nanguang Chen, National Univ. of Singapore (Singapore) [8928-24]

11:10 am: **Noninvasive optical evaluation of low frequency oscillations in prefrontal cortex hemodynamics during visual verbal working memory**, Ting Li, Univ. of Electronic Science & Technology in China (China) [8928-26]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

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See full Hot Topics presentation listing on page 17.

Neurophotonics

Conference Chairs: **E. Duco Jansen**, Vanderbilt Univ. (USA); **Qingming Luo**, Huazhong Univ. of Science and Technology (China)

Conference Co-Chairs: **Jun Ding**, Stanford School of Medicine (USA); **Anna W. Roe**, Vanderbilt Univ. (USA)

Program Committee: **Yu Chen**, Univ. of Maryland, College Park (USA); **Hongwei Dong**, Univ. of California, Los Angeles (USA); **Congwu Du**, Stony Brook Univ. (USA); **Z. Josh Huang**, Cold Spring Harbor Lab. (USA); **Matthew D. Keller**, Lockheed Martin Aculight (USA); **Beop-Min Kim**, Korea Univ. (Korea, Republic of); **Vesa Kiviniemi**, Univ. of Oulu (Finland); **Pengcheng Li**, Britton Chance Ctr. for Biomedical Photonics (China); **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA); **Timothy H. Murphy**, The Univ. of British Columbia (Canada); **Francesco Saverio Pavone**, European Lab. for Non-linear Spectroscopy (Italy); **Kambiz Pourrezaei**, Drexel Univ. (USA); **Claus-Peter Richter**, Northwestern Univ. (USA); **Shy Shoham**, Technion-Israel Institute of Technology (Israel); **Vladislav Toronov**, Ryerson Univ. (Canada); **Shaoqun Zeng**, Britton Chance Ctr. for Biomedical Photonics (China)

Monday 3 February

SESSION 7

Location: Room 202 (Mezzanine) . . . Mon 8:00 am to 10:10 am

Novel Photonic/Optoelectronic Methods and Applications I

Session Chairs: **Yu Chen**, Univ. of Maryland, College Park (USA);
Ling Fu, Britton Chance Ctr. for Biomedical Photonics (China)

8:00 am: **Infrared light can block onset responses to kilo hertz frequency nerve block** (*Invited Paper*), Emilie H. Lothet, Kevin Kilgore, Niloy Badhra, Narendra Badhra, Tina Vrabec, Yves T. Wang, Case Western Reserve Univ. (USA); E. Duco Jansen, Vanderbilt Univ. (USA); Michael W. Jenkins, Hillel Chiel, Case Western Reserve Univ. (USA). . . . [8928-35]

8:30 am: **Imaging of injury and recovery in experimental models of brain injury using intrinsic scattering signatures** (*Invited Paper*), Vivek J. Srinivasan, Univ. of California, Davis (USA). . . . [8928-36]

9:00 am: **Towards holographically-patterned three-dimensional neuronal stimulation in a bioengineered optoneuronal** (*Invited Paper*), Shy Shoham, Alaa Zoubi, Shir Paluch, Gali Sela, Anat Marom, Inbar Brosh, Technion-Israel Institute of Technology (Israel). . . . [8928-37]

9:30 am: **Optical pacing of developing hearts**, Yves T. Wang, Matthew T. McPheeters, Shi Gu, Michiko Watanabe, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA). . . . [8928-38]

9:50 am: **Laser-acupuncture for autism/autism spectrum disorder: a randomized sham controlled trial**, Shahzad Anwar, Anwar Shahs Trust for Cerebral Palsy & Paralysis (Pakistan); Malik Muhammad Nazir Khan, Children's Hospital & Institute of Child Health (Pakistan); Faiza Munir Qazi, Anwar Shahs Trust for Cerebral Palsy & Paralysis (Pakistan). . . . [8928-39]

Coffee Break Mon 10:10 am to 10:40 am

SESSION 8

Location: Room 202 (Mezzanine) . . . Mon 10:40 am to 1:00 pm

Novel Photonic/Optoelectronic Methods and Applications II

Session Chairs: **Vladislav Toronov**, Ryerson Univ. (Canada);
Ling Fu, Britton Chance Ctr. for Biomedical Photonics (China)

10:40 am: **Studying hemispheric lateralization during a Stroop task by near-infrared spectroscopy** (*Invited Paper*), Lei Zhang, Hui Gong, Huazhong Univ. of Science and Technology (China). . . . [8928-40]

11:10 am: **Quantitative assessment of brain tissue oxygenation in porcine models of cardiac arrest and cardiopulmonary resuscitation using hyperspectral near-infrared spectroscopy** (*Invited Paper*), Shahin S. Lotfabadi, Ryerson Univ. (Canada). . . . [8928-41]

11:40 am: **Optical stimulation of the hearing and deaf cochlea under thermal and stress confinement condition**, Michael Schultz, Laser Zentrum Hannover e.V. (Germany) and Univ. Oldenburg (Germany); Peter Baumhoff, Medizinische Hochschule Hannover (Germany); Nicole Kallweit, Laser Zentrum Hannover e.V. (Germany) and Univ. Oldenburg (Germany); Mika Sato, Medizinische Hochschule Hannover (Germany) and Univ. Oldenburg (Germany); Alexander Krüger, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany) and Univ. Oldenburg (Germany); Thomas Lenarz, Andrej Kral, Medizinische Hochschule Hannover (Germany) and Univ. Oldenburg (Germany). . . . [8928-42]

12:00 pm: **Localization of changes in optical backscattering during seizure progression in vivo with optical coherence tomography**, Melissa M. Eberle, Carissa L. R. Rodriguez, Jenny I. Szu, Univ. of California, Riverside (USA); Yan Wang, Harvard Medical School (USA); Mike S. Hsu, Devin K. Binder, Univ. of California, Riverside (USA) and Umbrella Neurotechnologies Inc. (USA); B. Hyle Park, Univ. of California, Riverside (USA). . . . [8928-43]

12:20 pm: **Infrared neural stimulation (INS) inhibits electrically evoked neural responses in the deaf while cat**, Claus-Peter Richter, Hunter Young, Alan M. Robinson, Northwestern Univ. (USA); Xiaodong Tan, Northwestern State Univ. (USA). . . . [8928-103]

12:40 pm: **Target structures in the cochlea for infrared neural stimulation (INS)**, Hunter Young, Northwestern Univ. (USA); Xiaodong Tan, Northwestern State Univ. (USA); Claus-Peter Richter, Northwestern Univ. (USA). . . . [8928-104]

Lunch Break Mon 1:00 pm to 2:00 pm

SESSION 9

Location: Room 202 (Mezzanine) Mon 2:00 pm to 3:40 pm

Optical Neuroimaging I

Session Chairs: **Shy Shoham**, Technion-Israel Institute of Technology (Israel); **Congwu Du**, Stony Brook Univ. (USA)

2:00 pm: **Multimodal optoacoustic and two photon microscopy for simultaneous imaging of fluorescence and absorption contrasts** (*Invited Paper*), Gali Sela, Technion-Israel Institute of Technology (Israel); Alaa Zoubi, Technion IIT (Israel); Anat Marom, Shy Shoham, Technion-Israel Institute of Technology (Israel). . . . [8928-44]

2:30 pm: **Development of optical neuroimaging to detect drug-induced brain functional changes in vivo** (*Invited Paper*), Congwu Du, Yingtian Pan, State University of New York at Stony Brook (USA). . . . [8928-45]

3:00 pm: **Detection of cerebral edema in vivo using optical coherence tomography**, Carissa L. R. Rodriguez, Jenny I. Szu, Melissa M. Eberle, Univ. of California, Riverside (USA); Yan Wang, Harvard Medical School (USA); Mike S. Hsu, Devin K. Binder, Univ. of California, Riverside (USA) and Umbrella Neurotechnologies Inc. (USA); B. Hyle Park, Univ. of California, Riverside (USA). . . . [8928-46]

3:20 pm: **Imaging of rat brain using short graded-index multimode fiber**, Manabu Sato, Takahiro Kanno, Syoutarou Ishihara, Hiroshi Suto, Toshihiro Takahashi, Reiko Kurotani, Hiroyuki Abe, Yamagata Univ. (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan). . . . [8928-47]

Coffee Break Mon 3:40 pm to 4:00 pm

SESSION 10

Location: Room 202 (Mezzanine) Mon 4:00 pm to 5:40 pm

Optical Neuroimaging II

Session Chairs: **Pengcheng Li**, Britton Chance Ctr. for Biomedical Photonics (China); **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

4:00 pm: **Resting-state functional connectivity of cortical networks based on spontaneous optical neural and hemodynamic signals** (*Invited Paper*), Pengcheng Li, Bing Li, Rui Liu, Qin Huang, Jinling Lu, Britton Chance Ctr. for Biomedical Photonics (China). . . . [8928-48]

4:30 pm: **High speed imaging of mouse brain cortical spontaneous activity provides insight into regional connectivity** (*Invited Paper*), Timothy H. Murphy, Majid Mohajerani, Allen Chan, Matthieu Vanni, Yiecheng Xie, University of British Columbia (Canada). . . . [8928-49]

5:00 pm: **Backscattered OCT intensity changes during seizure activity**, Md. Rezuhanul Haque, Michael C. Oliveira, M. Shahidul Islam, Gregory N. Filatov, Mike S. Hsu, Devin K. Binder, Maxim Bazhenov, B. Hyle Park, Univ. of California, Riverside (USA). . . . [8928-50]

5:20 pm: **Fiber bundle system for deep brain imaging**, Ling Fu, Britton Chance Ctr. for Biomedical Photonics (China). . . . [8928-51]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Cerebral hemodynamics in patients with obstructive sleep apnea syndrome monitored with near-infrared spectroscopy (NIRS) during positive airways pressure (CPAP) therapy: a pilot study. Zhongxing Zhang, Univ. of Zürich (Switzerland); Maja Schneider, Ursula Fritschi, Isabella Lehner, Ming Qi, Center for Sleep Medicine and Sleep Research, Clinic Barmelweid (Switzerland); Ramin Khatami, Klinik Barmelweid (Switzerland) [8928-69]

Pilot study to compare the cerebral hemodynamics between patients with obstructive sleep apnea syndrome (OSA) and periodic limb movement syndrome (PLMS) during nocturnal sleep with near-infrared spectroscopy (NIRS). Zhongxing Zhang, Univ. of Zürich (Switzerland); Maja Schneider, Ramin Khatami, Clinic Barmelweid (Switzerland) [8928-70]

Fluorescence holography with enhanced interference extent and improved signal-to-noise. Xiaomin Lai, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-71]

Effect of RGB monochromatic and polychromatic LED lighting on growth performance, behavior, and development of broilers. Waldirene B. B. Morrill, Janice M. C. Barnabé, Tatiana P. N. da Silva, Héilton Pandorfí, Artur S. Gouveia-Neto, Wellington S. Souza, Univ. Federal Rural de Pernambuco (Brazil) . [8928-72]

Fluorescence micro-optical sectioning tomography for brain circuits visualization. Xiaoli Qi, Xiaohua Lv, Anan Li, Hui Gong, Qingming Luo, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-73]

Enhancing the precision of neurite tracing for brain circuits via directional filtering. Jing Li, Tingwei Quan, Shiwei Li, Hui Gong, Qingming Luo, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-74]

Classification of various mental task combinations for functional NIRS-based brain-computer interface. Chang-Hwan Im, Han-Jeong Hwang, Hanyang Univ. (Korea, Republic of) [8928-75]

Range-dependent synchronized bursts in dissociated neuronal networks. Xiangning Li, Huazhong Univ. of Science and Technology (China); Hui Gong, Huazhong Univ. of Science and Technology (China); Qingming Luo, Huazhong Univ. of Science and Technology (China) [8928-76]

Quantitative assessment of brain tissue oxygenation in porcine models of cardiac arrest and cardiopulmonary resuscitation using broadband near-infrared spectroscopy. Shahin S. Lotfabadi, Ryerson Univ. (Canada) . . [8928-77]

Depth resolved optical detection of nerve activity in Limulus nerve and murine brain slice using common-path OCT. M. Shahidul Islam, Md. Rezuhanul Haque, Christian M. Oh, Univ. of California, Riverside (USA); Yan Wang, Massachusetts General Hospital (USA); B. Hyle Park, Univ. of California, Riverside (USA) [8928-78]

Optical monitoring of shock wave-induced spreading depolarization and concomitant hypoxia in rat brain. Wataru Okuda, Tokyo Univ. of Agriculture and Technology (Japan); Satoko Kawauchi, Hiroshi Ashida, Shunichi Sato, National Defense Medical College Research Institute (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan) [8928-79]

Prefrontal hemodynamic responses related with consumer preferences using fNIRS. Eun-Ju Lee, Su Jeong Hong, Da Ae Lee, Jay-u Sin, Young Kyung Yoon, Dong-Han Park, Minah Suh, Gu-sang Kwong, Sungkyunkwan Univ. (Korea, Republic of); Beop-Min Kim, Hyuna Song, Seung-ho Paik, Korea Univ. (Korea, Republic of) [8928-80]

Tuesday 4 February

SESSION 11

Location: Room 202 (Mezzanine) Tue 8:00 am to 10:00 am

Visible Brainwide Networks I

Session Chairs: **Qingming Luo**, Britton Chance Ctr. for Biomedical Photonics (China); **Francesco Saverio Pavone**, European Lab. for Non-linear Spectroscopy (Italy)

8:00 am: **Digital mouse brain atlas with high-resolution images** (*Invited Paper*), Hongwei Dong, Univ. of California (USA) [8928-52]

8:30 am: **Visible brainwide networks at single-neuron resolution** (*Invited Paper*), Qingming Luo, Wuhan National Laboratory for Optoelectronics-Huazhong University of Science and Technology (China) [8928-53]

9:00 am: **Simultaneous visualization of cells and capillaries in an entire mouse brain with one voxel resolution.** Jingpeng Wu, Hui Gong, Huazhong Univ. of Science and Technology (China) [8928-54]

9:20 am: **Visualization brain circuits using two-photon fluorescence micro-optical sectioning tomography.** Ting Zheng, Zhongqing Yang, Anan Li, Xiaohua Lv, Qingming Luo, Hui Gong, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-55]

9:40 am: **Reconstruction of dense neuronal fibers in three-dimensional fluorescence image stacks.** Tingwei Quan, Hang Zhou, Hui Gong, Qingming Luo, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-56]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 12

Location: Room 202 (Mezzanine) . . . Tue 10:30 am to 12:10 pm

Visible Brainwide Networks II

Session Chairs: **Hongwei Dong**; **Timothy H Murphy**, The Univ. of British Columbia (Canada)

10:30 am: **In vivo imaging of neural reactive plasticity after laser axotomy in cerebellar cortex** (*Invited Paper*), Anna Letizia Allegra Mascaro, European Lab. for Non-linear Spectroscopy (Italy); Paolo Cesare, Fondazione Santa Lucia (Italy); Leonardo Sacconi, European Lab. for Non-linear Spectroscopy (Italy); Giorgio Grasselli, Fondazione Santa Lucia (Italy); Bohumil Maco, Graham W. Knott, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Piergiorgio Strata, Fondazione Santa Lucia (Italy) and Univ. degli Studi di Torino (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) [8928-57]

11:00 am: **In vivo voltage-sensitive dye optical imaging of the brain subcortical structures** (*Invited Paper*), Qinggong Tang, Univ. of Maryland, College Park (USA); Vassilij Tsytarev, Univ. of Maryland (USA); Chia-Pin Liang, Univ. of Maryland, College Park (USA); Reha Erzurumlu, Univ. of Maryland School of Medicine (USA); Yu Chen, Univ. of Maryland, College Park (USA) . . . [8928-58]

11:30 am: **Femto-second pulsed laser induced astrocytic calcium wave.** Wei Zhou, Yuan Zhao, Britton Chance Ctr. for Biomedical Photonics (China) [8928-59]

11:50 am: **Chemical reactivating fluorescent protein molecules enables large scale resin-embedded fluorescence micro-imaging.** Hanqing Xiong, Qingming Luo, Hui Gong, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8928-60]

Lunch/Exhibition Break Tue 12:10 pm to 1:40 pm

SESSION 13

Location: Room 202 (Mezzanine) Tue 1:40 pm to 3:30 pm

Optical Neuroimaging III

Session Chairs: **Jun Ding**; **Beop-Min Kim**, Korea Univ. College of Health Sciences (Korea, Republic of)

1:40 pm: **Neural circuit plasticity in the motor cortex in mouse models of Parkinson's disease** (*Invited Paper*), Tonghui Xu, Huazhong Univ. of Science and Technology (China); Jun Ding, Stanford Univ. School of Medicine (USA) [8928-61]

2:10 pm: **Functional NIRS-based brain-computer interface for the classification of covert yes and no intentions.** Chang-Hwan Im, Han-Jeong Hwang, Hanyang Univ. (Korea, Republic of) [8928-62]

2:30 pm: **Detection of action potentials in a bulk neural tissue via intrinsic properties of neurons.** Olivier Thouvenin, A. Claude Boccara, Mathias Fink, Institut Langevin (France) [8928-63]

Conference 8928B · Location: Room 202 (Mezzanine)

2:50 pm: **Optical clearing cranial window for imaging cortical blood flow**, Yang Zhang, Jing Wang, Tonghui Xu, Qingming Luo, Dan Zhu, Huazhong Univ. of Science and Technology (China). [8928-64]

3:10 pm: **Hemodynamic response studies using multimodal optical imaging technique in chronic epileptic mouse model**, Hyuna Song, Areum Jo, Jeong-eun Sim, Sungkyunkwan Univ. (Korea, Republic of); Minah Suh, Sungkyunkwan Univ. (Korea, Republic of) and Samsung Advanced Institute for Health Science and Technology, Sungkyunkwan Univ. (Korea, Republic of); Beop-Min Kim, Sungkyunkwan Univ. (Korea, Republic of) and Korea Univ. (Korea, Republic of) [8928-65]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 14

Location: Room 202 (Mezzanine) Tue 4:00 pm to 5:30 pm

Optical Neuroimaging IV

Session Chairs: **E. Duco Jansen**, Vanderbilt Univ. (USA); **Shaoqun Zeng**, Britton Chance Ctr. for Biomedical Photonics (China)

4:00 pm: **Astrocytic adaptation during cerebral angiogenesis follows the new vessel formation induced through chronic hypoxia in adult mouse cortex** (*Invited Paper*), Kazuto Masamoto, Iwao Kanno, National Institute of Radiological Sciences (Japan) [8928-67]

4:30 pm: **Multiphoton 3D imaging and control of neurons** (*Invited Paper*), Darcy Peterka, Sean Quirin, Rafael Yuste, Columbia Univ. (USA) [8928-66]

5:00 pm: **Imaging neuronal activity using femtosecond laser pulses** (*Invited Paper*), Shaoqun Zeng, Huazhong Univ. of Science and Technology (China); Wei R. Chen, Univ. of Central Oklahoma (USA); Qingming Luo, Huazhong Univ. of Science and Technology (China) [8928-68]

Optogenetics and Optical Control of Cells

Conference Chairs: **Samarendra K. Mohanty**, The Univ. of Texas at Arlington (USA); **Nitish V. Thakor**, Johns Hopkins Univ. (USA)

Program Committee: **Anna W. Roe**, Vanderbilt Univ. (USA); **Elizabeth M. Hillman**, Columbia Univ. (USA); **Isaac P. Clements**, Plexon Inc. (USA); **John P. Welsh**, Univ. of Washington (USA); **Rafael Yuste M.D.**, Columbia Univ. (USA); **Xue Han**, Boston Univ. (USA); **George J. Augustine**, Duke-NUS Graduate Medical School (Singapore); **Richard Kramer**, Univ. of California, Berkeley (USA); **Klaus B. Gerwert**, Ruhr-Univ. Bochum (Germany); **Alfred L. Nuttall**, Oregon Health & Science Univ. (USA); **Antoine Adamantidis**, McGill Univ. (Canada)

Saturday 1 February

SESSION 15

Location: Room 300 (Esplanade) Sat 8:50 am to 10:00 am

Optogenetics I

Session Chair: **Samarendra K. Mohanty**,
The Univ. of Texas at Arlington (USA)

8:50 am: **The brain activity map: imaging the activity of entire neural circuits** (*Invited Paper*), Darcy Peterka, Rafael Yuste, Columbia Univ. (USA) [8928-81]

9:20 am: **3D optrode array neural interface for comprehensive and/or selective optogenetic light delivery**, Tanya Vanessa F. Abaya, Mohit Diwekar, Steve Blair, Loren Rieth, Prashant Tathireddy, Florian Solzbacher, Univ of Utah (USA) [8928-82]

9:40 am: **Integrated neural probe for localized light delivery and electrical recording**, Wei-Chuan Shih, Mufaddal M. Gheewala, Univ. of Houston (USA); Gopathy Purushothaman, Vanderbilt Univ. (USA); John A. Dani, Univ. of Pennsylvania (USA); John C. Wolfe, Univ. of Houston (USA) [8928-83]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 16

Location: Room 300 (Esplanade) . . . Sat 10:30 am to 12:30 pm

Optogenetics II

Session Chair: **Nitish V. Thakor**, Johns Hopkins Univ. (USA)

10:30 am: **Development of new optogenetic tools: red light activatable channelrhodopsin and inhibitor of synaptic release** (*Invited Paper*), John Y. Lin, Per Magne Knutsen, Arnaud Muller, Sharon B. Sann, Keming Zhou, Sayeed Nabavi, Christophe Proulx, David Kleinfeld, Roberto Malinow, Univ. of California, San Diego (USA); Yishi Jin, Roger Y. Tsien, Univ. of California, San Diego (USA) and HHMI (USA) [8928-84]

11:00 am: **Non-invasive manipulation of optogenetic sensors**, Ute Hochgeschwender, Ken Berglund, Duke Univ. (USA) [8928-85]

11:20 am: **Optogenetically controlled neural stem cell differentiation**, Young-tae Kim, Shahina Ahmed, Samik Bhattarai, Kamal Dhakal, Bryan Black, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-86]

11:40 am: **A versatile and low cost stimulation source for optogenetics experiments**, Frederic Pain, Farnoosh Farmani, Univ. Paris Sud (France) and CNRS (France); Maud Marty, Univ. Paris Sud (France); Eric Marty, PHYMEP (France); Serge Luquet, Univ. Paris 7-Denis Diderot (France); Claire Martin, Univ. Paris Sud (France) [8928-87]

12:00 pm: **Transplantation of retinal progenitor cells for retinal repair** (*Invited Paper*), Henry J. Klassen M.D., Univ. of California, Irvine (USA) [8928-101]

Lunch/Exhibition Break Sat 12:30 pm to 1:30 pm

SESSION 17

Location: Room 300 (Esplanade) Sat 1:30 pm to 2:50 pm

Optical Control of Cells I

Session Chair: **Samarendra K. Mohanty**,
The Univ. of Texas at Arlington (USA)

1:30 pm: **Optical control of cells: past, present, and future** (*Invited Paper*), Michael W. Berns, Univ. of California, Irvine (USA) and Univ. of California, San Diego (USA) [8928-88]

2:20 pm: **Force, flow and heat: optical control of axonal guidance** (*Invited Paper*), Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-89]

Coffee Break Sat 2:50 pm to 3:30 pm

SESSION 18

Location: Room 300 (Esplanade) Sat 3:30 pm to 5:10 pm

Optical Control of Cells II

Session Chair: **Antoine R. Adamantidis**

3:30 pm: **Photochemically controlled pathway for cellular migration**, Young-tae Kim, Samik Bhattarai, Shahina Ahmed, Bryan Black, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-90]

3:50 pm: **Spatial light modulation and imaging system for investigation of neurometabolic and neurovascular coupling**, Ryan Baumgartner, Univ. of Wisconsin-Milwaukee (USA); Thomas J. Richner, Sarah Brodnick, Justin Williams, Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA); Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA) [8928-91]

4:10 pm: **Fiber optic fluorescence microscopy for functional brain imaging in awake mobile mice**, Jaepyeong Cha, Martin Paukert, Dwight E. Bergles, Jin U. Kang, Johns Hopkins Univ. (USA) [8928-92]

4:30 pm: **Impact of near-infrared laser irradiation on neuronal growth**, Amit Kumar, The Univ. of Texas at Arlington (USA) and Indian Institute of Science Education and Research Kolkata (India); Raghav Upadhyaya, Kamal Dhakal, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-93]

4:50 pm: **Potential applications of optogenetics for aging and Alzheimer's research**, Wen G. Chen, National Institutes of Health (USA) [8928-102]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 19

Location: Room 300 (Esplanade) Sun 8:30 am to 10:00 am

Optogenetics III

Session Chair: **Samarendra K. Mohanty**,
The Univ. of Texas at Arlington (USA)

8:30 am: **Molecular reaction mechanism of channelrhodopsin** (*Invited Paper*), Klaus B. Gerwert, Ruhr-Univ. Bochum (Germany) [8928-94]

9:00 am: **Regulating cofilin spatiotemporal dynamics and transport using optogenetic modulation**, Atena Zahedi, Univ. of California, Riverside (USA); Seyyed Farhad Razavi, Consultant (USA); Vincent On, Iryna Ethell, Univ. of California, Riverside (USA) [8928-95]

9:20 am: **Recombinant Adeno-associated virus (rAAV)-mediated transduction and optogenetic manipulation of cortical neurons in vitro**, Wienke Lange, Annika Meisenberg, Lei Jin, Andreas Offenhäusser, Forschungszentrum Jülich GmbH (Germany) [8928-96]

9:40 am: **Four-state photocycle modelling of two-photon optogenetic activation**, Amit Kumar, The Univ. of Texas at Arlington (USA) and Indian Institute of Science Education and Research Kolkata (India); Ling Gu, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-97]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 20

Location: Room 300 (Esplanade) . . . Sun 10:30 am to 11:40 am

Optogenetics IV

Session Chair: **Klaus B. Gerwert**, Ruhr-Univ. Bochum (Germany)

10:30 am: **Effect of light stimulation on interictal spikes from Chr2 expressed CA1 pyramidal cells**, Shivakeshavan Ratnadurai Giridharan, Univ. of Florida (USA); Roxana A. Stefenscau, Univ. of Michigan (USA); Pramod P. Khargonekar, Paul R. Carney, Sachin S. Talathi, Univ. of Florida (USA) . [8928-98]

10:50 am: **A system for combined in vivo cellular resolution optogenetic stimulation and imaging for vision research** (*Invited Paper*), Adi Schejter, Limor Tsur, Nairouz Farah, Technion-Israel Institute of Technology (Israel); Inna Reutsky-Gefen, Ruppin Academic Ctr. (Israel); Shy Shoham, Technion-Israel Institute of Technology (Israel) [8928-99]

11:20 am: **Mueller matrix polarimetric imaging of neurons**, Mathias I. Ajaero, The Univ. of Texas at Arlington (USA); Harshit Lakhotia, Amit Kumar, The Univ. of Texas at Arlington (USA) and Indian Institute of Science Education and Research Kolkata (India); Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India); Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8928-100]

Lasers in Dentistry XX

Conference Chairs: **Peter Rechmann**, Univ. of California, San Francisco (USA); **Daniel Fried**, Univ. of California, San Francisco (USA)

Program Committee: **Gregory B. Altshuler**, Palomar Medical Technologies, Inc. (USA); **Tatjana Dostálová M.D.**, Charles Univ. in Prague (Czech Republic); **John D. Featherstone**, Univ. of California, San Francisco (USA); **David M. Harris**, Bio-Medical Consultants, Inc. (USA); **Harvey A. Wigdor D.D.S.**, Advocate Illinois Masonic Medical Ctr. (USA)

Sunday 2 February

SESSION 1

Location: Room 228 (Mezzanine) Sun 8:30 am to 10:10 am

Lasers in Diagnostics and Caries

Session Chair: **Daniel Fried**, Univ. of California, San Francisco (USA)

8:30 am: **Diagnosis, ablation and characterization of human teeth using blue laser induced fluorescence (LIF) at 457 nm**, Ashraf F. El-Sherif, Arab Academy for Science, Technology & Maritime Transport (Egypt); Walid Gomaa, Military Technical College (Egypt) [8929-1]

8:50 am: **Does ozone enhance the remineralizing potential of nanohydroxyapatite on artificially demineralized enamel: a laser induced fluorescence study**, Samuel Raj Srinivasan, Vijendra Prabhu, Subhash Chandra, Salini S. Koshy, Shashidhar Acharya, Krishna K. Mahato, Manipal Univ. (India) [8929-2]

9:10 am: **Guided fluorescence diagnosis of childhood caries: preliminary measures correlate with depth of carious decay**, Mary Timoshchuk, Liang Zhang, Brian A. Dickinson, Jeremy S. Ridge, Amy S. Kim, Camille T. Baltuck, Leonard Y. Nelson, Joel H. Berg, Eric J. Seibel, Univ. of Washington (USA) [8929-3]

9:30 am: **Viability of imaging structures inside human dentin using dental transillumination**, Cristine L. Grandisoli, Francisca D. Alves-de-Souza, UFABC (Brazil); Mardoqueu M. da Costa, BioPDI Industria de Equipamentos Médico-Hospitalares (Brazil); Livia Castro, Xenics, Inc. (Brazil); Patrícia Aparecida Da-Ana, UFABC (Brazil); Denise M. Zzell, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Emery C. Lins, UFABC (Brazil) [8929-4]

9:50 am: **SOPROCARE - 450 nm wavelength detection tool for microbial plaque and gingivitis: a clinical study**, Peter Rechmann, Shasan W Liou, Beate M.T. Rechmann, John D.B. Featherstone, Univ of California San Francisco (USA) [8929-5]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 2

Location: Room 228 (Mezzanine) . . . Sun 10:40 am to 12:00 pm

Lasers in Hard Tissue: Structure, Ablation, and Microleakage

Session Chair: **Peter Rechmann**, Univ. of California, San Francisco (USA)

10:40 am: **Structure and chemical composition of the dentine-enamel junction analyzed by confocal Raman microscopy**, Alban Desoutter, Univ. Montpellier 1 (France) [8929-6]

11:00 am: **Ablation of human carious dentin with a nanosecond pulsed laser at a wavelength of 5.85 µm: relationship between hardness and ablation depth**, Katsunori Ishii, Tetsuya Kita, Osaka Univ. (Japan); Kazushi Yoshikawa, Kenzo Yasuo, Osaka Dental Univ. Hospital (Japan); Kazuyo Yamamoto, Osaka Dental Univ. (Japan); Kunio Awazu, Osaka Univ. (Japan) [8929-7]

11:20 am: **Er:YAG laser delivery systems and sonic-activated bulk composite restoration: sculpturing and microleakage evaluation**, Tatjana Dostálová, Mgdalena Kasparova, Michaela Buckova, Pavel Bradna, Charles Univ. in Prague (Czech Republic); Helena Jelinková, Michal Němec, Jan Šulc, Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic) [8929-8]

11:40 am: **3D photomechanical model of tooth enamel ablation by Er-laser radiation**, Andrey V. Belikov, Ksenia V. Shatilova, Alexei V. Skrypnik, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [8929-9]

Lunch/Exhibition Break Sun 12:00 pm to 1:50 pm

SESSION 3

Location: Room 228 (Mezzanine) Sun 1:50 pm to 3:30 pm

Lasers in Endodontics and Imaging

Session Chair: **Peter Rechmann**, Univ. of California, San Francisco (USA)

1:50 pm: **The quest of finding the mechanism for effective root canal treatment**, Rudolf M. Verdaasdonk, Albert J. van der Veen, Vrije Univ. Medical Ctr. (Netherlands); Vladimir Lemberg, Optomix (USA); Dmitri Boutoussov, BIOLASE Technology, Inc. (USA); Maarten Meire, Roeland J. G. de Moor, Univ. Gent (Belgium) [8929-10]

2:10 pm: **Determining optimum irradiation parameters for 1940 nm thulium fiber laser in root canal treatment**, Ayse S. Kabas Sarp, Bogaziçi Üniv (Turkey); Murat Gulsoy, Bogaziçi Üniv. (Turkey) [8929-11]

2:30 pm: **Near-infrared imaging probes for clinical transillumination and reflectance**, Jacob C. Simon, Seth Lucas, Kenneth H. Chan, Michal Staninec, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8929-12]

2:50 pm: **Automated detection of remineralization layer formation in simulated lesions with PS-OCT**, Robert C. Lee, Univ of California San Francisco (USA); Kenneth H. Chan, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8929-13]

3:10 pm: **Monitoring the inhibition of erosion by a CO2 laser using PS-OCT**, Kenneth H. Chan, Henry Tom, Daniel Fried, Univ. of California, San Francisco (USA) [8929-14]

Coffee Break Sun 3:30 pm to 4:00 pm

SESSION 4

Location: Room 228 (Mezzanine) Sun 4:00 pm to 5:20 pm

Lasers in Periodontal Treatment and LLLT

Session Chair: **Daniel Fried**, Univ. of California, San Francisco (USA)

4:00 pm: **Change in clinical indices following laser or surgical treatment for periodontitis: a split-mouth, randomized, multi-center trial**, David M. Harris, Millennium Dental Technologies, Inc. (USA) and Bio-Medical Consultants, Inc. (USA); Dawn M. Nicholson D.D.S., Delwin K. McCarthy D.D.S., Millennium Dental Technologies, Inc. (USA); Raymond A. Yukna, Univ. of Colorado Denver School of Medicine (USA); Mark Reynolds D.D.S., Univ. of Maryland School of Dentistry (USA); Henry Greenwell, Univ. of Louisville (USA); James Finley, Thomas K. McCawley D.D.S., Private Practice (USA); Robert H. Gregg II, Millennium Dental Technologies, Inc. (USA) [8929-15]

4:20 pm: **Pulsed Nd:YAG Laser treatment for failing dental implants due to peri-implantitis**, Dawn M. Nicholson D.D.S., Millennium Dental Technologies, Inc. (USA); Jeanne Fourrier D.D.S., Private Practice (USA); Robert H. Gregg II, Millennium Dental Technologies, Inc. (USA); Allen Honigman D.D.S., Neil Lehrman D.D.S., Eric Linden D.D.S., Edward Marcus D.D.S., Private Practice (USA); Delwin K. McCarthy D.D.S., Millennium Dental Technologies, Inc. (USA); Peter Rubelman D.D.S., Maurice Salama D.D.S., Brandon C. Seamons D.D.S., Private Practice (USA); David M. Harris, Bio-Medical Consultants Inc. (USA) and Millennium Dental Technologies, Inc. (USA) [8929-16]

4:40 pm: **Effect of low level laser irradiation on implant-tissue interaction: in vivo and in vitro studies**, Shelly Ahuja, APS GROUP (India) [8929-17]

5:00 pm: **Effect of simvastatin versus Low Level Laser Therapy (LLLT) on bone regeneration in rabbit's tibia**, Mostafa E. Gheith, Cairo Univ. (Egypt); Maggie A. Khairy, October University for Modern Science and Arts (Egypt) [8929-18]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Evaluation of the effect of CO₂ laser and fluoride on demineralized primary enamel: an in vitro study, Bruna R. Zancoppe, Marina M. Cesar, Lidiany K. Rodrigues, Marinês Nobre dos Santos, Univ. Estadual de Campinas (Brazil) [8929-19]

Longitudinally excited CO₂ laser with short laser pulse for hard tissue drilling, Kazuyuki Uno, Hiroyuki Hayashi, Tetsuya Akitsu, Univ. of Yamanashi (Japan); Takahisa Jitsuno, Osaka Univ. (Japan) [8929-20]

Attenuation of near-IR light through dentin at wavelengths from 1300 - 1650 nm, Andrew C. Chan, Daniel Fried, Cynthia L. Darling, Univ. of California, San Francisco (USA) [8929-21]

Integral ceramic superstructure evaluation by time domain optical coherence tomography, Cosmin Sinescu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); Adrian Bradu, Univ. of Kent (United Kingdom); Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania); Florin Topala, Meda Lavinia Negrutiu, Mihai Rominu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); Adrian Podoleanu, Univ. of Kent (United Kingdom) [8929-22]

Enhancing the contrast of natural occlusal lesions in OCT images with index matching agents, Hobin J. Kang, Daniel Fried, Univ. of California, San Francisco (USA) [8929-23]

High contrast optical imaging methods for image guided laser ablation of dental caries lesions, Nicole LaMantia, Henry Tom, Kenneth H. Chan, Jacob C. Simon, Daniel Fried, Univ. of California, San Francisco (USA) [8929-24]

Near-IR imaging of cracks in teeth, William A. Fried, Cynthia L. Darling, Kenneth H. Chan, Jacob C. Simon, Daniel Fried, Univ. of California, San Francisco (USA) [8929-25]

Multispectral near-IR imaging of composite restorations in extracted teeth, Cooper M. Logan, Katrina U. Co, Daniel Fried, Michal Staninec, Cynthia L. Darling, Univ. of California, San Francisco (USA) [8929-26]

Near-IR imaging of demineralization under sealants, Henry Tom, Kenneth H. Chan, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) [8929-27]

Indocyanine green (ICG) as a new adjuvant for the antimicrobial photodynamic therapy (aPDT) in dentistry, Joerg Meister, M. Hopp, J. Schäfers, J. Verbeek, M. Frentzen, Univ. Bonn (Germany) [8929-28]

Ophthalmic Technologies XXIV

Conference Chairs: **Fabrice Manns**, Univ. of Miami (USA); **Per G. Söderberg**, Uppsala Univ. (Sweden); **Arthur Ho**, Brien Holden Vision Institute (Australia)

Program Committee: **Rafat R. Ansari**, NASA Glenn Research Ctr. (USA); **Michael Belkin**, Tel Aviv Univ. (Israel); **Kostadinka Bizheva**, Univ. of Waterloo (Canada); **David Borja**, Alcon Labs., Inc. (USA); **Ralf Brinkmann**, Univ. zu Lübeck (Germany); **Wolfgang Drexler**, Medizinische Univ. Wien (Austria); **Daniel X. Hammer**, U.S. Food and Drug Administration (USA); **Karen M. Joos**, Vanderbilt Univ. (USA); **Kirill V. Larin**, Univ. of Houston (USA); **Ezra Maguen**, American Eye Institute (USA); **Donald T. Miller**, Indiana Univ. (USA); **Daniel V. Palanker**, Stanford Univ. (USA); **Jean-Marie Parel**, Bascom Palmer Eye Institute (USA); **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Luigi Rovati**, Univ. degli Studi di Modena e Reggio Emilia (Italy); **Georg Schuele**, OptiMedica Corp. (USA); **Jerry Sebag**, The Univ. of Southern California (USA); **Peter Soliz**, VisionQuest Biomedical, LLC (USA); **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Saturday 1 February

SESSION 1

Location: Room 305 (Esplanade) Sat 8:30 am to 10:00 am

Small Animal Models

Session Chairs: **Daniel X. Hammer**, U.S. Food and Drug Administration (USA); **Kirill V. Larin**, Univ. of Houston (USA); **Karen M. Joos M.D.**, Vanderbilt Univ. (USA)

8:30 am: **In vivo confocal (CLSM) and two-photon fluorescence microscopy (TPM) on the cornea of diabetic and non-diabetic mice**, Tobias Ehmke, Friedrich-Schiller-Univ. Jena (Germany); Maria Reichard, Heike Weiss, Simone Baltrusch, Oliver Stachs, Univ. Rostock (Germany); Alexander Heisterkamp, Friedrich-Schiller-Univ. Jena (Germany) [8930-1]

8:45 am: **In vivo mouse corneal imaging with confocal microscopy and two-photon microscopy**, Jun Ho Lee, Seong Hun Lee, Pohang Univ. of Science and Technology (Korea, Republic of); In Seok Song, Myoung Joon Kim, Asan Medical Ctr. (Korea, Republic of); Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8930-2]

9:00 am: **Air-puff OCE for assessment of mouse cornea in vivo**, Jiasong Li, Shang Wang, Manmohan Singh, Univ. of Houston (USA); Salavat Aglyamov, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA); Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) [8930-3]

9:15 am: **Evaluation of state-of-the-art imaging systems for in vivo monitoring of retinal structure in mice: current capabilities and limitations**, Pengfei Zhang, Azhar Zam, Univ. of California, Davis (USA); Edward N. Pugh Jr., Robert J. Zawadzki, UC Davis Medical Ctr. (USA) [8930-4]

9:30 am: **In vivo recording of intrinsic optical signals in light-stimulated rat retina with a combined functional OCT and ERG system**, Bingyao Tan, Man Chun A. Tam, Kirsten Carter, Ameneh Boroomand, Alexander Wong, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8930-5]

9:45 am: **In vivo optical coherence tomography of intracellular pigment migration in retinal pigment epithelium**, Qiu-Xiang Zhang, Xincheng Yao, Rongwen Lu, Christine A. Curcio, The Univ. of Alabama at Birmingham (USA) [8930-6]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 2

Location: Room 305 (Esplanade) . . . Sat 10:30 am to 11:15 am

Ophthalmic Imaging: Polarization

Session Chairs: **Donald T. Miller**, Indiana Univ. (USA); **Luigi Rovati**, Univ. degli Studi di Modena e Reggio Emilia (Italy); **Rafat R. Ansari**, NASA Glenn Research Ctr. (USA)

10:30 am: **Five-dimensional analysis of multi-contrast Jones matrix tomography of posterior eye**, Udaya Bhaskar, Univ. of Tsukuba (Japan) and Indian Institute of Technology (India); Young-Joo Hong, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8930-7]

10:45 am: **Retinal tracking polarization sensitive optical coherence tomography of the diseased eye**, Mitsuro Sugita, Medizinische Univ. Wien (Austria) and Canon Inc. (Japan); Stefan Zotter, Michael Pircher, Philipp Roberts, Medizinische Univ. Wien (Austria); Tomoyuki Makihira, Canon Inc. (Japan); Kenichi Saito, Canon U.S.A., Inc. (Japan); Nobuhiro Tomatsu, Makoto Sato, Canon Inc. (Japan); Ursula Schmidt-Erfurth, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8930-8]

11:00 am: **Imaging pigmented structures in the rat eye using polarization sensitive optical coherence tomography**, Bernhard Baumann, Sabine Rauscher, Medizinische Univ. Wien (Austria); Martin Glösmann, Veterinärmedizinische Univ. Wien (Austria); Erich Götzinger, Micheal Pircher, Stefan Zotter, Marion Gröger, Wolfgang Trasischker, Teresa Torzicky, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8930-9]

PASCAL ROL LECTURE

Location: Room 305 (Esplanade) 11:15 am to 12:00 pm

11:15 am: **Corneal refractive surgery: is intracorneal the way to go and what are the needs for technology?** (Keynote Presentation), Jesper O. Hjortdal M.D., Aarhus Univ. (Denmark) [8930-57]

Lunch/Exhibition Break Sat 12:00 pm to 1:45 pm

SESSION 3

Location: Room 305 (Esplanade) Sat 1:45 pm to 3:00 pm

Ophthalmic Instruments I

Session Chairs: **Ravi Chandra Bakaraju**, Brien Holden Vision Institute (Australia); **Jean-Marie Parel**, Bascom Palmer Eye Institute (USA); **Ezra Maguen M.D.**, American Eye Institute (USA)

1:45 pm: **Eye vision system using programmable micro-optics and micro-electronics**, Nabeel A. Riza, Muhammad Junaid Amin, Univ. College Cork (Ireland); Mehdi N. Riza, Presentation Brothers College (Ireland) [8930-10]

2:00 pm: **High temporal resolution ocular aberrometry with pupil tracking**, Jessica Jarosz, ONERA (France) and Quantel Medical (France); Serge C. Meimon, Jean-Marc Conan, ONERA (France); Michel Paques, CHNO des Quinze-Vingts (France) [8930-11]

2:15 pm: **Simple handheld pupillometer for chromatic Flicker studies**, Mario Bernabei, Univ. degli Studi di Modena e Reggio Emilia (Italy); Roberto Tinarelli, Lorenzo Peretto, Univ. degli Studi di Bologna (Italy); Luigi Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8930-12]

2:30 pm: **High frequency pupillometry**, Serge C. Meimon, ONERA (France); Jessica Jarosz, ONERA (France) and Quantel Medical (France) [8930-13]

2:45 pm: **Novel technique: a pupillometer-based objective chromatic perimetry**, Ygal Rotenstreich, Alon Skaat, Ifat Sher, Tel Aviv Univ. (Israel); Andru Kolker, George Washington Univ. (USA); Elkana Rosenfeld, Shlomo Melamed, Michael Belkin, Tel Aviv Univ. (Israel) [8930-14]

Coffee Break Sat 3:00 pm to 3:30 pm

SESSION 4

Location: Room 305 (Esplanade) Sat 3:30 pm to 4:45 pm

Ophthalmic Instruments II

Session Chairs: **Ralf Brinkmann**, Univ. zu Lübeck (Germany);
Georg Schuele, OptiMedica Corp. (USA);
Michael Belkin, Tel Aviv Univ. (Israel)

3:30 pm: **The Uppsala Contrast Sensitivity Test (UCST): a fast strategy for clinical assessment of contrast sensitivity**, Lars Malmqvist, KTH Royal Institute of Technology (Sweden); Per G. Söderberg, Uppsala Univ. (Sweden) . . . [8930-56]

3:45 pm: **Complete 360° circumferential SSOCT gonioscopy of the iridocorneal angle**, Ryan P. McNabb, Anthony N. Kuo, Duke Univ. (USA); Joseph A. Izatt, Duke Univ. (USA) and Duke Univ. Medical Ctr. (USA) . . . [8930-15]

4:00 pm: **Portable, low-priced retinal imager for eye disease screening**, Peter Soliz, VisionQuest Biomedical, LLC (USA); Andrey Larichev, Lomonosov Moscow State Univ. (Russian Federation); Sheila Nemeth, Richard VanNess, Eduardo Simon Barriga, Gilberto Zamora, VisionQuest Biomedical, LLC (USA) [8930-16]

4:15 pm: **Non-mydriatic, wide-field, fundus video camera**, Bernhard Hoehner, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Peter Voigtmann, Voigtmann GmbH (Germany); Georg Michelson, Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8930-17]

4:30 pm: **Handheld simultaneous color SLO/OCT instrument**, Francesco LaRocca, Derek Nankivil, Sina Farsiu, Joseph A. Izatt, Duke Univ. (USA) [8930-18]

SESSION 5

Location: Room 305 (Esplanade) Sat 4:45 pm to 5:45 pm

Ophthalmic Imaging: Image Processing

Session Chairs: **David Borja**, Alcon Labs., Inc. (USA);
Peter Soliz, VisionQuest Biomedical, LLC (USA);
Kostadinka Bizheva, Univ. of Waterloo (Canada)

4:45 pm: **Novel publicly available denoising algorithm improves the performance of automated ophthalmic segmentation algorithms**, David L. Cunefare, Duke Univ. (USA); Alec V. Arshavsky, East Chapel Hill High School (USA); Leyuan Fang, Stephanie J. Chiu, Cynthia A. Toth, Anthony N. Kuo, Joseph A. Izatt, Sina Farsiu, Duke Univ. (USA) [8930-19]

5:00 pm: **Sub-cellular segmentation of adaptive optics - optical coherence tomography images**, Ravi S. Jonnal, Robert J. Zawadzki, Sang-Hyuck Lee, John S. Werner, UC Davis Medical Ctr. (USA) [8930-20]

5:15 pm: **Automatic segmentation of nine layers in SD-OCT images of the mouse retina with and without pathology**, Pratul P. Srinivasan, Stephanie Heflin, Joseph A. Izatt, Vadim Y. Arshavsky, Sina Farsiu, Duke Univ. (USA) [8930-21]

5:30 pm: **Segmentation method for in vivo meibomian gland OCT image**, Jun Geun Shin, Gwangju Institute of Science and Technology (Korea, Republic of); Ho Sik Hwang, Chuncheon Sacred Heart Hospital (Korea, Republic of); Byeong Ha Lee, Tae Joong Eom, Gwangju Institute of Science and Technology (Korea, Republic of) [8930-22]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT
Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 6

Location: Room 305 (Esplanade) Sun 8:45 am to 10:00 am

Ocular Biometry and Eye Models

Session Chairs: **Arthur Ho**, Brien Holden Vision Institute (Australia);
David Borja, Alcon Labs., Inc. (USA);
Ezra Maguen M.D., American Eye Institute (USA)

8:45 am: **Challenging evolution for a different design of the human visual system**, Pier Giorgio Gobbi, Scientific Institute Hospital San Raffaele (Italy) [8930-23]

9:00 am: **Finite element study on the effects of GRIN order on the accommodative response of the human crystalline lens**, Hooman Mohammad Pour, Univ. of New South Wales (Australia) and Brien Holden Vision Institute (Australia); Sangarapillai Kanapathipillai, The Univ. of New South Wales (Australia); Fabrice Manns, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Arthur Ho, Brien Holden Vision Institute (Australia) and The Univ. of New South Wales (Australia) [8930-24]

9:15 am: **Accuracy evaluation of scleral lens thickness and radius of curvature using high-resolution SD- and SS-OCT**, Kirsten Carter, Sebastian Marschall, Ahmed Gawish, Paul Fieguth, Luigina Sorbara, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8930-25]

9:30 am: **Correlation of glaucoma severity with OCT-derived reference-free RNFL attenuation coefficients**, Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Gijs Thepass M.D., Rotterdam Ophthalmic Institute (Netherlands) and Rotterdam Eye Hospital (Netherlands); Hans G. Lemij M.D., The Rotterdam Eye Hospital (Netherlands); Johannes F. De Boer, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands) [8930-26]

9:45 am: **Retinal gain evaluation**, Pier Giorgio Gobbi, Scientific Institute Hospital San Raffaele (Italy) [8930-27]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 7

Location: Room 305 (Esplanade) . . . Sun 10:30 am to 12:00 pm

Ophthalmic Imaging: Structural and Functional

Session Chairs: **Wolfgang Drexler**, Medizinische Univ. Wien (Austria);
Daniel V. Palanker, Stanford Univ. (USA);
Donald T. Miller, Indiana Univ. (USA)

10:30 am: **Label-free SHG and spectral FLIM of corneas using a sub-15 fs laser microscope**, Ana Batista, Univ. de Coimbra (Portugal) and Univ. des Saarlandes (Germany); Berthold Seitz, Aisada Uchugonova, Hans Georg Breunig, Univ. des Saarlandes (Germany); Antonio Miguel Morgado, Univ. de Coimbra (Portugal); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH, Jena (Germany) [8930-28]

10:45 am: **Biometry of the ciliary muscle during dynamic accommodation assessed with OCT**, Marco Ruggeri, Bascom Palmer Eye Institute (USA); Victor M. Hernandez, Carolina De Freitas, Fabrice Manns, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Jean-Marie Parel, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA) and Vision Cooperative Research Ctr., Sydney (Australia) [8930-29]

11:00 am: **Improved in vivo imaging of human blood circulation in the chorioretinal complex with new phase stabilized 1 µm swept-source phase-variance optical coherence tomography (SSpOCT)**, Raju Poddar, UC Davis Medical Ctr. (USA); Dae Yu Kim, California Institute of Technology (USA); John S. Werner, UC Davis Medical Ctr. (USA); Robert J. Zawadzki, California Institute of Technology (USA) [8930-30]

11:15 am: **Motion-artifact-free multicontrast optical coherence tomography with simultaneous polarization and Doppler imaging**, Young-Joo Hong, Univ. of Tsukuba (Japan); Myeong Jin Ju, The Univ. of British Columbia (Canada) and Univ. of Tsukuba (Japan); Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8930-31]

11:30 am: **In vivo imaging of the choriocapillaris using ultrahigh-speed swept source OCT angiography**, WooJhon Choi, Massachusetts Institute of Technology (USA); Kathrin J. Mohler, Massachusetts Institute of Technology (USA) and Ludwig-Maximilians-Univ. München (Germany); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs, Inc. (USA); Chen D. Lu, Jonathan J. Liu, Massachusetts Institute of Technology (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Alex E. Cable, Thorlabs Inc. (USA); Jay S. Duker M.D., Tufts Medical Ctr. (USA); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8930-32]

11:45 am: **Visualization of transretinal blood flow in retinal angiomatous proliferation with phase-resolved optical frequency domain imaging**, Jan H. de Jong, Boy Braaf, Rotterdam Ophthalmic Institute (Netherlands); Sankha Amarakoon, Rotterdam Ophthalmic Institute (Netherlands) and The Rotterdam Eye Hospital (Netherlands); Leah S. Wilk, Rotterdam Ophthalmic Institute (Netherlands) and LaserLaB Amsterdam (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Mirjam E. J. van Velthoven M.D., Rotterdam Ophthalmic Institute (Netherlands) and The Rotterdam Eye Hospital (Netherlands); Tom Missotten, The Rotterdam Eye Hospital (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) and LaserLaB Amsterdam (Netherlands) [8930-33]
Lunch/Exhibition Break Sun 12:00 pm to 1:30 pm

SESSION 8

Location: Room 305 (Esplanade) Sun 1:30 pm to 3:00 pm

Ophthalmic Surgery: Image-Guided and Therapy

Session Chairs: **Georg Schuele**, OptiMedica Corp. (USA); **Roberto Pini**, Istituto di Fisica Applicata Nello Carrara (Italy); **Jean-Marie Parel**, Bascom Palmer Eye Institute (USA)

1:30 pm: **Quality control of human graft corneas with full-field optical coherence tomography**, Wajidene Ghouaili M.D., Vision Institute, INSERM-UPMC Research Ctr. (France); Katharine Grieve, Institut Langevin (France); Salima Bellefqih M.D., Otman Sandali M.D., Vision Institute, INSERM-UPMC Research Ctr. (France); Fabrice Harms, Institut Langevin (France) and LLTech (France); Vincent Borderie M.D., Vision Institute, INSERM-UPMC Research Ctr. (France); A. Claude Boccarda, Institut Langevin (France) and LLTech (France) [8930-34]

1:45 pm: **Manual dynamic tracking for microscope-integrated OCT in ophthalmic surgery**, Anthony N. Kuo, Justin V. Migacz, Oscar M. Carrasco-Zevallos, Cynthia A. Toth, Joseph A. Izatt, Duke Univ. (USA) [8930-35]

2:00 pm: **Intraoperative OCT for lamellar ocular surgery**, Gereon Hüttmann, Univ. zu Lübeck (Germany); Philipp Steven, Univ. zu Köln (Germany); Eva Lankenau, Marc Krug, Opto Medical Technologies GmbH (Germany); Stefan Oelckers, MÖLLER-WEDEL GmbH (Germany); Reginald Birngruber, Univ. zu Lübeck (Germany); Claus Cursiefen, Univ. zu Köln (Germany) [8930-36]

2:15 pm: **Repetitive magnetic stimulation improves retinal function in a rat model of retinal dystrophy**, Ygal Rotenstreich, Adi Tzameret, Nir Levi, Sapir Kalish, Ifat Sher, Tel Aviv Univ. (Israel); Avraham Zangen, Ben Gurion Univ. of the Negev (Israel); Michael Belkin, Tel Aviv Univ. (Israel) [8930-37]

2:30 pm: **Transscleral selective laser trabeculoplasty (SLT) without a gonioscopy lens**, Michael Belkin, Tel Aviv Univ. (Israel); Noa Geffen, Shay Ofir, Meir Medical Ctr. (Israel); Audrey Kaplan Messas, Ein Tal Eye Hospital (Israel); Yaniv Barkana, Assaf Harofeh Medical Ctr. (Israel); Avner Belkin, Ehud I. Assia M.D., Meir Medical Ctr. (Israel) [8930-38]

2:45 pm: **Non-damaging laser therapy of the macula: titration algorithm and tissue response**, Daniel V. Palanker, Stanford Univ. (USA); Daniel Lavinsky, Federal Univ. Rio Grande do Sul (Brazil); Roopa Dalal, Philip Hue, Stanford Univ. (USA) [8930-39]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 9

Location: Room 305 (Esplanade) Sun 3:30 pm to 4:45 pm

Adaptive Optics

Session Chairs: **Daniel X. Hammer**, U.S. Food and Drug Administration (USA); **Peter Soliz**, VisionQuest Biomedical, LLC (USA); **Per G. Söderberg**, Uppsala Univ. (Sweden)

3:30 pm: **GPU accelerated realtime wavefront sensorless AO-OCT for in vivo small animal imaging**, Yifan Jian, Simon Fraser Univ. (Canada); Stefaho Bonora, Univ. degli Studi di Padova (Italy); Edward N. Pugh Jr., Robert J. Zawadzki, UC Davis Medical Ctr. (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada) [8930-40]

3:45 pm: **Method to noninvasively probe the modal content of cone photoreceptors**, Zhuolin Liu, Omer P. Kocaoglu, Timothy L. Turner, Donald T. Miller, Indiana Univ. (USA) [8930-41]

4:00 pm: **Adaptive optics optical coherence tomography for automated temporal analysis of cone photoreceptors**, Omer P. Kocaoglu, Zhuolin Liu, Timothy L. Turner, Donald T. Miller, Indiana Univ. (USA) [8930-42]

4:15 pm: **Photoreceptor phantom for evaluation of adaptive optics scanning laser ophthalmoscopy**, Daniel X. Hammer, William R. Calhoun III, Jigesh Baxi, T. Joshua Pfefer, Ilko Ilev, U.S. Food and Drug Administration (USA); Scott A. Mathews, The Catholic Univ. of America (USA); Anant Agrawal, U.S. Food and Drug Administration (USA) [8930-43]

4:30 pm: **Compact adaptive optics line scanning retinal imager: closer to the clinic**, Mircea Mujat, Ankit H. Patel, Nicusor Iftimia, R. Daniel Ferguson, Physical Sciences Inc. (USA) [8930-44]

PASCAL ROL AWARD

Location: Room 305 (Esplanade) 4:45 pm to 5:00 pm

Session Chairs: **Arthur Ho**, Brien Holden Vision Institute (Australia); **Fabrice Manns**, Univ. of Miami (USA)

Prize donated by:

Brien Holden Vision Institute (Australia)

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Cost-effective instrumentation for quantitative depth measurement of optic nerve head using stereo fundus image pair and image cross correlation techniques, Luis A. V. Carvalho, Univ. de São Paulo (Brazil); Valeria M Carvalho, Departamento de Biotecnologia - Universidade Federal de São Carlos - UFSCar (Brazil) and Grupo de Optica - Univ. de São Paulo (Brazil) and Wavetek Technologies LLC (USA) [8930-45]

Phase retardation differences in diabetic versus normal eyes, Joel A. Papay, Ann E. Elsner, Bryan P. Haggerty, Indiana Univ. (USA) [8930-46]

UV protection for sunglasses: revisiting the standards, Mauro Masili, Homero Schiabel, Liliane Ventura, Univ. de São Paulo (Brazil) [8930-47]

UV transmittance during the crosslinking procedure: tunable treatment, Victor A. Cacciaccaro Lincoln, Liliane Ventura, Univ. de São Paulo (Brazil) [8930-48]

Flammability test for sunglasses: developing a system, Renan Magri, Liliane Ventura, Univ. de São Paulo (Brazil) [8930-49]

Detection of chronologic changes in the size of human choroidal vascularization using 1-micron swept-source optical coherence tomography and a new semi-automated system, Yukari Jo M.D., Yasushi Ikuno M.D., Osaka Univ. Graduate School of Medicine (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan); Satoshi Sugiyama, Tomey Corp. (Japan); Kohji Nishida M.D., Osaka Univ. Graduate School of Medicine (Japan) [8930-50]

Robotic console for ocular surgery: a preliminary study, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Luca Menabuoni M.D., Ivo Lenzetti, Azienda USL 4 (Italy); Sheila Russo, Arianna Mencias, Scuola Superiore Sant'Anna (Italy); Damiano Fortuna, El.En. S.p.A. (Italy) [8930-51]

Femtosecond laser assisted design of sutureless intrastromal graft as an alternative to partial thickness keratoplasty, Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Annalisa Canovetti, Alex Malandrini, Ivo Lenzetti, Azienda USL 4 (Italy); Pierangela Rubino, Rosachiara Leaci, Alberto Neri, Patrizia Scaroni, Claudio Macaluso, Univ. degli Studi di Parma (Italy); Luca Menabuoni M.D., Azienda USL 4 (Italy) [8930-52]

Utilization of the excimer laser and a moving piezoelectric mirror to accomplish the customized contact lens ablation to correct high-order aberrations, Luciana de Matos, Wavetek Technologies Industry Ltd. (Brazil) and Univ. de São Paulo (Brazil); Fatima M. Yasuoka, Univ. Federal de São Paulo (Brazil) and Wavetek Technologies Industry Ltd. (Brazil); Paulo Schor, Enos Oliveira, Univ. Federal de São Paulo (Brazil); Vanderlei S. Bagnato, Univ. de São Paulo (Brazil); Luis Albert V. Carvalho, Wavetek Technologies Industry Ltd. (Brazil) and Univ. de São Paulo (Brazil) [8930-53]

Development of a universal toric intraocular lens calculator, David Hjelmstad, Arizona State Univ. (USA) and The Eye Center (USA); Samir I. Sayegh M.D., The Eye Center (USA) [8930-54]

Repetitive magnetic stimulation reduces corneal permeability, Ygal Rotenstreich, Tel Aviv Univ. (Israel); Avner Belkin, Meir Medical Ctr. (Israel); Sapir Kalish, Ifat Sher, Michael Belkin, Tel Aviv Univ. (Israel) [8930-55]

Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII

Conference Chairs: **David H. Kessel**, Wayne State Univ. (USA); **Tayyaba Hasan**, Massachusetts General Hospital (USA)

Program Committee: **Charles J. Gomer**, Children's Hospital Los Angeles (USA); **Nancy L. Oleinick**, Case Western Reserve Univ. (USA); **Ravindra K. Pandey**, Roswell Park Cancer Institute (USA); **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (USA); **Kenneth K. Wang M.D.**, Mayo Clinic (USA)

Saturday 1 February

SESSION 1

Location: Room 236 (Mezzanine) Sat 9:00 am to 10:35 am

Photodynamic Therapy I

Session Chair: **David H. Kessel**, Wayne State Univ. (USA)

9:00 am: **Optimization of PDT directed toward mitochondria** (*Invited Paper*), David H. Kessel, Neha Aggarwal, Wayne State Univ. (USA); Bonnie F Sloane, Wayne State Univ (USA) [8931-1]

9:25 am: **Drug resistance mechanisms, photodynamic therapy (PDT) and combination treatment** (*Invited Paper*), Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8931-2]

9:50 am: **Delineation of the molecular mechanisms behind improved benefit following combination erlotinib/photodynamic therapy**, Shannon M. Gallagher-Colombo, Rensa Chen, Joann Miller, Theresa M. Busch, Univ. of Pennsylvania (USA) [8931-3]

10:05 am: **Combination of photodynamic therapy and cancer molecular targeted agents**, Bin Chen, Univ. of the Sciences in Philadelphia (USA) . [8931-4]

10:20 am: **Metal-based phthalocyanines as a potential photosensitizing agent in photodynamic therapy for the treatment of melanoma skin cancer**, Kaminee Maduray, Durban Univ. of Technology (South Africa) and Durban Univ. of Technology (South Africa) [8931-5]

Coffee Break Sat 10:35 am to 11:00 am

SESSION 2

Location: Room 236 (Mezzanine) . . . Sat 11:00 am to 12:35 pm

Photodynamic Therapy II

Session Chair: **Tayyaba Hasan**, Massachusetts General Hospital (USA)

11:00 am: **Identifying stromal determinants of heterogeneous treatment response in 3D tumor co-cultures** (*Invited Paper*), Imran Rizvi, Sriram R. Anbil, Emma Briars, Shazia Khan, Ruth Goldschmidt, Nermina Alagic, Massachusetts General Hospital (USA); Jonathan P. Celli, Massachusetts General Hospital (USA) and Univ. of Massachusetts Boston (USA); Lawrence B. Mensah, Iqbal Massodi, Arnav Chandra, Massachusetts General Hospital (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8931-6]

11:25 am: **PDT for targeting drug-resistance associated with stromal interactions and epithelial-mesenchymal transition in pancreatic cancer** (*Invited Paper*), Jonathan P. Celli, Massachusetts General Hospital (USA) and Univ. of Massachusetts Boston (USA); Gwendolyn M. Cramer, Dustin P. Jones, William Hanna, Ljubica Petrovic, Univ. of Massachusetts Boston (USA); Ruth Goldschmidt, Massachusetts General Hospital (USA); Yuyu Li, Chandra S. Yelleswarapu, Univ. of Massachusetts Boston (USA); Imran Rizvi, Massachusetts General Hospital (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8931-7]

11:50 am: **Three-dimensional cell culturing by magnetic levitation for evaluating efficacy/toxicity and optimizing near infrared photodynamic therapy**, Luis G. Sabino, Priscila Fernanda Campos Menezes, Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil); Glaucio Souza, Nano3D Biosciences, Inc. (United States); Thomas C. Killian, Rice Univ. (United States); Cristina Kurachi, Univ. de São Paulo (Brazil) [8931-8]

12:05 pm: **Parameter determination for BPD mediated vascular PDT**, Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Baochang Liu, Joann Miller, Theresa M. Busch, Univ. of Pennsylvania (USA); Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-9]

12:20 pm: **Evaluation of photodynamic therapy effect using tumor model in chorioallantoic membrane with melanoma cells**, Hilde H. Buzza, Layla Pires, Vanderlei Salvador Bagnato, Cristina Kurachi D.D.S., Univ. de São Paulo (Brazil) [8931-10]

Lunch/Exhibition Breaks Sat 12:35 pm to 1:35 pm

SESSION 3

Location: Room 236 (Mezzanine) Sat 1:35 pm to 3:15 pm

Photodynamic Therapy III

Session Chairs: **Imran Rizvi**, Massachusetts General Hospital (USA); **Jonathan P. Celli**, Massachusetts General Hospital (USA)

1:35 pm: **Development of image-guided targeted two-photon pdt for the treatment of head and neck cancers**, Charles W. Spangler, SensoPath Technologies Inc. (USA); Jean R. Starkey, Montana State Univ. (USA); Bo Liang, Sara Fedorka, SensoPath Technologies Inc. (USA); Hao Yang, Huabei Jiang, Univ. of Florida (USA) [8931-11]

2:00 pm: **Real-time monitoring of photo-immunotherapy using optical coherence tomography**, Chia-Pin Liang, Yu Chen, Univ. of Maryland, College Park (USA); Takahito Nakajima, Rira Watanabe, Kazuhide Sato, Hisataka Kobayashi, Peter L. Choyke M.D., National Cancer Institute (USA) [8931-12]

2:15 pm: **Development of photodynamic therapy for treatment of peritoneal metastases**, Bryan Q. Spring, Adnan O. Abu-Yousif, Akilan Palanisami, Xiang Zheng, Imran Rizvi, Zhiming Mai, Sriram R. Anbil, R. Bryan Sears, Lawrence B. Mensah, Ruth Goldschmidt, Sultan S. Erdem, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Esther Oliva, Massachusetts General Hospital (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8931-13]

2:30 pm: **Highly diffusive, tumor selective, molecularly targeted constructs for PDT**, Oliver J. Klein, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Hushan Yuan, Lee Josephson, Massachusetts General Hospital (USA); Conor L. Evans, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) [8931-14]

2:45 pm: **Monitoring of photodynamic therapy with photoacoustic imaging**, Srivalleesha Mallidi, Harvard Medical School (USA); Kohei Watanabe, Massachusetts General Hospital (USA) and Canon U.S.A., Inc. (USA); Dmitry Timerman, Tayyaba Hasan, Massachusetts General Hospital (USA) . . . [8931-15]

3:00 pm: **Noninvasive tumor oxygen imaging by photoacoustic lifetime imaging integrated with PDT**, Qi Shao, Merrill A. Biel M.D., Shai Ashkenazi, Univ. of Minnesota (USA) [8931-16]

Coffee Break Sat 3:15 pm to 3:45 pm

SESSION 4

Location: Room 236 (Mezzanine) Sat 3:45 pm to 5:20 pm

Photodynamic Therapy IV

Session Chair: **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (USA)

3:45 pm: **Comparison of singlet oxygen threshold dose for PDT** (*Invited Paper*), Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA); Baochang Liu, Univ. of Pennsylvania (USA); Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Dayton D. McMillan, Univ. of Pennsylvania (USA); Xing Liang, Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA); Theresa M. Busch, Univ. of Pennsylvania (USA) . [8931-17]

4:05 pm: **High variability in patient-specific therapeutic dose observed during clinical aminolevulinic acid based photodynamic therapy treatments of actinic keratosis**, Stephen C. Kanick, Scott C. Davis, Yan Zhao, Thayer School of Engineering at Dartmouth (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Edward V Maytin M.D., The Cleveland Clinic (USA); M. Shane Chapman M.D., Dartmouth Hitchcock Medical Ctr. (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) [8931-18]

4:20 pm: **Recovery of optical properties from interstitial spectroscopy for photodynamic therapy treatment planning**, Timothy M. Baran, Univ. of Rochester Medical Ctr. (USA); Michael C. Fenn, Univ. of Rochester (USA); Thomas H. Foster, Univ. of Rochester Medical Ctr. (USA) [8931-19]

4:35 pm: **A fluorescence imaging system for sensitizer monitoring in pleural PDT**, Jarod C. Finlay, Arash Darafsheh, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-20]

4:50 pm: **Multimodal imaging of skin cancer for treatment planning**, Ulas Sunar, Daniel J. Rohrbach, Roswell Park Cancer Institute (USA); Daniel Muffoletto, Univ. at Buffalo (USA); Rolf B. Saager, Univ. of California, Irvine (USA); Kenneth Keymel, Anne Paquette, Janet Morgan, Joseph Housel, Natalie Zeitouni, Roswell Park Cancer Institute (USA) [8931-21]

5:05 pm: **Optimization of the light profile in tissues for photodynamic therapy**, Dilleys Ferreira da Silva, Thereza Cury Fortunato, Cristina Kurachi D.D.S., Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8931-22]

10:15 am: **Photodynamic effect of photosensitizer-loaded hollow silica nanoparticles for hepatobiliary malignancies: an in vitro and in vivo study**, Xiaofeng Deng, Xiongying Miao, Li Xiong, Yu Wen, Zhongtao Liu, Dongni Pei, Yaxun Huang, The Second Xiangya Hospital (China) [8931-28]

Coffee Break Sun 10:30 am to 11:00 am

SESSION 6

Location: Room 236 (Mezzanine) . . . Sun 11:00 am to 12:35 pm

Photodynamic Therapy VI

Session Chairs: **Kenneth K. Wang M.D.**, Mayo Clinic (USA); **Keith A. Cengel**, Univ. of Pennsylvania School of Medicine (USA)

11:00 am: **Prospects for future adoption of photodynamic therapy as a mainstream treatment of nonmelanoma skin cancer in the USA** (*Invited Paper*), Edward V. Maytin M.D., The Cleveland Clinic (USA) [8931-29]

11:25 am: **To be announced** (*Invited Paper*), Merrill A. Biel M.D., Univ. of Minnesota (USA) [8931-30]

11:50 am: **Pulsed light imaging for wide-field dosimetry of photodynamic therapy in the skin**, Scott C. Davis, Kristian J. Sexton, Thayer School of Engineering at Dartmouth (USA); M. Shane Chapman M.D., Dartmouth Hitchcock Medical Ctr. (USA) and Geisel School of Medicine at Dartmouth (USA); David B. McClatchy III, Stephen C. Kanick, Thayer School of Engineering at Dartmouth (USA); Pablo A. Valdes, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine at Dartmouth (USA); Edward V. Maytin M.D., The Cleveland Clinic (USA); Tayyaba Hasan, Massachusetts General Hospital (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) [8931-31]

12:05 pm: **Photodynamic therapy of cervical intraepithelial neoplasia**, Natalia Mayumi Inada, Univ. de São Paulo (Brazil) and São Carlos Institute of Physics (Brazil); Wellington Lombardi M.D., Marieli Fernanda Martins Leite M.D., Univ. Estadual Paulista (Brazil); J. Roberto Trujillo M.D., TruBios (USA) and Johns Hopkins Univ. (USA); Cristina Kurachi D.D.S., Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8931-32]

12:20 pm: **Definitive surgery and intraoperative photodynamic therapy: a prospective study of local control and survival for patients with pleural dissemination of non-small cell lung cancer**, Charles B. Simone M.D., The Univ. of Pennsylvania Health System (USA); Keith A. Cengel, Univ. of Pennsylvania School of Medicine (USA) [8931-33]

Lunch/Exhibition Break Sun 12:35 pm to 1:45 pm

SESSION 7

Location: Room 236 (Mezzanine) Sun 1:45 pm to 2:45 pm

Photodynamic Therapy VII

Session Chair: **Conor L. Evans**, Wellman Ctr. for Photomedicine (USA)

1:45 pm: **Porphyrin-based polysilsesquioxane nanoparticles to improve photodynamic therapy for cancer treatment**, Juan L. Vivero-Escoto, The Univ. of North Carolina at Charlotte (USA) [8931-34]

2:00 pm: **Diffuse optical tomography using multichannel robotic platform for interstitial PDT**, Anna V. Sharikova, Xing Liang, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-35]

2:15 pm: **Perfusion CT as a surrogate for verteporfin PDT dosimetry in pancreatic cancer: validation in rabbit tumor model studies**, Kimberley S. Samkoe, Dartmouth Hitchcock Medical Ctr. (USA) and Thayer School of Engineering at Dartmouth College (USA); Jonathan T. Elliott, Geisel School of Medicine at Dartmouth (USA); Errol E. Stewart, Univ. of Western Ontario (Canada); Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA); Karen L. Moodie, Susan Kane, Geisel School of Medicine at Dartmouth (USA); P. Jack Hoopes, Geisel School of Medicine (USA); Ting-Yim Lee, Roberts Research Institute (Canada); Stephen P. Pereira, Univ. College London (United Kingdom); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Dartmouth Hitchcock Medical Ctr. (USA) [8931-36]

2:30 pm: **Association of optical clarity and photodynamic therapy for melanoma: in vivo study at tumor model**, Layla Pires, Lilian Tan Moriyama, Clóvis Gracco, Sebastião Pratavieira, Cristina Kurachi D.D.S., Univ. de São Paulo (Brazil) [8931-37]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 236 (Mezzanine) . . . Sun 8:30 am to 10:30 am

Photodynamic Therapy V

Session Chairs: **Edward V. Maytin M.D.**, The Cleveland Clinic (USA); **Merrill A. Biel M.D.**, Univ. of Minnesota (USA)

8:30 am: **Novel indications for PDT of solid and cystic tumors of the pancreas** (*Invited Paper*), Stephen P. Pereira, Margaret G. Keane M.D., Stephen G. Bown M.D., Univ. College London (United Kingdom); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8931-23]

8:55 am: **Photodynamic therapy in the treatment of Barrett's esophagus: current status and future directions** (*Invited Paper*), Kenne

9:20 am: **STAT3 Expression Reduces PDT Efficacy in Malignant Pleural Mesothelioma: combined analysis of clinical tissue microarrays and preclinical 3D tumor nodules with inducible shRNA knockdown** (*Invited Paper*), Keith A. Cengel, Univ. of Pennsylvania School of Medicine (USA) [8931-25]

9:45 am: **Receptor concentration imaging (RCI) can quantify available epidermal growth factor status after photodynamic therapy in pancreatic cancer**, Kimberley S. Samkoe, Geisel School of Medicine at Dartmouth (USA) and Thayer School of Engineering at Dartmouth College (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA); Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine at Dartmouth (USA) [8931-26]

10:00 am: **Photodynamic inactivation of pathogens causing infectious keratitis**, Carole Simon, Meik Walthert, Technische Univ. Kaiserslautern (Germany); Katrin Winkler, Melanie Finke, Jiong Wang, Nora Szentmary, Timo Eppig, Univ. des Saarlandes (Germany); Dirk Hüttenberger, ApoCare Pharma GmbH (Germany); Achim Langenbacher, Markus Bischoff, Berthold Seitz, Univ. des Saarlandes (Germany); John Cullum, Hans-Jochen Foth, Technische Univ. Kaiserslautern (Germany) [8931-27]

Conference 8931 · Location: Room 236 (Mezzanine)

SESSION 8

Location: Room 236 (Mezzanine) Sun 2:45 pm to 3:30 pm

Photodynamic Therapy VIII

Session Chair: **Charles W. Spangler**, Rasiris, Inc. (USA)

2:45 pm: **Investigation of dynamic morphological changes of cancer cells during photo-immuno therapy (PIT) by low-coherence quantitative phase microscopy**, Mikako Ogawa, Hamamatsu Univ. School of Medicine (Japan); Toyohiko Yamauchi, Hidenao Iwai, Hamamatsu Photonics K.K. (Japan); Yasuhiro Magata, Hamamatsu Univ. School of Medicine (Japan); Peter L. Choyke M.D., Hisataka Kobayashi, National Cancer Institute (USA) [8931-38]

3:00 pm: **ALA-PpIX variability quantitatively imaged in A431 epidermoid tumors using in vivo ultrasound-fluorescence tomography and ex vivo assay**, Alisha V. DSouza, Brendan P. Flynn, Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Kimberley S. Samkoe, Geisel School of Medicine (USA) and Thayer School of Engineering at Dartmouth (USA); Sanjay Anand, Cleveland Clinic Lerner Research Institute (USA); Edward V. Maytin M.D., Cleveland Clinic Lerner Research Institute (USA) and Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine at Dartmouth (USA) and Wellman Ctr. for Photomedicine, Harvard Medical School, Massachusetts General Hospital (USA) [8931-39]

3:15 pm: **In vitro studies of chlorin e6-assisted photodynamic inactivation of Helicobacter pylori**, Carole Simon, Technische Univ. Kaiserslautern (Germany); Christina Mohrbacher, Westpfalz-Klinikum GmbH (Germany) and ApoCare Pharma GmbH (Germany); Dirk Hüttenberger, ApoCare Pharma GmbH (Germany); Ina Bauer-Marschall, Christian Krickhahn, Axel Stachon, Westpfalz-Klinikum GmbH (Germany); Hans-Jochen Foth, Technische Univ. Kaiserslautern (Germany) [8931-40]

Monday 3 February

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Optimization of topical PDT using ALA and metil-ALA mixtures evaluated by fluorescence spectroscopy and widefield fluorescence imaging, Priscila Fernanda Campos Menezes, Michelle B. Requena, Alessandra K. K. Fujita, Cristina Kurachi D.D.S., Univ. de São Paulo (Brazil); Andriago B. de Nardi, Andre Escobar, Univ. Estadual Paulista (Brazil); Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8931-41]

Singlet oxygen-based dosimetry for BPD-PDT efficacy, Dayton D. McMillan, Colorado State Univ. (USA) and Univ. of Pennsylvania (USA); Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-42]

Anisotropic modeling for IR navigation-based PDT dosimetry, Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Xing Liang, Univ. of Pennsylvania (USA); Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-43]

Photodynamic and biological activity of new cationic porphyrins in vitro, Anna G. Gyulkhandanyan, Institute of Biochemistry (Armenia); Robert K. Ghazaryan, Yerevan State Medical Univ. (Armenia); Aram G. Gyulkhandanyan, Grigor V. Gyulkhandanyan, Institute of Biochemistry (Armenia) [8931-44]

Evaluation of protoporphyrin ix production using different mixtures of ALA and M-ALA by widefield fluorescence in porcine skin model, Alessandra K. K. Fujita, Univ. de São Paulo (Brazil); Priscila Fernanda Campos Menezes, Michelle B. Requena, Cristina Kurachi D.D.S., Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8931-45]

Blood flow and oxygenation correlate with local PDT dose and response, Daniel J. Rohrbach, Nestor R. Rigual, Heinz Baumann, Erin Tracy, Mary Jo Bowman, Barbara W. Henderson, Ulas Sunar, Roswell Park Cancer Institute (USA) [8931-46]

Comparison of PDT parameters for RIF and H460 tumor models during HPPH-mediated PDT, Baochang Liu, Univ. of Pennsylvania (USA); Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Shannon M. Gallagher-Colombo, Theresa M. Busch, Univ. of Pennsylvania (USA); Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-47]

Chlorophyll spectra in mice fluorescence measurements for PDT, Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA); Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA); Baochang Liu, Univ. of Pennsylvania (USA); Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) [8931-48]

Intense pulsed light an alternative to perform photodynamic therapy, Michelle B. Requena, Priscila Fernanda Campos Menezes, Alessandra K. Fujita, Clóvis Grecco, Univ. de São Paulo (Brazil); Andriago B. de Nardi, Andre Escobar, Univ. Estadual Paulista (Brazil); Cristina Kurachi D.D.S., Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8931-49]

Fluorescence lifetime for melanoma murine detection, Layla Pires, Marcelo S. Nogueira, Lilian Tan Moriyama, Cristina Kurachi D.D.S., Univ. de São Paulo (Brazil) [8931-50]

Comparison of photodynamic therapy using two photosensitizers for melanoma: in vitro study, Layla Pires, Bruno Ono, Lilian Tan Moriyama, Cristina Kurachi D.D.S., Univ. de São Paulo (Brazil) [8931-51]

Synthesis and study of novel targeted photosensitive for use in invasive breast cancer, Rebecca Gilson, Rui Tang, Pinaki Sarder, Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) [8931-52]

Evaluating the efficacy of photodynamic therapy in glioblastoma spheroids, Kohei Watanabe, Bryan Q. Spring, Massachusetts General Hospital (USA) and Wellman Ctr for Photomedicine, Harvard Medical School (USA); Srivalleesha Mallidi, Wellman Ctr for Photomedicine, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Dmitriy Timerman, Harvard-MIT Health Sciences and Technology (USA); Tayyaba Hasan, Wellman Ctr for Photomedicine, Harvard Medical School (USA) and Massachusetts General Hospital (USA) [8931-53]

Targeting glioblastoma stem cells for fluorescence-guided resection with follow-up photodynamic therapy: preliminary studies, Bryan Q. Spring, Wellman Ctr. for Photomedicine, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Kohei Watanabe, Massachusetts General Hospital (USA) and Wellman Ctr for Photomedicine, Harvard Medical School (USA) and Canon, Inc. (USA); Srivalleesha Mallidi, Massachusetts General Hospital (USA) and Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Dmitriy Timerman, Massachusetts General Hospital (USA) and Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Wellman Ctr. for Photomedicine, Harvard Medical School (USA) and Harvard-MIT Health Sciences and Technologies (USA) [8931-54]

Mechanisms for Low-Light Therapy IX

Conference Chairs: **Michael R. Hamblin**, Wellman Ctr. for Photomedicine (USA); **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom); **Praveen Arany**, National Institute of Dental and Craniofacial Research (USA)

Program Committee: **Juanita Anders**, Uniformed Services Univ. of the Health Sciences (USA); **Tomas Hode**, Immunophotonics, Inc. (USA); **Daniel Barolet M.D.**, McGill Univ (Canada)

Saturday 1 February

SESSION 1

Location: Room 274 (Mezzanine) Sat 8:10 am to 11:30 am

Mechanisms and Dosimetry

Session Chair: **Michael R. Hamblin**, Wellman Ctr. for Photomedicine (USA)

8:10 am: **Application and possible mechanisms of combining LLLT, Infrared hyperthermia, and ionizing radiation in the treatment of cancer** (*Invited Paper*), Edward H. Abraham, Van H. Woo, Cheryl Harlin-Jones, Artesian Cancer Ctr. (USA); Anja Heselich, Florian Frohns, Technische Univ. Darmstadt (Germany) [8932-1]

8:40 am: **Near infrared laser therapy for stroke: does it penetrate the skull?**, Paul A. Lapchak, Pramod V. Butte, Padmesh Rajput, Cedars-Sinai Medical Ctr. (USA) [8932-2]

9:00 am: **Photo-excitation of electrons as a theory of the mechanism of the increase of ATP production in mitochondria by laser therapy**, Andrzej Zielke, Medical Frontiers, LLC (USA) [8932-3]

9:20 am: **Combination of nitric oxide therapy, anti-oxidative therapy, low level laser therapy, plasma rich platelet therapy and stem cell therapy as a novel therapeutic application to manage the pain and treat many clinical conditions.**, Salaheldin Halasa, Cutting Edge Treatment Ctr. (USA) and Compassionate Pain Management (USA); Eva Dickinson, Compassionate Pain Management (USA) and Cutting Edge Treatment Ctr. (USA) [8932-4]

9:40 am: **VCSELs in the visible to IR as a light source for low light therapy**, Mary Hibbs-Brenner, Klein L. Johnson, Vixar Inc. (USA); Matthew M. Dummer, Vixar Inc (USA); William K. Hogan, Charles Steidl, Vixar Inc. (USA) [8932-5]

Coffee Break Sat 10:00 am to 10:30 am

10:30 am: **Near infrared laser penetration and absorption in human skin**, Babak Nasouri, Halil Berberoglu, The Univ. of Texas at Austin (USA) [8932-6]

10:50 am: **Evaluation of laser photobiomodulation (λ 780 nm) in the repair of dental reimplantation in rats**, Fabíola B. Bastos de Carvalho, Rebeca M. Vasconcelos, Laila S. Santos, Artur F. S. Barbosa, Marcio C. Aguiar, Maria Cristina T. Cangussu, Antônio L. B. Pinheiro, Luciana M. Pedreira Ramalho, Univ. Federal da Bahia (Brazil) [8932-7]

11:10 am: **Wavelength, beam size, and type dependences of cerebral low-level light therapy: a Monte Carlo study on visible Chinese human**, Ting Li, Univ. of Electronic Science and Technology of China (China) [8932-8]

SESSION 2

Location: Room 274 (Mezzanine) . . . Sat 11:30 am to 12:30 pm

In Vitro Studies I

Session Chair: **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom)

11:30 am: **Irradiation at 660 nm modulates different genes central to wound healing in wounded and diabetic wounded cell models**, Nicolette N. Hourel, Univ. of Johannesburg (South Africa) [8932-9]

11:50 am: **Genetic expression of adipose derived stem cell and smooth muscle cell markers to monitor differentiation potential following low intensity laser irradiation**, Heidi Abrahamse, Univ. of Johannesburg (South Africa) [8932-10]

12:10 pm: **Alterations in cell migration and cell viability of wounded human skin fibroblasts following visible red light exposure**, Vijendra Prabhu, Satish Bola Sadashiva Rao, Krishna Kishore Mahato, Manipal Univ. (India) [8932-11]

SESSION 3

Location: Room 274 (Mezzanine) Sat 1:40 pm to 3:20 pm

In Vitro Studies II

Session Chair: **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom)

1:40 pm: **Nitric oxide measurements in hTERT-RPE cells and subcellular fractions exposed to low levels of red light**, Jeffrey C. Wigle, U.S. Air Force (USA); Cherry C. Castellanos, Michael L. Denton, TASC, Inc. (USA); Eric A. Holwitt, U.S. Air Force Academy (USA) [8932-12]

2:00 pm: **In vitro effect of 470 nm LED (Light Emitting Diode) in keloid fibroblasts**, Fabia

2:20 pm: **Programmed cell death mechanism identified in breast, lung and colon cancer cells post photodynamic therapy using PCR arrays**, Heidi Abrahamse, Univ. of Johannesburg (South Africa) [8932-14]

2:40 pm: **Association phenothiazine and laser on growth of c.tropicalis fluconazole-resistant**, Gustavo M. Pires Santos, Juliana S. Monteiro, Anderson F. S. Miranda, Susana P. de Oliveira, Luiz Guilherme P. Soares, Univ. Federal da Bahia (Brazil); Marcos André V. Vannier-Santos, Fundação Oswaldo Cruz (Brazil); Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8932-15]

3:00 pm: **In vitro influence of photodynamic antimicrobial chemotherapy on staphylococcus aureus by using phenothiazines derivatives associated with laser/led light**, Juliana S. Monteiro, Susana P. de Oliveira, Luiz Guilherme P. Soares, Gustavo M. Pires Santos, Anderson F. S. Miranda, Univ. Federal da Bahia (Brazil); Marcos André V. Vannier-Santos, Fundação Oswaldo Cruz (Brazil); Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8932-16]

Coffee Break Sat 3:20 pm to 3:50 pm

SESSION 4

Location: Room 274 (Mezzanine) Sat 3:50 pm to 6:00 pm

Animal Studies I

Session Chair: **Tomas Hode**, Immunophotonics, Inc. (USA)

3:50 pm: **Can light interact with neurons to decrease pain?** (*Invited Paper*), Marcelo V. Pires de Sousa, Univ. de São Paulo (Brazil) and Wellman Ctr. for Photomedicine (USA); Cleber Ferraresi, Beatriz Kaippert, Masayoshi Kawakubo, Wellman Ctr. for Photomedicine (USA); Elisabeth M. Yoshimura, Univ. de São Paulo (Brazil); Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [8932-17]

4:20 pm: **Treating metabolic syndrome's metaflammation with low level light therapy: preliminary results**, Tania M. Yoshimura, Univ. de São Paulo (Brazil); Alessandro M. Deana, UNINOVE (Brazil); Martha S. Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8932-18]

4:40 pm: **Light emitting diode λ 850nm on repair of calcaneus tendon in rats**, Carlos E. Pinfildi, Rafael C. Gobatto, Michele A. Nishioka, Bernardo S. Hochman, Univ. Federal de São Paulo (Brazil) [8932-19]

5:00 pm: **Raman and histological study of the repair of surgical bone defects grafted with biphasic synthetic micro-granular HA + β - calcium triphosphate and irradiated or not with λ 780 nm laser**, Antônio Luiz B. Pinheiro, Luiz Guilherme P. Soares, Aparecida Maria C. Marques, Joubert Mateus S. Aciole, Jean Nunes Dos Santos, Univ. Federal da Bahia (Brazil); Landulfo Silveira Jr., Camilo Castelo Branco Univ. (Brazil) [8932-20]

5:20 pm: **Evaluation of Low Level Laser Therapy Irradiation Parameters on Rat Muscle Inflammation through Systemic Blood Cytokines**, Matias E. Mantineo, João P. Pinheiro, Antonio M. Morgado, Univ. de Coimbra (Portugal) [8932-21]

5:40 pm: **Effect of application site of low-level laser therapy in random cutaneous flap viability in rats**, Bernardo S. Hochman, Rodrigo P. Prado, Carlos E. Pinfildi, Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) . [8932-22]



BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 274 (Mezzanine) . . . Sun 8:20 am to 10:00 am

Animal Studies II

Session Chair: **Tomas Hode**, Immunophotonics, Inc. (USA)

- 8:20 am: **Effect of low-level laser therapy with output power of 30 mW and 60 mW in the viability of a random skin flap**, Lydia M. Ferreira, Maira S. Costa, Carlos E. Pinfieldi, Richard E. Liebano, Univ. Federal de São Paulo (Brazil) [8932-23]
- 8:40 am: **LED (660 nm) and laser (670 nm) use on skin flap viability: angiogenesis and mast cells on transition line**, Michele A. Nishioka, Carlos E. Pinfieldi, Arainy S. Antunes, Heitor C. Gomes, Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) [8932-24]
- 9:00 am: **Collagen changes and realignment induced by low-level laser therapy and low-intensity ultrasound in the calcaneal tendon**, Bernardo S. Hochman, Viviane Tim Wood, Carlos E. Pinfieldi, Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) [8932-25]
- 9:20 am: **Effect of low-level laser therapy on mast cells in viability of the transverse rectus abdominis musculocutaneous flap**, Lydia M. Ferreira, Carlos E. Pinfieldi, Bernardo S. Hochman, Rafael C. Gobatto, Univ. Federal de São Paulo (Brazil) [8932-26]
- 9:40 am: **Low level laser therapy and light emitting diode in neuropeptides SP and CGRP secretion in healthy skin in rats**, Michele A. Nishioka, Bernardo S. Hochman, Paola K. Monteiro, Fabianne Furtado, Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) [8932-27]
- Coffee Breaks Sun 10:00 am to 10:30 am

SESSION 6

Location: Room 274 (Mezzanine) . . . Sun 10:30 am to 11:50 am

Animal Studies III

Session Chair: **Michael R. Hamblin**, Wellman Ctr. for Photomedicine (USA)

- 10:30 am: **Efficacy of multiple exposure with low level He-Ne laser dose on acute wound healing: a pre-clinical study**, Vijendra Prabhu, Satish Bola Sadashiva Rao, Krishna Kishore Mahato, Manipal Univ. (India) [8932-28]
- 10:50 am: **Helium-neon laser in viability of random skin flap in rats**, Lydia M. Ferreira, Carlos E. Pinfieldi, Richard E. Liebano, Bernardo S. Hochman, Univ. Federal de São Paulo (Brazil) [8932-29]
- 11:10 am: **Low-level laser therapy (808 nm) in incisional wound healing in rat skin**, Bernardo S. Hochman, Silvilena Bonatti, Univ. Federal de São Paulo (Brazil); Nivaldo Parizoto, Univ. Federal de São Carlos (Brazil); Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) [8932-30]
- 11:30 am: **Mast cellcurve response in partial partial Archilles's tendon rupture after phototherapy 830nm**, Carlos E. Pinfieldi, Erika C. R. Silva, Roberta A. C. Folha, Paola Turchetto, Arainy S. Antunes, Bernardo S. Hochman, Lydia M. Ferreira, Univ. Federal de São Paulo (Brazil) [8932-31]
- Lunch/Exhibition Break Sun 11:50 am to 1:30 pm

SESSION 7

Location: Room 274 (Mezzanine) Sun 1:30 pm to 3:00 pm

Clinical Studies

Session Chair: **James D. Carroll**, THOR Photomedicine Ltd. (United Kingdom)

- 1:30 pm: **Low-level light therapy and aesthetic dermatology** (*Invited Paper*), Pinar Avci, Mossum Sawhney, Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) [8932-32]
- 2:00 pm: **Acute effects of low-level laser therapy on gas exchange and electromyographic fatigue threshold during cardiopulmonary exercise testing in healthy adults**, Carlos E. Pinfieldi, Mariana A. S. Alves, Luiz Nilsen Neto, Rebeca Palomo, Paulo H. S. M. Azevedo, Victor Z. Dourado, Univ. Federal de São Paulo (Brazil) [8932-33]
- 2:20 pm: **Effect of laser acupuncture versus traditional acupuncture in neck pain of cervical spondylosis**, Alia A. El Gendy, National Research Ctr. (Egypt); Ahmed M. El Kharbotly, National Institute of Laser Enhanced Sciences (Egypt); Moushira Abdel Salam, National Research Ctr. (Egypt); Manal M. El Masry, Eiteidal M. El Marsy, Cairo Univ. (Egypt); Khaled AbdelWahab, National Research Ctr. (Egypt) [8932-35]
- 2:40 pm: **Comparison of clinical effectiveness of laser acupuncture and amytrptalin in diabetic peripheral neuropathu (DPN): a sham controled randomized cinical trial**, Shahzad Anwar, Anwar Shah's First C.P. and Paralysis Clinic and Research Ctr. (Pakistan); Malik Muhammad Nazir Khan, Children's Hospital & Institute of Child Health (Pakistan); Faiza Munir Qazi, Iffat Anwar Medical Complex (Pakistan) [8932-37]

POSTER SESSION AND COFFEE BREAK

Location: South Hall A Sun 3:00 pm to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Sunday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday and 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

- Assessment laser phototherapy on bone defects grafted or not with biphasic synthetic micro-granular HA + β -tricalcium phosphate: histological study in an animal model**, Luiz Guilherme P. Soares, Aparecida Maria C. Marques, Joubert Mateus S. Aciole, Univ. Federal da Bahia (Brazil); Landulfo Silveira Jr., Camilo Castelo Branco Univ. (Brazil); Jean Nunes dos Santos, Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8932-38]
- Evaluation of photodynamic therapy phenothiazine and using laser light (660nm) on cultures of murine melanoma: study in vitro**, Gustavo M. Pires Santos, Juliana S. Monteiro, Anderson F. S. Miranda, Susana P. de Oliveira, Luiz Guilherme P. Soares, Univ. Federal da Bahia (Brazil); Marcos André V. Vannier-Santos, Fundação Oswaldo Cruz (Brazil); Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8932-39]
- Mechanisms of laser-induced regeneration of cartilage**, Emil N. Sobol, Institute on Laser and Information Technologies (Russian Federation) . . [8932-40]
- Evaluation of enamel by scanning electron microscopy green led associated to hydrogen peroxide 35% for dental bleaching**, Susana P. de Oliveira, Juliana S. Monteiro, Gustavo M. Pires Santos, Luiz Guilherme P. Soares, Univ. Federal da Bahia (Brazil); Marcos André V. Vannier-Santos, Fundação Oswaldo Cruz (Brazil); Fátima A. A. Zanin, Antônio Luiz B. Pinheiro, Univ. Federal da Bahia (Brazil) [8932-41]
- Enhanced angiogenic effet of adipose-derived stromal cell spheroid with low-level laser therapy in mouse hind limb ischemia**, In-Su Park, Jin Chul Ahn, Phil-Sang Chung, Dankook Univ. (Korea, Republic of) [8932-42]
- Effect of LED phototherapy ($\lambda 630 \pm 20nm$) on mast cells during wound healing in hypothyroid and euthyroid rats**, Gardênia M. Paraguassu, Isabele C. V. DeCastro, Rebeca M. Vasconcelos, Milena Guarda, Tânia T. Rodriguez, Maria José P. Ramalho, Antônio Luiz B. Pinheiro, Luciana Maria P. Pedreira Ramalho, Univ. Federal da Bahia (Brazil) [8932-43]
- Laser photobiomodulation as an adjunct of the wound healing impairment of rats exposed to a cafeteria diet**, Virginia Uzeda, Gardênia M. Paraguassu, Jean Nunes Dos Santos, Maria José P. Ramalho, Tânia T. Rodriguez, Luciana M. Pedreira Ramalho, Univ. Federal da Bahia (Brazil) [8932-44]
- LLLT and pharmacological approaches for wound-healing in cell models**, Ryan Spittler, Univ. of California, Irvine (USA); Gerry Boss, Univ. of California, San Diego (USA); Michael W. Berns, Univ. of California, Irvine (USA) [8932-45]

Frontiers in Biological Detection: From Nanosensors to Systems

Conference Chairs: **Benjamin L. Miller**, Univ. of Rochester Medical Ctr. (USA); **Philippe M. Fauchet**, Vanderbilt Univ. (USA); **Brian T. Cunningham**, Univ. of Illinois at Urbana-Champaign (USA)

Program Committee: **Xudong Fan**, Univ. of Michigan (USA); **Laura Maria Lechuga**, Catalan Institute of Nanoscience and Nanotechnology (Spain); **Frances S. Ligler**, U.S. Naval Research Lab. (USA); **Michael J. Sailor**, Univ. of California, San Diego (USA); **Oliver G. Schmidt**, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany); **Christopher C. Striemer**, Adarza BioSystems, Inc. (USA); **Sharon M. Weiss**, Vanderbilt Univ. (USA)

Saturday 1 February

SESSION 1

Location: Room 124 (Exhibit Level) .. Sat 9:00 am to 10:00 am

Fibers and Interferometry

Session Chair: **Philippe M. Fauchet**, Vanderbilt Univ. (USA)

9:00 am: **Understanding and mitigating DNA induced corrosion in porous silicon based biosensors**, Yiliang Zhao, Sharon M. Weiss, Jenifer L. Lawrie, Paul E. Laibinis, Vanderbilt Univ. (USA)[8933-12]

9:20 am: **Biosensing platform with tapered optical microfibers: new results**, Branden J. King, Ighodalo Idehenre, Peter E. Powers, Joseph W. Haus, Karolyn M. Hansen, Univ. of Dayton (USA)[8933-2]

9:40 am: **Arrayed imaging reflectometry as a tool for multiplex label-free determination of RNA-protein binding kinetics**, Benjamin L. Miller, Univ. of Rochester Medical Ctr. (USA); Amrita R. Yadav, Univ. of Rochester (USA); Charles R. Mace, Univ. of Rochester Medical Ctr. (USA)[8933-3]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 2

Location: Room 124 (Exhibit Level) . Sat 10:30 am to 12:10 pm

Nanostructures

Session Chair: **Brian T. Cunningham**, Univ. of Illinois at Urbana-Champaign (USA)

10:30 am: **Integrated-optical waveguide and nanoparticle based label-free molecular biosensing concepts (Invited Paper)**, Rainer Hainberger, Paul Muellner, Eva Melnik, Markus Wellenzohn, Roman Bruck, Stefan Schrittwieser, Jörg Schotter, AIT Austrian Institute of Technology GmbH (Austria); Michael Waldow, Thorsten Wahlbrink, AMO GmbH (Germany); Guenther Koppitsch, Franz Schrank, ams AG (Austria); Katerina Soulantica, Sergio Lentijo, Institut National des Sciences Appliquées de Toulouse (France); Beatriz Pelaz, Wolfgang Parak, Philipps-Univ. Marburg (Germany)[8933-4]

11:10 am: **Suspended micro-ring resonator for enhanced biomolecule detection sensitivity**, Shuren Hu, Kun Qin, Vanderbilt Univ. (USA); Ivan I. Kravchenko, Scott T. Retterer, Oak Ridge National Lab. (USA); Sharon M. Weiss, Vanderbilt Univ. (USA)[8933-5]

11:30 am: **Highly sensitive integrated optical biosensors**, Alethea V. Zamora Gomez, Peter Luetzow, Martin Weiland, Daniel Pergande, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany)[8933-6]

11:50 am: **Detection of target DNA using photo-reactive protoporphyrin moeity on a nanocomposite substrate**, Sumana Das, Madhusmita Mishra, Ramakrishna Vasireddi, D. Roy Mahapatra, Indian Institute of Science (India)[8933-7]

Lunch/Exhibition Break Sat 12:10 pm to 1:30 pm

SESSION 3

Location: Room 124 (Exhibit Level) ... Sat 1:30 pm to 3:10 pm

Fluorescence Methods

Session Chair: **Benjamin L. Miller**, Univ. of Rochester Medical Ctr. (USA)

1:30 pm: **Fluorescent nanosensors for monitoring neurotransmitter release (Invited Paper)**, Heather A. Clark, Ryan Walsh, Jennifer Morales, Northeastern Univ. (USA)[8933-8]

2:10 pm: **Label-free assay for the detection of glucose mediated by the effects of narrowband absorption on quantum dot photoluminescence**, Saara A. Khan, Gennifer T. Smith, Audrey Ellerbee, Stanford Univ. (USA)[8933-9]

2:30 pm: **Utilizing embedded optofluidic sensors for fluorescent detection measurements in space and time**, Mark C. Harrison, Andrea M. Armani, The Univ. of Southern California (USA)[8933-10]

Coffee Break Sat 2:50 pm to 3:20 pm

SESSION 4

Location: Room 124 (Exhibit Level) ... Sat 3:20 pm to 5:00 pm

Photonic Crystals and Porous Silicon

Session Chair: **Philippe M. Fauchet**, Vanderbilt Univ. (USA)

3:20 pm: **Photonic crystal enhancement of a homogeneous fluorescent assay using submicron fluid channels fabricated by e-jet patterning**, Yafang Tan, Erick Sutanto, Andrew G. Alleyne, Brian T. Cunningham, Univ. of Illinois at Urbana-Champaign (USA)[8933-13]

3:40 pm: **Multiplexed detection of breast cancer cell lysates in silicon photonic crystal microcavity biosensors**, Liang Zhu, The Univ. of Texas at Austin (USA); Swapnajt Chakravarty, Omega Optics, Inc. (USA); Wei-Cheng Lai, Yi Zou, Ray T. Chen, The Univ. of Texas at Austin (USA)[8933-14]

4:00 pm: **Measurements of affinity and dissociation constants in silicon based high sensitivity photonic crystal microcavity biosensors**, Dakota Crisp, Southeast Missouri State Univ. (USA); Swapnajt Chakravarty, Omega Optics, Inc. (USA); Wei-Cheng Lai, Liang Zhu, Ray T. Chen, The Univ. of Texas at Austin (USA)[8933-15]

4:20 pm: **Dead/alive bacteria detection using an all-fibre optical system**, Evgeny Bogomolny, Michael Cheng, Simon Swift, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand)[8933-1]

4:40 pm: **Förster (fluorescence) resonance energy transfer (FRET) activated by biosensors: study of bacteria cellular activity of cyclic di Guanlylate using an advanced all-fibre optical system**, Evgeny Bogomolny, Frédérique Vanholsbeeck, Michael Cheng, Guneet Kaur, Simon Swift, The Univ. of Auckland (New Zealand)[8933-11]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) ... Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 124 (Exhibit Level) . . Sun 8:50 am to 10:10 am

SPR/Plasmonics/SERS

Session Chair: **Brian T. Cunningham**, Univ. of Illinois at Urbana-Champaign (USA)

8:50 am: **Integrating SPR-ellipsometry and electrochemical measurements for performance evaluation of label-free thiophene-based biosensor**, P. I. Tsai, C. K. Lee, National Taiwan Univ. (Taiwan); S. S. Lee, National Taiwan Ocean Univ. (Taiwan); S. T. Chou, National Taiwan Univ. (Taiwan); Y. T. Chang, A. S. Y. Lee, Tamkang Univ. (Taiwan) [8933-16]

9:10 am: **Bowtie plasmonic nanoantenna arrays for polarimetric optical biosensing**, Jonathan Calderón, Jesús Álvarez, Juan P. Martínez-Pastor, Daniel Hill, Univ. de València (Spain) [8933-17]

9:30 am: **Label-free optical sensing on hybrid plasmonic-nanobiosilica platforms**, Fanghui Ren, Jeremy Campbell, Gregory L. Rorrer, Alan X. Wang, Oregon State Univ. (USA) [8933-18]

9:50 am: **Ultrasensitive DNA hybridization monitoring on nanoporous gold disks in microfluidics**, Wei-Chuan Shih, Ji Qi, Jianbo Zeng, Fusheng Zhao, Richard C. Willson, Univ. of Houston (USA) [8933-19]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 6

Location: Room 124 (Exhibit Level) . Sun 10:40 am to 12:00 pm

Novel Imaging Technologies

Session Chair: **Benjamin L. Miller**, Univ. of Rochester Medical Ctr. (USA)

10:40 am: **Imaging magnetometer for bio-sensing based on nitrogen-vacancy centers in diamond**, Michael Gould, Russell Barbour, Chris Chen, Zhiting Zhu, Kai-Mei Fu, Univ. of Washington (USA) [8933-20]

11:00 am: **Smart-phone based albumin testing in urine**, Ahmet F. Coskun, California Institute of Technology (USA) and Univ. of California, Los Angeles (USA); Richie Nagi, Kayvon Sadeghi, Stephen Phillips, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8933-21]

11:20 am: **Dual-mode lensless imaging device for digital enzyme linked immunosorbent assay**, Kiyotaka Sasagawa, Hironari Takehara, Kazuya Miyazawa, Nara Institute of Science and Technology (Japan); Soo Heyon Kim, The Univ. of Tokyo (Japan); Toshihiko Noda, Takashi Tokuda, Nara Institute of Science and Technology (Japan); Ryota Iino, Hiroyuki Noji, The Univ. of Tokyo (Japan); Jun Ohta, Nara Institute of Science and Technology (Japan) . . . [8933-22]

11:40 am: **Molecular analysis and imaging at the nanoscale by soft x-ray laser ablation mass spectrometry**, Ilya Kuznetsov, Gerald Gasper, Cornelius Oster, Nengyun Zhang, Colorado State Univ. (USA); David Carlton, Weilun Chao, Erik Anderson, Lawrence Berkeley National Lab. (USA); Elliot R. Bernstein, Dean Crick, Mario Marconi, Jorge Rocca, Carmen Menoni, Colorado State Univ. (USA) [8933-23]

POSTER SESSION AND COFFEE BREAK

Location: South Hall A Sun 3:00 pm to 4:00 pm

Attendees are invited to view the conference posters, which will be available on Saturday and Sunday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Sunday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 10:00 to 11:30 AM on Saturday or 8:00 to 9:30 on Sunday in South Hall A. Please plan to stand with your poster during the poster session on Sunday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Detection of campylobacter jejuni using whispering gallery mode optical biosensors in an aqueous environment, Emily C. O'Brien, Heather K. Hunt, Univ. of Missouri (USA) [8933-24]

Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII

Conference Chairs: **Joseph A. Izatt**, Duke Univ. (USA); **James G. Fujimoto**, Massachusetts Institute of Technology (USA); **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Program Committee: **Peter E. Andersen**, Technical Univ. of Denmark (Denmark); **Kostadinka Bizheva**, Univ. of Waterloo (Canada); **Stephen A. Boppert M.D.**, Univ. of Illinois at Urbana-Champaign (USA); **Zhongping Chen**, Beckman Laser Institute and Medical Clinic (USA); **Johannes de Boer**, Vrije Univ. Amsterdam (Netherlands); **Wolfgang Drexler**, Medizinische Univ. Wien (Austria); **Christoph K. Hitzenberger**, Medizinische Univ. Wien (Austria); **Robert A. Huber**, Ludwig-Maximilians-Univ. München (Germany); **Rainer A. Leitgeb**, Medizinische Univ. Wien (Austria); **Xingde Li**, Johns Hopkins Univ. (USA); **Yingtian Pan**, Stony Brook Univ. (USA); **Adrian Gh. Podoleanu**, Univ. of Kent (United Kingdom); **Andrew M. Rollins**, Case Western Reserve Univ. (USA); **Natalia M. Shakhova**, Institute of Applied Physics (Russian Federation); **Guillermo J. Tearney M.D.**, Wellman Ctr. for Photomedicine (USA); **Ruikang K. Wang**, Univ. of Washington (USA); **Maciej Wojtkowski**, Nicolaus Copernicus Univ. (Poland); **Yoshiaki Yasuno**, Univ. of Tsukuba (Japan)

Monday 3 February

SESSION 1

Location: Room 303 (Esplanade) . . . Mon 8:30 am to 10:00 am

New Light Sources and High Performance OCT Technologies

Session Chair: **Joseph A. Izatt**, Duke Univ. (USA)

- 8:30 am: **Recent Advances in MEMS-VCSELs for High Performance Structural and Functional SS-OCT Imaging**, Vijaysekhar Jayaraman, Demis D. John, Christopher Burgner, Martin Robertson, Praevium Research, Inc. (USA); Benjamin Potsaid, James Jiang, Thorlabs, Inc. (USA); Tsung-Han Tsai, WooJhon Choi, Massachusetts Institute of Technology (USA); Peter J. S. Heim, Thorlabs, Inc. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA); Alex E. Cable, Thorlabs, Inc. (USA) [8934-1]
- 8:45 am: **Akinetic all-semiconductor programmable swept-source at 1550 nm and 1310 nm with centimeters coherence length**, Marco Bonesi, Medizinische Univ. Wien (Austria); Michael P. Minneman, Jason Ensher, Insight Photonic Solutions, Inc. (USA); Behrooz Zabihian, Harald Sattmann, Medizinische Univ. Wien (Austria); Paul Boschert, Erich Hoover, Michael Crawford, Insight Photonic Solutions, Inc. (USA); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8934-2]
- 9:00 am: **High-speed wideband and long coherence length swept sources for Optical Coherence Tomography**, Brian D. Goldberg, Peter Whitney, Mark Kuznetsov, Walid Atia, Bart C. Johnson, Ranko Galeb, Vaibhav Mathur, Randy Murdza, Dale Flanders, AXSUN Technologies Inc. (USA) [8934-3]
- 9:15 am: **Region of interest based digital adaptive optics for anisotropic aberration in high resolution full field swept source OCT**, Abhishek Kumar, Wolfgang Drexler, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) [8934-4]
- 9:30 am: **Focus-extension by depth-encoded synthetic aperture in Optical Coherence Tomography**, Jianhua Mo, Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8934-5]
- 9:45 am: **Extended depth-of-focus OCT imaging using energy-efficient low-Fresnel-number Bessel-like beams**, Dirk Lorenser, C. Christian Singe, Andrea Curatolo, Sebastian R. Henn, David D. Sampson, The Univ. of Western Australia (Australia) [8934-6]
- Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 303 (Esplanade) . . Mon 10:30 am to 12:00 pm

Catheter/Endoscopic

Session Chair: **James G. Fujimoto**, Massachusetts Institute of Technology (USA)

- 10:30 am: **Intravascular optical coherence tomography imaging at 3200 frames per second**, Tianshi Wang, Erasmus MC (Netherlands); Wolfgang Wieser, Ludwig-Maximilians-Univ. München (Germany); Geert Springeling, Robert Beurskens, Charles Lancée, Erasmus MC (Netherlands); Tom Pfeiffer, Ludwig-Maximilians-Univ. München (Germany); Antonius F. W. van der Steen, Erasmus MC (Netherlands); Robert Huber, Ludwig-Maximilians-Univ. München (Germany); Gijs van Soest, Erasmus MC (Netherlands) [8934-7]
- 10:45 am: **Tethered Capsule OCT Endomicroscopy**, Michalina J. Gora, Amna Soomro, Weina Lu, Robert W. Carruth, Elena Quijano, Drew Carlton, William Puricelli, Mireille Rosenberg, Wellman Ctr. for Photomedicine (USA); Norman S. Nishioka, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA); Guillermo J. Tearney, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA), and Harvard-MIT Health Sciences and Technology (USA) [8934-8]
- 11:00 am: **Diffraction endoscope for ultrahigh-resolution SD-OCT imaging at 800 nm**, Anqi Zhang, Jiefeng Xi, Jessica Mavadia, Xingde Li, Johns Hopkins Univ. (USA) [8934-9]
- 11:15 am: **Towards intravascular two- and three-dimensional flow measurements based on speckle decorrelation using optical frequency-domain imaging**, Néstor Uribe-Patarroyo, Martin L. Villiger, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) [8934-10]
- 11:30 am: **In vivo imaging of the human upper airway using long range optical coherence tomography**, Joseph C. Jing, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA); Anthony E. Chin Loy, Univ. of California, Irvine (USA); Li-dek Chou, Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Brian J. F. Wong, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA) [8934-11]
- 11:45 am: **Compensating for polarization mode variation in catheter based OFDI**, David C. Adams, Alyssa J. Miller, Melissa J. Suter, Massachusetts General Hospital (USA) [8934-12]
- Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 3

Location: Room 303 (Esplanade) Mon 1:30 pm to 3:30 pm

OCT New Technology I

Session Chair: **Maciej Wojtkowski**, Nicolaus Copernicus Univ. (Poland)

- 1:30 pm: **Coherence Revival Multiplexed, Dual Spot, Buffered Swept Source Optical Coherence Tomography: 400 kHz with a 100 kHz Commercial Source**, Derek Nankivil, Al-Hafeez Dhalla, Kevin Shia, Sina Farsiou, Joseph A. Izatt, Duke Univ. (USA) [8934-13]
- 1:45 pm: **On-chip spectrometer for low-cost optical coherence tomography**, Arthur Nitkowski, Kyle Preston, Nicolás Sherwood-Droz, Tornado Spectral Systems (USA); Bradley S. Schmidt, Arsen R. Hajian, Tornado Spectral Systems (Canada) [8934-14]

Conference 8934 · Location: Room 303 (Esplanade)

2:00 pm: **Space-division multiplexing optical coherence tomography**, Chao Zhou, Aneesh Alex, Janarthanan Rasakanthan, Lehigh Univ. (USA); Yutao Ma, Wuhan Univ. (China) [8934-15]

2:15 pm: **Spectrally multiplexed imaging for swept-source optical coherence tomography using tunable virtually imaged phase arrays**, Hee Yoon Lee, Tahereh Marvdashti, Timothy Welsh, Lian Duan, Audrey K. Ellerbee, Stanford Univ. (USA) [8934-16]

2:30 pm: **Tracking both magnitude and direction of 2-D transverse motion with optical coherence tomography**, Xuan Liu, Jin U. Kang, Johns Hopkins Univ. (USA) [8934-17]

2:45 pm: **Ultra-high-resolution Spectral-domain OCT for micro-vascular imaging**, Jessica Mavadia, Carmen Kut, Jiefeng Xi, Suyi Cao, Raymond C. Koehler, Xingde Li, Johns Hopkins Univ. (USA) [8934-18]

3:00 pm: **Off-axis full-field swept-source OCT of ocular tissue**, Helge M. Sudkamp, Univ. zu Lübeck (Germany); Dierck Hillmann, Thorlabs GmbH (Germany); Gesa Franke, Univ. zu Lübeck (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany); Laura Hinkel, Thorlabs GmbH (Germany); Gereon Hüttmann, Univ. zu Lübeck (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany) [8934-19]

3:15 pm: **Frequency multiplexed long range swept source optical coherence tomography**, Mantas Zuraszkas, Adrian Bradu, Adrian Gh. Podoleanu, Univ. of Kent (United Kingdom) [8934-20]

Coffee Break Mon 3:30 pm to 4:00 pm

SESSION 4

Location: Room 303 (Esplanade) Mon 4:00 pm to 6:00 pm

Ophthalmic New Technology

Session Chair: **Yoshiaki Yasuno**, Univ. of Tsukuba (Japan)

4:00 pm: **Imaging of human cone and rod photoreceptors in vivo using SLO/OCT with adaptive optics**, Michael Pircher, Bernhard Baumann, Stefan Zotter, Julia-Sophie Kroisamer, Paul Vetschera, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8934-21]

4:15 pm: **Hemodynamic imaging of the human retina using ultrahigh speed swept source optical coherence tomography**, WooJhon Choi, ByungKun Lee, Massachusetts Institute of Technology (USA); Benjamin Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Chen D. Lu, Massachusetts Institute of Technology (USA); Martin F. Kraus, Massachusetts Institute of Technology (USA) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Joachim Hornegger, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Alex E. Cable, Thorlabs Inc. (USA); David Huang, Oregon Health & Science Univ. (USA); Jay S. Duker, Tufts Univ. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) [8934-22]

4:30 pm: **Real-Time Pupil Tracking for Motion Corrected Anterior Segment Optical Coherence Tomography**, Oscar Carrasco-Zevallos, Christian Viehland, Ryan P. McNabb, Derek Nankivil, Joseph A. Izatt, Duke Univ. (USA) ... [8934-23]

4:45 pm: **Ultra-wide-field MHz-OCT-imaging with 85° viewing angle**, Jan Philip Kolb, Thomas Klein, Wolfgang Wieser, Corinna Kufner, Robert Huber, Ludwig-Maximilians-Univ. München (Germany) [8934-24]

5:00 pm: **Application of adaptive lens in sensorless AO-OCT for in vivo mouse retinal imaging**, Stefano Bonora, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Yifan Jian, Simon Fraser Univ. (Canada); Edward N. Pugh Jr., Univ. of California, Davis (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada); Robert J. Zawadzki, UC Davis Medical Ctr. (USA) [8934-25]

5:15 pm: **Dual-beam Doppler OCT for complete angle independent flow measurement**, Cedric Blatter, Branislav Grajciar, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) [8934-26]

5:30 pm: **Dual beam Doppler FD-OCT system with integrated retinal vessel analyzer and rotatable beams to measure total retinal blood flow**, Veronika Doblhoff-Dier, René M. Werkmeister, Medizinische Univ. Wien (Austria); Martin Gröschl, Technische Univ. Wien (Austria); Leopold Schmetterer, Medizinische Univ. Wien (Austria) [8934-27]

5:45 pm: **Absolute retinal blood flow measurement with a dual-beam Doppler optical coherence tomography**, Xiaojing Liu, Tan Liu, Florida International Univ. (USA); Cuixia Dai, Shanghai Institute of Technology (China); Hao F. Zhang, Northwestern Univ. (USA); Shuliang Jiao, Florida International Univ. (USA) [8934-28]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

A novel dispersion-based wavelength-swept and wavelength-stepped laser source for optical coherence tomography, Serhat Tozburun, Wellman Ctr. for Photomedicine (USA); Meena Siddiqui, Harvard-MIT (USA); Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA) [8934-85]

Towards a comprehensive eye model for zebrafish retinal imaging using full-range spectral domain optical coherence tomography, Maria Gärtner, Universitätsklinikum Carl Gustav Carus Dresden (Germany); Anke Weber, DFG-Ctr. for Regenerative Therapies Dresden (Germany); Peter Cimalla, Felix Köttig, Universitätsklinikum Carl Gustav Carus Dresden (Germany); Michael Brand, DFG-Ctr. for Regenerative Therapies Dresden (Germany); Edmund Koch, Universitätsklinikum Carl Gustav Carus Dresden (Germany) [8934-86]

Polarization-sensitive OFDI with polarization-multiplexed wavelength-swept light source, Han Saem Cho, Wang-Yuhl Oh, KAIST (Korea, Republic of) [8934-87]

Maximum likelihood estimation of blood velocity using Doppler optical coherence tomography, Aaron C. Chan, The Univ. of Hong Kong (Hong Kong, China); Vivek J. Srinivasan, Univ. of California, Davis (USA); Edmund Y. Lam, The Univ. of Hong Kong (Hong Kong, China) [8934-88]

Rotational Imaging OCT for Full-Body Embryonic Imaging, Narendran Sudheendran, Chen Wu, Univ. of Houston (USA); Irina V. Larina, Mary E. Dickinson, Baylor College of Medicine (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) [8934-89]

Variation in Cross-Correlation as a discriminator for microvessel imaging using clinical intracoronary Optical Coherence Tomography systems, Shiju G. Joseph, Clément Rousseau, Univ. of Leicester (United Kingdom); Hrebesh M. Subhash, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland); David Adlam, Univ. of Leicester (United Kingdom) [8934-90]

Comparison of sampling and reconstruction strategies for Fourier Domain Optical Coherence Tomography, Evgeniy Lebed, Marinko V. Sarunic, Mirza Faisal Beg, Simon Fraser Univ. (Canada) [8934-91]

Swept-source common-path optical coherence tomography with a MEMS endoscopic imaging probe, Can Duan, Univ. of Florida (USA); Donglin Wang, Univ. of Shanghai for Science and Technology (China); Zhengwei Zhou, Peng Liang, WIO Technology Ltd., Co. (China); Sean Samuelson, Huikai Xie, Univ. of Florida (USA) [8934-92]

Real-time FD OCT flow contrast imaging in the retina using GPU accelerated processing, Jing Xu, Kevin Wong, Yifan Jian, Sherry X. Han, Marinko V. Sarunic, Simon Fraser Univ. (Canada) [8934-93]

Assessment of the flow velocity of blood components in a microfluidics device using spectral and time domain optical coherence tomography, Danuta M. Bukowska, Maciej Szkulmowski, Szymon Tamborski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8934-94]

Swept source optical coherence tomography for soft contact lens measurements, Karol Kamowski, Krzysztof Maliszewski, Hong Chou Lyu, Nicolaus Copernicus Univ. (Poland); Nishant Mohan, Ian G. Cox, Bausch & Lomb Inc. (USA); Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) ... [8934-95]

Temporal correlation of optical coherence tomography in-vivo images of rabbit airway for the diagnosis of edema, DongYel Kang, Univ. of California, Irvine (USA) and HanBat National Univ. (Korea, Republic of); Alex Wang, Tjosed Tjoa, Univ. of California, Irvine (USA); Veronika Volgger, Ludwig-Maximilians-Univ. München (Germany); Ashley Hamamoto, Erica Su, Zhongping Chen, Brian J. F. Wong, Joe Jing, Univ. of California, Irvine (USA) [8934-96]

Pulsed laser tissue marking for OFDI-guided biopsy, Hyoung Won Baac, Martin L. Villiger, William Lo, Néstor Uribe-Patarroyo, Brett E. Bouma, Harvard Medical School (USA) [8934-97]

Speckle reduction for OCT images using wave atoms thresholding filtering, Yongzhao Du, Gangjun Liu, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8934-98]

Longitudinal optical coherence tomography attenuation mapping to study the effect of temperature and fixation in ex-vivo atherosclerotic tissue characterization, Muthukaruppan Gnanadesigan, Erasmus MC (Netherlands); Stephen White, Univ. of Bristol (United Kingdom); Antonius F. W. van der Steen, Erasmus MC (Netherlands); Thomas W. Johnson, Univ. of Bristol (United Kingdom); Gijs van Soest, Erasmus MC (Netherlands) [8934-99]

Physical attributes and assembly of PEG-linked immuno-labeled gold nanoparticles for OCM image contrast in tissue engineering and developmental biology, Alanna L. Weisberg, Nathaniel J. H. Bean, Theodore B. DuBose, Elizabeth J. Orwin, Richard C. Haskell, Harvey Mudd College (USA)[8934-100]

Robust, real-time, digital focusing for FD-OCM using ISAM on a GPU, Luke St. Marie, Fangzhao A. An, Anthony L. Corso, John Grasel, Richard C. Haskell, Harvey Mudd College (USA)[8934-101]

O-Band (1310 nm) Vernier-Tuned Distributed Bragg Reflector (VT-DBR) device characterization for OCT, Desmond Talkington, Dennis Derickson, California Polytechnic State Univ., San Luis Obispo (USA); Jason R. Ensher, Insight Photonic Solutions, Inc. (USA)[8934-102]

Ultra-high-phase-stable swept source based on KTN electro-optic deflector towards Doppler OCT and polarization-sensitive OCT, Yuza Sasaki, NTT Photonics Labs. (Japan); Masatoshi Fujimoto, Hamamatsu Photonics K.K. (Japan); Shogo Yagi, NTT Advanced Technology Corp. (Japan); Shogo Yamagishi, Hamamatsu Photonics K.K. (Japan); Seiji Toyoda, Junya Kobayashi, NTT Photonics Labs. (Japan)[8934-103]

Full-field en face correlation mapping optical coherence tomography, Paul M. McNamara, Univ. of Limerick (Ireland) and National Univ. of Ireland, Galway (Ireland); Hrebesh M. Subhash, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland)[8934-104]

Stability analysis of polarization-based demodulation interferometers, Meena Siddiqui, Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA); Serhat Tozburun, Ellen Z. Zhang, Benjamin J. Vakoc, Massachusetts General Hospital (USA)[8934-105]

Angle polished single mode fiber probe with optimized reference for a common-path optical coherence tomography, Xuan Liu, Jin U. Kang, Johns Hopkins Univ. (USA)[8934-106]

Multiple reference optical coherence tomography (MRO): a miniature low coherence interferometric imaging platform, Hrebesh M. Subhash, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol Wilson, Compact Imaging, Inc. (USA)[8934-107]

Interferometric synthetic aperture microscopy with automated parameter evaluation and phase equalization preprocessing, Alexander A. Moiseev, Grigory V. Gelikonov, Dmitry A. Terpelov, Pavel A. Shilyagin, Valentin M. Gelikonov, Institute of Applied Physics (Russian Federation)[8934-108]

Toward absorption contrast imaging of biological tissues in vivo by using photothermal optical coherence tomography, Shuichi Makita, Young-Joo Hong, Yoshiaki Yasuno, Univ. of Tsukuba (Japan)[8934-109]

Design of binary pupil filter for extended depth of focus and lateral superresolution in optical coherence tomography, Evgenia Bousi, Costas Pitris, Univ. of Cyprus (Cyprus)[8934-110]

High-sensitive full-range optical vibrometry based on

Fourier-domain optical coherence tomography, Hrebesh M. Subhash, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland)[8934-111]

A new algorithm for speckle reduction of optical coherence tomography images, Mohammadreza Avanaki, Washington Univ. in St. Louis (USA); Manuel Marques, Adrian Bradu, Ali Hojjatoleslami, Adrian Gh. Podoleanu, Univ. of Kent (United Kingdom)[8934-112]

Imaging of neuronal tissue using a prism adjunct, Philip J. Broadbridge, Adrian Bradu, Gurprit Lall, Adrian Gh. Podoleanu, Univ. of Kent (United Kingdom)[8934-113]

Wavelet decomposition for speckle reduction with feature preservation in optical coherence tomography, Evgenia Bousi, Panayiotis Ioannides, Costas Pitris, Univ. of Cyprus (Cyprus)[8934-114]

Towards using spectral domain optical coherence tomography for dental wear monitoring, Adrian Bradu, Univ. of Kent (United Kingdom); Corina Marcauteanu, Cosmin Sinescu, Florin Topala, Meda Lavinia Negrutiu, Univ. of Medicine and Pharmacy Victor Babes Timisoara (Romania); Adrian Gh. Podoleanu, Univ. of Kent (United Kingdom)[8934-115]

Effect of contact lens on optical coherence tomography imaging of rodent retina, Xiaojing Liu, Florida International Univ. (USA); Hao F. Zhang, Northwestern Univ. (USA); Shuliang Jiao, Florida International Univ. (USA)[8934-116]

Gold nanorods: circular depolarization response and its use for contrast enhancement, Kalpesh B. Mehta, Pengfei Zhang, Nanguang Chen, National Univ. of Singapore (Singapore)[8934-117]

Dynamic analysis of mental sweating of eccrine sweat glands for various sound stimulus by optical coherence tomography, Masato Ohmi, Yuki Wada, Yoshihiko Sugawa, Osaka Univ. (Japan)[8934-118]

Hann, Gaussian, and super-Gaussian window functions for reducing side-lobes in spectral domain optical coherence tomography, Sang-Won Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Joo Hyun Park, Univ. of Science and Technology (Korea, Republic of); Eun Seong Lee, Jae Yong Lee, Korea Research Institute of Standards and Science (Korea, Republic of)[8934-120]

Adaptive compressed sensing for spectral-domain optical coherence tomography, Yi Wang, Xiaodong Chen, Ting Wang, Hongxiao Li, Daoyin Yu, Tianjin Univ. (China)[8934-121]

Optical teardown of a Kindle Paperwhite display by OCT, Bart C. Johnson, Walid Atia, Mark Kuznetsov, Brian D. Goldberg, Noble Larson, Eric McKenzie, AXSUN Technologies Inc. (USA)[8934-122]

Over-depth artifacts elimination in spectral-domain optical coherence tomography, Pavel A. Shilyagin, Grigory V. Gelikonov, Valentin M. Gelikonov, Institute of Applied Physics (Russian Federation); Natalia Shilyagina, Nizhny Novgorod State Univ. (Russian Federation)[8934-123]

Speckle reduction in optical coherence tomography images via dynamic infinite-impulse-response filtering, Jun Lee, Jungcho Chung, Sangshik Park, LG Electronics Inc. (Korea, Republic of)[8934-124]

Dual-fiber OCT measurements, Alaa Eldin S. Mohamed El Hady, Ain Shams Univ. (Egypt); Yasser M. Sabry, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Mohamed Yehia, Ain Shams Univ. (Egypt); Daa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt)[8934-125]

Monitoring of hemodynamic signals post optogenetic stimulation via optical coherence tomography, Seth Frye, Alana Soehartono, Farid Atry, Amy L. Kaczmarowski, Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA)[8934-126]

Design consideration and performance analysis of OCT-based topography, Panomsak Meemon, Suranaree Univ. of Technology (Thailand) and Univ. of Rochester (USA); Jianing Yao, Jannick P. Rolland, Univ. of Rochester (USA)[8934-127]

Validation of a new real-time in-situ optical coherence tomography with modified oral probe by comparing with the certified CE marking optical coherence tomography dermatology probe, Dara B. Rashed, Eastman Dental Institute (United Kingdom); Colin Hopper, Eastman Dental Institute (United Kingdom) and Univ. College London Hospital (United Kingdom); Stefano Fedele, Eastman Dental Institute (United Kingdom); Richard J. Cook, King's College London (United Kingdom)[8934-128]

Photodynamic therapy induces epidermal thickening in hairless mice skin: an optical coherence tomography assessment, Ana Elisa S. Jorge, Carolina P. Campos, Univ. de São Paulo (Brazil); Anderson Z. de Freitas, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Vanderlei S. Bagnato, Univ. de São Paulo (Brazil)[8934-129]

Temporal analysis of optical coherence tomography to measure glucose levels in blood, Andrew Weatherbee, Univ. of Toronto (Canada)[8934-130]

Development of real-time dual displaying handheld and bench-top hybrid mode SD-OCT, Yong Seung Shin, Nam Hyun Cho, Kibeom Park, Ruchire Eranga Henry Wijesinghe, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of)[8934-131]

Three-dimensional real-time displaying optical coherence tomography for diagnosis of human otitis media, Nam Hyun Cho, Kibeom Park, Yong Seung Shin, Rechire Eranga Henry Wijesinghe, Nayun Choo, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of)[8934-132]

White light low coherence interferometry for wavelength dependent refractive index measurement of biological cells and tissues, Dalip S. Mehta, Vishal Srivastava, Indian Institute of Technology Delhi (India)[8934-133]

Tuesday 4 February

SESSION 5

Location: Room 303 (Esplanade) Tue 8:30 am to 10:00 am

Elastography and Nanoscale Sensing

Session Chair: **Stephen A. Boppart M.D.**,
Univ. of Illinois at Urbana-Champaign (USA)

8:30 am: **Shear wave elastography using phase sensitive optical coherence tomography**, Shaozhen Song, Univ. of Washington (USA) and Univ. of Dundee (United Kingdom); Zhihong Huang, Univ. of Dundee (United Kingdom); Thu-Mai Nguyen, Emily Y. Wong, Bastien Arnal, Matthew O'Donnell, Ruikang K. Wang, Univ. of Washington (USA)[8934-29]

8:45 am: **Quantitative two-dimensional micro-displacement measurement by optical coherence tomography**, Kazuhiro Kurokawa, Shuichi Makita, Young-Joo Hong, Yoshiaki Yasuno, Univ. of Tsukuba (Japan)[8934-30]

Conference 8934 · Location: Room 303 (Esplanade)

9:00 am: **Resonant acoustic radiation force optical coherence elastography**, Wenjuan Qi, Rui Li, Beckman Laser Institute and Medical Clinic (USA); Teng Ma, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) [8934-31]

9:15 am: **Phase-sensitive optical coherence tomography in the middle ear using an akinetic swept laser source**, Jesung Park, Xi Chen, Felipe Zambrano, Anna M. Wisniewiecki, Wihan Kim, Texas A&M Univ. (USA); John S. Oghalai, Stanford Univ. (USA); Brian E. Applegate, Texas A&M Univ. (USA) [8934-32]

9:30 am: **Depth-resolved detection of tissue biomechanics for optical coherence elastography of crystalline lens**, Shang Wang, Univ. of Houston (USA); Salavat Aglyamov, Andrei Karpiouk, The Univ. of Texas at Austin (USA); Jiasong Li, Univ. of Houston (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA); Fabrice Manns, Univ. of Miami (USA); Kirill V. Larin, Univ. of Houston (USA) [8934-33]

9:45 am: **Nano-sensitive optical coherence tomography (NSOCT) for depth resolved characterization of 3D submicron structure**, Sergey A. Alexandrov, Hreshesh M. Subhash, Azhar Zam, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) [8934-34]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 6

Location: Room 303 (Esplanade) . . . Tue 10:30 am to 12:00 pm

Nanoparticle and Molecular Contrast

Session Chair: **Guillermo J. Tearney M.D.**, Wellman Ctr. for Photomedicine (USA)

10:30 am: **MAPS-OCT contrasts diffusing nanorods and cellular motility in 3D mammary epithelial cultures**, Amy L. Oldenburg, Raghav Chhetri, Jason Cooper, The Univ. of North Carolina at Chapel Hill (USA); Wei-Chen Wu, North Carolina State Univ. (USA); Melissa Troester, The Univ. of North Carolina at Chapel Hill (USA); Joseph Tracy, North Carolina State Univ. (USA) [8934-35]

10:45 am: **Detection of pH-induced aggregation of smart gold nanoparticles with photothermal optical coherence tomography**, Peng Xiao, Qingyun Li, Juttaek Nam, Sekyu Hwang, Jaejung Song, Sungjee Kim, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8934-36]

11:00 am: **In vivo imaging of gold nanorod delivery to tumors using photothermal optical coherence tomography**, Jason M. Tucker-Schwartz, Kelsey R. Beavers, Wesley W. Sit, Craig L. Duvall, Melissa C. Skala, Vanderbilt Univ. (USA) [8934-37]

11:15 am: **Photothermal optical coherence tomography based on localized surface plasmon resonance enhanced absorption of Au nanoring**, Ting-Ta Chi, Yi-Chou Tu, Chen-Chin Liao, Ming-Jyun Li, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8934-38]

11:30 am: **In vivo molecular contrast OCT imaging of methylene blue in a zebrafish embryo**, Wihan Kim, Brian E. Applegate, Texas A&M Univ. (USA) [8934-39]

11:45 am: **Dual wavelength-band spectroscopic optical frequency domain imaging using coherent scattering in metallic nanopores**, Tae Shik Kim, Sun-Joo Yang, Nuri Oh, Yongjoo Kim, Taejin Park, Ji Ho Park, Wang-Yuhl Oh, KAIST (Korea, Republic of) [8934-40]

Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 7

Location: Room 303 (Esplanade) Tue 1:30 pm to 3:30 pm

OCT New Technology II

Session Chair: **Andrew Rollins**, Case Western Reserve Univ. (USA)

1:30 pm: **Visible light optical coherence tomography for retinal oximetry**, Ji Yi, Qing Wei, Wenzhong Liu, Hao F. Zhang, Northwestern Univ. (USA) [8934-41]

1:45 pm: **Stability in computed optical interferometric tomography for in vivo imaging**, Nathan D. Shemonski, Univ. of Illinois at Urbana-Champaign (USA); Steven G. Adie, Cornell Univ. (USA); P. Scott Carney, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) [8934-42]

2:00 pm: **Real-time speckle reduction using wavefront modulation in multi-functional optical coherence tomography images**, Christian M. Oh, Koji Hirota, M. Rezuani Haque, Univ. of California, Riverside (USA); Yan Wang, Harvard Medical School (USA) and Massachusetts General Hospital (USA); M. Shahidul Islam, B. Hyle Park, Univ. of California, Riverside (USA) [8934-43]

2:15 pm: **Depth-resolved attenuation coefficient estimation from beam-shape corrected OCT scans of phantoms**, Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Jianhua Mo, Jelmert J. A. Weda, Vrije Univ. Amsterdam (Netherlands); Hans G. Lemij, The Rotterdam Eye Hospital (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands) [8934-44]

2:30 pm: **Improved attenuation coefficient and birefringence parametric optical coherence tomography imaging of burn scars using vasculature masking**, Peijun Gong, The Univ. of Western Australia (Australia); Yih Miin Liew, Univ. of Malaya (Malaysia); Lixin Chin, Shaghayegh Eshaghian, Peter R. T. Munro, The Univ. of Western Australia (Australia); Fiona M. Wood, Royal Perth Hospital (Australia) and The Univ. of Western Australia (Australia); David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia) [8934-45]

2:45 pm: **Intelligent microinjector for intracardiac microinjection based on common-path optical coherence tomography fiber sensor**, Mingtao Zhao, Yong Huang, Jin U. Kang, Johns Hopkins Univ. (USA) [8934-46]

3:00 pm: **Imaging of the interaction of low frequency electric fields with biological tissues by optical coherence tomography**, Adrián Peña Delgado, Jack Devine, Alexander Doronin, Igor V. Meglinski, Univ. of Otago (New Zealand) [8934-47]

3:15 pm: **A computational model of optical coherence tomography employing an electromagnetic description of light**, Peter R. T. Munro, Andrea Curatolo, Lixin Chin, Brendan F. Kennedy, David D. Sampson, The Univ. of Western Australia (Australia) [8934-48]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 8

Location: Room 303 (Esplanade) Tue 4:00 pm to 6:00 pm

Blood Flow: New Technology

Session Chair: **Ruikang K. Wang**, Univ. of Washington (USA)

4:00 pm: **OCT imaging of capillary RBC flux and speed**, Jonghwan Lee, Weicheng Wu, Harvard Medical School (USA); Frédéric Lesage, Ecole Polytechnique de Montréal (Canada); David A. Boas, Harvard Medical School (USA) [8934-49]

4:15 pm: **Flexibly combined optical microangiography and dual-wavelength laser speckle system for comprehensive imaging of hemodynamic and metabolic responses**, Lei Shi, Jia Qin, Lin An, Ruikang K. Wang, Univ. of Washington (USA) [8934-50]

4:30 pm: **Wide-field and high-resolution mapping of network blood flow using optical coherence tomography**, David G. Blauvelt, Yun-Sheng Chen, Xiaoxing Han, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA); Rakesh K. Jain, Timothy P. Padera, Harvard Medical School (USA); Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA) [8934-51]

4:45 pm: **Orientation-independent single-shot pulsatile flow measurement using Doppler OCT**, Lindsay M. Peterson, Shi Gu, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8934-52]

5:00 pm: **Resolving directional ambiguity in light scattering-based transverse motion velocimetry in optical coherence tomography**, Brendan Huang, Michael Choma, Yale School of Medicine (USA) [8934-53]

5:15 pm: **Quantitative blood flux measurement using MUSIC**, Siavash Yousefi, Ruikang K. Wang, Univ. of Washington (USA) [8934-54]

5:30 pm: **Algorithms for signal and image processing in OCT-based angiography**, Ahhyun S. Nam, Isabel Chico-Calero, Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA) [8934-55]

5:45 pm: **Localized measurement of longitudinal and transverse flow velocities using optical coherence tomography**, Nicolas Weiss, Ton G. van Leeuwen, Academisch Medisch Ctr. (Netherlands); Jeroen Kalkman, Academisch Medisch Ctr. (Netherlands) and Technische Univ. Delft (Netherlands) . . . [8934-56]

Wednesday 5 February

SESSION 9

Location: Room 303 (Esplanade) . . . Wed 8:30 am to 10:00 am

PSOCT

Session Chair: **Christoph K. Hitzemberger**, Medizinische Univ. Wien (Austria)

8:30 am: **Polarization sensitive optical frequency domain imaging of lung cancer**, Lida P. Hariri, David C. Adams, Martin L. Villiger, Brett E. Bouma, Alyssa J. Miller, Matthew B. Applegate, Mari Mino-Kenudson, Melissa J. Suter, Massachusetts General Hospital (USA) [8934-57]

8:45 am: **Spectral degree of polarization uniformity for depolarization assessment with polarization sensitive optical coherence tomography**, Bernhard Baumann, Stefan Zotter, Erich Götzinger, Michael Pircher, Sabine Rauscher, Medizinische Univ. Wien (Austria); Martin Glösmann, Veterinaermedizinische Univ. Wien (Austria); Jan Lammer, Ursula Schmidt-Erfurth, Marion Gröger, Christoph K. Hitzemberger, Medizinische Univ. Wien (Austria) [8934-58]

9:00 am: **Characterization of acute and chronic clots in a rat model of deep venous thrombosis with polarization sensitive optical coherence tomography**, Martin L. Villiger, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Rahmi Oklu, Hassan Albadawi, Harvard Medical School (USA) and Massachusetts General Hospital (USA); William Lo, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Michael T. Watkins, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [8934-59]

9:15 am: **Monte-Carlo based Bayesian estimator to obtain the true local birefringence of biological samples using polarization-sensitive optical coherence tomography**, Deepa K. Kasaragod, Shuichi Makita, Shinichi Fukuda, Simone Beheregaray, Tetsuro Oshika, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) [8934-60]

9:30 am: **Determination of the collagen fiber Brushing direction in articular cartilage by conical-scan polarization-sensitive optical coherence tomography**, Zenghai Lu, Deepa K. Kasaragod, Stephen J. Matcher, The Univ. of Sheffield (United Kingdom) [8934-61]

9:45 am: **Simplified fiber-based polarization-sensitive swept-source OCT for application to cardiac radiofrequency ablation monitoring**, Xiaoyong Fu, Zhao Wang, Yves T. Wang, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8934-62]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 10

Location: Room 303 (Esplanade) . . Wed 10:30 am to 12:00 pm

Novel Coherence Microscopy

Session Chair: **Rainer A. Leitgeb**, Medizinische Univ. Wien (Austria)

10:30 am: **New methods for epi-detected self-interference fluorescence microscopy**, Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) [8934-63]

10:45 am: **Quantification of cytoarchitecture and myeloarchitecture using optical coherence microscopy**, Harsha Radhakrishnan, Conor Leahy, Vivek J. Srinivasan, Univ. of California, Davis (USA) [8934-64]

11:00 am: **Enhancement of optical coherence microscopy by using an optical parametric amplifier**, Youbo Zhao, Yuan Liu, Haohua Tu, Andrew J. Bower, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) [8934-65]

11:15 am: **High-speed OCT / OCM imaging with ultrafast acousto-optic dynamic focusing**, Ireneusz Grulkowski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8934-66]

11:30 am: **Real-time computed optical interferometric tomography**, Nathan D. Shemonski, Yuan-Zhi Liu, Adeel Ahmad, Univ. of Illinois at Urbana-Champaign (USA); Steven G. Adie, Cornell Univ. (USA); P. Scott Carney, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) [8934-67]

11:45 am: **Super-resolved reconstruction of optical coherence tomography images by use of multi-penalty conditional random field algorithm**, Ameneh Boroomand, Alexander Wong, Edward Li, Daniel S. Cho, Betty Ni, Kostadinka Bizheva, Univ. of Waterloo (Canada) [8934-68]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

SESSION 11

Location: Room 303 (Esplanade) Wed 1:30 pm to 3:30 pm

Pre-Clinical Applications

Session Chair: **Zhongping Chen**, Beckman Laser Institute and Medical Clinic (USA)

1:30 pm: **Pre-clinical study design for cancer detection with full-field optical coherence tomography**, Katharine Grieve, Institut Langevin (France); Eugénie Dalimier, Anne Latrive, LLTECH SAS (France); Fabrice Harms, Amir Nahas, Claude Boccard, Institut Langevin (France) and LLTECH SAS (France) . . [8934-69]

1:45 pm: **Longitudinal study of arteriogenesis with swept source optical coherence tomography**, Kristin M. Poole, Chetan A. Patil, Christopher E. Nelson, Devin R. McCormack, Megan C. Madonna, Craig L. Duvall, Melissa C. Skala, Vanderbilt Univ. (USA) [8934-70]

2:00 pm: **Multiparametric, longitudinal OCT in a mouse model of chronic cerebral hypoperfusion**, Vivek J. Srinivasan, Harsha Radhakrishnan, Univ. of California, Davis (USA); Anil Can, Mihail Climov, Cenk Ayata, Katharina Eikermann-Haerter, Massachusetts General Hospital (USA) [8934-71]

2:15 pm: **Evaluation of spontaneous seizure induced neuronal changes using optical coherence microscopy**, Fengqiang Li, Alexandra Dryer, Lehigh Univ. (USA); Michael D. Feldman, The Univ. of Pennsylvania (USA); Yevgeny Berdichevsky, Chao Zhou, Lehigh Univ. (USA) [8934-72]

2:30 pm: **Evaluation of OCT for quantitative in-vivo measurements of changes in neural tissue scattering in longitudinal studies in mouse model of retinal degeneration**, Azhar Zam, Pengfei Zhang, Emily Levine, Edward N. Pugh Jr., Marie Burns, Univ. of California, Davis (USA); Robert J. Zawadzki, UC Davis Medical Ctr. (USA) [8934-73]

2:45 pm: **Morphometric analysis of normal and transgenic murine hearts using optical coherence tomography**, Michelle Cua, Eric Lin, Simon Fraser Univ. (Canada); Ling Lee, Xiaoye Sheng, Simon Fraser Univ. (Canada) and Children & Family Research Institute (Canada); Yifan Jian, Simon Fraser Univ. (Canada); Glen F. Tibbitts, Simon Fraser Univ. (Canada) and Children & Family Research Institute (Canada); Mirza F. Beg, Marinko V. Sarunic, Simon Fraser Univ. (Canada) [8934-74]

3:00 pm: **Longitudinal characterization of Drosophila heart development using optical coherence microscopy**, Aneesh Alex, Lehigh Univ. (USA); Airong Li, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Nicole M. Pirozzi, Fengqiang Li, Lehigh Univ. (USA); Rudolph E. Tanzi, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Chao Zhou, Lehigh Univ. (USA) [8934-75]

3:15 pm: **Microvascular anastomosis in rodent model evaluated by Fourier domain Doppler optical coherence tomography**, Yong Huang, Dedi Tong, Shan Zhu, Lehao Wu, Ibrahim Zuhaib, WeiPing Andrew Lee, Gerald Brandacher, Jin U. Kang, Johns Hopkins Univ. (USA) [8934-76]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 12

Location: Room 303 (Esplanade) Wed 4:00 pm to 6:00 pm

OCT Multimodal Imaging

Session Chair: **Valery V. Tuchin**,

N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

4:00 pm: **Integrated OCT and OM enables 3D correction of conduction velocity mapping in the early embryonic heart**, Pei Ma, Yves T. Wang, Shi Gu, Michiko Watanabe, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8934-77]

4:15 pm: **Intracoronary dual-modality optical coherence tomography and near-infrared spectroscopy for coronary artery disease diagnosis**, Ali M. Fard, Paulino Vacas-Jacques, Ehsan Hamidi, Hao Wang, Robert W. Carruth, Joseph A. Gardecki, Guillermo J. Tearney, Wellman Ctr. for Photomedicine (USA) [8934-78]

4:30 pm: **Back-to-back optical coherence tomography-ultrasound probe for co-registered three-dimensional intravascular imaging with real-time display**, Jiawen Li, Univ. of California, Irvine (USA); Teng Ma, The Univ. of Southern California (USA); Joseph C. Jing, Jun Zhang, Pranav Patel, Univ. of California, Irvine (USA); Koping K. Shung, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Univ. of California, Irvine (USA) [8934-79]

4:45 pm: **Multi functional retinal OCT for simultaneous imaging of microvasculature and polarization properties**, Stefan Zotter, Mitsuro Sugita, Michael Pircher, Bernhard Baumann, Wolfgang Trasischker, Teresa Torzicky, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) [8934-80]

5:00 pm: **In-vivo mouse model imaging with combined two-photon microscopy and angiographic optical coherence tomography**, Bumju Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8934-81]

5:15 pm: **A combined OCT- reflectance confocal microscopy approach for real-time assessment of skin lesions**, Nicusor Iftimia, Ernest Chang, Mircea Mujat, Ankit H. Patel, Physical Sciences Inc. (USA); William Fox, Caliber Imaging & Diagnostics, Inc. (USA); R. Daniel Ferguson, Physical Sciences Inc. (USA); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA) [8934-82]

5:30 pm: **High-sensitivity, dual-modality optical coherence tomography and fluorescence needle probe for imaging fluorescently labelled tissue**, Loretta Scolaro, Dirk Lorenser, The Univ. of Western Australia (Australia); Wendy-Julie Madore, Ecole Polytechnique de Montréal (Canada); Anne Kramer, George C. Yeoh, The Univ. of Western Australia (Australia); Nicolas Godbout, Ecole Polytechnique de Montréal (Canada); David D. Sampson, The Univ. of Western Australia (Australia); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Robert A. McLaughlin, The Univ. of Western Australia (Australia) [8934-83]

5:45 pm: **Development of a side-view endoscopic imaging probe for combined two photon microscopy (TPM) and optical coherence tomography (OCT) in mouse colon study**, Qingyun Li, Taejun Wang, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8934-84]

Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII

Conference Chairs: Tuan Vo-Dinh, Fitzpatrick Institute for Photonics, Duke Univ. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA); Warren S. Grundfest M.D., Univ. of California, Los Angeles (USA)

Program Committee: Maurice C. Aalders, Forensic Technical Solutions (Netherlands); Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy); Jennifer K. Barton, The Univ. of Arizona (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA); Gerald Grant, Duke Univ. (USA); Hong Liu, The Univ. of Oklahoma (USA); Laura Marcu, Univ. of California, Davis (USA); Mary-Ann Mycek, Univ. of Michigan (USA); Jianan Y. Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China); Urs Utzinger, The Univ. of Arizona (USA); Georges A. Wagnières, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Christopher W. Woods M.D., Duke Univ. (USA); Pixuan 'Joe' Zhou, DMetrix, Inc. (USA)

Sunday 2 February

SESSION 1

Location: Room 252 (Mezzanine) Sun 8:50 am to 10:30 am

Fluorescence Systems

Session Chair: Tuan Vo-Dinh, Duke Univ. (USA)

8:50 am: **Autofluorescence Microscopy with sub-300 nm Excitation for Cellular Diagnostics**, Urs Utzinger, The Univ. of Arizona (USA); Timothy Renkoski, College of Optical Sciences, The Univ. of Arizona (USA); Bhaskar Bannerjee, The Univ. of Arizona (USA); Logan Graves, College of Optical Sciences, The Univ. of Arizona (USA); Nathaniel Rial, The Univ. of Arizona College of Medicine (USA); Brenda Bagett, The Univ. of Arizona (USA) [8935-1]

9:10 am: **A compact and portable hyperspectral autofluorescence lifetime point probe system applied to the study of cardiac disease and arthritis**, Joao Lagarto, Clifford Talbot, Benjamin T. Dyer, Douglas Kelly, Hugh B. Manning, Imperial College London (United Kingdom); Kazuhiro Yamamoto, Mohammad B. Nickdel, Univ. of Oxford (United Kingdom); Markus B. Sikkell, Imperial College London (United Kingdom); Jayesh Dudhia, The Royal Veterinary College (United Kingdom); Yoshi Itoh, Univ. of Oxford (United Kingdom); Nicholas S. Peters, Alexander Lyon, Christopher Dunsby, Paul French, Imperial College London (United Kingdom) [8935-2]

9:30 am: **Fluorescence spectroscopy using indocyanine green for lymph node mapping**, Neda Haj-Hosseini, Linköping Univ. (Sweden); Pascal Behm, Fachhochschule NordWestschweiz (Switzerland) and Linköping Univ. (Sweden); Ivan Shabo, Karin Wårdell, Linköping Univ. (Sweden) [8935-3]

9:50 am: **Early prediction of skin flap viability using visible diffuse reflectance spectroscopy and autofluorescence spectroscopy**, Caigang Zhu, Shuo Chen, Nanyang Technological Univ. (Singapore); Christopher Hoe-Kong Chui, Bien-Keem Tan, Singapore General Hospital (Singapore); Quan Liu, Nanyang Technological Univ. (Singapore) [8935-4]

10:10 am: **High sensitivity intra-operative targeted fluorescence imaging: system, algorithms and early in-human results**, Maximilian W. Koch, Jürgen Glatz, Helmholtz Zentrum München GmbH (Germany); Gooitzen M. van Dam M.D., Univ. Medical Ctr. Groningen (Netherlands); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8935-5]

Coffee Break Sun 10:30 pm to 11:00 pm

SESSION 2

Location: Room 252 (Mezzanine) . . . Sun 11:00 am to 11:50 am

Global Health Technologies I

Session Chairs: Tuan Vo-Dinh, Duke Univ. (USA); Joe P. Zhou, DMetrix, Inc. (USA)

11:00 am: **Optical technologies for global women's cancers (Invited Paper)**, Nirmala Ramanujam, Duke Univ. (USA) [8935-6]

11:30 am: **Plasmonic color change assay for detection of nucleic acid disease biomarkers**, H. H. Wang, Tuan Vo-Dinh, Duke Univ. (USA) [8935-7]

Lunch/Exhibition Break Sun 11:50 am to 1:00 pm

SESSION 3

Location: Room 252 (Mezzanine) Sun 1:00 pm to 2:50 pm

Global Health Technologies II

Session Chairs: Tuan Vo-Dinh, Duke Univ. (USA); Joe P. Zhou, DMetrix, Inc. (USA)

1:00 pm: **Rapid transdermal bloodless and reagent-free malaria detection**, Ekaterina Y. Lukianova-Hleb, Michael Wandell, Rice Univ. (USA); David J. Sullivan, Johns Hopkins Bloomberg School of Public Health (USA); Dmitri Lapotko, Rice Univ. (USA) [8935-7]

1:20 pm: **The study of synchronization of rhythms of microvascular blood flow and oxygen saturation during adaptive changes**, Andrey V. Dunaev, Univ. of Dundee (United Kingdom); Victor V. Sidorov, SPE LAZMA Ltd. (Russian Federation); Alexander I. Krupatkin M.D., Central Research Institute of Traumatology and Orthopaedics (Russian Federation); Scott G. Palmer, Ilya E. Rafailov, Neil Z. Stewart, Sergei G. Sokolovski, Edik U. Rafailov, Univ. of Dundee (United Kingdom) [8935-9]

1:40 pm: **Dermascope assisted interactive patient interface for multiple reference optical coherence tomography**, Roshan I. Dsouza, Kai Neuhaus, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol Wilson, Compact Imaging, Inc. (USA); Martin Leahy, Hrebesh Subhash, National Univ. of Ireland, Galway (Ireland) [8935-10]

2:00 pm: **Digital scanning microscope hardware and software: an essential tool for telepathology (Invited Paper)**, Joe P. Zhou, Chen Liang, DMetrix, Inc. (USA); Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA) [8935-11]

2:30 pm: **Handheld fluorescence lifetime imaging (FLIM) system with real-time image processing**, Shuna Cheng, Rodrigo Cuenca, Boang Liu, Bilal H. Malik, Joey Jabbour, Kristen Maitland, Javier Jo, Texas A&M Univ. (USA) [8935-12]

SESSION 4

Location: Room 252 (Mezzanine) Sun 2:50 pm to 6:00 pm

Treatment Modalities and Image-Guided Surgery

Session Chair: Warren S. Grundfest M.D., Univ. of California, Los Angeles (USA)

2:50 pm: **Optically enhanced blood-brain-barrier crossing of plasmonic-active nanoparticles in preclinical brain tumor animal models**, Hsiangkuo Yuan, Christy Wilson, Shuqin Li, Andrew M. Fales, Yang Liu, Gerald Grant, Tuan Vo-Dinh, Duke Univ. (USA) [8935-13]

3:10 pm: **The Fluostick: a real handheld system for near-infrared fluorescence image-guided surgery**, Paul Dorval, iCube (France) and Fluoptics (France); Norman Mangeret, Stephanie Guillermet, Fluoptics (France); Christian Adrien Righini, Institut Albert Bonniot (France) and Univ. Joseph Fourier (France) and Univ. Hospital of Grenoble (France); Gabriele Barabino, Univ. Jean Monnet Saint-Etienne (France); Philippe Rizo, Commissariat à l'Énergie Atomique (France); Patrick Poulet, iCube (France) [8935-14]

Coffee Break Sun 3:30 pm to 4:00 pm

4:00 pm: **A novel multiwavelength fluorescence image-guided surgery imaging system**, Davide Volpi, Iain C. Tullis, Alexander Laios, Univ. of Oxford (United Kingdom); Pubudu N. J. Pathiraja, Krishnayan Haldar, Oxford Univ. Hospitals NHS Trust (United Kingdom); Ahmed A. Ahmed, Borivoj Vojnovic, Univ. of Oxford (United Kingdom) [8935-15]

4:20 pm: **Real-time three-dimensional fluorescence imaging for surgical guidance**, Peng Liu, Junbin Xu, Shiwu Zhang, Pengfei Shao, Univ. of Science and Technology of China (China); Michael F. Tweedle, Ronald X. Xu, The Ohio State Univ. (USA)[8935-16]

4:40 pm: **Image-guided plasma therapy for cutaneous wound**, Zhiwu Zhang, Wenqi Ren, Shiwu Zhang, Ting Yue, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA)[8935-17]

5:00 pm: **A goggle navigation system for cancer resection surgery**, Junbin Xu, Pengfei Shao, Ting Yue, Shiwu Zhang, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA)[8935-18]

5:20 pm: **Fluorescence-guided surgical resection of oral cancer**, Pierre M. Lane, Catherine F. Poh D.D.S., The BC Cancer Agency Research Ctr. (Canada); J. Scott Durham, Vancouver General Hospital (Canada); Lewei Zhang, Vancouver General Hospital (Canada) and The Univ. of British Columbia (Canada); Miriam Rosin, Calum MacAulay, The BC Cancer Agency Research Ctr. (Canada)[8935-19]

5:40 pm: **Towards femtosecond laser surgery guidance in the posterior eye: utilization of optical coherence tomography and adaptive optics for focus positioning and shaping.**, Alexander Krüger, Anja Hansen, Ben Matthias, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany)[8935-20]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Rapid estimation of key tissue parameters from wide-band diffuse reflectance measurements based on sequential weighted Wiener estimation, Shuo Chen, Xiaoqian Lin, Caigang Zhu, Quan Liu, Nanyang Technological Univ. (Singapore)[8935-63]

Abnormal heart rate detection device warning via mobile phone network, Adisorn Sirikham, Rajamangala Univ. of Technology (Thailand); Oranicha Jumreornvong, Stanford Univ. (USA); Janta Watcharapong, Rajamangala Univ. of Technology (Thailand)[8935-64]

GaAs-based photonic biosensor for detection of E. coli in water, Elnaz Nazemi, Srivatsa Aithal, Walid Hassen, Eric H. Frost, Jan J. Dubowski, Univ. de Sherbrooke (Canada)[8935-65]

A surgical navigation system imaging software for sentinel lymph node detection, Jinzuo Ye, Chongwei Chi, Shuang Zhang, Xibo Ma, Jie Tian, Institute of Automation (China)[8935-66]

Photooxidation-assisted-photodynamic diagnosis of lymph node metastasis using 5-aminolevulinic acid, Takeo Minamikawa, Noriaki Koizumi, Yoshinori Harada, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan)[8935-67]

Fluorescence and hyperspectral imaging of sentinel lymph nodes using dyes banded on superparamagnetic nanoparticles, Patrick Poulet, Franklin Tellier, Univ. de Strasbourg (France); Julien Jouhannaud, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Antonio Garofalo, Renee Chabrier, Delphine Felder, Genevieve Pourroy, Univ. de Strasbourg (France)[8935-68]

Optical measurement system for preparation and after-OP-check of a hip joint endoprosthetic implantation, Ronny Maschke, Benjamin Lempe, Christopher Taudt, Fabiola Basan, Tobias Baselt, Westsächsische Hochschule Zwickau (Germany); Ronny Grunert, Fraunhofer-Institut für Werkzeugmaschinen und Umformtechnik (Germany); Peter Hartmann, Westsächsische Hochschule Zwickau (Germany)[8935-69]

Compact photo-acoustic probe structure for in-vivo clinical image, Yong-Jae Lee, Bong-Kyu Kim, EunJu Jeong, Hyun-Woo Song, Chang-geun Ahn, Hyeong-Uk Noh, Electronics and Telecommunications Research Institute (Korea, Republic of); Min-Yong Jeon, Chungnam National Univ. (Korea, Republic of)[8935-70]

New bilirubin meters for neonatal jaundice using laser diodes and LEDs, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammad Hamza Sayed El-Ahl D.V.M., Military Medical Academy (Egypt); Ahmad Mohammad Hamza, National Research Ctr. (Egypt); Aya Mostafa Hamza, Yahya Mohammad Hamza, Tabarak Children's Hospital (Egypt)[8935-71]

Nature of autofluorescence in human serum albumin under its native, unfolding and digested forms, Manjunath S. Bola Sadashiva Satish Rao, Kapaettu Satyamoorthy, Krishna Kishore Mahato, Manipal Univ. (India) .[8935-72]

Integrated biosensors in clinical technologies and their intellectual property protection, Dennis Fernandez, Fernandez & Associates, LLP (USA); Antonia Maninang, Stanford Univ. School of Medicine (USA); Shumpei Kobayashi, Univ. of California, San Diego (USA); Gangadharan Sajithlal, Virginia Commonwealth Univ. (USA)[8935-73]

Passive split ring resonator for continuous physiological sensing through conductivity measurements, Evan C. Baker, Chen Wang, Robert Mills, Noah Shaw, Cheng Sun, Hao Zhang, Northwestern Univ. (USA)[8935-74]

Assessment of metastatic disease in human lymph nodes via intraoperative optical coherence tomography, Ryan M. Nolan, Steven G. Adie, Marina Marjanovic, Eric J. Chaney, Nathan D. Shemonski, Guillermo L. Monroy, Fredrick A. South, Sarah J. Erickson-Bhatt, Ryan L. Shelton, Andrew J. Bower, Douglas G. Simpson, Univ. of Illinois at Urbana-Champaign (USA); Partha Ray M.D., Kimberly A. Cradock M.D., John Brockenbrough M.D., George Liu M.D., Carle Foundation Hospital (USA); Daniel T. McCormick, AdvancedMEMS (USA); Jeffrey Putney, Diagnostic Photonics, Inc. (USA); Donald Darga, Andrew Cittadine, AdvancedMEMS (USA); Paul S. Carne, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA)[8935-75]

Heat-induced microbubbles in combination with ultrasound imaging as a potential tool for temperature measurement during thermal ablation surgery, Dengke Zhao, Jiwei Huang, The Ohio State Univ. (USA)[8935-76]

Automation of a dispersive Raman spectrometer using LabVIEW aiming in vivo diagnosis of skin cancer, Landulfo Silveira Jr., Antonio C. Zena, Camilo Castelo Branco Univ. (Brazil); Fabricio L. Silveira, Univ. Camilo Castelo Branco (Brazil); Benito Bodanese M.D., UNOCHAPECO (Brazil); Ailson N. Campos, Instituto de Aeronáutica e Espaço (Brazil); Renato A. Zângaro M.D., Marcos T. T. Pacheco, Univ. Camilo Castelo Branco (Brazil); Carlos A. Pasqualucci M.D., Univ. de São Paulo (Brazil)[8935-77]

Continuous noninvasive in vivo monitoring of intravascular plasma volume and hematocrit changes in response to blood removal and fluid replacement in a rat model, Bin Deng, Syracuse Univ. (USA); Evan Kastner, SUNY Upstate Medical Univ. (USA); Paul Dent, Joseph Chaiken, Syracuse Univ. (USA) .[8935-78]

Multispectral tissue analysis and classification towards enabling automated robotic surgery, Brian Triana, Children's National Medical Ctr. (USA); Jaepyeong Cha, Johns Hopkins Univ. (USA); Azad Shademan, Axel Krieger, Children's National Medical Ctr. (USA); Jin U. Kang, Johns Hopkins Univ. (USA); Peter C. W. Kim, Children's National Medical Ctr. (USA)[8935-79]

Photon-tissue interaction model for quantitative assessment of biological tissues, Seung Yup Lee, William R Lloyd, University of Michigan (USA); Robert H Wilson, University of California Irvine (USA); Malavika Chandra, University of Pennsylvania (USA); Barbara McKenna, Diane Simeone, James Scheiman, University of Michigan Medical School (USA); Mary-Ann Mycek, University of Michigan (USA)[8935-80]

Monday 3 February

SESSION 5

Location: Room 252 (Mezzanine) . . . Mon 8:30 am to 10:10 am

Raman Devices and Methods

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

8:30 am: **Shifted excitation Raman difference spectroscopy using a dual-wavelength DBR diode laser at 671 nm**, Martin Maiwald, Jörg Fricke, Arnim Ginolas, Johannes Pohl, Bernd Sumpf, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany)[8935-21]

8:50 am: **In vivo Raman spectroscopy as a clinical tool to detect biochemical change in the pregnant cervix**, Christine M. O'Brien, Elizabeth Vargis, Jeffrey Reese, Kelly Bennett, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) .[8935-22]

9:10 am: **In vivo sensing of plasmonic nanoprobe using surface-enhanced Raman scattering detection**, Tuan Vo-Dinh, Janna K. Register, Andrew M. Fales, Hsin-Neng Wang, Eugenia H. Cho, Alina Boico, Duke Univ. (USA); Natalie A. Wisniewski, PROFUSA, Inc. (USA); Thies Schroeder, Duke Univ. (USA); Bruce Klitzman, Duke Univ. School of Medicine (USA)[8935-23]

9:30 am: **Resonance Raman spectroscopic characterization of oral cancer blood plasma**, Rekha Pachaiappan, Aruna Praska Rao, Singaravelu Ganesan, Wilfred Prasanna Savarimuthu, Udayakumar Kaniyappan, Anna Univ. Chennai (India); Koteeswaran D., Meenakshi Ammal Dental College & Hospital (India)[8935-24]

9:50 am: **Device for 3 dimensional, real time and intraoperative evaluation of surgical margin status**, The-Quyen Nguyen, Jennifer Giltne M.D., Melinda Sanders M.D., Vanderbilt Univ. (USA); Mark C. Kelley M.D., Vanderbilt Univ. Medical Ctr. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) .[8935-25]

Coffee Break Mon 10:10 am to 10:40 am

Conference 8935 · Location: Room 252 (Mezzanine)

SESSION 6

Location: Room 252 (Mezzanine) . . . Mon 10:40 am to 12:00 pm

Scattering, Reflectance, and Polarimetric Techniques

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

10:40 am: **Reflectance confocal microscopy of oral epithelial tissue using an electrically tunable lens**, Kristen C. Maitland, Joey M. Jabbour, Bilal H. Malik, Rodrigo Cuenca, Shuna Cheng, Javier A. Jo, Texas A&M Univ. (USA); Yi-Shing L. Cheng D.D.S., John M. Wright D.D.S., Texas A&M Health Science Ctr. (USA) [8935-26]

11:00 am: **Mueller polarimetry for the detection of cancers**, Hui Ma, Honghui He, Nan Zeng, E. Du, Yihong Guo, Graduate School at Shenzhen, Tsinghua Univ. (China); Shaoxiong Liu, Minghua Li, Shenzhen Peoples Hospital (China); Jian Wu, Yonghong He, Graduate School at Shenzhen, Tsinghua Univ. (China) . . . [8935-27]

11:20 am: **An optimized dual photoelastic modulator polarimetry system for the investigation of biological tissues, with applications to breast cancer**, Adam Gribble, Univ. of Toronto (Canada); I. Alex Vitkin, Univ. of Toronto (Canada) and Ontario Cancer Institute (Canada) [8935-28]

11:40 am: **Endoscopic 3x3 and 4x4 Mueller matrix polarimetric tissue imaging system**, Ji Qi, Mohan Singh, Daniel Elson, Imperial College London (United Kingdom) [8935-29]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 7

Location: Room 252 (Mezzanine) Mon 1:30 pm to 3:10 pm

Biosensing and Imaging I

Session Chair: **Francesco Baldini**,
Istituto di Fisica Applicata Nello Carrara (Italy)

1:30 pm: **IgG/anti-IgG immunoassay based on a turn-around point long period grating**, Francesco Chiavaioli, Istituto di Fisica Applicata Nello Carrara (Italy); Palas Biswas, Central Glass and Ceramic Research Institute (India); Cosimo Trono, Ambra Giannetti, Sara Tombelli, Istituto di Fisica Applicata Nello Carrara (Italy); Somnath Bandyopadhyay, Central Glass and Ceramic Research Institute (India); Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy) [8935-30]

1:50 pm: **The application of surgical navigation system using optical molecular imaging technology in breast cancer and metastasis studies**, Chongwei Chi, Institute of Automation (China); Qian Zhang, Xidian Univ. (China); Deqiang Kou, Chinese PLA General Hospital (China); Jinzuo Ye, Yamin Mao, Institute of Automation (China); Jiandong Wang, Chinese PLA General Hospital (China); Xin Yang, Yang Du, Jie Tian, Institute of Automation (China) . . . [8935-31]

2:10 pm: **The optics inside an automated single molecule array analyzer**, William McGuigan, STRATEC Biomedical USA (USA); David R. Fournier, Quanterix Corp. (USA); Gary W. Watson, Les Walling, Bill Gigante, STRATEC Biomedical USA (USA); David C. Duffy, David M. Rissin, Cheuk W. Kan, Raymond E. Meyer, Quanterix Corp. (USA) [8935-32]

2:30 pm: **Fluorescence imaging for intraoperative detection of the parathyroid glands in endocrine surgery**, Melanie Gault McWade, Isaac J. Pence, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8935-33]

2:50 pm: **Background fluorescence reduction and absorption correction for fluorescence reflectance imaging**, Frederic Fantoni, Lionel Hervé, Vincent Poher, CEA-LETI-Minatec (France); Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA); Jérôme I. Mars, Institut National Polytechnique de Grenoble (France); Jean-Marc Dinten, CEA-LETI-Minatec (France) [8935-34]

Coffee Break Mon 3:10 pm to 3:40 pm

SESSION 8

Location: Room 252 (Mezzanine) Mon 3:40 pm to 5:40 pm

Biosensing and Imaging II

Session Chair: **Warren S. Grundfest M.D.**,
Univ. of California, Los Angeles (USA)

3:40 pm: **Multispectral imaging of organ viability during uterine transplantation surgery**, Neil T. Clancy, Srdjan Saso, Imperial College London (United Kingdom); Danail Stoyanov, Univ. College London (United Kingdom); Vincent Sauvage, Imperial College London (United Kingdom); David J. Corless, Leighton Hospital (United Kingdom); Michael Boyd, David E. Noakes, The Royal Veterinary College (United Kingdom); Guang-Zhong Yang, Sadaf Ghaem-Maghani, J. R. Smith, Daniel S. Elson, Imperial College London (United Kingdom) [8935-35]

4:00 pm: **Multispectral digital colposcopy (MDC) for detection of clinical cervical intraepithelial neoplasia**, Calum MacAulay, The BC Cancer Agency Research Ctr. (Canada); Leonid Fradkin, Texas Tech Univ. Health Sciences Ctr. (USA); Sylvia F. Lam, Martial Guillaud, Deanna Ceron, The BC Cancer Agency Research Ctr. (Canada); Jessica McAlpine, Tom Ehlan, Dianne Miller, The Univ. of British Columbia (Canada); Dennis D. Cox, Rice Univ. (USA); E. Neely Atkinson, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Dirk van Niekerk, Timon P. H. Buys, Pierre Lane, The BC Cancer Agency Research Ctr. (Canada); Michele Follen, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . [8935-36]

4:20 pm: **Wide-field high-resolution imager for optical pathology**, Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Jesung Park, Texas A&M Univ. (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8935-37]

4:40 pm: **Diffuse and fluorescence optical tomography with a fully integrated time-gated near-infrared spectroscopic imaging device**, Patrick Poulet, Virginie Zint, Renee Chabrier, Wilfried Uhring, Univ. de Strasbourg (France) [8935-38]

5:00 pm: **Implementation and evaluation of Google Glass for visualizing real-time image and patient data in the primary care office**, Guillermo L. Monroy, Nathan D. Shemonski, Ryan L. Shelton, Ryan M. Nolan, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8935-39]

5:20 pm: **Using tissue phantoms to determine the relationship between blood vessel depth and size from thermal images**, Jason R. Case, Madison A. Young, Susan R. Trammell, The Univ. of North Carolina at Charlotte (USA) [8935-40]

Tuesday 4 February

SESSION 9

Location: Room 252 (Mezzanine) Tue 8:30 am to 10:10 am

Coherence Techniques I

Session Chair: **A. Claude Boccara**, Institut Langevin (France)

8:30 am: **Full-field optical coherence tomography for rapid qualification of deep organ microbiopsies**, Katharine Grieve, Institut Langevin (France); Laurent Palazzo M.D., Clinique du Trocadéro (France); Claude Boccara, Institut Langevin (France) and LLTECH SAS (France); Philippe Vielh M.D., Monique Fabre M.D., Institut Gustave Roussy (France); Fabrice Harms, Institut Langevin (France) and LLTECH SAS (France) [8935-41]

8:50 am: **Motion tracking to enable pre-surgical margin mapping of basal cell carcinoma using optical imaging modalities: initial feasibility study using optical coherence tomography**, Megan Duffy, Andrew J. Coleman, Thomas Richardson, Emma Craythorne, Raj Mallipeddi, Guy's and St Thomas' NHS Foundation Trust (United Kingdom) [8935-42]

9:10 am: **Improved method to visualize lipid distribution within arterial vessel walls by 1.7 µm spectroscopic spectral-domain optical coherence tomography**, Mitsuharu Hirano, Takemi Hasegawa, Masato Tanaka, Shozo Tonosaki, Takahiro Ueno, Sumitomo Electric Industries, Ltd. (Japan) . . [8935-43]

9:30 am: **Linear source spectral-domain OCT for diagnosis of ocular and skin diseases**, Linbo Liu, Jun Gu, Xiaojun Yu, Xinyu Liu, Ling Chen, Yingying Diao, Nanyang Technological Univ. (Singapore) [8935-44]

9:50 am: **Validation of a bronchoscopic anatomical optical coherence tomography system for quantitative airway geometry**, Kushal C. Wijesundara, Hillel B. Price, The Univ. of North Carolina at Chapel Hill (USA); Nicusor V. Iftimia, Physical Sciences Inc. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8935-45]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 10

Location: Room 252 (Mezzanine) . . . Tue 10:40 am to 12:00 pm

Coherence Techniques II

Session Chair: **Stephen A. Boppart M.D.**,
Univ. of Illinois at Urbana-Champaign (USA)

10:40 am: **Combined NIR absorption spectroscopy and OCT for neurovascular bundle proximity sensing during dental implant surgery**, Jessie R. Weber, François Baribeau, François Duchesne, Paul Grenier, Frédéric Émond, Sylvain Dubois, Marc Girard, Timothy Pope, Pascal Gallant, Ozzy Mermut, INO (Canada); Hassan G. Moghadam, Argyle Associates Inc. (Canada) [8935-46]

11:00 am: **Optical coherence tomography-aided anastomosis platform study in the rodent model**, Yong Huang, Dedi Tong, Shan Zhu, Lehao Wu, Zuhair Ibrahim, W. P. Andree Lee M.D., Gerald Brandacher, Jin U. Kang, Johns Hopkins Univ. (USA) [8935-47]

11:20 am: **In vivo intra-operative breast tumor margin detection using a portable OCT system with a handheld surgical imaging probe**, Sarah J. Erickson-Bhatt, Ryan M. Nolan, Nathan D. Shemonski, Steven G. Adie, Univ. of Illinois at Urbana-Champaign (USA); Jeffrey Putney, Donald Darga, Diagnostic Photonics, Inc. (USA); Daniel T. McCormick, AdvancedMEMS (USA); Andrew Cittadine, Diagnostic Photonics, Inc. (USA); Marina Marjanovic, Eric J. Chaney, Guillermo L. Monroy, Fredrick A. South, P. Scott Carney, Univ. of Illinois at Urbana-Champaign (USA); Kimberly A. Cradock M.D., George Liu, Partha S. Ray, Carle Foundation Hospital (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) and Diagnostic Photonics, Inc. (USA) and Carle Foundation Hospital (USA) [8935-48]

11:40 am: **Demonstration of 3D imaging of skeletal muscle at centimeter depths using a 30-gauge side-viewing optical coherence tomography needle probe**, Xiaojie Yang, Dirk Lorensen, Robert A. McLaughlin, Rodney W. Kirk, The Univ. of Western Australia (Australia); Matthew Edmond, Miriam C. Simpson, The Univ. of Auckland (New Zealand); Miranda D. Grounds, David D. Sampson, The Univ. of Western Australia (Australia) [8935-49]

Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 11

Location: Room 252 (Mezzanine) Tue 1:30 pm to 3:10 pm

Endoscopic Devices and Methods

Session Chair: **Urs Utzinger**, The Univ. of Arizona (USA)

1:30 pm: **Spectral encoding enhances visual flexibility of surgical endoscopes**, Christopher Barsi, Massachusetts Institute for Technology (USA); Atiq Rehman, Sarasota Memorial Hospital (USA); Andreas Velten, Univ. of Wisconsin-Madison (USA) and Morgridge Institute for Research (USA); Mirella L. Altoe, Ramesh Raskar, Massachusetts Institute for Technology (USA) [8935-50]

1:50 pm: **System for clinical photometric stereo endoscopy**, Nicholas J. Durr, German Gonzalez, Daryl Lim, Giobanni Traverso M.D., Massachusetts Institute of Technology (USA) and Massachusetts General Hospital (USA); Norman S. Nishioka M.D., Massachusetts General Hospital (USA); Benjamin J. Vakoc, Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA); Vicente Parot, Massachusetts Institute of Technology (USA) and Massachusetts General Hospital (USA) [8935-51]

2:10 pm: **Evaluation of the three-dimensional endoscope system for assessing the gastrointestinal motility**, Kayo Yoshimoto, Kenji Yamada, Kenji Watabe, Maki Takeda, Takahiro Nishimura, Michiko Kido, Osaka Univ. (Japan); Toshiaki Nagakura, Osaka Electro-Communication Univ. (Japan) and Osaka Univ. (Japan); Hideya Takahashi, Osaka City Univ. (Japan); Tsutomu Nishida, Hideki Iijima, Masahiko Tsujii, Tetsuo Takehara, Yuko Ohno, Osaka Univ. (Japan) [8935-52]

2:30 pm: **A catheter-based fluorescence tomography platform**, Farouk Naouizi, Tiffany C. Kwong, Yu-Wen Chang, Po-jung M. Tseng, Kenji Ikemura, Cindy R. Martinez, Melissa Ali-Santosa, Gultekin Gulsen, Univ. of California, Irvine (USA) [8935-53]

2:50 pm: **Development of a forward-looking rigid imaging probe for wide-field fluorescence and optical coherence tomography**, Yeoreum Yoon, Peng Xiao, Bumju Kim, Taejun Wang, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8935-54]

Coffee Break Tue 3:10 pm to 3:30 pm

SESSION 12

Location: Room 252 (Mezzanine) Tue 3:30 pm to 6:10 pm

Advanced Medical Devices and Techniques

Session Chair: **Paul M. W. French**,
Imperial College London (United Kingdom)

3:30 pm: **Development of a fiber based Raman probe compatible with interventional magnetic resonance imaging**, Praveen C. Ashok, Bavishna B. Praveen, Univ. of St. Andrews (United Kingdom); Martin Rube, Benjamin Cox, Andreas Melzer, Institute for Medical Science & Technology (United Kingdom); Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8935-55]

3:50 pm: **Development of a multi-frequency diffuse photon density wave device for the characterization of tissue damage at multiple depths**, David Diaz, Michael Neidrauer, Drexel Univ. (USA); Michael S. Weingarten, Drexel Univ. College of Medicine (USA); Joshua Samuels, Drexel Univ. (USA); Richard Huneke, Drexel Univ. College of Medicine (USA); Peter A. Lewin, Leonid Zubkov, Drexel Univ. (USA) [8935-56]

4:10 pm: **Development of multiwavelength excitation light source for autofluorescence and photodynamic diagnosis systems**, Necla Kenar, Kocaeli Univ. (Turkey) and Chungnam National Univ. (Korea, Republic of); Hyun S. Lim, Amin Mirzaaghassi, Chungnam National Univ. (Korea, Republic of) [8935-57]

4:30 pm: **Optical thromboelastography (OTEG): a new approach to evaluate coagulation defects in patients**, Markandey M. Tripathi, Zeinab Hajjarian Kashany, Elizabeth M. Van Cott, Seemantini K. Nadkarni, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8935-58]

4:50 pm: **Continuous noninvasive in vivo monitoring of intravascular plasma volume and hematocrit changes during hemodialysis in humans: direct comparison with the CRIT-LINE**, Bin Deng, Syracuse Univ. (USA); Evan Kastner, Sriram Narsipur M.D., SUNY Upstate Medical Univ. (USA); Joseph Chaiken, Syracuse Univ. (USA) [8935-59]

5:10 pm: **A high sensitivity, anastigmatic, side-facing OCT-guided biopsy needle**, Bryden C. Quirk, Loretta Scolaro, Dirk Lorensen, The Univ. of Western Australia (Australia); Barry Vuong, Ryerson Univ. (Canada); David D. Sampson, The Univ. of Western Australia (Australia); Victor X. D. Yang, Ryerson Univ. (Canada); Robert A. McLaughlin, The Univ. of Western Australia (Australia) [8935-60]

5:30 pm: **Development of a baby friendly non-contact method for measuring vital signs, first results of clinical measurements in an open incubator on a Neonatal Intensive Care Unit**, John H. Klaessens, Marlies van den Born, Univ. Medical Ctr. Utrecht (Netherlands); Albert van der Veen, Janine Sikkens van de Kraats, Frank A. M. van den Dungen, Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands) [8935-61]

5:50 pm: **Minimal resection approaches for lung cancer surgery using intraoperative merged fluorescence imaging system**, Yujin Oh, Korea Univ. College of Health Sciences (Korea, Republic of); Yuhua Quan, Hyun Koo Kim, Korea Univ. (Korea, Republic of); Beop-Min Kim, Korea Univ. College of Health Sciences (Korea, Republic of) [8935-62]

Design and Quality for Biomedical Technologies VI

Conference Chairs: Ramesh Raghavachari, U.S. Food and Drug Administration (USA); Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA)

Conference Co-Chair: T. Joshua Pfefer, U.S. Food and Drug Administration (USA)

Program Committee: Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA); Kenji Taira, Olympus Corp. (USA); Jeeseong Hwang, National Institute of Standards and Technology (USA); Stephen P. Morgan, The Univ. of Nottingham (United Kingdom); Robert J. Nordstrom, National Institutes of Health (USA); Jannick P. Rolland, Univ. of Rochester (USA); Eric J. Seibel, Univ. of Washington (USA); Tomasz S. Tkaczyk, Rice Univ. (USA); Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands); David W. Allen, National Institute of Standards and Technology (USA)

Saturday 1 February

SESSION 1

Location: Room 222 (Mezzanine) Sat 8:30 am to 10:10 am

Simulation and Applications of Biomedical Imaging Technologies

Session Chair: **Rudolf M. Verdaasdonk**,
Vrije Univ. Medical Ctr. (Netherlands)

8:30 am: **Simulation of light transport in arthritic- and non-arthritic human fingers**, Matija Milanic, Lukasz A. Paluchowski, Lise Lygnes Randeberg, Norwegian Univ. of Science and Technology (Norway) [8936-1]

8:50 am: **Optical-thermal response of tissue during photoacoustic imaging**, Taylor Gould, Quanzeng Wang, Joshua Pfefer, U.S. Food & Drug Administration (USA) [8936-2]

9:10 am: **Glucose level estimation considering light source fluctuation in non-invasive blood glucose sensing**, Satoru Suzuki, Akane Ishida, Pradeep K. W. Abeygunawardha, Kenji Wada, Akira Nishiyama, Ichiro Ishimaru, Kagawa Univ. (Japan) [8936-3]

9:30 am: **Oxygenation changes in the skeletal muscles of stroke patients by surface near-infrared spectroscopy**, Whitney W. Linz, Gregory J. Michalak, Mohammad Masoudi Motlagh, Na Jin Seo, Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA) [8936-4]

9:50 am: **Electrochemical impedance spectroscopy based-on interferon-gamma detection**, Guan-Wei Li, Yi-Ching Kuo, Pei-I Tsai, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8936-5]

Coffee Break Sat 10:10 am to 10:30 am

SESSION 2

Location: Room 222 (Mezzanine) . . . Sat 10:30 am to 12:00 pm

OCT Systems

Session Chair: **Jeeseong Hwang**,
National Institute of Standards and Technology (USA)

10:30 am: **Non-invasive optical volumetric imaging of tissue microstructures and microcirculations in vivo (Invited Paper)**, Ruikang Wang, Univ. of Washington (USA) [8936-6]

11:00 am: **Telemedicine + OCT: toward design of optimized algorithms for high-quality compressed images**, Mahta Mousavi, Univ. of California, San Diego (USA); Kristen L. Lurie, Audrey K. Ellerbee, Stanford Univ. (USA); Tara Javidi, Univ. of California, San Diego (USA) [8936-7]

11:20 am: **Objective assessment of multimodality optical coherence tomography and second-harmonic generation image quality of ex vivo mouse ovaries using human observers**, Weston A. Welge, The Univ. of Arizona (USA); Andrew T. DeMarco, The Univ of Arizona (USA); Matthew A. Kupinski, Jennifer M. Watson, Photini S. Rice, Jennifer K. Barton, The Univ. of Arizona (USA) [8936-8]

11:40 am: **Simultaneous estimation of lipid and aqueous thicknesses of the tear film with optical coherence tomography and statistical decision theory**, Jinxin Huang, Univ. of Rochester (USA); Eric W. Clarkson, Matthew A. Kupinski, The Univ. of Arizona (USA); Patrice Tankam, Jannick P. Rolland, Univ. of Rochester (USA) [8936-9]

Lunch/Exhibition Break Sat 12:00 pm to 1:30 pm

SESSION 3

Location: Room 222 (Mezzanine) Sat 1:30 pm to 3:40 pm

Quality of Biomedical Imaging Technologies

Session Chair: **Ramesh Raghavachari**,
U.S. Food and Drug Administration (USA)

1:30 pm: **Development and quality assessment of intra-operative optical imaging systems (Invited Paper)**, Yu Chen, Univ. of Maryland, College Park (USA) [8936-10]

2:00 pm: **Novel measure for the calibration of laser Doppler flowmetry devices**, Andrey V. Dunaev, Univ. of Dundee (United Kingdom) and State Univ. Educational Scientific Production Complex (Russian Federation); Evgeny A. Zhrebtsov, State Univ. Educational Scientific Production Complex (Russian Federation); Dmitrii A. Rogatkin, Moscow Regional Research and Clinical Institute (Russian Federation); Sergei G. Sokolovski, Neil Z. Stewart, Edik U. Rafailov, Univ. of Dundee (United Kingdom) [8936-11]

2:20 pm: **Quantification of air flows produced by medical equipment disturbing the clean air in the field of surgery using large field background subtraction imaging**, Rudolf M. Verdaasdonk, Niek van Asperena, Albert J. van der Veen, Keith S. Cover, John M. Klaessens, Peter W. P. Vandertop, Vrije Univ. Medical Ctr. (Netherlands) [8936-12]

2:40 pm: **Fresh versus frozen tissue preparations for quantitative fluorescence lifetime imaging of NADH and FAD**, Alex J. Walsh, Rebecca S. Cook, Melissa C. Skala, Vanderbilt Univ. (USA) [8936-13]

3:00 pm: **Reproducibility analysis of measurements with a mechanical semiautomatic eye model for evaluation of intraocular lenses**, Elisabet Rank, Lukas Traxler, Fachhochschule Technikum Wien (Austria); Kirsten Lux, Christian Krutzler, Integrated Microsystems Austria GmbH (Austria); Andreas Drauschke, Fachhochschule Technikum Wien (Austria) [8936-14]

3:20 pm: **Novel yet effective motion artefact reduction method for continuous physiological monitoring**, Abdullah Alzahrani, Sijung Hu, Vicente Azorin-Peris, Roy Kalawsky, Loughborough Univ. (United Kingdom) . . . [8936-15]

Coffee Break Sat 3:40 pm to 4:00 pm

SESSION 4

Location: Room 222 (Mezzanine) Sat 4:00 pm to 5:30 pm

Biomedical Imaging Technologies I

Session Chair: **Anthony J. Durkin**,
Beckman Laser Institute and Medical Clinic (USA)

4:00 pm: **Per-cutaneous single-fiber reflectance spectroscopy for in vivo assessment of liver steatosis in a rat model and post-mortem evaluation of mineral degeneration in canine intervertebral disk (Invited Paper)**, Daqing Piao, Oklahoma State University (USA) [8936-16]

4:30 pm: **Hyperspectral spatial frequency domain optical tomography technique for quantitative three-dimensional reconstruction of tissue properties**, Robert H. Wilson, Elliott Kwan, Haotian Cui, Beckman Laser Institute and Medical Clinic (USA); Tomasz S. Tkaczyk, Rice Univ. (USA); Bernard Choi, Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8936-17]

4:50 pm: **Sensitive time-correlated single photon counting enables efficient singlet oxygen detection**, Uwe Ortmann, Manoel Veiga, Steffen Ruettinger, Sebastian Tannert, Felix Koberling, Christian Litwinski, Matthias Patting, Marcus Sackrow, Michael Wahl, Rainer Erdmann, PicoQuant GmbH (Germany) . [8936-19]

5:10 pm: **A digital broad bandwidth frequency-domain Diffuse Optical Spectroscopy (dDOS) system for multiplexed measurements in turbid media**, Justin Jung, Raef Istfan, Darren M. Roblyer, Boston Univ. (USA) [8936-20]

SESSION 6

Location: Room 222 (Mezzanine) . . . Sun 10:20 am to 12:20 pm

Intraoperative Systems

Session Chair: **Rongguang Liang**,
College of Optical Sciences, The Univ. of Arizona (USA)

- 10:20 am: **Intra-operative optical imaging of breast tumor margins**
(*Invited Paper*), Nimmi Ramanujam, Duke Univ. (USA) [8936-23]
- 10:50 am: **Design and validation of Intra-operative guidance of surgery**
(*Invited Paper*), Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8936-24]
- 11:20 am: **Intraoperative imaging and fluorescence image guidance in oncologic surgery using a wearable fluorescence goggle system**, Suman B. Mondal, Washington Univ. in St Louis (USA); Shengkui Gao, Washington Univ. in St. Louis (USA); Nan Zhu, The Univ. of Arizona (USA); Gail P. Sudlow, Walter J. Akers, Washington Univ. in St Louis (USA); Rongguang Liang, The Univ. of Arizona (USA); Viktor Gruev, Samuel Achilefu, Washington Univ. in St Louis (USA) [8936-25]
- 11:40 am: **Optical design of fluorescence imaging system for image guided surgery**, Nan Zhu, College of Optical Sciences, The Univ. of Arizona (USA); Shengkui Gao, Suman B. Mondal, Viktor Gruev, Samuel Achilefu, Washington Univ. in St. Louis (USA); Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA) [8936-26]
- 12:00 pm: **Scanning fiber endoscope with multi fluorescence-reflectance imaging channels for guiding biopsy**, Chenying Yang, Vivian W. Hou, Leonard Y. Nelson, Richard S. Johnston, C. David Melville, Eric J. Seibel, Univ. of Washington (USA) [8936-27]
- Lunch/Exhibition Break Sun 12:20 pm to 1:20 pm

SESSION 7

Location: Room 222 (Mezzanine) Sun 1:20 pm to 3:30 pm

Biomedical Imaging Technologies II

Session Chair: **T. Joshua Pfefer**,
U.S. Food and Drug Administration (USA)

- 1:20 pm: **Compact spectral-polarization imaging sensor** (*Invited Paper*), Viktor Gruev, Washington Univ. in St. Louis (USA) [8936-28]
- 1:50 pm: **Challenges and promises in quantitative label-free hyperspectral confocal imaging**, Daniel J. Stark, Ji Youn Lee, Robert Chang, National Institute of Standards and Technology (USA); Fuyuki Tokumasu, National Institutes of Health (USA); Kimberly A. Briggman, National Institute of Standards and Technology (USA); Do-Hyun Kim, U.S. Food & Drug Administration (USA); Jeeseong Hwang, National Institute of Standards and Technology (USA) [8936-29]
- 2:10 pm: **Design of an extended field of view two-photon light-sheet microscope for live embryo imaging**, Ming Zhao, Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA) [8936-30]
- 2:30 pm: **System design and evaluation of the array confocal fluorescence microscope**, Shaun Pacheco, Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA) [8936-31]
- 2:50 pm: **Giga-pixel on-chip microscopy and tomography using lensfree holography with color image sensors**, Wei Luo, Alon Greenbaum, Serhan O. Isikman, Ahmet F. Coskun, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8936-32]
- 3:10 pm: **A novel combined frequency-domain near-infrared spectroscopy and diffuse correlation spectroscopy system**, Erin M. Buckley, Stefan A. Carp, Pei-Yi Lin, Massachusetts General Hospital (USA); Haruo Nakaji, Canon U.S.A., Inc. (USA); Jay Dubb, Massachusetts General Hospital (USA); Dennis M. Hueber, ISS, Inc. (USA); Patricia Ellen Grant, Mathieu Dehaes, Children's Hospital Boston (USA); David A. Boas, Maria Angela Franceschini, Massachusetts General Hospital (USA) [8936-18]
- Coffee Break Sun 3:30 pm to 4:00 pm

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT
Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 222 (Mezzanine) Sun 8:30 am to 10:00 am

Standards and Phantoms in Biophotonics

Joint Session with Conferences 8936 and 8945

Session Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)

- 8:30 am: **Special imaging techniques in tissue models for validation, safe application, education, and improvement of medical devices** (*Invited Paper*), Rudolf M. Verdaasdonk, Albert J. Van der Veen, John M. Klaessens, Vrije Univ. Medical Ctr. (Netherlands) [8936-21]
- 9:00 am: **Quantitative assessment of biophotonic imaging system performance with phantoms fabricated by rapid prototyping**, Jianting Wang, Univ. of Maryland, College Park (USA); James Coburn, U.S. Food & Drug Administration (USA); Nicholas Woolsey, Chia-Pin Liang, Univ. of Maryland, College Park (USA); Du Vinh Nguyen Le, McMaster Univ. (Canada); Jessica Ramella-Roman, The Catholic Univ. of America (USA); Yu Chen, Univ. of Maryland, College Park (USA); Joshua Pfefer, U.S. Food & Drug Administration (USA) [8936-22]
- 9:20 am: **Microfluidic channel devices as volumetric measurement phantoms in optical coherence tomography and confocal microscopy**, Jeeseong Hwang, Daniel Stark, Darwin Reyes, Michael Halter, National Institute of Standards and Technology (USA) [8945-17]
- 9:40 am: **Characterization of a novel time-domain non-contact tissue scanning system**, Heidrun Wabnitz, Mikhail Mazurenka, Physikalisch-Technische Bundesanstalt (Germany); Laura Di Sieno, Alberto Dalla Mora, Davide Contini, Gianluca Boso, Alberto Tosi, Politecnico di Milano (Italy); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Yoko Hoshi, Tokyo Metropolitan Institute of Medical Science (Japan); Yukari Tanikawa, National Institute of Advanced Industrial Science and Technology (Japan); Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany); Antonio Pifferi, Politecnico di Milano (Italy) and CNR, Istituto di Fotonica e Nanotecnologie (Italy) [8945-18]
- Coffee Break Sun 10:00 am to 10:20 am

Conference 8936 · Location: Room 222 (Mezzanine)

SESSION 8

Location: Room 222 (Mezzanine) Sun 4:00 pm to 5:40 pm

Optics for Biomedical Imaging Technologies

Session Chair: **Jannick P. Rolland**, Univ. of Rochester (USA)

4:00 pm: **Optical systems engineering and manufacturing for biomedical technologies: examples and applications**, Peter Triebel, Hilmar Straube, Lutz Reichmann, Marco Bornschein, Helmut Bernitzki, Kay-Uwe Klepzig, JENOPTIK Optical Systems GmbH (Germany); Ingolf Reischel, JENOPTIK Polymer Systems GmbH (Germany) [8936-33]

4:20 pm: **Optical testing of progressive ophthalmic glasses based on galvo mirrors**, Stephan Stuerwald, Fraunhofer-Institut für Produktionstechnologie (Germany) [8936-34]

4:40 pm: **Comparison of digital holographic lenses to increase the depth of focus**, Alexis Vazquez-Villa, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Rui kang K. Wang, Univ. of Washington (USA); Jorge Castro-Ramos, José Alberto Delgado-Atencio, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8936-35]

5:00 pm: **Demonstration of a pulsed Raman fiber laser for tissue marking and integration with an OFDI system sharing a single-mode fiber optic probe**, Hyoung Won Baac, Martin L. Villiger, William Lo, Brett E. Bouma, Harvard Medical School (USA) [8936-36]

5:20 pm: **Advancements on galvanometer scanners for high-end applications**, Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania); Jannick P. Rolland, Univ. of Rochester (USA) [8936-37]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Effect of noise levels of an edge image on determining the presampled modulation transfer function, Wenbo WAN, Feng Gao, Tianjin university (China); Huijuan Zhao, Lixin Zhang, Zhongxing Zhou, Tianjin Univ. (China) [8936-38]

3D papillary image capturing by the stereo fundus camera system for clinical diagnosis on retina and optic nerve, Danilo A. Motta, Wavetek Technologies Industry Ltd. (Brazil); Luciana de Matos, Fatima M. M. Yasuoka, Univ. de São Paulo (Brazil) and Wavetek Technologies Industry Ltd. (Brazil); Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil); Luis Albert V. Carvalho, Wavetek Technologies Industry Ltd. (Brazil) and Univ. de São Paulo (Brazil) [8936-39]

Extracting optical properties of turbid media using radially and spectrally resolved diffuse reflectance, Jonathan Malsan, Northeastern Univ. (USA) and Radiation Monitoring Devices, Inc. (USA); Rajan Gurjar, David E. Wolf, Karthik Vishwanath, Radiation Monitoring Devices, Inc. (USA) [8936-40]

Characterization and modeling of point spread function in push-broom hyperspectral imaging systems for spectral and spatial resolution enhancement, Jurij Jemec, Miran Bürmen, Franjo Pernuš, Boštjan Likar, Univ. of Ljubljana (Slovenia) [8936-41]

Optical method to estimate the alcohol concentration by analyzing the human skin, Norma P. Puente, Griselda Quiroz-Campean, Univ. Autónoma de Nuevo León (Mexico); Aurora Espinoza-Valdez, Universidad de Guadalajara (Mexico) [8936-42]

Multimodal Biomedical Imaging IX

Conference Chairs: **Fred S. Azar**, Philips Medical Systems (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

Program Committee: **Caroline Boudoux**, Ecole Polytechnique de Montréal (Canada); **Yu Chen**, Univ. of Maryland, College Park (USA); **Qianqian Fang**, Massachusetts General Hospital (USA); **Sergio Fantini**, Tufts Univ. (USA); **Gultekin Gulsen**, Univ. of California, Irvine (USA); **Theodore J. Huppert**, Univ. of Pittsburgh (USA); **Tim Nielsen**, Philips Research (Germany); **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany); **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (USA); **Siavash Yazdanfar**, GE Global Research (USA); **Arjun G. Yodh**, Univ. of Pennsylvania (USA)

Saturday 1 February

SESSION 1

Location: Room 200 (Mezzanine) Sat 8:00 am to 10:10 am

Imaging in Surgical Procedures

Session Chairs: **Fred S. Azar**, Philips Medical Systems (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

- 8:00 am: **Multimodal stereoscopic optical intraoperative imaging**, Vyacheslav Kalchenko, Weizmann Institute of Science (Israel); Igor Meglinski, Univ. of Otago (New Zealand); Yuri Kuznetsov, Alon Harmelin, Weizmann Institute of Science (Israel) [8937-1]
- 8:20 am: **A surgical navigation system for noncontact diffuse optical tomography and intraoperative cone-beam CT**, Michael J. Daly, Univ. of Toronto (Canada); Jonathan C. Irish, Brian C. Wilson, David A. Jaffray, Princess Margaret Cancer Ctr. (Canada) [8937-2]
- 8:40 am: **Multimodal confocal mosaics enable high sensitivity and specificity in screening of in situ squamous cell carcinoma**, Anna Bar, Nicholas Snavelly, Steven Jacques, Oregon Health & Science Univ. (USA); Daniel S. Gareau, The Rockefeller Univ. (USA) [8937-3]
- 9:00 am: **Single-snapshot widefield optical properties imaging**, Jean Vervandier, Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA) [8937-4]
- 9:20 am: **Multimodal and multiview imaging of cutaneous tissue structural and functional parameters**, Wenqi Ren, Qiang Wu, Peng Liu, Shiwu Zhang, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8937-5]
- 9:40 am: **TBD (Invited Paper)**, [8937-6]
- Coffee Break Sat 10:10 am to 10:40 am

SESSION 2

Location: Room 200 (Mezzanine) . . . Sat 10:40 am to 12:20 pm

Microscopy

Session Chairs: **Caroline Boudoux**, Ecole Polytechnique de Montréal (Canada); **Yu Chen**, Univ. of Maryland, College Park (USA)

- 10:40 am: **Multimodal confocal microscopy based on a double-clad fiber coupler**, Etienne De Montigny, Wendy-Julie Madore, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Hospital Research Ctr. (Canada); Amber M. Beckley, Ecole Polytechnique de Montréal (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) and Ctr. Hospitalier de l'Univ. de Montreal Research Ctr. (Canada); Nicolas Godbout, Ecole Polytechnique de Montréal (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Hospital Research Ctr. (Canada) . . [8937-7]
- 11:00 am: **Resonant hyperspectral CARS and FWM microscopy of in-vivo carotenoid accumulation in H. Pluvialis**, Aaron D. Slepko, Trent Univ. (Canada); Aaron M. Barlow, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Andrew Ridsdale, National Research Council Canada (Canada); Joel T. Tabarangao, Trent Univ. (Canada); Albert Stolow, National Research Council Canada (Canada) and Univ. of Ottawa (Canada) [8937-8]
- 11:20 am: **Design, fabrication, and characterization of a compound lens for simultaneous optical coherence tomography and confocal microscopy**, Mathias Strupler, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Hospital Research Ctr. (Canada); Etienne De Montigny, Amber M. Beckley, Ecole Polytechnique de Montréal (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Hospital Research Ctr. (Canada) . . [8937-9]
- 11:40 am: **In-vivo widefield imaging of a fluorescent deoxy-glucose bioprobe: guiding multiphoton microscopy in oral epithelial neoplasia**, Rahul Pal, Jinping Yang, Gracie Vargas, The Univ. of Texas Medical Branch (USA) [8937-10]

- 12:00 pm: **In-vivo measurements of oxy- and deoxyhemoglobin levels in breast cancer xenografts in a mammary window chamber model**, Hui Min Leung, College of Optical Sciences, The Univ. of Arizona (USA); Rachel Schafer, Arthur F. Gmitro, The Univ. of Arizona (USA) [8937-11]

SESSION 3

Location: Room 200 (Mezzanine) Sat 1:40 pm to 3:40 pm

Multimodal Tomography/Spectroscopy Imaging

Session Chairs: **Michael A. Mastanduno**, Thayer School of Engineering at Dartmouth (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

- 1:40 pm: **A parallel framework for simultaneous FNIRS/fMRI fusion**, Zhen Yuan, Univ. of Florida (USA) and Univ. of Macau (China) [8937-12]
- 2:00 pm: **MRI-guided optical spectroscopy of human breast cancer increases information content of clinical DCE-MRI**, Michael A. Mastanduno, Fadi El-Ghoussein, Shudong Jiang, Thayer School of Engineering at Dartmouth (USA); Roberta DiFlorio-Alexander, Dartmouth Hitchcock Medical Ctr. (USA); Junqing Xu, Hong Yin, Xijing Hospital (China); Brian W. Pogue, Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA) [8937-13]
- 2:20 pm: **Dual-mode dynamic imaging of breast cancer**, Shiwu Zhang, Min Xu, Junnan Zhang, Univ. of Science and Technology of China (China); Qingping Tong, The 105th PLA Hospital (China); Pengfei Shao, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8937-14]
- 2:40 pm: **A true multimodality approach for high resolution optical imaging: photo-magnetic imaging**, Alex T. Luk, Univ. of California, Irvine (USA) . [8937-15]
- 3:00 pm: **Validation of temperature-modulated fluorescence tomography in vivo**, Tiffany C. Kwong, Univ. of California, Irvine (USA) [8937-16]
- 3:20 pm: **Multiplexed small animal fluorescence imaging using joint fluorescence spectral and lifetime information**, Niksa Valim, Mark Niedre, Northeastern Univ. (USA) [8937-17]
- Coffee Break Sat 3:40 pm to 4:10 pm

SESSION 4

Location: Room 200 (Mezzanine) Sat 4:10 pm to 5:50 pm

Agents, Reconstruction, and Analysis

Session Chairs: **Mark J. Niedre**, Northeastern Univ. (USA); **Xavier Intes**, Rensselaer Polytechnic Institute (USA)

- 4:10 pm: **Detection, enumeration, and tracking of extremely rare circulating cells in vivo with diffuse fluorescent light**, Mark J. Niedre, Noah Pestana, Stacey Markovic, Vivian E. Pera, Northeastern Univ. (USA) [8937-18]
- 4:30 pm: **One-step microencapsulation of nanoparticles and perfluorocarbon in microbubbles for controlled activation and image-guided therapy**, Guangbin Li, Ting Si, Xisheng Luo, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8937-19]
- 4:50 pm: **Single snapshot RGB multispectral imaging at fixed wavelengths: proof of concept**, Janis Spigulis, Univ. of Latvia (Latvia) [8937-20]
- 5:10 pm: **Microencapsulation of drugs and imaging agents in multiple compartments by compound-fluidic electro-flow focusing**, Chuansheng Yin, Ting Si, Peng Gao, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8937-21]
- 5:30 pm: **A fast and effective reconstruction method for fluorescence tomography based on sparsity adaptive subspace pursuit**, Jinzuo Ye, Chongwei Chi, Yu An, Han Xu, Shuang Zhang, Institute of Automation (China); Xin Yang, Institute of Automation, Chinese Academy of Sciences (China); Jie Tian, Institute of Automation (China) [8937-22]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

An overlap time-gated and IRF-calibrated born normalization scheme for time-domain diffuse fluorescence tomography, Feng Gao, Tianjin Univ. (China) . . . [8937-23]

Dental imaging using laminar optical tomography and micro CT, Feixiao Long, Mehmet S. Ozturk, Xavier Intes, Shiva Kotha, Rensselaer Polytechnic Institute (USA) . . . [8937-28]

Comparative sensitivity evaluation of avalanche photodiode detector and electron multiplying CCD for mesoscopic fluorescence tomography, Mehmet S. Ozturk, Xavier Intes, Rensselaer Polytechnic Institute (USA) . [8937-29]

High resolution 3D image reconstruction in laminar optical tomography based on compressive sensing, Fugang Yang, Shandong Institute of Business and Technology (China) and Rensselaer Polytechnic Institute (USA) . . . [8937-30]

Mesh optimization in Monte Carlo-based fluorescence molecular tomography, Xavier Intes, Andrew Edmans, Rensselaer Polytechnic Institute (USA) . . . [8937-31]

Structured light-based hyperspectral time-resolved diffuse optical tomography system, Qi Pian, Xavier Intes, Rensselaer Polytechnic Institute (USA) . . . [8937-32]

Unsupervised clustering analyzes of features extraction for a caries computer-assisted diagnosis using dental fluorescence images, Michel Bessani, Mardoqueu Martins da Costa, Univ. de São Paulo (Brazil); Emery C. C. Lins, UFABC (Brazil); Carlos Dias Maciel, Univ. de São Paulo (Brazil) . . . [8937-33]

Comparison of LP-regularization-based reconstruction methods for early time gates in time domain fluorescence molecular tomography, Lingling Zhao, He Yang, Wenxiang Cong, Ge Wang, Xavier Intes, Rensselaer Polytechnic Institute (USA) . . . [8937-34]

A featured-data scheme for time domain diffuse fluorescence tomography based on the radiative transfer equation, Jiao Li, Zhongwei Yang, Limin Zhang, Huijuan Zhao, Feng Gao, Tianjin Univ. (China) . . . [8937-35]

Comparison of NIR FRET pairs for quantitative transferrin-based assay, Nattawat Sinsuebphon, Rensselaer Polytechnic Institute (USA); Travis Bevington, Albany Medical College (USA); Lingling Zhao, Rensselaer Polytechnic Institute (USA); Abe Ken, Margarida Barroso, Albany Medical College (USA); Xavier Intes, Rensselaer Polytechnic Institute (USA) . . . [8937-37]

Developing and testing a multisource and detector reflectance diffuse optical tomography system, Murat Canpolat, Hüseyin Özgür Kazanci, Tanju Mercan, Akdeniz Üniv. (Turkey) . . . [8937-40]

Optimal arrangements of fiber optic probes to enhance the spatial resolution in depth for 3D reflectance diffuse optical tomography with time-resolved measurements performed with fast-gated single-photon avalanche diodes, Agathe Puszk, CEA-LETI (France); Laura Di Sieno, Alberto Dalla Mora, Antonio Pifferi, Davide Contini, Gianluca Boso, Alberto Tosi, Politecnico di Milano (Italy); Lionel Hervé, CEA-LETI-Minatec (France); Anne Planat-Chrétien, CEA-LETI (France); Anne Koenig, CEA (France); Jean-Marc Dinten, CEA-LETI-Minatec (France) . . . [8937-24]

Time-resolved measurements in diffuse reflectance: effects of the instrument response function of different detection systems on the depth sensitivity, Anne Planat-Chrétien, CEA-LETI (France); Michel Berger, CEA (France); Agathe Puszk, CEA-LETI (France); Lionel Hervé, Jean-Marc Dinten, CEA-LETI-Minatec (France) . . . [8937-25]

Spectrally-resolved fluorescence diffuse tomography with autofluorescence reducing technique based on symmetric measurements, Mikhail S. Kleshnin, Ilya Iosifovich Fiks, Institute of Applied Physics (Russian Federation); Ilya V. Turchin, Institute of Applied Physics (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation) . . . [8937-26]

The use of 3D deformable optical coherence tomography and co-registered computed tomography in imaging of trapeziometacarpal articular cartilage, Paul Cernohorsky, Daniel M. de Bruin, Geert J. Streekstra, Simon D. Strackee, Ton G. van Leeuwen, Academisch Medisch Ctr. (Netherlands) . . . [8937-27]

Novel fusion for hybrid optical/microcomputed tomography imaging based on natural light surface reconstruction and iterated closest point, Nannan Ning, Harbin Univ. of Science and Technology (China); Jie Tian, Institute of Automation (China); Xia Liu, Harbin Univ. of Science and Technology (China); Kexin Deng, Xidian Univ. (China); Ping Wu, Kun Wang, Institute of Automation (China); Xibo Ma, Institute of automation, Chinese academy of sciences (China); Bo Wang, Harbin Univ. of Science and Technology (China) . . . [8937-35]

Combining 3D optical and dual energy x-ray imaging to measure lipid, water, protein body composition, Sergei Malkov, John A. Shepherd, Univ. of California, San Francisco (USA) . . . [8937-38]

Quantitative determination of the signal and resolution limits of Cerenkov luminescence imaging, Justin S. Klein, Gregory S. Mitchell, Simon R. Cherry, Univ. of California, Davis (USA) . . . [8937-39]

On the use of Cramér-Rao bounds for diffuse optical imaging system design, Vivian E. Pera, Dana H. Brooks, Mark J. Niedre, Northeastern Univ. (USA) . . . [8937-41]

Simulation of optical breast density measurements using structured light illumination, essica Kwong, Farouk Nouizi, Yifan Li, Min-Ying Su, Gultekin Gulsen, Univ. of California, Irvine (USA) . . . [8937-42]

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XIV

Conference Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

Program Committee: **James P. Clarkin**, Polymicro Technologies, A Subsidiary of Molex Incorporated (USA); **Ilko Ilev**, U.S. Food and Drug Administration (USA); **Jin U. Kang**, Johns Hopkins Univ. (USA); **Karl-Friedrich Klein**, Technische Hochschule Mittelhessen (Germany); **Pierre Lucas**, The Univ. of Arizona (USA); **Yuji Matsuura**, Tohoku Univ. (Japan); **Angela B. Seddon**, The Univ. of Nottingham (United Kingdom)

Saturday 1 February

KEYNOTE ADDRESS

Location: Room 250 (Mezzanine) 8:30 am to 9:00 am

Session Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

8:30 am: **Fiber optics sensing (Keynote Presentation)**, Wojtek J. Bock, Univ. du Québec en Outaouais (Canada) [8938-1]

SESSION 1

Location: Room 250 (Mezzanine) Sat 9:00 am to 10:20 am

Optical Fibers and Sensors I

Session Chair: **Angela B. Seddon**, The Univ. of Nottingham (United Kingdom)

9:00 am: **Needle-tip localization using an optical fiber hydrophone**, Jean Martial Mari, Univ. College London (United Kingdom); Simeon West, Univ. College Hospital (United Kingdom); Benjamin T. Cox, Paul C. Beard, Adrien E. Desjardins, Univ. College London (United Kingdom) [8938-2]

9:20 am: **Chalcogenide glass optical fibers for medical diagnosis: state of the art and perspective (Invited Paper)**, Bruno Bureau, Catherine Boussard-Plédel, Virginie Nazabal, Johann Trolés, Univ. de Rennes 1 (France); Laurent Brilland, Univ. de Rennes I (France); Jacques Lucas, Univ. de Rennes 1 (France) [8938-3]

9:40 am: **Effects of sterilization on optical and mechanical reliability of specialty optical fibers and terminations**, Andrei A. Stolov, Edward T. Warych, William P. Smith, Paula L. Fournier, Adam S. Hokansson, Jie Li, R. Steve Allen, OFS (USA) [8938-4]

10:00 am: **Fiber optic enables point of care bioanalysis 250 miles from earth**, Ozzy Mermut, Christophe Riviere, Jessie Weber, Mathieu Legros, Paul Grenier, Pierre Chartrand, Pascal Gallant, INO (Canada); Geneviève Dubeau-Laramée, Luchino Y. Cohen, Isabelle Jean, Derrick Piontek, Daniel Provençal, Canadian Space Agency (Canada) [8938-5]

Coffee Break Sat 10:20 am to 10:50 am

SESSION 2

Location: Room 250 (Mezzanine) Sat 10:50 am to 12:10 pm

Optical Fibers and Sensors II

Session Chair: **Pierre Lucas**, The Univ. of Arizona (USA)

10:50 am: **Fabrication of 50- μ m-bore hollow fiber for infrared transmission**, Katsumasa Iwai, Kouki Takahashi, Hiroyuki Takaku, Sendai National College of Technology (Japan); Mitsunobu Miyagi, Tohoku Institute of Technology (Japan); Yi-Wei Shi, Fudan Univ. (China); Yuji Matsuura, Tohoku Univ. (Japan) . . . [8938-6]

11:10 am: **Monitoring Biofilm Attachment on Medical Device Surfaces Using Hyperspectral Imaging**, Hanh ND Le, Victoria M Hitchins, Wenhui Zhang, Ilko Ilev, Do-Hyun Kim, US Food and Drug Administration (USA) [8938-8]

11:30 am: **Improved deep UV optical fiber for medical and spectroscopy applications**, John H. Shannon, Valery Khalilov, Richard J. Timmerman, Polymicro Technologies (USA) [8938-9]

11:50 am: **Design of graded index fiber for fiber-optics probe in OCT applications**, Xiaoguang Sun, Jie Li, OFS (USA) [8938-55]

Lunch/Exhibition Break Sat 12:10 pm to 1:10 pm

SESSION 3

Location: Room 250 (Mezzanine) Sat 1:10 pm to 3:10 pm

Optical Fibers and Sensors III

Session Chair: **Jin U. Kang**, Johns Hopkins Univ. (USA)

1:10 pm: **Effect of diffusivity in calculating photothermal damage of tissue embedded with small heat-absorbing particles**, Hanh ND Le, Do-Hyun Kim, US Food and Drug Administration (USA) [8938-10]

1:30 pm: **Dual optical coherence tomography and infrared thermography imaging system**, Israel Gannot, Tel Aviv Univ. (Israel) [8938-11]

1:50 pm: **New glass developments for fiber optics**, Paige L. Higby, SCHOTT North America, Inc. (USA); Karen Holst, SCHOTT AG (Germany) [8938-12]

2:10 pm: **Grazing angle sensing approach in fiber-optic Fourier transform infrared (FO-FTIR) spectroscopy for detecting surface contamination**, Moinuddin Hassan, Ilko Ilev, U.S. Food & Drug Administration (USA) . . [8938-13]

2:30 pm: **Improvement of specialty fiber damage at 266 nm wavelength**, Karl-Friedrich Klein, Tim Tobisch, Hannah Ohlmeyer, Technische Hochschule Mittelhessen (Germany); Hartmut Zimmermann, CryLas GmbH (Germany); Georg Hillrichs, Hochschule Merseburg (Germany) [8938-14]

2:50 pm: **Integrated optical fiber shape sensor modules based on twisted multicore fiber grating arrays**, Paul S. Westbrook, Kenneth S. Feder, Tristan Kremp, Thierry F. Taunay, Eric M. Monberg, James Kelliher, Roy M. Ortiz, Kelvin B. Bradley, Kazi S. Abedin, David C. Au, Gabriel S Puc, OFS Laboratories LLC (USA) [8938-15]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 4

Location: Room 250 (Mezzanine) Sat 3:40 pm to 6:00 pm

Optical Fibers and Sensors IV

Session Chair: **Moinuddin Hassan**, U.S. Food and Drug Administration (USA)

3:40 pm: **Silver-coated Teflon hollow waveguides for the delivery of terahertz radiation**, James A. Harrington, Jeffrey E. Melzer, Rutgers, The State Univ. of New Jersey (USA); Oleg Mitrofanov, Univ. College London (United Kingdom); Miguel Navarro-Cia, Imperial College London (United Kingdom) [8938-16]

4:00 pm: **Multi-channel near-infrared spectrometer for functional depth-resolved tissue examination and positioning applications**, Dominic Ernst, Michael Peyer, Dominik Täschler, Berner Fachhochschule Technik und Informatik (Switzerland); Patrick Steiner, Berner Fachhochschule Technik und Informatik (Switzerland), Univ. Bern (Switzerland); Anke Bossen, Boris Považay, Christoph Meier, Berner Fachhochschule Technik und Informatik (Switzerland) . . [8938-17]

4:20 pm: **Multi component extruded crystalline fibers for 3-15 μ m**, Leonid Nikolaevich Butvina, Alexey L. Butvina, Andrey G. Okhrimchuk, Eugeny M. Dianov, Fiber Optic Research Ctr. (Russian Federation); Ninel V. Lichkova, Vladimir Nikolaevich Zagorodnev, Institute of Microelectronics Technology and High Purity Materials (Russian Federation) [8938-18]

4:40 pm: **Microstructured optical fiber-based micro-cavity sensor for chemical detection**, Bongkyun Kim, Dankook Univ. (Korea, Republic of) and Gwangju Institute of Science and Technology (Korea, Republic of); Jin Chul Ahn M.D., Phil-Sang Chung M.D., Dankook Univ. (Korea, Republic of); Youngjoo Chung, Dankook Univ. (Korea, Republic of) and Gwangju Institute of Science and Technology (Korea, Republic of) [8938-19]

5:00 pm: **5-mm piezo-actuated fiber endoscope for high-speed ultrafast laser microsurgery**, Onur Ferhanoglu, Murat Yildirim, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) [8938-20]

Conference 8938 · Location: Room 250 (Mezzanine)

5:20 pm: **Low-temperature, low-cost growth of robust ATR GeO₂ hollow fibers based on copper capillary tubes for transmission of CO₂ laser light**, Chengbin Jing, Wei Bai, Zhigao Hu, Pingxiong Yang, East China Normal Univ. (China); Aiyun Liu, Fangtin Lin, Shanghai Normal Univ. (China); Yi-Wei Shi, Fudan Univ. (China); Junhao Chu, East China Normal Univ. (China) and Shanghai Institute of Technical Physics (China) [8938-21]

5:40 pm: **Towards simultaneous and co-localized optical frequency domain imaging and laser therapy through a double clad fiber**, Kathy Beaudette, Ecole Polytechnique de Montréal (Canada), Massachusetts General Hospital (USA); Hyoung Won Baac, Harvard Medical School (USA), Massachusetts General Hospital (USA); Wendy-Julie Madore, Etienne De Montigny, Ecole Polytechnique de Montréal (Canada); Martin L. Villiger, Harvard Medical School (USA), Massachusetts General Hospital (USA); Nicolas Godbout, Ecole Polytechnique de Montréal (Canada); Brett E. Bouma, Harvard Medical School (USA), Massachusetts General Hospital (USA); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) [8938-22]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

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See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 250 (Mezzanine) . . . Sun 8:30 am to 10:20 am

Optical Fibers and Sensors V

Session Chair: **James A. Harrington**, Rutgers, The State Univ. of New Jersey (USA)

8:30 am: **Photothermal tissue coagulation using pulsed Raman fiber laser at 1.44- μ m wavelength**, Hyoung Won Baac, William Lo, Martin L. Villiger, Brett E. Bouma, Harvard Medical School (USA) [8938-23]

8:50 am: **Optical fiber spectroscopy measures perfusion of the brain in a murine Alzheimer's disease model**, Hyung Jun Ahn, The Rockefeller Univ. (USA); Sidney Strickland, Rockefeller Univ. (USA); James Kreuger, Daniel S. Gareau, The Rockefeller Univ. (USA) [8938-24]

9:10 am: **Optical coherence tomography envelope statistics methodology to assess temperature changes in tissue mimicking fluids**, Subaagari Seevaratnam, Mashal Farid, Ryerson Univ. (Canada); Golnaz Farhat, Univ. of Toronto (Canada); Michael C. Kolios, The Univ. of Toronto (Canada) and Ryerson Univ. (Canada); Beau A. Standish, Ryerson Univ. (Canada) [8938-25]

9:30 am: **Gold nanoparticles sensing with diffusion reflection measurement as a new medical diagnostics application (Invited Paper)**, Dror Fixler, Bar-Ilan Univ. (Israel) [8938-7]

10:00 am: **Bio-functionalized hollow core photonic crystal fibers for label-free DNA detection**, Alessandro Candiani, Univ. degli Studi di Parma (Italy); Hussein T. Sallloom, Univ. of Baghdad (Iraq); Sara Giannetti, Univ. degli Studi di Parma (Italy); Ahmad K. Ahmad, Al-Nahrain Univ. (Iraq); Annamaria Cucinotta, Univ. degli Studi di Parma (Italy); A. Hadi Al-Janabi, Univ. of Baghdad (Iraq); Stefano Selleri, Univ. degli Studi di Parma (Italy) [8938-26]

Coffee Break Sun 10:20 am to 10:50 am

SESSION 6

Location: Room 250 (Mezzanine) . . . Sun 10:50 am to 12:10 pm

Optical Fibers and Sensors VI

Session Chair: **Yuji Matsuura**, Tohoku Univ. (Japan)

10:50 am: **Efficacy of pressure relief maneuvers in spinal cord injury patients: a clinical study**, Thuan Ho, The Catholic Univ. of America (USA); Alison M. Lichy, Inger H. Ljungberg, Suzanne L. Groah, National Rehabilitation Hospital (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA) and National Rehabilitation Hospital (USA) [8938-27]

11:10 am: **Towards mid-infrared fibre-lasers: comparison of Ga- and In-containing, rare earth doped, selenide chalcogenide glasses and optical fibres**, Hesham Sakr, Zhuoqi Tang, David Furniss, Lukasz Sojka, Nabil A. Moneim, Emma Barney, Slawomir Sujecki, Trevor M. Benson, Angela B. Seddon, The Univ. of Nottingham (United Kingdom) [8938-28]

11:30 am: **Towards mid-IR supercontinuum generation: Ge-Sb-Se mid-infrared step-index small-core optical fibre**, Jessica H. Butterworth, Dinuka Jayasuriya, QingQuan Li, David Furniss, Nabil A. Moneim, Emma Barney, Slawomir Sujecki, Trevor M. Benson, Angela B. Seddon, The Univ. of Nottingham (United Kingdom) [8938-29]

11:50 am: **Exposed core microstructured optical fiber surface plasmon resonance biosensor**, Elizaveta Klantsataya, Alexandre François, Agnieszka Zuber, The Univ. of Adelaide (Australia); Valeria Torok, South Australian Research and Development Institute (Australia); Roman Kostecki, Tanya M. Monro, The Univ. of Adelaide (Australia) [8938-30]

Lunch/Exhibition Break Sun 12:10 pm to 1:10 pm

SESSION 7

Location: Room 250 (Mezzanine) Sun 1:10 pm to 3:10 pm

Optical Fibers and Sensors VII

Session Chair: **James P. Clarkin**, Polymicro Technologies, A Subsidiary of Molex Incorporated (USA)

1:10 pm: **Hollow fiber based SERS probe for analysis of biological molecules**, Masahiro Nagaoka, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [8938-31]

1:30 pm: **Temperature controlled laser bonding of incisions in tissues through a single compound fiber**, Ilan Gabay, Abraham Katzir, Tel Aviv Univ. (Israel); David Varssano, Tel Aviv Sourasky Medical Ctr. (Israel) and Tel Aviv Univ. (Israel); Irina Barequet, Sheba Medical Ctr. (Israel) and Tel Aviv Univ. (Israel); Mordechai Rosner, Sheba Medical Ctr. (Israel); Marcel Rattunde, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8938-32]

1:50 pm: **Influence of optical fiber bundle parameters on the transmission of laser speckle patterns**, Jing Wang, Seemantini K. Nadkarni, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [8938-33]

2:10 pm: **High-resolution fiber-optic bundle microscopy based on dithered spatial compounding**, Gyeong Woo Cheon, Jaepyeong Cha, Jin U. Kang, Johns Hopkins Univ. (USA) [8938-34]

2:30 pm: **Multi-channel surface plasmon sensor using a unique H-cross-section optical fiber**, Mohamad Diaa Baiad, Victor Lambin Iezzi, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [8938-35]

2:50 pm: **Micro sized implantable ball lens-based fiber optic probe design**, Jaepyeong Cha, Jin U. Kang, Johns Hopkins Univ. (USA) [8938-36]

Coffee Break Sun 3:10 pm to 3:40 pm

SESSION 8

Location: Room 250 (Mezzanine) Sun 3:40 pm to 6:00 pm

Optical Fibers and Sensors VIII

Session Chair: **Karl-Friedrich Klein**,
Technische Hochschule Mittelhessen (Germany)

3:40 pm: **Improvements of CP-OCT sensor guided SMART micro-forceps**,
Cheol Song, Peter Gehlbach, Jin U. Kang, Johns Hopkins Univ. (USA) . [8938-38]

4:00 pm: **Biconically tapered fiber optic dip probe for rapid label-free immunoassays**, Ertan Salik, John Miller, Angelica Castaneda, Wei-Jen Lin, Shelton Murinda, Kun Ho Lee, Martin Sanchez, California State Polytechnic Univ., Pomona (USA) [8938-38]

4:20 pm: **Application of ball-lens hollow fiber Raman probe to study an anorectal prolapse**, Bibin Bintang Andriana, Akinori Taketani, Kwansai Gakuin Univ. (Japan); C. Linda R. Soeratman, The Univ. of Tokyo (Japan); Mika Ishigaki, Yasuhiro Maeda, Masanori Sawa, Hidetoshi Sato, Kwansai Gakuin Univ. (Japan) [8938-39]

4:40 pm: **Chalcogenide microstructured optical fibers for chemical sensing**, Johann Trolès, Perrine Toupin, Univ. de Rennes 1 (France); Laurent Brilland, PERFOS (France); Catherine Boussard-Plédel, Bruno Bureau, Univ. de Rennes 1 (France); David Mechin, PERFOS (France); Jean Luc Adam, Univ. de Rennes 1 (France) [8938-40]

5:00 pm: **Bending compensation for multimode fiber based endoscopes**, Salma Farahi, Ioannis N. Papadopoulos, David Ziegler, Demetri Psaltis, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8938-41]

5:20 pm: **Label-free biochemical characterization of sperm cells using Raman microscopy**, Anna Chiara De Luca, Stefano Managò, Maria Antonietta Ferrara, Luigi Sirloto, Consiglio Nazionale delle Ricerche (Italy); Ivo Rendina, National Research Council (Italy); Roberto Puglisi, Donatella Balduzzi, Andrea Galli, Istituto Sperimentale Italiano Lazzaro Spallanzani (Italy); Pietro Ferraro, Giuseppe Coppola, Consiglio Nazionale delle Ricerche (Italy) [8938-42]

5:40 pm: **Large-core tube-leaky waveguide for delivery of high-powered Er:YAG laser**, Shun Kobayashi, Takashi Katagiri, Yuji Matsuura, Tohoku Univ. (Japan) [8938-43]

Blood pH optrode based on evanescent waves and refractive index change, Krister Hammarling, Mid Sweden Univ. (Sweden); Jöns Hilborn, Uppsala Univ. (Sweden); Hans-Erik Nilsson, Mid Sweden Univ. (Sweden) [8938-48]

Microfluidic on optical fibers: towards a new kind of fluorescent biosensor, Marjorie Lismont, Nicolas Vandewalle, Floriane Weyer, Bernard Joris, Laurent A. Dreesen, Univ. de Liège (Belgium) [8938-49]

Dental caries diagnosis system with UV fiber bundle lighting and camera, Joo Beom Eom, In Hee Shin, Jae Seok Park, Hyeong Ju Park, Byeong-II Lee, Korea Photonics Technology Institute (Korea, Republic of) [8938-50]

Optimized surface enhanced Raman spectroscopy (OSERS) using nanosphere lithography phase I: flat substrate characterization and optimization, Aditya Pandya, Ryerson Univ. (Canada); Alexander Douplik, Ryerson Univ. (Canada) and School of Advanced Optical Technologies (SAOT), Friedrich-Alexander Erlangen-Nuremberg University (Germany) [8938-51]

Optical fiber-based photomechanical molecular delivery system, Koki Nakano, Tokyo Univ. of Agriculture and Technology (Japan); Shunichi Sato, Satoko Kawauchi, Hiroshi Ashida, National Defense Medical College (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan) . . . [8938-52]

Self-referenced label free biosensors based on differential fiber optic interferometry, Raquel B. Queirós, Carlos de Jesus Gouveia, Pedro A. S. Jorge, INESC TEC (Portugal) [8938-53]

Comparison of photoacoustic spectroscopy and Fourier-transform infrared attenuated total reflection spectroscopy on biofilm, Hanh ND Le, Yi Yang, Do-Hyun Kim, US Food and Drug Administration (USA) [8938-54]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Full-field optical coherence tomography system implemented with fiber-optic components, Eun-Seo Choi, Seung Suk Lee, Joo Ha Kim, Chosun Univ. (Korea, Republic of) [8938-44]

Empiric model for identification of Laser tissue soldering process completion using IR-spectroscopy, Yuval Greenberg, Tel Aviv Univ. (Israel) [8938-45]

Surface plasmon resonance based fiber optic urea sensor using ITO and enzyme, Satyendra K. Mishra, Samta Rani, Banshi D. Gupta, Indian Institute of Technology Delhi (India) [8938-46]

Cost-effective optical coherence tomography spectrometer based on a tilted fiber Bragg grating, Stefan Remund, Anke Bossen, Berner Fachhochschule Technik und Informatik (Switzerland); Xianfeng Chen, Bangor Univ. (United Kingdom); Ling Wang, Katholieke Univ. Leuven (Belgium); Adedotun Adebayo, Lin Zhang, Aston Univ. (United Kingdom); Boris Považay, Christoph Meier, Berner Fachhochschule Technik und Informatik (Switzerland) [8938-47]

Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry

Conference Chairs: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA); **Wolfgang Petrich**, Roche Diagnostics GmbH (Germany)

Program Committee: **Andrew J. Berger**, Univ. of Rochester (USA); **Rohit Bhargava**, Univ. of Illinois at Urbana-Champaign (USA); **Airton Abrahão Martin**, Univ. do Vale do Paraíba (Brazil); **Michael D. Morris**, Univ. of Michigan (USA); **Dieter Naumann**, Robert Koch-Institut (Germany); **Jürgen Popp**, Institut für Photonische Technologien e.V. (Germany); **Nicholas Stone**, Gloucestershire Royal Hospital (United Kingdom)

Saturday 1 February

SESSION 1

Location: Room 202 (Mezzanine) Sat 1:00 pm to 3:00 pm

Cells

Session Chair: **Anita Mahadevan-Jansen**, Vanderbilt Univ. (USA)

1:00 pm: **Analysis of the infected cell by Raman spectroscopy in dynamics with using of other methods of comparison**, Kamila Moor, Kiyoshi Ohtani, Kwansai Gakuin Univ. (Japan); Diyas Myrzakozha, Orik Zhanserkenova, Kazakstan National Agrarian Univ. (Kazakhstan); Bibin Bintang Andriana, Hidetoshi Sato, Kwansai Gakuin Univ. (Japan) [8939-1]

1:20 pm: **Distinction of tumor-derived vesicles from normal vesicles by Raman microspectroscopy**, E. van der Pol, F. A. W. Coumans, C. M. Hau, Univ. van Amsterdam (Netherlands); Cees Otto, A. T. Lenferink, Univ. Twente (Netherlands); A. Sturk, R. Nieuwland, T. G. van Leeuwen, Univ. Van Amsterdam (Netherlands) [8939-2]

1:40 pm: **Identifying adult stem cells residing in the bulb area of hair follicles using micro-Raman spectroscopy**, Michael A. Short, The BC Cancer Agency Research Ctr. (Canada); Martin Tsai, Photomedicine Institute (Canada); Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Harvey Lui, Photomedicine Institute (Canada) [8939-3]

2:00 pm: **Differentiating the growth phases of single bacteria using Raman spectroscopy**, Samy Andrea Strola, Pierre Robert Marcoux, Emmanuelle Schultz, Rémi Perenon, CEA-LETI-Minatec (France); Anne-Catherine Simon, Isabelle Espagnon, Commissariat à l'Énergie Atomique (France); Cédric Allier, Jean-Marc Dinten, CEA-LETI-Minatec (France) [8939-4]

2:20 pm: **Cell identification using Raman spectroscopy in combination with optical trapping and microfluidics**, Christoph Krafft, Sebastian Dochow, Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8939-5]

2:40 pm: **Label-free Haemogram using wavelength modulated Raman spectroscopy for identifying immune-cell subset**, Praveen C. Ashok, Bavishna B. Praveen, Elaine C. Campbell, Kishan Dholakia, Simon Powis, Univ. of St. Andrews (United Kingdom) [8939-6]

Coffee Break Sat 3:00 pm to 3:30 pm

SESSION 2

Location: Room 202 (Mezzanine) Sat 3:30 pm to 5:30 pm

Methods I

Session Chair: **Zhiwei Huang**, National Univ. of Singapore (Singapore)

3:30 pm: **Multimodal nano-bioprobes for imaging EGFR on single human cancer cells**, Lifu Xiao, Qifei Li, Anhong Zhou, The Utah State Univ. (USA) [8939-7]

3:50 pm: **New SERS: scattering enhanced Raman scattering**, Joel N. Bixler, Vladislav V. Yakovlev, Texas A&M Univ. (USA) [8939-8]

4:10 pm: **SERS-barcode colloidal gold NP assemblies as imaging agents for use in biodiagnostics**, Priyanka Dey, Queensland Univ. of Technology (Australia); William Olds, CPME, Queensland University of Technology (Australia); Idriss Blakey, The Univ. of Queensland (Australia); Kristofer J. Thurecht, The Australian Institute for Bioengineering and Nanotechnology (Australia); Emad L. Izake, CPME, Queensland University of Technology (Australia); Peter M. Fredericks, Queensland Univ. of Technology (Australia) [8939-9]

4:30 pm: **Application of online Fourier Transform CARS**, Tschackad Kamali, Boris Považay, Wolfgang Drexler, Angelika Unterhuber, Medizinische Univ. Wien (Austria) [8939-10]

4:50 pm: **Hyperspectral Raman imaging (HSRI) by active-illumination for molecular imaging**, Wei-Chuan Shih, Ji Qi, Jingting Li, Jing Lu, Univ. of Houston (USA) [8939-12]

5:10 pm: **A novel method for single bacteria identification by Raman spectroscopy**, Samy Andrea Strola, Emmanuelle Schultz, Rémi Perenon, CEA-LETI-Minatec (France); Anne-Catherine Simon, Isabelle Espagnon, Commissariat à l'Énergie Atomique (France); Cédric Allier, Patricia Claustre, Dorothée Jary, Jean-Marc Dinten, CEA-LETI-Minatec (France) [8939-13]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Here the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 3

Location: Room 202 (Mezzanine) . . . Sun 8:00 am to 10:00 am

Oncology I

Session Chair: **Rohit Bhargava**, Univ. of Illinois at Urbana-Champaign (USA)

8:00 am: **Classification of oral cancers using Raman spectroscopy of serum**, Aditi Sahu, Sneha Talathi, Sharada Sawant, C. Murali Krishna, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [8939-14]

8:20 am: **Label-free assessment of different acute myeloid leukemia subtypes using Raman spectroscopy**, Renzo Vanna, Fondazione Don Carlo Gnocchi (Italy) and Univ. Twente (Netherlands); Cristina Tresoldi, Fondazione San Raffaele del Monte Tabor (Italy); Aufried T. Lenferink, Univ. Twente (Netherlands); Paola Ronchi, Fondazione San Raffaele del Monte Tabor (Italy); Carlo Morasso, Dora Mehn, Marzia Bedoni, Chiara Pignatari, Fondazione Don Carlo Gnocchi (Italy); Leon W. M. M. Terstappen, Univ. Twente (Netherlands); Fabio Ciceri, Fondazione San Raffaele del Monte Tabor (Italy); Cees Otto, Univ. Twente (Netherlands); Furio Gramatica, Fondazione Don Carlo Gnocchi (Italy) . . . [8939-15]

8:40 am: **Vibrational imaging unveils the essential role of cholesterol accumulation in cancer proliferation**, Ji-Xin Cheng, Shuhua Yue, Purdue Univ. (USA) [8939-16]

9:00 am: **The use of confocal Raman microscopy to study the effects of phenothiazine derivatives in human colon cancer cells**, Shanti Rywkin, Borough of Manhattan Community College (USA); Hamideh Salehi, Frédéric J. G. Cuisinier, Univ. Montpellier 1 (France) [8939-17]

9:20 am: **Micro-Raman spectroscopy studies of changes in lipid composition in breast and prostate cancer cells treated with MPA and R1881 hormones**, Mariana C. Potcoava, Gregory Futia, Jessica Aughenbaugh, Isabel Schlaepfer, Emily A. Gibson, Univ. of Colorado Denver (USA) [8939-18]

9:40 am: **Investigating the biochemical progression of liver disease through fibrosis, cirrhosis, dysplasia, and hepatocellular carcinoma using Fourier transform infrared spectroscopic imaging**, Hari Sreedhar, Mamta Pant, Rohini Chennuri, Jacqueline Choi, Univ. of Illinois at Chicago (USA); Joaquin A. Herrera, Univ. of Wisconsin-Madison (USA); Ana C. Hinojosa, Andre Kajdacsy-Balla, Grace Guzman, Michael J. Walsh, Univ. of Illinois at Chicago (USA) [8939-19]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 4

Location: Room 202 (Mezzanine) . . . Sun 10:30 am to 11:50 am

Oncology II

Session Chair: **Jürgen Popp**,
Institut für Photonische Technologien e.V. (Germany)

10:30 am: **A pilot study on Raman mapping of normal and cancerous oral tissues**, Amuthachelvi Daniel, Aruna Prakasa Rao, Singaravelu Ganesan, Anna Univ. Chennai (India); Balu David M., Arignar Anna Memorial Cancer Hospital & Research Institute (India); Jayachandran S., Tamil Nadu Government Dental College & Hospital (India); Koteeswaran D., Meenakshi Ammal Dental College & Hospital (India) [8939-20]

10:50 am: **Combined information from Raman spectroscopy and optical coherence tomography for enhanced diagnostic accuracy in tissue discrimination**, Praveen C. Ashok, Bavishna B. Praveen, Nicola Bellini, Andrew Riches, Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Simon Herrington, Univ. of Dundee (United Kingdom) and Univ. of St Andrews (United Kingdom) [8939-21]

11:10 am: **Real-time depth-resolved fiber optic Raman endoscopy for in vivo diagnosis of gastric precancer**, Mads S. Bergholt, Wei Zheng, Khék Yu Ho, Khay Guan Yeoh, Ming Teh, Jimmy B. So, Zhiwei Huang, National Univ. of Singapore (Singapore) [8939-22]

11:30 am: **Performing independent validation of Raman spectroscopy for cervical precancer detection in vivo**, Christine Mary O'Brien, Vanderbilt Univ. (USA) [8939-23]

Lunch/Exhibition Break Sun 11:50 am to 1:00 pm

SESSION 5

Location: Room 202 (Mezzanine) Sun 1:00 pm to 3:00 pm

Applications Beyond Oncology

Session Chair: **Haishan Zeng**,
The BC Cancer Agency Research Ctr. (Canada)

1:00 pm: **The discriminate of fish egg quality and viability by using Raman spectroscopy**, Mika Ishigaki, Hidetoshi Sato, Kwansai Gakuin Univ. (Japan) [8939-24]

1:20 pm: **Monitoring the influence of antibiotic exposure using Raman spectroscopy**, O. Samek, P. Zemánek, S. Bernatová, J. Jezek, M. Šerý, P. Ják, M. Siler, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); F. Ružička, Faculty of Medicine and St. Anne's Faculty Hospital (Czech Republic) [8939-25]

1:40 pm: **Raman spectroscopic estimation of myocardial infarction**, Takeo Minamikawa, Nanae Muranishi, Yoshinori Harada, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan) [8939-26]

2:00 pm: **Endoscopy-coupled Raman spectroscopy for in vivo discrimination of inflammatory bowel disease**, Isaac J. Pence, Quyen T. Nguyen, Alan J. Herline, David A. Schwartz, Vanderbilt Univ. (USA); Xiaohong Bi, The Univ. of Texas Health Science Ctr. at Houston (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) [8939-27]

2:20 pm: **Mid-infrared laser spectroscopy in vivo**, Christian Vrancic, Niels Kröger, Stepan Dobrodey, Norbert Gretz, Sabine Neudecker, Annemarie Pucci, Wolfgang Petrich, Univ. of Heidelberg (Germany) [8939-28]

2:40 pm: **Fourier transform infrared spectroscopic imaging identifies early biochemical markers of tissue damage**, Vishal Varma, Samuel J. Ohlander, Peter Nguyen, Sujeeth Parthiban, Andre Kajdacsy-Balla, Univ. of Illinois at Chicago (USA); Blake Hannaford, Univ. of Washington (USA); Thomas Lendvay, Seattle Children's Hospital (USA); James M. Hotelling, The Univ. of Utah (USA); Michael J. Walsh, Univ. of Illinois at Chicago (USA) [8939-29]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 6

Location: Room 202 (Mezzanine) Sun 3:30 pm to 6:10 pm

Methods II

Session Chair: **Wolfgang Petrich**, Roche Diagnostics GmbH (Germany)

3:30 pm: **Multimodal fiber probe spectroscopy for tissue diagnostics applications: a combined Raman-fluorescence approach**, Riccardo Cicchi, National Institute of Optics (Italy); Susanna Rossari, Alessandro Sturiale, Univ. degli Studi di Firenze (Italy); Flavio Giordano, Azienda Ospedaliera Univ. Anna Meyer (Italy); Vincenzo De Giorgi, Vincenza Maio, Daniela Massi, Gabriella Nesi, Anna Maria Buccoliero, Francesco Tonelli, Univ. degli Studi di Firenze (Italy); Renzo Guerrini, Azienda Ospedaliera Univ. Anna Meyer (Italy); Nicola Pimpinelli, Univ. degli Studi di Firenze (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) [8939-30]

3:50 pm: **Quantitative fiber optic Raman spectroscopy for tissue Raman measurements**, Shiyamala Duraipandian, Mads S. Bergholt, Zhiwei Huang, Wei Zheng, National Univ. of Singapore (Singapore) [8939-31]

4:10 pm: **A low background Raman probe for optical biopsy of brain tissue**, Oliver A. C. Stevens, Univ. of Bristol (United Kingdom); Joanne Hutchings, Gloucestershire Royal Hospital (United Kingdom); William Gray, Cardiff Univ. (United Kingdom); John Day, Univ. of Bristol (United Kingdom) [8939-32]

4:30 pm: **Clinical Raman measurements under special ambient lighting illumination**, Jianhua Zhao, Michael Short, The BC Cancer Agency Research Ctr. (Canada); Thomas Braun, Verisante Technology, Inc. (Canada); Harvey Lui, The Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada) and The Univ. of British Columbia (Canada) [8939-33]

4:50 pm: **Application of the shifted excitation Raman difference spectroscopy (SERDS) to the analysis of trace amounts of methanol in red wines**, Boris Volodin, Sergei Dolgy, PD-LD, Inc. (United States); Davor Gracin, Krunoslav Juračić, Rucer Bošković Institute (Croatia) [8939-34]

5:10 pm: **Rapid hyperspectral imaging in the mid-infrared**, Niels Kröger, Alexander Egl, Maria Engel, Norbert Gretz, Katharina Haase, Iris Herpich, Sabine Neudecker, Annemarie Pucci, Wolfgang Petrich, Univ. of Heidelberg (Germany) [8939-35]

5:30 pm: **Flexible highly sensitive protected ATR FTIR fiber sensor from nanostructured silver halides for spectroscopic (500-4000 cm⁻¹) characterization of soft tissue in vivo**, Leonid N. Butvina, Alexey L. Butvina, Fiber Optic Research Ctr. (Russian Federation); Vladimir D. Bitzov, Medical Clinic 60 (Russian Federation); Eugeny M. Dianov, Fiber Optic Research Ctr. (Russian Federation); Ninel V. Lichkova, Institute of Microelectronics Technology and High Purity Materials (Russian Federation) [8939-36]

5:50 pm: **Understanding the TERS effect with on-line tunneling and force feedback using multiprobe AFM/NSOM with Raman integration**, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Rimma Dekhter, Patricia Hamra, Yossi Bar-David, Hesham Taha, Nanonics Imaging Ltd. (Israel) [8939-11]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

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Quantitative analysis of melamine by multi-way partial least squares model with two-dimensional near-infrared correlation spectroscopy, Ren-jie Yang, Rong Liu, Kexin Xu, Yanrong Yang, Tianjin Univ. (China) [8939-37]

IR spectroscopic studies of intercellular liquid as tool for cancer detection, Valdas Sablinskas, Milda Pucetaite, Vidita Ruboniene, Feliksas Jankevicius, Vilnius Univ. (Lithuania); Gerald Steiner, Technische Univ. Dresden (Germany) [8939-38]

Raman study of analysis for the states of maturation and the drug response of neural cell, Kosuke Hashimoto, Suguru N. Kudoh, Hidetoshi Sato, Kwansai Gakuin Univ. (Japan) [8939-39]

Raman spectroscopy study of thyroid tissues, Lazaro Medeiros, Renata A. Canevari, Univ. do Vale do Paraíba (Brazil); Andre B. O. Santos, Evandro S. de Mello, Lelaine G. Brandão, Univ. de São Paulo (Brazil); Airtón A. Martin, Univ. do Vale do Paraíba (Brazil) [8939-41]

Optical Biopsy XII

Conference Chairs: **Robert R. Alfano**, The City College of New York (USA);
Stavros G. Demos, Lawrence Livermore National Lab. (USA)

Program Committee: **Irving J. Bigio**, Boston Univ. (USA); **Nicole J. Crane**, Naval Medical Research Ctr. (USA);
Zhiwei Huang, National Univ. of Singapore (Singapore); **Amir Gandjbakhche**, National Institutes of Health (USA);
Israel Gannot, Tel Aviv Univ. (Israel); **Xiaohui Ni**, Harvard Univ. (USA); **Milind Rajadhyaksha**, Memorial Sloan-Kettering
 Cancer Ctr. (USA); **Kestutis Sutkus**, The City College of New York (USA); **Sebastian Wachsmann-Hogiu**, NSF Ctr. for
 Biophotonics Science and Technology (USA); **Siavash Yazdanfar**, GE Global Research (USA)

Conference Sponsors:



Tuesday 4 February

SESSION 1

Location: Room 309 (Esplanade) Tue 8:00 am to 10:00 am

Light Scattering Methods

Session Chair: **Israel Gannot**, Tel Aviv Univ. (Israel)

8:00 am: **Polarization-enhanced multispectral wide-field imaging for noninvasive in vivo assessment of collagen structures**, Xin Feng, Rakesh Patel, Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8940-1]

8:20 am: **Monitoring hemoglobin concentration of normal and malignant oral tissues using diffuse reflectance spectroscopy (DRS): an in vitro study**, Udayakumar Kanniyappan, Anna Univ. Chennai (India); Yuvaraj Manoharan, Anna Univ. Coimbatore (India); Prakasa Rao Aruna, Anna Univ. Chennai (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Munusamy Balu David, Government Arignar Anna Memorial Cancer Hospital and Regional Cancer Ctr. (India); Wilfred Prasanna Savarimuthu, Murugesan Suresh Kumar, Singaravelu Ganesan, Anna Univ. Chennai (India) [8940-2]

8:40 am: **Multifocal non-contact setup for depth sensitive fluorescence imaging of early epithelial cancer**, Caigang Zhu, Yi Hong Ong, Quan Liu, Nanyang Technological Univ. (Singapore) [8940-3]

9:00 am: **Experimental methods for recording stable NIRS measurements from upright alert infants**, Ashley Cannaday, James Goodwin, Brooke D. Beier, Andrew Berger, Univ. of Rochester (USA) [8940-4]

9:20 am: **Propagation and scattering of complex structured light in turbid scattering medium**, Alexander Doronin, Univ. of Otago (New Zealand); Giovanni Milione, The City College of New York (USA); Igor V. Meglinski, Univ. of Otago (New Zealand); Robert R. Alfano, The City College of New York (USA) [8940-5]

9:40 am: **Diffusing-wave polarimetry for tissue diagnostics**, Callum Macdonald, Adrian F. Pena, Alexander Doronin, Michael Eccles, Igor V. Meglinski, Univ. of Otago (New Zealand) [8940-6]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 2

Location: Room 309 (Esplanade) . . . Tue 10:30 am to 11:50 am

Microscopy Methods

Session Chair: **Stavros G. Demos**,
 Lawrence Livermore National Lab. (USA)

10:30 am: **Nonlinear microspectroscopy: a tool to discriminate between healthy skin and nonmelanoma skin cancer**, Sandro Heuke, Nadine Vogler, Tobias Meyer, Denis Akimov, Benjamin Dietzek, Institut für Photonische Technologien e.V. (Germany); Franziska Kluschke, Jürgen M. Lademann, Hans-Joachim Röwert-Huber, Charité Univ. Hospital Berlin (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany) [8940-7]

10:50 am: **Detecting breast cancer in single cells**, Xin Feng, Univ. of Massachusetts Lowell (USA); Yingying Huang, Massachusetts General Hospital (USA); Rakesh Patel, Dennis J. Wirth, Univ. of Massachusetts Lowell (USA); Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA); Anna N. Yaroslavsky, Univ. of Massachusetts Lowell (USA) [8940-8]

11:10 am: **Automated cellular pathology in noninvasive confocal microscopy**, Monica Ting, James Krueger, Daniel S. Gareau, The Rockefeller Univ. (USA) [8940-9]

11:30 am: **Classifying collagen remodeling and pathological lipid deposition by multimodal label-free microscopy and image statistics**, Leila B. Mostaco-Guidolin, Alex Ko, National Research Council Canada (Canada) and Univ. of Manitoba (Canada); Mark Hewko, National Research Council Canada (Canada); Masashi Shiomi, Kobe Univ. School of Medicine (Japan); Arkady Major, Univ. of Manitoba (Canada); Michael G. Sowa, National Research Council Canada (Canada) [8940-10]

Lunch Break Tue 11:50 am to 1:20 pm

SESSION 3

Location: Room 309 (Esplanade) Tue 1:20 pm to 3:00 pm

Raman Scattering Methods

Session Chair: **Zhiwei Huang**, National Univ. of Singapore (Singapore)

1:20 pm: **Brain metastasis detection by resonant Raman optical biopsy method**, Yan Zhou M.D., The General Hospital of the Air Force, PLA (China); Cheng-Hui Liu, The City College of New York (USA); Gangge Cheng, The General Hospital of the Air Force, PLA (China); Lixin Zhou M.D., Beijing Cancer Hospital (China); Chunyuan Zhang, Yang Pu, The City College of New York (USA); Zhongwu Li M.D., Beijing Cancer Hospital (China); Yulong Liu, Institute of Physics (China); Qingbo Li, Wei Wang, BeiHang Univ. (China); Robert R. Alfano, The City College of New York (USA) [8940-11]

1:40 pm: **Raman microspectroscopic study of oral buccal mucosa**, C. Murali Krishna, Isha Behl, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Hitesh Mangain, WITec GmbH (Germany); Atul Deshmukh, Lekha Kukreja, Arti R. Hole, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [8940-12]

2:00 pm: **In vivo Raman spectroscopy of cervix cancers**, Priyanka P. Sathe, Tapas Dora, Supriya Chopra, Advanced Ctr. for Treatment, Research & Education in Cancer (India); Amita Maheshwari, Tata Memorial Hospital (India); C. Murali Krishna, Rubina S. Shaikh, Advanced Ctr. for Treatment, Research & Education in Cancer (India) [8940-13]

2:20 pm: **Fast reconstruction of Raman spectra from wide-band measurements of Raman signals with fluorescence background**, Shuo Chen, Xiaoqian Lin, Quan Liu, Nanyang Technological Univ. (Singapore) [8940-14]

2:40 pm: **Characterization of urine of normal subjects and oral cancer patients by Raman spectroscopy**, Brindha Elumalai, Aruna Prakasa Rao, Anna Univ. Chennai (India); Balu David Munusamy, Government Arignar Anna Memorial Cancer Hospital and Regional Cancer Ctr. (India); Koteeswaran Dornadula, Meenakshi Ammal Dental College and Hospital (India); Singaravelu Ganesan, Anna Univ. Chennai (India) [8940-15]

Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 4

Location: Room 309 (Esplanade) Tue 3:30 pm to 5:30 pm

Fluorescence Methods

Session Chairs: **Wubao Wang**, The City College of New York (USA);
Yang Pu, The City College of New York (USA)

3:30 pm: **Autofluorescence lifetime metrology for label-free detection of cartilage matrix degradation**, Mohammad B. Nickdel, Univ. of Oxford (United Kingdom); Joao Lagarto, Douglas J. Kelly, Hugh B. Manning, Imperial College London (United Kingdom); Kazuhiro Yamamoto, Univ. of Oxford (United Kingdom); Clifford B. Talbot, Christopher Dunsby, Paul M. W. French, Imperial College London (United Kingdom); Yoshifumi Itoh, Univ. of Oxford (United Kingdom) [8940-16]

3:50 pm: **Experimental validation of Monte Carlo modeling of depth sensitive fluorescence illumination and detection configurations in skin tissues**, Yi Hong Ong, Caigang Zhu, Quan Liu, Nanyang Technological Univ. (Singapore) [8940-17]

4:10 pm: **Cervical precancer detection with polarized light based hand held device**, Bharat L. Meena, Indian Institute of Technology Kanpur (India); Chayanika Pantola, GSVM Medical College Kanpur (India); Asha Agarwal, Kiran Pandey, Ganesh Shanker Vidhyarthi Memorial Medical College (India); Asima Pradhan, Indian Institute of Technology Kanpur (India) [8940-18]

4:30 pm: **Stoke's shift spectral features of blood plasma and urine of bladder cancer patients**, Mohamad Saleh AlSalhi, S. Devanesan, Muhammad Atif, Vadivel Masilamani, King Saud Univ. (Saudi Arabia); Karim H. Farhat, Danny Rabah, King Khalid Univ. Hospital (Saudi Arabia) [8940-19]

4:50 pm: **Noninvasive diagnosis of oral cancer by Stokes shift spectroscopy**, Jeyasingh Ebenezar, Jamal Mohamed College (India); Singaravelu Ganesan, Aruna Prakasrao, Anna Univ. Chennai (India); Radhakrishnan Muralinaidu, Ragas Dental College (India) and Annamalai Univ. (India) [8940-20]

5:10 pm: **Fluorescence spectroscopy of tongue malignancy**, Santhosh Chidangil, Ajeetkumar Patil, Unnikrishnan N. V. V., Keerthilatha M. Pai, Ravikiran Ongole, Vasudevan B. Kartha, Manipal Univ. (India). [8940-21]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. This session will also feature posters from select BIOS conferences. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Tumor margin detection using optical biopsy techniques, Yan Zhou M.D., The General Hospital of the Air Force, PLA (China); Cheng-Hui Liu, The City College of New York (USA); Jiyou Li M.D., Zhongwu Li M.D., Lixin Zhou M.D., Ke Chen M.D., Beijing Cancer Hospital (China); Yang Pu, The City College of New York (USA); Yong He, Beijing Normal Univ. (China); Ke Zhu, Institute of Physics (China); Qingbo Li, Beihang Univ. (China); Robert R. Alfano, The City College of New York (USA). [8940-42]

Investigation of relative content of tryptophan for monitoring breast cancer aggressiveness by native fluorescence spectroscopy, Lin Zhang, Yang Pu, The City College of New York (USA); Jianpeng Xue, China Pharmaceutical Univ. (China); Sebastião Pratavieira, Univ. de São Paulo (Brazil); Sammuell Achilefu, Washington Univ. in St. Louis (USA); Robert R. Alfano, The City College of New York (USA). [8940-41]

Spatial Fourier frequency statistics analysis of human cervix precancer tissues, Yang Pu, The City College of New York (USA); Jaidip M. Jagtap, Asima Pradhan, Indian Institute of Technology Kanpur (India); Robert R. Alfano, The City College of New York (USA). [8940-40]

Enhancing the depth of tissue microscope imaging using two-photon exciting of the second singlet state of fluorescent agents, Yang Pu, Lingyan Shi, The City College of New York (USA); Sebastião Pratavieira, Univ. de São Paulo (Brazil); Robert R. Alfano, The City College of New York (USA). [8940-39]

Wednesday 5 February

SESSION 5

Location: Room 309 (Esplanade) . . . Wed 8:00 am to 10:00 am

Novel Methods and Instrumentation I

Session Chair: **Anna N. Yaroslavsky**, Univ. of Massachusetts Lowell (USA)

8:00 am: **Quantitative photonic pathology for cancer diagnosis and prognosis**, Michael Reilly, Kyle Scherer, Fairfield Univ. (USA); Yongchao Ge, Mount Sinai School of Medicine (USA); Jonathan Melamed, New York Univ. Langone Medical Ctr. (USA); Min Xu, Fairfield Univ. (USA). [8940-22]

8:20 am: **Quantitative wavelength-dependent measurement of contrast in NIR and extended NIR spectral range (650-1500 nm) in biological phantoms**, Daniel Salo, David M. Kim, Mikhail Y. Berezin, Washington Univ. School of Medicine in St Louis (USA). [8940-23]

8:40 am: **Parametric study of different contributors to tumor thermal profiles**, Michal Tepper, Asaf Shoval, Israel Gannot, Tel Aviv Univ. (Israel) [8940-24]

9:00 am: **Optical characterization of ex-vivo axillary lymph nodes of breast cancer patients using a custom-built spectrophotometer**, Ashwin Sampathkumar, Riverside Research Institute (USA); Emi Saegusa-Beercroft, Univ. of Hawai'i Kuakani Medical Ctr. (USA); Jonathan Mamou, Parag V. Chitnis, Ernest J. Feleppa, Riverside Research Institute (USA). [8940-25]

9:20 am: **Enhanced visualization of the bile duct via parallel white light and ICG fluorescence laparoscopic imaging**, Stavros G. Demos, Lawrence Livermore National Lab. (USA); Shiro Urayama, UC Davis Health System (USA). [8940-26]

9:40 am: **Time-resolved fluorescence imaging to characterize the cancer specific biomarkers**, Yasaman Ardeshirpour, Victor Chernomordik, National Institutes of Health (USA); Moinuddin Hassan, National Institute of Child Health & Human Dev. (USA); Rafal Zielinski, Jacek Capala, National Cancer Institutes (USA); Amir Gandjbakhche, National Institute of Child Health & Human Dev (USA). [8940-27]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 6

Location: Room 309 (Esplanade) . . Wed 10:30 am to 11:50 am

Novel Methods and Instrumentation II

Session Chair: **Stavros G. Demos**, Lawrence Livermore National Lab. (USA)

10:30 am: **Polarization-enhanced reflectance continuous wave terahertz and optical imaging for delineating nonmelanoma skin cancers in fresh excisions**, Anna N. Yaroslavsky, Rakesh Patel, Robert Giles, Cecil Joseph, Univ. of Massachusetts Lowell (USA); Victor Neel, Massachusetts General Hospital (USA). [8940-28]

10:50 am: **Measurement of fluorescent probes concentration ratio in the cerebrospinal fluid for early detection of Alzheimer's disease**, Osnat Harbater, Israel Gannot, Tel Aviv Univ. (Israel). [8940-29]

11:10 am: **Third therapeutic spectral window for deep tissue imaging**, Laura A. Sordillo, Sebastião Pratavieira, Yang Pu, Kaliris Salas-Ramirez, Lin Zhang, Robert R. Alfano, The City College of New York (USA). [8940-30]

11:30 am: **Spectral discrimination of blood components of thalassemia and iron deficiency anemia in adult patients**, Vadivel Masilamani, Mohamad Saleh AlSalhi, S. Devanesan, King Saud Univ. (Saudi Arabia); K. Perinbam, Government Arts College Nandanam (India); M. Ravikumar, Government Arts college Nandanam (India); Siddanna Palled, Kidwai Memorial Institute of Oncology (India). [8940-31]

Lunch Break Wed 11:50 am to 1:30 pm

SESSION 7

Location: Room 309 (Esplanade) . . . Wed 1:30 pm to 5:30 pm

**Anniversary Session:
45 Years of Supercontinuum Generation**

Session Chairs: **Robert A. Fisher**, RA Fisher Associates, LLC (USA);
Robert W. Boyd, Univ. of Ottawa (Canada)

1:30 pm: **Ultimate ultrafast white light's first observations: early discovery circa 1970** (*Invited Paper*), Robert R. Alfano, The City College of New York (USA) [8940-32]

2:00 pm: **Evolution of the supercontinuum source** (*Invited Paper*), James Roy Taylor, Imperial College London (United Kingdom) [8940-33]

2:30 pm: **Supercontinuum generation in optical fibers and its biomedical applications** (*Invited Paper*), Govind P. Agrawal, Univ. of Rochester (USA). . [8940-34]

3:00 pm: **White light for the fast lane: supercontinuum generation in all-normal dispersion fibers for ultrafast photonics** (*Invited Paper*), Alexander M. Heidt, Univ. of Southampton (United Kingdom) [8940-35]


Coffee Break Wed 3:30 pm to 4:00 pm


4:00 pm: **Supercontinuum generation in microstructure fiber at the advent of femtosecond combs** (*Invited Paper*), Steven T. Cundiff, JILA (USA) [8940-36]

4:30 pm: **Collapsing light really shines** (*Invited Paper*), Alexander L. Gaeta, Cornell Univ. (USA). [8940-37]


5:00 pm: **Cross-phase modulation in optical Kerr media: from early discovery works to recent all-optical applications** (*Invited Paper*), Patrice L. Baldeck, Univ. Joseph Fourier (France). [8940-38]


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Optical Interactions with Tissue and Cells XXV

Conference Chairs: **E. Duco Jansen**, Vanderbilt Univ. (USA); **Robert J. Thomas**, Air Force Research Lab. (USA)

Program Committee: **Randolph Glickman**, The Univ. of Texas Health Science Ctr. at San Antonio (USA); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Beop-Min Kim**, Korea Univ. (Korea, Republic of); **Duncan J. Maitland**, Texas A&M Univ. (USA); **Jessica C. Ramella-Roman**, The Catholic Univ. of America (USA); **William P. Roach**, Air Force Office of Scientific Research (USA); **Marissa Nicole Rylander**, Virginia Polytechnic Institute and State Univ. (USA); **Alfred Vogel**, Univ. zu Lübeck (Germany); **Gerald J. Wilmink**, Air Force Research Lab. (USA)

Monday 3 February

SESSION 1

Location: Room 238 (Mezzanine) . . . Mon 8:30 am to 10:00 am

Anniversary Session: 25 Years of Laser-Tissue Interaction I

Session Chair: **E. Duco Jansen**, Vanderbilt Univ. (USA)

8:30 am: **Erbium laser tissue interaction: from bench to bedside** (*Invited Paper*), Martin Frenz, Univ. Bern (Switzerland) [8941-1]

9:00 am: **Photons kill, cure, and diagnose: what's next?** (*Invited Paper*), Joseph T. Walsh Jr., Northwestern Univ. (USA) [8941-2]

9:30 am: **From cooking egg whites to gold nano-particles: a 25 year journey** (*Invited Paper*), Massoud Motamedi, The Univ. of Texas Medical Branch (USA) [8941-3]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 238 (Mezzanine) . . Mon 10:30 am to 12:30 pm

Anniversary Session: 25 Years of Laser-Tissue Interaction II

Session Chair: **Steven L. Jacques**, Oregon Health & Science Univ. (USA)

10:30 am: **Enhanced imaging techniques for research and education of medical professionals: playing "Mythbuster" for 25 years** (*Invited Paper*), Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands); Tjeerd de Boorder, Herke Jan Noordmans, John H. G. M. Klaessens, Univ. Medical Ctr. Utrecht (Netherlands); Albert J. Van der Veen, Vrije Univ. Medical Ctr. (Netherlands) [8941-4]

11:00 am: **Laser surgery to imaging to image-guided surgery in 25 years** (*Invited Paper*), Joseph A. Izatt, Duke Univ. (USA) [8941-5]

11:30 am: **PDT: Back to the future (25 years of follies and fortunes)** (*Invited Paper*), Tayyaba Hasan, Massachusetts General Hospital (USA); David H. Kessel, Wayne State Univ. (USA) [8941-6]

12:00 pm: **Photofrin as a gateway drug: how PDT can lead to hardcore tissue optics and obsession with oxygen metabolism** (*Invited Paper*), Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8941-7]

Lunch Break Mon 12:30 pm to 2:10 pm

SESSION 3

Location: Room 238 (Mezzanine) Mon 2:10 pm to 3:30 pm

Photomechanical Effects

Session Chair: **Robert J. Thomas**, Air Force Research Lab. (USA)

2:10 pm: **Melanin microcavitation threshold in the near-infrared**, Morgan S. Schmidt, Benjamin A. Rockwell, Robert J. Thomas, Paul K. Kennedy, Andrew W. Wharmby, Air Force Research Lab. (USA); Kurt J. Schuster, Gary D. Noojin, TASC, Inc. (USA) [8941-8]

2:30 pm: **New techniques for imaging pressure waves induced by pulsed lasers**, Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands) . . . [8941-9]

2:50 pm: **Focusing of photomechanical waves with an optical lens for depth-targeted molecular delivery**, Takuichirou Shimada, Keio Univ. (Japan); Shunichi Sato, Satoko Kawachi, Hiroshi Ashida, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan) [8941-10]

3:10 pm: **Analysis of thermal effects in endoscopic nanocarriers-based photodynamic therapy applied to esophageal diseases**, Irene Salas-Garcia, Félix Fanjul-Vélez, Noé Ortega-Quijano, Univ. de Cantabria (Spain); Otakar Wilfert, Lucie Hudcová, Juraj Poliak, Peter Barcik, Brno Univ. of Technology (Czech Republic); José Luis Arce-Diego, Univ. de Cantabria (Spain) . . . [8941-12]

Coffee Break Mon 3:30 pm to 4:00 pm

SESSION 4

Location: Room 238 (Mezzanine) Mon 4:00 pm to 5:20 pm

Ultrafast Pulse Laser Interactions

Session Chair: **William P. Roach**, Air Force Office of Scientific Research (USA)

4:00 pm: **Pulse-to-pulse interaction analysis and parameter optimization for future-generation ophthalmic laser systems**, Nadine Tinne, Brigitte Kaune, Sebastian Bleeker, Laser Zentrum Hannover e.V. (Germany); Holger Lubatschowski, Rowiak GmbH (Germany); Alexander Krueger, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany) [8941-13]

4:20 pm: **Simultaneously digital-holographic analysis during femtosecond laser-induced photodisruption in ocular tissue and material by using a pump-probe configuration**, Emanuel Saerchen, Kevin Biessy, Rowiak GmbH (Germany); Björn Kemper, Univ. of Münster (Germany); Holger Lubatschowski, Rowiak GmbH (Germany) [8941-14]

4:40 pm: **Comparison of human serum and bovine serum albumins on oxidation dynamics induced by talaporfin sodium photosensitization reaction with albumin rich conditions: solution experiments**, Mariko Kurotsu, Tetsuya Nakamura, Mei Takahashi, Emiyu Ogawa, Tsunenori Arai, Keio Univ. (Japan) [8941-15]

5:00 pm: **Human cadaver retina model for retinal heating during corneal surgery with a femtosecond laser**, Hui Sun, Zhongwei Fan, Jin Yun, Tianzhao Zhao, Ying Yan, Academy of Opto-Electronics (China); Ron M Kurtz, Tibor Juhasz, University of California Irvine (USA) [8941-16]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Objective fitting of hemoglobin dynamics in traumatic bruises based on temperature depth profiling, Luka Vidovic, Matija Milanić, Boris Majaron, Jožef Stefan Institute (Slovenia) [8941-37]

Characterization of a chamber for ultraviolet irradiation of biomolecules and monitoring of structural changes by Raman spectroscopy, Viviane G. Borio, Adjaci U. Fernandes, Landulfo Silveira Jr., Univ. Camilo Castelo Branco (Brazil) [8941-38]

The effect of picosecond laser pulses on redox-dependent processes in mice red blood cells studied in vivo, Olga Voronova, Tatyana Gening, Tatyana Abakumova, Ulyanovsk State Univ. (Russian Federation); Alexey Sysolyatin, A. M. Prokhorov General Physics Institute (Russian Federation); Igor Zolotovskiy, Inna Antoneeva, Vladimir A. Ostatochnikov, Snezhanna Gening, Ulyanovsk State Univ. (Russian Federation) [8941-39]

Scattering coefficients of cancerous and normal human prostate tissues in near infrared range, Kenneth J. Zhou, Stony Brook Univ. (USA); Lin Wang, Columbia Univ. Medical Ctr. (USA) and Kunmin Medical College (China) [8941-41]

Optimization of the interstitial PDT light dosimetry, Mirian M. Stringasci, Thereza C. Fortunato, Lilian T. Moriyama, Vanderlei S. Bagnato, Cristina Kurachi, Univ. de São Paulo (Brazil)[8941-42]

Monte Carlo simulation of coral tissue optics, Daniel Wangpraseurt, Univ. of Technology, Sydney (Australia); Steven L. Jacques, Oregon Health & Science Univ. (USA); Michael Kühl, Univ. of Copenhagen (Denmark)[8941-43]

Identification of optimal wavelengths to improve broadband optical thermometry, Mohammad Fazel Bakhsheshi, The Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada) and Robarts Research Institute (Canada); Mamadou Diop, Lawson Health Research Institute (Canada); Keith St. Lawrence, Ting-Yim Lee, Lawson Health Research Institute (Canada) and The Univ. of Western Ontario (Canada) and Robarts Research Institute (Canada)[8941-44]

Experimental validation of Monte Carlo simulators of light transport through tissue phantoms, Aedán Eanrán Breathnach, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland)[8941-45]

Opto-thermal interaction of porcine intestinal tissue with 808-nm laser in endoscopic submucosal dissection, Seongjun Kim, Kookmin Univ. (Korea, Republic of); Jaesoon Choi, Asan Medical Ctr. (Korea, Republic of) and Univ. of Ulsan (Korea, Republic of); Don Haeng Lee, Inha Univ. (Korea, Republic of) and Utah-Inha DDS & Advanced Therapeutics Research Ctr. (Korea, Republic of); Jung Kyung Kim, Kookmin Univ. (Korea, Republic of)[8941-46]

Application of the 1940-nm thulium fiber laser in stereotaxic surgery, Burcu Tunç, Tuba Akgül, Murat Gülsoy, Bogaziçi Üniv. (Turkey)[8941-47]

The photothermal effects of 1940-nm thulium fiber laser on cortical tissue: in vivo dosimetry study, Burcu Tunç, Tuba Akgül, Murat Gülsoy, Bogaziçi Üniv. (Turkey)[8941-48]

Laser-induced fluorescence spectroscopy in tissue local necrosis detection, Zdenek Buchta, Adam Lesundak, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); MD. A. Randula, Masaryk Univ. (Czech Republic); Bretislav Mikel, Josef Lazar, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); MD L. Verková, Masaryk Univ. (Czech Republic); Ondrej Cip, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic)[8941-50]

Tuesday 4 February

SESSION 5

Location: Room 238 (Mezzanine) Tue 8:20 am to 10:00 am

Photothermal Effects

Session Chair: **E. Duco Jansen**, Vanderbilt Univ. (USA)

8:20 am: **Consolidated numerical temperature/pressure modelling to assess the accuracy of optoacoustic temperature determination during retinal photocoagulation**, Alexander Baede, Kerstin Schlott, Medizinisches Laserzentrum Lübeck GmbH (Germany); Reginald Birngruber, Univ. zu Lübeck (Germany); Ralf Brinkmann, Medizinisches Laserzentrum Lübeck GmbH (Germany)[8941-17]

8:40 am: **Observation of changes in membrane fluidity after infrared laser stimulation using a polarity-sensitive fluorescent probe**, Maria A. Troyanova-Wood, Texas A&M Univ. (USA); Joshua D. Musick, Bennett L. Ibey, Robert J. Thomas, Hope Thomas Beier, Air Force Research Lab. (USA)[8941-18]

9:00 am: **Thermal and damage data from multiple microsecond pulse trains at 532 nm in an in vitro retinal model**, Michael L. Denton, Gary D. Noojin, TASC, Inc. (USA); Amanda J. Tijerina, Conceptual MindWorks, Inc. (USA); Cherry C. Castellanos, TASC, Inc. (USA); Sarah J. Boukhris, The Univ. of Texas at San Antonio (USA); Benjamin A. Rockwell, Robert J. Thomas, Air Force Research Lab. (USA)[8941-19]

9:20 am: **Semi-dynamical cryo-imaging study of laser- tissue vaporization and coagulation process**, Hui Wang, Thuy Nguyen, Danop Rajabhandharaks, Aditi Ray, Ray Chia, Tom Hasenberg, American Medical Systems (USA) [8941-20]

9:40 am: **Acute cell death rate of vascular smooth muscle cells during or after short heating up to 20 s ranging 50 to 60°C as a basic study of thermal angioplasty**, Machiko Shinozuka, Natsumi Shimazaki, Emiyu Ogawa, Naoki Machida, Tsunenori Arai, Keio Univ. (Japan)[8941-21]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 6

Location: Room 238 (Mezzanine) . . . Tue 10:30 am to 11:50 am

Imaging and Dosimetry

Session Chair: **Robert J. Thomas**, Air Force Research Lab. (USA)

10:30 am: **Reconstruction of double tumors in vivo based on the fluorescence molecular tomography**, Yingjie Ni, Zhejiang Normal Univ. (China); Jie Tian, Institute of Automation (China); Jianmin Zhao, Zhejiang Normal Univ. (China); Qian Zhang, Xidian Univ. (China); Yu An, Han Xu, Beijing Jiaotong Univ. (China); Chongwei Chi, Yang Du, Institute of Automation (China); Xinzhong Zhu, Zhejiang Normal Univ. (China)[8941-22]

10:50 am: **Optically clearing tissue as an initial step for 3D imaging of core biopsies to diagnose pancreatic cancer**, Ronnie Das, Univ. of Washington (USA); Aishwarya Agrawal, Indian Institute of Technology Gandhinagar (India); Melissa P. Upton, Eric J. Seibel, Univ. of Washington (USA)[8941-23]

11:10 am: **Effect of an integrating sphere measurement in the distortion of a laser pulse propagating through a turbid medium**, Beatriz Morales Cruzado, Francisco G. Perez-Gutierrez, Dirk Frederik De Lange, Ricardo Romero-Méndez, Univ. Autónoma de San Luis Potosí (Mexico)[8941-24]

11:30 am: **Adaptive focus for deep tissue using diffuse backscatter**, Jeremy Kress, Kambiz Pourrezaei, Drexel Univ. (USA)[8941-25]

Lunch/Exhibition Break Tue 11:50 am to 1:20 pm

SESSION 7

Location: Room 238 (Mezzanine) Tue 1:20 pm to 2:20 pm

Numerical Methods and Theory

Session Chair: **Robert J. Thomas**, Air Force Research Lab. (USA)

1:20 pm: **Development of a simulation toolbox for predicting light distribution in rat brain tissue during optical stimulation**, Mehdi Azimpour, Ryan Baumgartner, Univ. of Wisconsin-Milwaukee (USA); Yuming Liu, Univ. of Wisconsin-Madison (USA); Amy L. Kaczmarowski M.D., Univ. of Wisconsin-Milwaukee (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA); Kevin Eliceiri, Univ. of Wisconsin-Madison (USA); Ramin Pashaie, Univ. of Wisconsin-Milwaukee (USA)[8941-26]

1:40 pm: **Theory and experiments on time-resolved reflectance from adult heads for functional tomographic imaging of brain activities**, Tadatoshi Tanifuji, Masahiro Suzuki, Kitami Institute of Technology (Japan)[8941-27]

2:00 pm: **Absorption, thermal diffusion and specular reflection, Monte Carlo-based study on human skin using a multi-wavelength pulsed fiber laser for acupuncture applications**, Solange I. Rivera-Manrique, Ctr. de Investigación e Innovación Tecnológica (Mexico); Steven L. Jacques, Oregon Health & Science Univ. (USA); José A. Alvarez-Chávez, Ctr. de Investigación e Innovación Tecnológica (Mexico)[8941-28]

SESSION 8

Location: Room 238 (Mezzanine) Tue 2:20 pm to 3:40 pm

Photochemical Effects

Session Chair: **Randolph Glickman**,

The Univ. of Texas Health Science Ctr. at San Antonio (USA)

2:20 pm: **Photoinduced structural changes to protein kinase A**, Sarah C. Rozinek, Lorenzo Brancalone, The Univ. of Texas at San Antonio (USA) [8941-29]

2:40 pm: **Immediate response of Ca²⁺ concentration in myocardial cells against oxidation stress by extracellular photosensitization reaction using Talaporfin sodium for the arrhythmia treatment application.**, Emiyu Ogawa, Mei Takahashi, Arisa Ito, Tsunenori Arai, Keio Univ. (Japan)[8941-30]

3:00 pm: **Photosensitization reaction along depth of a culture well with high concentration of talaporfin sodium for extra-cellular photodynamic therapy study**, Masahiro Yajima, Hiroshige Kawakami, Emiyu Ogawa, Mei Takahashi, Tsunenori Arai, Keio Univ. (Japan)[8941-31]

3:20 pm: **Laser based intracellular drug delivery with endocytosed peptide-conjugated gold nanoparticles**, Judith Krawinkel, Friedrich-Schiller-Universität Jena (Germany); U. Richter, M. L. Torres-Mapa, B. Tumursukh, Friedrich-Schiller-Universität Jena (Germany); Lisa Gamrad, Christoph Rehbock, Univ. Duisburg-Essen (Germany); H. Murua Escobar, Univ. Rostock (Germany); Anaclet Ngezahayo, Leibniz Univ. Hannover (Germany); Stephan Barcikowski, Univ. Duisburg-Essen (Germany); Alexander Heisterkamp, Friedrich-Schiller-Universität Jena (Germany)[8941-49]

Coffee Break Tue 3:40 pm to 4:00 pm

Conference 8941A · Location: Room 238 (Mezzanine)

SESSION 9

Location: Room 238 (Mezzanine) Tue 4:00 pm to 5:40 pm

Optical Properties of Tissues

Session Chair: **Jessica C. Ramella-Roman**,
The Catholic Univ. of America (USA)

4:00 pm: **The optical properties of whole blood: a critical review and theoretical approach**, Nienke Bosschaart, Gerda J. Edelman, Maurice C. G. Aalders, Ton G. van Leeuwen, Dirk J. Faber, Univ. van Amsterdam (Netherlands) [8941-32]

4:20 pm: **Absorption spectroscopy of melanin in fresh tissue sections from pigmented lesions**, Barukh Rohde, Israel Coats, James Krueger, Daniel S. Gareau, The Rockefeller Univ. (USA) [8941-33]

4:40 pm: **Optical properties of human tissues in 400-2500 nm spectral range**, Matija Milanič, Norwegian Univ. of Science and Technology (Norway); Ivar Skjåk Nordrum, St. Olavs Hospital (Norway); Lise Lyngsnes Randeberg, Norwegian Univ. of Science and Technology (Norway) [8941-34]

5:00 pm: **Determination of light scattering properties of thin slices of epithelial tissue based on three-dimensional refractive index mappings of the tissue slices**, Jing-Wei Su, Wei-Chen Hsu, Kung-Bin Sung, National Taiwan Univ. (Taiwan) [8941-35]

5:20 pm: **Optical signature of multiCellular tumor spheroid using index-mismatch- induced spherical aberrations**, Corinne Lorenzo, Gwenaële Le Corre, Pierre Weiss, Bernard Ducommun, Institut des Technologies Avancées en Sciences du Vivant, CNRS (France) [8941-36]

Terahertz and Ultrashort Electromagnetic Pulses for Biomedical Applications

Conference Chairs: **Gerald J. Wilmink**, Air Force Research Lab. (USA); **Bennett L. Ibey**, Air Force Research Lab. (USA)

Program Committee: **Hope Thomas Beier**, Air Force Research Lab. (USA); **Benjamin P. Born**, Weizmann Institute of Science (Israel); **Patrick Bradshaw**, Air Force Office of Scientific Research (USA); **Elliott R. Brown**, Wright State Univ. (USA); **Ibtissam Echchgadda**, Air Force Research Lab. (USA); **Yuri Feldman**, The Hebrew Univ. of Jerusalem (Israel); **Gian Piero Gallerano**, ENEA (Italy); **Martina Havenith**, Ruhr-Univ. Bochum (Germany); **Peter Uhd Jepsen**, DTU Fotonik (Denmark); **Kodo Kawase**, Nagoya Univ. (Japan); **Martin Koch**, Philipps-Univ. Marburg (Germany); **Richard Nuccitelli**, BioElectroMed Corp. (USA); **Gun-Sik Park**, Seoul National Univ. (Korea, Republic of); **Emma Pickwell-MacPherson**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **William P. Roach**, Air Force Office of Scientific Research (USA); **Peter H. Siegel**, Jet Propulsion Lab. (USA); **Joo-Hiuk Son**, The Univ. of Seoul (Korea, Republic of); **Koichiro Tanaka**, Kyoto Univ. (Japan); **Robert J. Thomas**, Air Force Research Lab. (USA); **Paul Thomas Vernier**; **Shu Xiao**, Old Dominion Univ. (USA); **Hao Xin**, The Univ. of Arizona (USA)

Sunday 2 February

KEYNOTE SESSION

Location: Room 238 (Mezzanine) 8:00 am to 9:00 am

Session Chair: **Gerald J. Wilmink**, Air Force Research Lab. (USA)

8:00 am: **THz impulse radar for biomedical sensing** (*Keynote Presentation*), Elliott R. Brown, Wright State Univ. (USA); Shijun Sung, Warren S. Grundfest M.D., Zachary D. Taylor, Univ. of California, Los Angeles (USA) . . . [8941-49]

8:30 am: **Investigation of the Frohlich hypothesis with high intensity terahertz radiation** (*Keynote Presentation*), Peter Weightman, Univ. of Liverpool (United Kingdom) [8941-65]

SESSION 10

Location: Room 238 (Mezzanine) Sun 9:00 am to 10:30 am

Terahertz Technologies I

Session Chair: **Gerald J. Wilmink**, Air Force Research Lab. (USA)

9:00 am: **Effect of intense THz pulses on expression of genes associated with skin cancer and inflammatory skin conditions** (*Invited Paper*), Lyubov V. Titova, Ayesheshim K. Ayesheshim, Univ. of Alberta (Canada); Andrey Golubov, Rocio Rodriguez-Juarez, Rafal Woycicki, Univ. of Lethbridge (Canada); Frank A. Hegmann, Univ. of Alberta (Canada); Olga Kovalchuk, Univ. of Lethbridge (Canada) [8941-50]

9:20 am: **State-of-the-art exposure chamber for highly controlled and reproducible THz biological effects studies**, Cesario Z. Cerna, General Dynamics Advanced Information Systems (USA); David P. Elam, Air Force Research Lab. (USA); Ibtissam Echchgadda, Mark A. Sloan, General Dynamics Advanced Information Systems (USA); Gerald J. Wilmink, Air Force Research Lab. (USA) [8941-64]

9:40 am: **The potential of THz radiation to perturb and manipulate biological function**, George Peter Swift, Andrew J. Gallant, Durham Univ. (United Kingdom); G. J. Sharples, Durham Univ. (USA); John Martyn Chamberlain, Durham Univ. (United Kingdom) [8941-63]

10:00 am: **Terahertz spectroscopy for classification of burn wounds in a standardized porcine model** (*Invited Paper*), M. Hassan Arbab, Samuel C. Henry, Adelaide Warsen, Dale P. Winebrenner, Abbi M. McClintic, Anne M. Hocking, Nicholas Shubin, Saman Arbabi M.D., Univ. of Washington (USA) [8941-52]

Coffee Break Sun 10:30 am to 11:00 am

SESSION 11

Location: Room 238 (Mezzanine) . . . Sun 11:00 am to 12:20 pm

Terahertz Technologies II

Session Chair: **Gerald J. Wilmink**, Air Force Research Lab. (USA)

11:00 am: **Multimodal terahertz pulsed and polarization optical imaging for delineating nonmelanoma skin cancers**, Anna Yaroslavsky, Univ. of Massachusetts Lowell (USA) and Massachusetts General Hospital, Boston, MA (USA); Melissa Spencer, Univ. of Massachusetts Lowell (USA); Maxim Evdokimov, Teraimaging Inc. (USA); Alexander P. Shkurinov, Lomonosov Moscow State Univ. (Russian Federation); Victor Neel, Massachusetts General Hospital (USA) [8941-53]

11:20 am: **Portable terahertz spectroscopy system for the noninvasive assessment of skin burn severity**, Mark A. Sloan, Cesario Z. Cerna, General Dynamics Advanced Information Systems (USA); David P. Elam, Air Force Research Lab. (USA); Ibtissam Echchgadda, General Dynamics Advanced Information Systems (USA); David M. Burmeister, Robert J. Christy, U.S. Army Institute of Surgical Research (USA); Gerald J. Wilmink, Air Force Research Lab. (USA) [8941-54]

11:40 am: **In vivo analysis of cellular-level inflammatory response induced by pulsed THz irradiation**, Yoonha Hwang, KAIST (Korea, Republic of); Jungho Mun, Korea Atomic Energy Research Institute (Korea, Republic of); Jinhyo Ahn, KAIST (Korea, Republic of); Sangyoon Bae, Young Uk Jeong, Korea Atomic Energy Research Institute (Korea, Republic of); Pilhan Kim, KAIST (Korea, Republic of) [8941-55]

Lunch Break Sun 12:20 pm to 1:20 pm

SESSION 12

Location: Room 238 (Mezzanine) Sun 1:20 pm to 3:40 pm

nsEP Applications

Session Chair: **Gerald J. Wilmink**, Air Force Research Lab. (USA)

1:20 pm: **TBA** (*Invited Paper*), P. Thomas Vernier, The Univ. of Southern California (USA); Richard Nuccitelli, BioElectroMed Corp. (USA) [8941-56]

1:50 pm: **Nanosecond pulsed electrical fields generate measurable pressure transients**, Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Saher Maswadi, The Univ. of Texas San Antonio (USA); Bennett L. Ibey, Hope T. Beier, Gary L. Thompson III, Air Force Research Lab. (USA); Erick K. Moen, The Univ. of Southern California (USA); Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (USA) [8941-57]

2:10 pm: **Nonlinear imaging techniques for the observation of cell membrane nanoporation due to exposure to nanosecond pulsed electric fields**, Erick K. Moen, Univ. of Southern California (USA); Hope T. Beier, Air Force Research Lab. (USA); Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Gary Thompson, Oak Ridge Institute for Science & Education (USA); Bennett L. Ibey, Air Force Research Lab. (USA) [8941-58]

2:30 pm: **AC field-induced cell membrane temperature gradients** (*Invited Paper*), Allen L. Garner, Purdue Univ. (USA); Maxim Deminsky, Russian Research Ctr. Kurchatov Institute (Russian Federation); Bogdan Neculaes, GE Global Research (USA); Boris Potapkin, Russian Research Ctr. Kurchatov Institute (Russian Federation) [8941-59]

Conference 8941B · Location: Room 238 (Mezzanine)

3:00 pm: **Effects of nanosecond pulsed electrical fields (NSPEFS) on the cell cycle of CHO and Jurkat cells**, Megan A. Mahlke, U.S. Air Force (USA); Christopher Navara, The Univ. of Texas at San Antonio (USA); Bennett L. Ibey, U.S. Air Force (USA) [8941-60]

3:20 pm: **Investigation of a direct effect of nanosecond pulse electric fields on mitochondria**, Larry E. Estlack, General Dynamics (USA); Cesario Z. Cerna, General Dynamics Advanced Information Systems (USA); Caleb C. Roth, General Dynamics Information Technology (USA); Gerald J. Wilmink, Air Force Research Lab. (USA); Bennett L. Ibey, U.S. Air Force (USA) [8941-61]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Dose-dependent translocation of fluorescent probes of PIP2 hydrolysis in cells exposed to nanosecond-pulsed electric fields, Gleb P. Tolstykh, National Research Council (USA); Melissa Tarango, General Dynamics Information Technology (USA); Bennett L. Ibey, Air Force Research Lab. (USA) . . . [8941-62]

Dynamics and Fluctuations in Biomedical Photonics XI

Conference Chairs: **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation), Univ. of Oulu (Finland); **Kirill V. Larin**, Univ. of Houston (USA); **Martin J. Leahy**, National Univ. of Ireland, Galway (Ireland); **Ruikang K. Wang**, Univ. of Washington (USA)

Program Committee: **Pierre O. Bagnaninchi**, The Univ. of Edinburgh (United Kingdom); **Wei R. Chen**, Univ. of Central Oklahoma (USA); **Joseph P. Culver**, Washington Univ. School of Medicine in St. Louis (USA); **Ekaterina I. Galanzha**, Univ. of Arkansas for Medical Sciences (USA); **Miya Ishihara**, National Defense Medical College (Japan); **Jingying Jiang**, Tianjin Univ. (China); **Sean J. Kirkpatrick**, Michigan Technological Univ. (USA); **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Hong Liu**, The Univ. of Oklahoma (USA); **Qingming Luo**, Huazhong Univ. of Science and Technology (China); **Igor V. Meglinski**, Univ. of Otago (New Zealand); **Brian S. Sorg**, Univ. of Florida (USA); **Vladislav Toronov**, Ryerson Univ. (Canada); **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Ying Yang**, Keele Univ. (United Kingdom); **Anna N. Yaroslavsky**, Univ. of Massachusetts Lowell (USA); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA); **Dan Zhu**, Huazhong Univ. of Science and Technology (China)

Saturday 1 February

SESSION 1

Location: Room 121 (Exhibit Level) .. Sat 9:40 am to 11:10 am

Speckle Technologies

Session Chair: **Ruikang K. Wang**, Univ. of Washington (USA)

9:40 am: **Tracking dynamic optical vortices using a minimum mean square error estimator** (*Invited Paper*), Dennis Thomas, Sean J. Kirkpatrick, Michigan Technological Univ. (USA) [8942-1]

Coffee Break Sat 10:00 am to 10:30 am

10:00 am: **Deep tissue blood perfusion during cold-induced vasodilation using diffuse speckle contrast analysis**, Renzhe Bi, Jing Dong, Kijoon Lee, Nanyang Technological Univ. (Singapore) [8942-2]

10:30 am: **Spatial and temporal integration for dynamic speckle contrast calculation**, Julio C. Ramirez-San-Juan, INAOE (Mexico); Bernard Choi, Beckman Laser Institute and Medical Clinic (USA); Gabriel Martinez-Niconoff, Ruben Ramos-Garcia, INAOE (Mexico) [8942-5]

10:50 am: **Polarization analysis of scattering for effective particle sizing in laser speckle rheology**, Zeinab Hajjarian Kashany, Seemantini Nadkarni, Harvard Medical School (USA) [8942-6]

Lunch/Exhibition Break Sat 11:10 am to 1:00 pm

SESSION 2

Location: Room 121 (Exhibit Level) ... Sat 1:00 pm to 2:40 pm

Tissue and Cell Dynamics I

Session Chair: **Kirill V. Larin**, Univ. of Houston (USA)

1:00 pm: **Liquid crystal-based spectral imaging goniometric polarimeter for sample characterization**, James C. Gladish, Donald D. Duncan, Portland State Univ. (USA) [8942-8]

1:20 pm: **Voice coil based robust and miniature optical delay for multiple reference optical coherence tomography**, Roshan I. Dsouza, Kai Neuhaus, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol Wilson, Compact Imaging, Inc. (USA); Martin J. Leahy, Hrebesh Subhash, National Univ. of Ireland, Galway (Ireland) [8942-9]

1:40 pm: **Improvement of tissue analysis and classification using optical coherence tomography combined with Raman spectroscopy**, Chih Hao Liu, Ji Qi, Shang Wang, Chen Wu, Wei Shih, Kirill Larin, Univ. of Houston (USA) [8942-10]

2:00 pm: **Label free cell tracking in 3-D tissue engineering constructs with high resolution imaging**, William A. Smith, Ka Po Lam, Katherine P. Dempsey, Keele Univ. (United Kingdom); James B. Richardson, Keele Univ. (United Kingdom) and The Robert Jones and Agnes Hunt Orthopaedic Hospital NHS Foundation Trust (United Kingdom); David M. Johnes, Ying Yang, Keele Univ. (United Kingdom) [8942-11]

2:20 pm: **Laser scanning microscopic investigations of the penetration of nanocontainers for drug delivery through the skin barrier by tissue-tolerable plasma** (*Invited Paper*), Jürgen M. Lademann, Alexa Patzelt, Heike Richter, Charité Univ. Berlin (Germany); Olaf Lademann, Univ. Medicine Greifswald (Germany); Eckart Rühl, Freie Univ. Berlin (Germany); Grit Baier, L. Breucker, Katharina Landfester, Max-Planck-Institut für Polymerforschung (Germany) [8942-12]

SESSION 3

Location: Room 121 (Exhibit Level) ... Sat 2:40 pm to 3:10 pm

Keynote Session: Tissue Optical Properties

Session Chair: **Martin J. Leahy**, National Univ. of Ireland, Galway (Ireland)

2:40 pm: **Tissue optics** (*Invited Paper*), Steven L. Jacques, Oregon Health & Science Univ. (USA) [8942-13]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 4

Location: Room 121 (Exhibit Level) ... Sat 3:40 pm to 6:00 pm

Clinical Imaging and Evaluation

Session Chair: **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany)

3:40 pm: **Seawater virus detection and identification through light scattering and Brownian motion using full field interferometry** (*Invited Paper*), A. Claude Boccara, Benoit Queney, Institut Langevin (France); Martine Boccara, IBENS (France) [8942-14]

4:00 pm: **Monte Carlo modeling of OCT-based microvascular imaging in skin**, Alzbeta E. Hartinger, Stephanie A. Nam, Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA) [8942-15]

4:20 pm: **Photophysical properties and photodynamic efficiency of cationic porphyrins**, Grigor V. Gyulkhandanyan, Institute of Biochemistry (Armenia); Robert K. Ghazaryan, Yerevan State Medical Univ. (Armenia); Marina H. Paronyan, Science and Production Ctr. Armbiotechnology (Armenia); Anna G. Gyulkhandanyan, Institute of Biochemistry (Armenia); Boris M. Dzhagarov, Institute of Molecular and Atomic Physics (Belarus); Elena S. Tuchina, Valery V. Tuchin, Saratov State Univ. (Russian Federation) [8942-16]

4:40 pm: **Optical measurements of CO₂ reactivity in children With single-ventricle physiology: comparison with ASL-MRI**, Peter Schwab, The Children's Hospital of Philadelphia (USA); Jennifer M. Lynch, The Children's Hospital of Philadelphia (USA) and Univ. of Pennsylvania (USA); Erin M. Buckley, Harvard Medical School (USA); David Busch, Lisa Montenegro, Susan Nicolson, Daniel J. Licht, The Children's Hospital of Philadelphia (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA); Mark A. Fogel, The Children's Hospital of Philadelphia (USA) [8942-17]

5:00 pm: **Anatomical co-registration using spatio-temporal features by non-contact optical imaging device**, YoungJin Jung, Jean Gonzalez, Suset Rodriguez, Gabrielle Clark, Maximiliano Velez Mejia, Anuradha Godavarty, Florida International Univ. (USA) [8942-18]

5:20 pm: **In vivo label-free monitoring microvascular and lymphatic vessel changes and dynamics during wound healing in mouse ear pinna using optical microangiography**, Siavash Yousefi, Ruikang Wang, Univ. of Washington (USA) [8942-19]

5:40 pm: **Wavelet and multifractal based analysis on DIC Images in stromal region to distinguish between normal and cancerous tissue**, Sabyasachi Mukhopadhyay, Nandan Kr Das, Indian Institute of Science Education and Research Kolkata (India); Asima Pradhan, Indian Institute of Technology Kanpur (India); Nirmalya Ghosh, Prasanta K. Panigrahi, Indian Institute of Science Education and Research Kolkata (India) [8942-20]

Conference 8942 · Location: Room 121 (Exhibit Level)

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 121 (Exhibit Level) . . Sun 8:40 am to 10:00 am

Optical Clearing and Biomechanics

Session Chair: **Kirill V. Larin**, Univ. of Houston (USA)

8:40 am: **Tissue optical clearing window for blood flow monitoring with laser speckle contrast imaging**, Jing Wang, Yang Zhang, Pengcheng Li, Qingming Luo, Dan Zhu, Huazhong Univ. of Science and Technology (China) . . . [8942-21]

9:00 am: **Enhanced resolution and contrast of photoacoustic microscopy with optical clearing methods** (*Invited Paper*), Dan Zhu, Xiaoquan Yang, Yang Zhang, Yanyan Liu, Rui Shi, Hui Gong, Qingming Luo, Huazhong Univ. of Science and Technology (China) . . . [8942-22]

9:20 am: **Laser-induced modification of pore structure in sclera towards a new method for intraocular pressure normalization**, Olga I. Baum, Emil N. Sobol, Eugeny M. Shcherbakov, Institute on Laser and Information Technologies (Russian Federation) . . . [8942-23]

9:40 am: **Imaging of the interaction of low frequency electric fields with biological tissues with and without optical clearing by optical coherence tomography**, Adrián Peña Delgado, Alexander Doronin, Igor V. Meglinski, Univ. of Otago (New Zealand) . . . [8942-24]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 7

Location: Room 121 (Exhibit Level) . Sun 10:30 am to 12:30 pm

Functional Imaging and Spectroscopy

Session Chair: **Ruikang K. Wang**, Univ. of Washington (USA)

10:30 am: **In vivo microcirculation imaging of reactive hyperaemia in human finger ischemia using correlation mapping optical coherence tomography**, Haroon Zafar, National Univ. of Ireland, Galway (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and National Biophotonics and Imaging Platform (Ireland) . . . [8942-25]

10:50 am: **Simultaneous measurement of flow and diffusion using optical coherence tomography**, Nicolas Weiss, Ton G. van Leeuwen, Academisch Medisch Ctr. (Netherlands); Jeroen Kalkman, Academisch Medisch Ctr. (Netherlands) and Technische Univ. Delft (Netherlands) . . . [8942-26]

11:10 am: **Automated choroidal segmentation method in human eye with 1050 nm optical coherence tomography**, Cindy Liu, The Harker School (USA); Ruikang Wang, Univ. of Washington (USA) . . . [8942-27]

11:30 am: **Temporal dynamics of cuttlefish (*Sepia bandensis*) camouflage**, Ryan M. Nolan, Mohammad Jaber, Darold R. Spillman Jr., Eric J. Chaney, Guillermo L. Monroy, Andrew J. Bower, Nathan D. Shemonski, Joanne Li, Ryan L. Shelton, Marina Marjanovic, Univ. of Illinois at Urbana-Champaign (USA); John M. Cwaygel, Sailfin Pet Shop, Inc. (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . [8942-28]

11:50 am: **Application of OCM techniques to the EMT study in an embryonic chick heart**, Siyu Ma, Rui Wang, Clemson Univ. (USA);

12:10 pm: **Functional optical imaging of oxygen supply and demand** (*Invited Paper*), Melissa C. Skala, Vanderbilt Univ. (USA) . . . [8942-30]

Lunch/Exhibition Break Sun 12:30 pm to 2:00 pm

SESSION 8

Location: Room 121 (Exhibit Level) . . Sun 2:00 pm to 3:00 pm

Cerebral Haemodynamics I

Session Chair: **Anna N. Yaroslavsky**, Univ. of Massachusetts Lowell (USA)

2:00 pm: **Volumetric mass flux density measurement using super-resolution optical coherence microangiography**, Siavash Yousefi, Ruikang Wang, Univ. of Washington (USA) . . . [8942-31]

2:20 pm: **Large field of view and depth specific cortical microvascular imaging underlies regional differences in ischemic brain** (*Invited Paper*), Jia Qin, Lei Shi, Suzan Dziennis, Ruikang Wang, Univ. of Washington (USA) . . . [8942-32]

2:40 pm: **Multi parametric imaging of cerebral hemodynamic and metabolic response followed by ischemic injury**, Jia Qin, Lei Shi, Lin An, Suzan Dziennis, Ruikang Wang, Univ. of Washington (USA) . . . [8942-33]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 9

Location: Room 121 (Exhibit Level) . . Sun 3:30 pm to 4:30 pm

Tissue and Cell Dynamics II

Session Chairs: **Martin J. Leahy**, National Univ. of Ireland, Galway (Ireland); **Kirill V. Larin**, Univ. of Houston (USA); **Ruikang K. Wang**, Univ. of Washington (USA)

3:30 pm: **Cell dynamics for contrast and diagnosis in digital holography** (*Invited Paper*), Adam Wax, Duke Univ. (USA) . . . [8942-34]

3:50 pm: **Role of cellular adhesions in tissue dynamics spectroscopy**, Daniel Merrill, Ran An, John Turek, David Nolte, Purdue Univ. (USA) . . . [8942-35]

4:10 pm: **Imaging of electro-kinetic properties of tissue using the amplitude and the phase of optical coherence tomography** (*Invited Paper*), Vladislav Toronov, Yuan Xu, Victor Yang, Ryerson Univ. (Canada) . . . [8942-36]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Monte Carlo simulation on the effect of contact pressure on in vivo NIRS measurement, Jingying Jiang, Junsheng Lu, Kexin Xu, Tianjin Univ. (China) . . . [8942-7]

Ear feature region detection based on compound image segmentation algorithm, Jingying Jiang, Hao Zhang, Junsheng Lu, Kexin Xu, Tianjin Univ. (China) . . . [8942-37]

Optical evaluation of hair follicle cycle, Caihua Liu, Britton Chance Ctr. for Biomedical Photonics (China); Jianru Wang, Xiewei Zhong, Gauan Yue, Dan Zhu, Huazhong Univ. of Science and Technology (China) . . . [8942-38]

Photons Plus Ultrasound: Imaging and Sensing 2014

Conference Chairs: **Alexander A. Oraevsky**, TomoWave Laboratories, Inc. (USA); **Lihong V. Wang**, Washington Univ. in St. Louis (USA)

Program Committee: **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Paul C. Beard**, Univ. College London (United Kingdom); **A. Claude Boccara**, Institut Langevin (France); **Charles A. DiMarzio**, Northeastern Univ. (USA); **Stanislav Y. Emelianov**, The Univ. of Texas at Austin (USA); **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch (USA); **Martin Frenz**, Univ. Bern (Switzerland); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Robert A. Kruger**, OptoSonics, Inc. (USA); **Pai-Chi Li**, National Taiwan Univ. (Taiwan); **Andreas Mandelis**, Univ. of Toronto (Canada); **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany); **Matthew O'Donnell**, Univ. of Washington (USA); **Günther Paltauf**, Karl-Franzens-Univ. Graz (Austria); **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **William M. Whelan**, Univ. of Prince Edward Island (Canada); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA); **Qifa Zhou**, The Univ. of Southern California (USA); **Quing Zhu**, Univ. of Connecticut (USA)

Sunday 2 February

SESSION 1

Location: Room 306 (Esplanade) Sun 8:30 am to 10:00 am

Clinical Applications of Imaging I

Session Chairs: **Alexander A. Oraevsky**, TomoWave Laboratories, Inc. (USA); **Lihong V. Wang**, Washington Univ. in St. Louis (USA)

8:30 am: **Light-enhanced transesophageal echocardiography for evaluating central hemodynamics: towards a clinical prototype**, Li Li, Massachusetts General Hospital, Harvard Medical School (USA); Balachundhar Subramaniam, Brett A. Simon M.D., Beth Israel Deaconess Medical Ctr., Harvard Medical School (USA); Guillermo J. Tearney, Massachusetts General Hospital, Harvard Medical School (USA) [8943-1]

8:45 am: **In vivo imaging of human microcirculation with linear-array based photoacoustic tomography: a feasibility study for clinical application**, Hreesh M. Subhash, Sergey A. Alexandrov, Haroon Zafar, National Univ. of Ireland, Galway (Ireland); Jithin Jose, VisualSonics B.V. (Netherlands); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) [8943-2]

9:00 am: **Characterization of myocardial ablation lesions using multi-wavelength photoacoustic imaging**, Nicholas Dana, The Univ. of Texas at Austin (USA); Richard R. Bouchard, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Luigi Di Biase, Texas Cardiac Arrhythmia Institute, St. David's Medical Ctr. (USA) and Albert Einstein College of Medicine, Montefiore Hospital (USA) and Univ. degli Studi di Foggia (Italy); Andrea Natale, Texas Cardiac Arrhythmia Institute, St. David's Medical Ctr. (USA) and The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas MD Anderson Cancer Ctr. (USA) [8943-3]

9:15 am: **Thermoacoustic imaging of prostate cancer: comparison to histology**, Sarah K. Patch, Stephanie Griep, Univ. of Wisconsin-Milwaukee (USA); Vern Hart, Kenneth Jacobsohn, William A. See, Medical College of Wisconsin (USA); David Hull, Bostwick Labs. (USA) [8943-98]

9:30 am: **Quantification of photoacoustic microscopy images for ovarian cancer detection**, Tianheng Wang, Yi Yang, Umar S. Alqasemi, Patrick D. Kumavor, Univ. of Connecticut (USA); Xiaohong Wang, Melinda Sanders, Molly Brewer, Univ. of Connecticut Health Ctr. (USA); Quing Zhu, Univ. of Connecticut (USA) [8943-5]

9:45 am: **Feasibility of transcranial photoacoustic imaging for interventional guidance of endonasal surgeries**, Muyinatu A. Lediju Bell, Johns Hopkins Univ. (USA); Anastasia K. Ostrowski, Johns Hopkins Univ. (USA) and The Univ. of Michigan (USA); Peter Kazanzides, Johns Hopkins Univ. (USA); Emad M. Bector, Johns Hopkins Outpatient Ctr. (USA) [8943-6]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 2

Location: Room 306 (Esplanade) . . . Sun 10:30 am to 12:15 pm

Microscopy and Endoscopy I

Session Chairs: **Lihong V. Wang**, Washington Univ. in St. Louis (USA); **Paul C. Beard**, Univ. College London (United Kingdom)

10:30 am: **Integrated intravascular ultrasound and optical-resolution photoacoustic microscopy with a 1-mm-diameter catheter**, Liang Song, Xiaosong Bai, Riqiang Lin, Xiao-jing Gong, Jianhua Chen, Shenzhen Institute of Advanced Technology (China) [8943-7]

10:45 am: **Intracellular temperature mapping with fluorescence-assisted photoacoustic thermometry**, Liang S. Gao, Chi Zhang, Chiye Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-8]

11:00 am: **Optical resolution photoacoustic imaging by the coherent control of light in a multimode fiber**, Ioannis N. Papadopoulos, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Olivier Simandoux, Institut Langevin (France); Salma Farahi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Jean-Pierre Huignard, Jphopto-consultant (France); Emmanuel Bossy, Institut Langevin (France); Christophe Moser, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8943-9]

11:15 am: **Prototype study on a miniaturized dual-modality imaging system for photoacoustic microscopy and confocal fluorescence microscopy**, Sung-Liang Chen, Zhixing Xie, L. Jay Guo, Xueding Wang, Univ. of Michigan (USA) [8943-10]

11:30 am: **Ultra-miniature fiber optic photoacoustic imaging probes for endoscopic applications**, Edward Z. Zhang, Adrien E. Desjardins, Paul C. Beard, Univ. College London (United Kingdom) [8943-11]

11:45 am: **Circulating tumor cell detection using photoacoustic spectral methods**, Eric M. Stroh, Elizabeth S. L. Berndt, Michael C. Kolios, Ryerson Univ. (Canada) [8943-12]

12:00 pm: **All optical laser scanning photoacoustic endoscopy using glancing angle deposited Fabry-Perot etalons**, Parsin Haji Reza, Jason B. Sorge, Michael J. Brett, Ronald B. Moore, Roger J. Zemp, Univ. of Alberta (Canada) [8943-13]

Lunch/Exhibition Break Sun 12:15 pm to 1:30 pm

SESSION 3

Location: Room 306 (Esplanade) Sun 1:30 pm to 3:15 pm

Small Animal Tomography

Session Chairs: **Alexander A. Oraevsky**, TomoWave Laboratories, Inc. (USA); **Pai-Chi Li**, National Taiwan Univ. (Taiwan)

1:30 pm: **Direct tissue oxygen monitoring by in vivo photoacoustic lifetime imaging (PALI)**, Qi Shao, Ekaterina Morgounova, Shai Asheknazi, Univ. of Minnesota (USA) [8943-14]

1:45 pm: **Photoacoustic and fluorescence imaged-guided delivery of photosensitizers using poly(ethylene glycol) covered gold nanostructures for enhanced photodynamic therapy**, Mansik Jeon, Univ. at Buffalo (USA) and Pohang Univ. of Science and Technology (Korea, Republic of); Avinash Srivatsan, Roswell Park Cancer Institute (USA); Samir Jenkins, Jingyi Chen, Univ. of Arkansas (USA); Ravindra Pandey, Roswell Park Cancer Institute (USA); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) and Univ. at Buffalo (USA) [8943-15]

Conference 8943 · Location: Room 306 (Esplanade)

2:00 pm: **Broadening detection view of a linear-array-based photoacoustic computed tomography system using a planar acoustic reflector**, Guo Li, Jun Xia, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-16]

2:15 pm: **Cellulose nanoparticles: photoacoustic contrast agents that biodegrade to simple sugars**, Jesse V. Jokerst, Sarah Bohndiek, Sanjiv S. Gambhir M.D., Stanford Univ. (USA) [8943-17]

2:30 pm: **3D laser optoacoustic ultrasonic imaging system (LOUIS-3D) for research in mice**, Sergey A. Ermilov, Richard Su, André Conjusteau, TomoWave Laboratories, Inc. (USA); Fatima Anis, Mark A. Anastasio, Washington Univ. in St. Louis (USA); Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA) [8943-18]

2:45 pm: **Photoacoustic imaging and photothermolysis treatment of tumors mediated by nanoparticles**, Geng Ku, Min Zhou, Shaoli Song, Qian Huang, Chun Li, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) [8943-19]

3:00 pm: **Real-time optoacoustic monitoring of stroke**, Moritz Kneipp, Jake B. Turner, Sebastian Hambauer, Sandro M. Krieg M.D., Jens Lehmberg M.D., Technische Univ. München (Germany); Ute Lindauer, Technische Univ. München (Germany) and SyNergy (Germany); Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) . [8943-20]

Coffee Break Sun 3:15 pm to 3:45 pm

SESSION 4

Location: Room 306 (Esplanade) Sun 3:45 pm to 5:30 pm

Novel Technologies and Applications I

Session Chairs: **Wiendelt Steenbergen**, Univ. Twente (Netherlands); **Martin Frenz**, Univ. Bern (Switzerland)

3:45 pm: **Multispectral photoacoustic imaging with a clinical ultrasound imaging system**, Daniil I. Nikitichev, Jean-Martial Mari, Rocio P. Soto-Astorga, Alexander C. Mosse, Paul C. Beard, Adrien E. Desjardins, Univ. College London (United Kingdom) [8943-21]

4:00 pm: **Photoacoustic imaging of brachytherapy seeds in an ex vivo prostate with transurethral light delivery**, Muyinatu A Lediju Bell, Johns Hopkins Univ. (USA); Emad M. Bector, Johns Hopkins Outpatient Ctr. (USA) [8943-22]

4:15 pm: **Multi-modal acousto-optic/echography imaging of ex-vivo liver tumors at 800 nm by wavefront adaptive holography**, Jean-Baptiste Laudereau, Emilie Benoit, Institut Langevin (France); Vincent Servois, Pascale Mariani, Institut Curie (France); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine); Jean-Luc Gennisson, François Ramaz, Institut Langevin (France) [8943-23]

4:30 pm: **Fiber-optic ultrasound transducers with carbon/PDMS composite coatings**, Charles A. Mosse, Ioannis Papakonstantinou, Edward Z. Zhang, Jean Martial Mari, Daniil I. Nikitichev, Paul C. Beard, Adrien E. Desjardins, Univ. College London (United Kingdom) [8943-24]

4:45 pm: **Multispectral photoacoustic imaging of nerves with a clinical ultrasound system**, Jean Martial Mari, Univ. College London (United Kingdom); Simeon West, Univ. College Hospital (United Kingdom); Paul C. Beard, Adrien E. Desjardins, Univ. College London (United Kingdom) [8943-25]

5:00 pm: **Correcting wavelength dependent optical fluence variations for deep tissue photoacoustic spectroscopy using reflection mode acousto-optics**, Altaf Hussain, Khalid Daoudi, Erwin Hondebrink, Wiendelt Steenbergen, Univ. Twente (Netherlands) [8943-26]

5:15 pm: **Temperature dependence of Gruneisen parameter in optically absorbing solutions measured by 2D optoacoustic imaging**, Elena V. Petrova, Sergey A. Ermilov, Vyacheslav V. Nadvoretzkiy, Richard Su, André Conjusteau, Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA) [8943-27]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

High-throughput fiber-array transvaginal photoacoustic probe for in vivo ovarian cancer imaging, Hassan S. Salehi, Patrick D. Kumavor, Umar S. Alqasemi, Hai Li, Tianheng Wang, Qing Zhu, Univ. of Connecticut (USA) [8943-110]

Optoacoustic monitoring of central and peripheral venous oxygenation during simulated hemorrhage, Andrey Petrov, Michael Kinsky, Donald S. Prough M.D., Yuriy Y. Petrov, Irene Y. Petrov, S. Nan Henkel, Roger Seeton, Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA) [8943-111]

Investigation of a method for laser-induced ultrasound tomography that eliminates the need for ray-tracing, Fatima Anis, Yang Lou, Washington Univ. in St. Louis (USA); André Conjusteau, Sergey A. Ermilov, Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA); Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8943-112]

Improvement of axial resolution in time-reversed ultrasonically encoded (TRUE) optical focusing by using two ultrasound transducers, Qiang Yang, Beijing Univ. of Posts and Telecommunications (China); Xiao Xu, Puxiang Lai, Washington Univ. in St. Louis (USA); Daxiong Xu, Beijing Univ. of Posts and Telecommunications (China); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-113]

High-speed time-reversed ultrasonically encoded (TRUE) optical focusing into scattering media at 793 nm, Yan Liu, Puxiang Lai, Washington Univ. in St. Louis (USA); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-114]

Optical clearing enhanced photoacoustic microscopy, Yong Zhou, Junjie Yao, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-115]

Optimization of all-optical ultrasound detector, Zhen Zhang, Biqin Dong, Hao Li, Hao F. Zhang, Cheng Sun, Northwestern Univ. (USA) [8943-116]

Improvement of signal detection selectivity and efficiency in two-photon absorption-induced photoacoustic microscopy, Yoshihisa Yamaoka, Yoshinori Harada, Kyoto Prefectural Univ. of Medicine (Japan); Shigeru Nishino, Seiji Maehara, Shujiro Hamano, Terasaki Electric Co., Ltd. (Japan); Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan) [8943-117]

Miniaturized photoacoustic endoscope with transparent optical micro-ring resonator ultrasonic sensor, Siyu Chen, Biqin Dong, Zhen Zhang, Cheng Sun, Hao F. Zhang, Northwestern Univ. (USA) [8943-118]

Inertial cavitation in theranostic nanoemulsions with simultaneous pulsed laser and low frequency ultrasound excitation, Jinjun Xia, Chen-wei Wei, Bastien Arnal, Univ. of Washington (USA); Ivan Pelivanov, Univ. of Washington (USA) and Moscow State Univ. (Russian Federation); Michael Lombardo, Camilo Perez, Thomas J. Matula, Danilo C. Pozzo, Matthew O'Donnell, Univ. of Washington (USA) [8943-119]

Imaging the distribution of photoacoustic contrast agents in vivo: a spectral unmixing approach, Andrew Heinmiller, Minalini Lakshman, Jim Mehi, VisualSonics Inc. (Canada); Chris White, VisualSonics, Inc. (Canada); Joy Kovar, Lael Cheung, Dan R. Draney, LI-COR Biosciences (USA); Andrew Needles, Catherine Theodoropoulos, VisualSonics Inc. (Canada) [8943-120]

Photothermal bleaching in time-lapse photoacoustic microscopy, Liang S. Gao, Washington Univ. in St. Louis (USA); Lidai Wang, Washington Univ. School of Medicine in St. Louis (USA); Chiye Li, Washington Univ. in St. Louis (USA); Alejandro Garcia-Urbe, Washington Univ. in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-121]

Cross-optical-beam nonlinear photoacoustic microscopy, Liren Zhu, Liang S. Gao, Lei Li, Lidai Wang, Washington Univ. in St. Louis (USA); Teng Ma, Qifa Zhou, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-122]

Scattering light modulated by focused ultrasound of various frequencies in scattering medium, Lili Zhu, Wenming Xie, Zhifang Li, Hui Li, Fujian Normal Univ. (China) [8943-123]

High axial resolution photoacoustic imaging enabled by 300 MHz ring resonator detector, Cheng Zhang, Tao Ling, Univ. of Michigan (USA); Sung-Liang Chen, UM-SJTU Joint Institute (China); L. Jay Guo, Univ. of Michigan (USA) [8943-124]

X-ray acoustic computed tomography (XACT) and medical applications, Liangzhong Xiang, Moiz Ahmad, Lei Xing, Stanford Univ. (USA) [8943-125]

Combined photoacoustic and speed-of-sound imaging using integrating optical detection, Gerhild Wurzinger, Sibylle Gratt, Robert Nuster, Günther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8943-126]

PLGA/PFC particles loaded with gold nanoparticles as dual contrast agents for photoacoustic and ultrasound imaging, Yan J. Wang, Eric M. Strohm, Ryerson Univ. (Canada); Yang Sun, Chengcheng Niu, Yuanyi Zheng, Zhigang Wang, Chongqing Medical Univ. (China); Michael C. Kolios, Ryerson Univ. (Canada) [8943-127]

Ultrasound modulated light blood flow measurement using intensity autocorrelation function: a Monte-Carlo simulation, Adi Tsalach, Yaakov Metzger, Ilan Breskin, Reuven Zeitak, Revital Shechter, Ornim Medical Ltd. (Israel) [8943-128]

Dual-mode optical-resolution photoacoustic microscopy and photoacoustic tomography imaging system, Sophie Brand, Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom) [8943-129]

Photoacoustic saturation effect and the selection of ultrasonic detector, Hao F. Zhang, Hao Li, Biqin Dong, Zhen Zhang, Cheng Sun, Northwestern Univ. (USA) [8943-130]

Quantitative optical scattering imaging using photoacoustic measurements with one-wavelength illumination, Zhen Yuan, Univ. of Macau (Macau, China) [8943-131]

Cross-correlation-based flowmetry using optical-resolution photoacoustic microscopy with a digital micromirror device, Jinyang Liang, Yong Zhou, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-132]

Photoacoustic microscopy for quantitative evaluation of angiogenesis inhibitor, Sung-Liang Chen, Joe Burnet, Duxin Sun, Zhixing Xie, Xueding Wang, Univ. of Michigan (USA) [8943-133]

Improving visibility in photoacoustic imaging with dynamic speckle illumination, Jérôme Gateau, Thomas Chaigne, Ori Katz, Sylvain Gigan, Emmanuel Bossy, Institut Langevin (France) [8943-134]

Consecutive reconstruction strategy for estimating absorption and scattering coefficient distribution in multiple-illumination photoacoustic tomography (MI-PAT), Peng Shao, Tyler J. Harrison, Roger J. Zemp, Univ. of Alberta (Canada) [8943-135]

Absolute photoacoustic thermography in deep tissue, Junjie Yao, Haixin Ke, Stephen Tai, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . [8943-136]

Reconstruction of the optical absorption coefficient from photoacoustic signals measured by scanning coaxial probe with regularization methods, Shinpei Okawa, Takeshi Hirasawa, Toshihiro Kushibiki, Miya Ishihara, National Defense Medical College (Japan) [8943-137]

Image reconstruction of photoacoustic tomography based on finite-aperture-effect corrected compressed sensing algorithm, Chien-Hao Chiu, Yen Chuo, Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8943-138]

Cross-sectional photoacoustic tomographic reconstructions in a polar grid, Xosé Luis Deán-Ben, Christian Lutzweiler, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) [8943-139]

Longitudinal in vivo photoacoustic imaging of tissue regeneration using an all-optical scanner, Julia Märk, Julius Wolff Institut (Germany) and Charité Universitätsmedizin Berlin (Germany) and Berlin-Brandenburger Centrum für Regenerative Therapien, Charité (Germany); Andrea Sass, Anke Dienelt, Kristin Strohschein, Charité Universitätsmedizin Berlin (Germany) and Julius Wolff Institut (Germany) and Charité Universitätsmedizin Berlin (Germany); Matthias Pumberger, Charité Universitätsmedizin Berlin (Germany) and Charité Universitätsmedizin Berlin (Germany); Edward Z. Zhang, Univ. College London (United Kingdom); Jan G. Laufer, Julius Wolff Institut (Germany) and Berlin-Brandenburger Centrum für Regenerative Therapien (Germany) and Charité Universitätsmedizin Berlin (Germany) [8943-140]

Mouse brain structure imaging using photoacoustic computed tomography, Yang Lou, Jun Xia, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-141]

In vivo spectroscopic photoacoustic tomography imaging of a far red fluorescent protein expressed in the exocrine pancreas of adult zebrafish, Mengyang Liu, Medizinische Univ. Wien (Austria); Nicole Schmitzer, Univ. Innsbruck (Austria); Michelle Gabriele Sandrian, Behrooz Zabihian, Boris Hermann, Medizinische Univ. Wien (Austria); Willi Salvenmoser, Dirk Meyer, Leopold-Franzens-Univ. Innsbruck (Austria); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8943-142]

Transparent broadband ultrasonic detector for functional photoacoustic imaging, Hao Li, Biqin Dong, Zhen Zhang, Siyu Chen, Cheng Sun, Hao F. Zhang, Northwestern Univ. (USA) [8943-145]

Magnetically mediated thermo-acoustic imaging, Xiaohua Feng, Fei Gao, Yuanjin Zheng, Nanyang Technological Univ. (Singapore) [8943-146]

All-optical intravascular photoacoustic catheter, Amir Rosenthal, Dmitry Bozhko, Stephan Kellnberger, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8943-147]

Multimodal non-contact photoacoustic and OCT imaging using a fiber based approach, Thomas Berer, Elisabeth Leiss-Holzinger, Armin Hochreiner, Johannes Bauer-Marschallinger, Michael Leitner, Andreas Buchsbaum, RECENDT GmbH (Austria) [8943-148]

Increase of penetration depth in real-time clinical epi-optoacoustic imaging: clutter reduction and aberration correction, Michael Jaeger, Sara Peeters, Gerrit Held, Michael Gruenig, Martin Frenz, Univ. Bern (Switzerland) . . [8943-227]

The origin of clutter in in-vivo epi-optoacoustic imaging, Michael Jaeger, Sara Peeters, Michael Gruenig, Martin Frenz, Univ. Bern (Switzerland) [8943-228]

Monday 3 February

SESSION 5

Location: Room 306 (Esplanade) . . . Mon 8:15 am to 10:00 am

Clinical Applications of Imaging II

- Session Chairs: **Matthew O'Donnell**, Univ. of Washington (USA); **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany)
- 8:15 am: **Three-dimensional hand-held optoacoustic imaging of spectrally-distinctive human structures in real-time**, Xosé Luis Deán-Ben, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) [8943-28]
- 8:30 am: **Photoacoustic imaging of the carotid artery plaque**, Pieter Kruizinga, Judy Zouaoui, Geert Springeling, Jan Lukas Robertus, Aad van der Lugt, Erasmus MC (Netherlands); Antonius F.W. van der Steen, Erasmus MC (Netherlands) and Delft Univ. of Technology (Netherlands) and Interuniversity Cardiology Institute (Netherlands); Gijs van Soest, Erasmus MC (Netherlands) [8943-29]
- 8:45 am: **Detection of breast lesions using spectroscopic photoacoustic imaging in a transgenic mouse model**, Katherlyne E. Wilson, Sunitha Bachawal, Juergen K. Willmann, Stanford Univ. (USA) [8943-30]
- 9:00 am: **Clinical application of photoacoustic flow cytometer for detection of circulating melanoma cells in vivo and ex vivo**, Yulian Menyayev, Mazen A. Juratli M.D., Mustafa Sarimollaoglu, Dmitry A. Nedosekin, Ekaterina I. Galanzha, James Y. Suen M.D., Laura Hutchins, Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) [8943-31]
- 9:15 am: **Optoacoustic measurement of central venous oxygenation for assessment of circulatory shock: clinical study in cardiac surgery patients**, Irene Y. Petrov, Donald S. Prough M.D., Michael Kinsky, Yuriy Y. Petrov, Andrey Petrov, S. Nan Henkel, Roger Seeton, Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA) [8943-32]
- 9:30 am: **Optoacoustic technique for noninvasive diagnosis of hematomas and monitoring cerebral venous blood oxygenation in patients with traumatic brain injury**, Yuriy Y. Petrov, Donald S. Prough M.D., Irene Y. Petrov, Andrey Petrov, The Univ. of Texas Medical Branch (USA); Claudia S. Robertson M.D., Baylor College of Medicine (USA); Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA) [8943-33]
- 9:45 am: **Clinically translatable integrated ultrasound and photoacoustic imaging system**, Jinjun Xia, Chen-Wei Wei, Thu-Mai Nguyen, Bastien Arnal, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA) and Moscow State Univ. (Russian Federation); Matthew O'Donnell, Univ. of Washington (USA) [8943-34]
- Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 306 (Esplanade) . . Mon 10:30 am to 12:15 pm

Microscopy and Endoscopy II

- Session Chairs: **Pai-Chi Li**, National Taiwan Univ. (Taiwan); **Qifa Zhou**, The Univ. of Southern California (USA)
- 10:30 am: **Optical resolution photoacoustic microscopy using capacitive micromachined ultrasonic transducer**, Parsin Haji Reza, Alexander Sampaleanu, Roger J. Zemp, Univ. of Alberta (Canada) [8943-35]
- 10:45 am: **DMD-based random-access optical-resolution photoacoustic microscopy**, Jinyang Liang, Yong Zhou, Washington Univ. in St. Louis (USA); Amy W Winkler, Lidai Wang, Washington Univ. in St. Louis (USA); Konstantin I. Maslov, Chiye Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) . [8943-36]
- 11:00 am: **Ultrasound-assisted thermal clearance photoacoustic flowmetry**, Lidai Wang, Washington Univ. School of Medicine in St. Louis (USA); Junjie Yao, Konstantin I. Maslov, Wenxin Xing, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-37]
- 11:15 am: **3D high resolution photoacoustic imaging based on pure optical photoacoustic microscopy with microring resonator**, Zhixing Xie, Univ. of Michigan Medical School (USA); Cheng Zhang, Tao Ling, L. Jay Guo, Univ. of Michigan (USA); Paul L. Carson, Xueding Wang, Univ. of Michigan Medical School (USA) [8943-38]
- 11:30 am: **Optical resolution photoacoustic microscopy using a Blu-ray DVD pickup head**, Po-Hsun Wang, Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8943-39]
- 11:45 am: **Slow-sound photoacoustic microscopy with enhanced axial resolution of 5.8 μm**, Chi Zhang, Yong Zhou, Chiye Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-40]
- 12:00 pm: **Integrated confocal, two-photon, and OR-PAM (optical-resolution photoacoustic microscopy) tri-modality microscope**, Bin Rao, Lijun Ma, Yu Wang, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-41]
- Lunch Break Mon 12:15 pm to 1:30 pm

SESSION 7

Location: Room 306 (Esplanade) Mon 1:30 pm to 3:15 pm

Ultrasonic Encoding and Wavefront Engineering

Session Chairs: **A. Claude Boccara**, Institut Langevin (France);
Charles A. DiMarzio, Northeastern Univ. (USA)

- 1:30 pm: **Optical wavefront shaping-enhanced photoacoustic microscopy**, Puxiang Lai, Jian Wei Tay, Washington Univ. in St. Louis (USA); Lidai Wang, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-42]
- 1:45 pm: **Impact of ultrasound focal volume changes on fluence mapping using reflection mode acousto-optics**, Jacob W. Staley, Erwin Hondebrink, Wiendelt Steenbergen, Univ. Twente (Netherlands) [8943-43]
- 2:00 pm: **Wave-mixing in gain media (Nd:YVO4) for acousto-optical imaging**, Baptiste Jayet, Institut Langevin (France); Jean-Pierre Huignard, Jphopto-consultant (France); Francois Ramaz, Institut Langevin (France) [8943-44]
- 2:15 pm: **Reflection-mode time-reversed ultrasonically encoded (TRUE) optical focusing**, Yuta Suzuki, Jian Wei Tay, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-45]
- 2:30 pm: **Recent progress in ultrasound-switchable fluorescence imaging**, Baohong Yuan, Mingyuan Wei, Yanbo Pei, Bingbing Cheng, Yuan Liu, Yi Hong, Kytai T. Nguyen, The Univ. of Texas at Arlington (USA) [8943-46]
- 2:45 pm: **Acousto-optic imaging using quantum memories in cryogenic rare earth ion doped crystals**, Alexander Doronin, Luke R. Taylor, Igor V. Meglinski, Jevon J. Longdell, Univ. of Otago (New Zealand) [8943-47]
- 3:00 pm: **Controlling light non-invasively in scattering media using the photoacoustic transmission-matrix**, Thomas Chaigne, Ori Katz, Jérôme Gateau, A. Claude Boccara, Mathias Fink, Emmanuel Bossy, Sylvain Gigan, Institut Langevin (France) [8943-48]
- Coffee Break Mon 3:15 pm to 3:45 pm

SESSION 8

Location: Room 306 (Esplanade) Mon 3:45 pm to 5:30 pm

Novel Technologies and Applications II

Session Chairs: **Günther Paltauf**, Karl-Franzens-Univ. Graz (Austria);
Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA)

- 3:45 pm: **High resolution raster-scan photoacoustic mesoscopy of genetically modified Drosophila pupae**, Murad Omar, Technische Univ. München (Germany); Jérôme Gateau, Institut Langevin (France); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8943-49]
- 4:00 pm: **Functional pitch of a liver: fatty liver disease diagnosis with photoacoustic spectrum analysis**, Guan Xu, Univ. of Michigan Medical School (USA); Zhuoxian Meng, Jiandie Lin, Univ. of Michigan (USA); Paul L. Carson, Xueding Wang, Univ. of Michigan Medical School (USA) [8943-50]
- 4:15 pm: **Photoacoustic microscopy of thermal diffusivity**, Junjie Yao, Lidai Wang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-51]
- 4:30 pm: **Fourier transform photoacoustic microscopy using a multi-wavelength laser**, Tae Joong Eom, Gwangju Institute of Science and Technology (Korea, Republic of) and Washington Univ. in St. Louis (USA); Lijun Ma, Bin Rao, Amos Danielli, Lidai Wang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-52]
- 4:45 pm: **Dual mode imaging with the multispectral opto-acoustic tomography and ultrasonically modulated optical tomography: computational modeling and experimental results**, Alexander Doronin, Luke R. Taylor, Jevon J. Longdell, Igor V. Meglinski, Univ. of Otago (New Zealand) [8943-53]
- 5:00 pm: **Acoustic resolution photoacoustic Doppler flowmetry: practical considerations for obtaining accurate, high resolution blood flow measurements**, Joanna Bruncker, Paul C. Beard, Univ. College London (United Kingdom) [8943-54]
- 5:15 pm: **Optical full-field holographic detection system for non-contact photoacoustic tomography**, Jens Horstmann, Medizinisches Laserzentrum Lübeck (Germany); Christian Myrtus, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Ralf Brinkmann, Medizinisches Laserzentrum Lübeck (Germany) and Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany) [8943-55]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

- Photoacoustic spectroscopy in the monitoring of breast tumor development: a pre-clinical study**, Mallika Priya, Krishna Kishore Mahato, Satish Bola Sadashiva Rao, Manipal Univ. (India); Satadru Ray, Kasturba Medical College (India) and Shirdi Sai Baba Cancer Hospital (India) [8943-143]
- In vivo photoacoustic imaging of prostate brachytherapy seeds**, Muyinatu A. Lediju Bell, Nathanael Kuo, Xiaoyu Guo, Jin U. Kang, Danny Y. Song M.D., Johns Hopkins Univ. (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) [8943-149]
- Classification algorithm of ovarian tissue based on co-registered ultrasound and photoacoustic tomography**, Hai Li, Patrick D. Kumavor, Umar S. Alqasemi, Qiong Zhu, Univ. of Connecticut (USA) [8943-150]
- Simultaneous three-dimensional photoacoustic and confocal microscopy at optical diffraction limited resolution**, Biqin Dong, Hao Li, Zhen Zhang, Siyu Chen, Kevin Zhang, Hao F. Zhang, Cheng Sun, Northwestern Univ. (USA) [8943-151]
- Compatible optical ultrasonic sensor for commercial laser scanning microscopy**, Cheng Sun, Biqin Dong, Hao Li, Zhen Zhang, Hao F. Zhang, Northwestern Univ. (USA) [8943-152]
- Sensing of oxygen saturation of hemoglobin in ocular tissue using acoustic-resolution photoacoustic microscopy through scattering sclera**, Wenxin Xing, Stella N. Arthur, Ying-Bo Shui, Jennifer Kalishman, Lisa Andrews, Michael Kass, David C. Beebe, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-153]
- Comprehensive characterization of plasmonic gold nanoparticles for photoacoustic contrast enhancement**, Miya Ishihara, National Defense Medical College (Japan); Ryota Sato, Kyoto Univ. (Japan); Takeshi Hirasawa, Shinpei Okawa, National Defense Medical College (Japan); Toshiharu Teranishi, Kyoto Univ. (Japan) [8943-154]
- NIR-activated iron oxides as a new multi-functional contrast agent of photoacoustic imaging**, Pei-Hsien Ting, National Tsing Hua Univ. (Taiwan); Chih-Chia Huang, National Yang-Ming Univ. (Taiwan); Meng-Lin Li, National Tsing Hua Univ. (Taiwan) [8943-155]
- Magnetomotive photoacoustic imaging with magnetic-conjugated-polymer nanoagent**, Chen-Wei Wei, Junwei Li, Bastien Arnal, Jinjun Xia, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA); Xiaohu Gao, Matthew O'Donnell, Univ. of Washington (USA) [8943-156]
- Co-registered spectral photoacoustic tomography and ultrasonography of breast cancer**, Haixin Ke, Washington Univ. in St. Louis (USA); Todd N. Erpelding, Philips Research North America (USA); Alejandro Garcia-Urbe, Washington Univ. in St. Louis (USA); Eileen Jacobs, Susan O. Holley M.D., Barbara Monsees M.D., Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-157]
- Photoacoustic tomography using a fibre laser and coded excitation schemes**, Thomas J. Allen, Paul C. Beard, Univ. College London (United Kingdom); Martin Berendt, Shaif-ul Alam, David J. Richardson, Univ. of Southampton (United Kingdom) [8943-158]
- Gold nanocages and phase-change materials for photoacoustic imaging and controlled drug release by high-intensity focused ultrasound in vivo**, Xin Cai, Washington Univ. in St. Louis (USA); Yucai Wang, The Univ. of Chicago (USA); Younan Xia, Georgia Institute of Technology (Venezuela); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-159]
- Dual plasmonic gold nanoparticles for multispectral photoacoustic imaging applications**, Vijay Raghavan, Hreesh M. Subhash, National Univ. of Ireland, Galway (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and Royal College of Surgeons Dublin (Ireland); Peter Dockery, National Univ. of Ireland, Galway (Ireland); Malini Olivio, National Univ. of Ireland, Galway (Ireland) and Royal College of Surgeons Dublin (Ireland) and Singapore Biomedicine Consortium (Singapore) [8943-161]
- Overcoming in vivo speckle decorrelation in acousto-optics using tandem optical pulses**, Steffen G. Resink, Wiendelt Steenbergen, Univ. Twente (Netherlands) [8943-162]
- Probing confined and unconfined hemoglobin molecules with photoacoustics**, Ratan K. Saha, Subhagit Karmakar, Madhusudan Roy, Saha Institute of Nuclear Physics (India) [8943-163]

Polyimide-etalon all-optical ultrasound transducer for high frequency applications, Clay Sheaff, Shai Ashkenazi, Univ. of Minnesota, Twin Cities (USA)[8943-164]

Theoretical and experimental investigation of multispectral photoacoustic osteoporosis detection method, Idan Steinberg, Isreal Gannot, Avishay Eyal, Tel Aviv Univ. (Israel)[8943-165]

Detecting occlusion inside the ventricular catheter using photoacoustic imaging through the skull, Behnoosh Tavakoli, Xiaoyu Gua, Jin U. Kang, Russell H. Taylor, Johns Hopkins Univ. (USA); Emad M. Bector, Johns Hopkins Outpatient Ctr. (USA)[8943-166]

Optical focusing into scattering media by digital ultrasonic encoding (DUE), Jian Wei Tay, Puxiang Lai, Yuta Suzuki, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-167]

Calibration-free structured-illumination photoacoustic flowgraphy of transverse flow, Junjie Yao, Rebecca Gilson, Lidai Wang, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-168]

Accuracy of retinal oximetry: a Monte Carlo investigation, Wenzhong Liu, Northwestern Univ. (USA); Shuliang Jiao, Florida International Univ. (USA); Hao F. Zhang, Northwestern Univ. (USA)[8943-169]

Propagation of photoacoustic shock waves, Xinmai Yang, The Univ. of Kansas (USA); Janggun Jo, KU Bioengineering Research Ctr. (USA)[8943-170]

Dependence of photoacoustic signal generation on the transducer and source type, Carlos A. Bravo Miranda, Arturo González Vega, Gerardo Gutiérrez Juárez, Univ. de Guanajuato (Mexico)[8943-172]

Iterative reconstruction algorithms for photoacoustic tomography using time reversal, Benjamin T. Cox, Univ. College London (United Kingdom); Leonid Kunyansky, The Univ. of Arizona (USA); Robert J. Ellwood, Bradley E. Treeby, Simon R. Arridge, Univ. College London (United Kingdom) ...[8943-173]

Three-dimensional modeling of the transducer shape in acoustic resolution photoacoustic microscopy, Xosé Luis Deán-Ben, Hector Estrada, Moritz Kneipp, Jake B. Turner, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany)[8943-174]

S-sequence patterned illumination for fixed-point multiple illumination photoacoustic tomography, Tyler J. Harrison, Peng Shao, Roger J Zemp, Univ. of Alberta (Canada)[8943-175]

Image reconstruction in ultrasound-modulated optical tomography, Terence S. Leung, Samuel Powell, Univ. College London (United Kingdom)[8943-176]

FPGA implementation of undecimated wavelet transform denoising and Fourier deconvolution for photoacoustic microscopy, Ryan T. Maxson, Scott P. Mattison, Brian E. Applegate, Texas A&M Univ. (USA)[8943-177]

Co-registered high frequency, high frame rate photoacoustic imaging for visualizing intra-cardiac blood flow of zebrafish, Jinhyoung Park, Volcano Corp. (USA) and Univ. of Southern California (USA); Thomas M. Cummins, The Univ. of Southern California (USA); Michael Harrison, Children's Hospital Los Angeles (USA); Ching-Ling Lien, Children's Hospital Los Angeles (USA) and Univ. of Southern California (USA); K. Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA)[8943-178]

Optoacoustic detection and monitoring of blast-induced intracranial hematomas in rats, Andrey Petrov, Karon E. Wynne, Donald S. Prough M.D., Douglas S. Dewitt, Yuriy Y. Petrov, Irene Y. Petrov, Margaret A. Parsley, Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA)[8943-179]

Three-dimensional arbitrary trajectory photoacoustic microscopy, Chenghung Yeh, Washington Univ. in St. Louis (USA); Brian T. Soetikno, Washington Univ. in St. Louis (USA); Song Hu, Washington Univ. in St. Louis (USA) and Univ. of Virginia (USA); Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-180]

Optoacoustic detection of Kudoa thyrsites infection in Atlantic Salmon, Michelle Patterson, Univ. of Prince Edward Island (Canada); Jonathan Horrocks, Bruno Ouimet, Sophie St. Hilaire, Atlantic Veterinary College (Canada); William M. Whelan, Univ. of Prince Edward Island (Canada)[8943-181]

Effectiveness of the far-field approximation for transducer modeling in photoacoustic computed tomography, Kenji Mitsuhashi, Kun Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA)[8943-182]

Differentiating fatty and non-fatty tissue using photoacoustic imaging, Leo L. Pan, Shuo Tang, Purang Abolmaesumi, Robert Rohling, Septimiu Salcudean, The Univ. of British Columbia (Canada)[8943-183]

Highly-sensitive optical microresonator sensor array for deep-tissue photoacoustic imaging, Jing Li, Edward Z Zhang, Paul C. Beard, Univ. College London (United Kingdom)[8943-184]

Shear wave elastography at the micron scale using ultrafast full field OCT, Amir Nahas, Mickael Tanter, A. Claude Boccara, Institut Langevin (France)[8943-185]

Imaging of blood vessels with CCD-camera based three-dimensional photoacoustic tomography, Robert Nuster, Karl-Franzens-Univ. Graz (Austria); Paul Slezak, Ludwig Boltzmann Institut (Austria); Günther Paltauf, Karl-Franzens-Univ. Graz (Austria)[8943-186]

Localized fluorescence excitation in opaque media by time-reversed ultrasonically encoded (TRUE) optical focusing, Yuta Suzuki, Puxiang Lai, Xiao Xu, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-187]

Tuesday 4 February

SESSION 9

Location: Room 306 (Esplanade) . . . Tue 8:15 am to 10:00 am

Monitoring of Therapy

Session Chairs: **Rinat O. Esenaliev**, The Univ. of Texas Medical Branch (USA); **William M. Whelan**, Univ. of Prince Edward Island (Canada)

8:15 am: **Noninvasive measurement of internal jugular venous oxygen saturation by photoacoustic imaging**, Alejandro Garcia-Uribe, Washington Univ. in St. Louis (USA); Todd N. Erpelding, Philips Research North America (USA); Haixin Ke, Kavya Reddy, Anshuman Sharma, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-56]

8:30 am: **Real-time monitoring of lesion profile during laser surgery using shock wave detection**, Erwin Bay, Xosé Luis Deán-Ben, Helmholtz Zentrum München GmbH (Germany); Alexandre Douplik, Ryerson Univ. (Canada); Daniel Razansky, Helmholtz Zentrum München GmbH (Germany)[8943-57]

8:45 am: **Photoacoustic imaging of mesenchymal stem cells in living mice via silica-coated gold nanorods**, Jesse V. Jokerst, Mridhula Thangaraj, Sanjiv Sam Gambhir M.D., Stanford Univ. (USA)[8943-58]

9:00 am: **Characterization and treatment monitoring of inflammatory arthritis by photoacoustic imaging: a study on adjuvant-induced arthritis rat model**, Xueding Wang, Justin Rajesh Rajian, Xia S. Shao, David L. Chamberland, Gandikota Girish, Univ. of Michigan Medical School (USA)[8943-59]

9:15 am: **Can photoacoustic imaging be used to differentiate photodynamic therapy responders from non-responders?**, Srivalleesha Mallidi, Harvard Medical School (USA); Kohei Watanabe, Massachusetts General Hospital (USA) and Canon Inc (USA); Dmitriy Timerman, Tayyaba Hasan, Massachusetts General Hospital (USA)[8943-60]

9:30 am: **Preclinical evaluation of tumour response to vascular targeted therapy using photoacoustic imaging**, Sean P. Johnson, Olumide Ogunlade, Edward Z. Zhang, Univ. College London (United Kingdom); Jan G. Laufer, Charité Universitätsmedizin Berlin (Germany); Vineeth Rajkumar, R. Barbara Pedley, Paul C. Beard, Univ. College London (United Kingdom)[8943-61]

9:45 am: **Wavelength modulated differential photoacoustic spectroscopy (WM-DPAS) for ultrasensitive quantitative hemoglobin concentration and oxygenation monitoring in soft tissues**, Sung soo (Sean) Choi, Bahman Lashkari, Xinxin Guo, Andreas Mandelis, Univ. of Toronto (Canada)[8943-62]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 10

Location: Room 306 (Esplanade) . . . Tue 10:30 am to 12:15 pm

Microscopy and Endoscopy II

Session Chairs: **Qifa Zhou**, The Univ. of Southern California (USA); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA)

10:30 am: **High-speed intravascular photoacoustic catheter for atherosclerotic artery imaging**, Pu Wang, Purdue Univ. (USA); Shanshan Liang, Beckman Laser Institute and Medical Clinic (USA); Teng Ma, The Univ. of Southern California (USA); Michael Sturek, Indiana Univ.-Purdue Univ. Indianapolis (USA); Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA); Ji-Xin Cheng, Purdue Univ. (USA)[8943-63]

10:45 am: **Structured-illumination photoacoustic Doppler flowmetry of axial flow in homogeneous scattering media**, Ruiying Zhang, Junjie Yao, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA)[8943-64]

11:00 am: **Two-photon absorption-induced photoacoustic and luminescence imaging employing a femtosecond laser**, Gregor Langer, Christian Doppler Lab. for Photoacoustic Imaging and Laser Ultrasonics (Austria) and RECENTD GmbH (Austria); Istvan Attila Veres, Klaus-Dieter Bouchal, Roland Galos, Jakob Kilgus, Peter Burgholzer, Thomas Berer, RECENTD GmbH (Austria)[8943-65]

Conference 8943 · Location: Room 306 (Esplanade)

11:15 am: **Photoacoustic correlation spectroscopy for calibration-free absolute quantification of particle concentration**, Yong Zhou, Junjie Yao, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-66]

11:30 am: **Multimodality photoacoustic and Raman imaging of magnetically-trapped tumor cells**, Wei Shi, Robert J. Paproski, Peng Shao, Roger J. Zemp, Univ. of Alberta (Canada) [8943-67]

11:45 am: **Label-free mouse brain imaging by high-speed functional photoacoustic microscopy**, Junjie Yao, Joon-mo Yang, Washington Univ. in St. Louis (USA); Lidai Wang, Washington Univ. School of Medicine in St. Louis (USA); Chih-Hsien Huang, Jun Zou, Texas A&M Univ. (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-68]

12:00 pm: **Intraoperative surgical photoacoustic microscopy using augmented reality**, Changho Lee, Seunghoon Han, Sehui Kim, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8943-69]

Lunch/Exhibition Break Tue 12:15 pm to 1:30 pm

SESSION 11

Location: Room 306 (Esplanade) Tue 1:30 pm to 3:15 pm

Molecular Imaging Using Contrast Agents

Session Chairs: **Stanislav Y. Emelianov**, The Univ. of Texas at Austin (USA); **Matthew O'Donnell**, Univ. of Washington (USA)

1:30 pm: **Alternative to the sentinel lymph node biopsy: ultrasound-guided spectroscopic photoacoustic imaging of molecularly-activatable plasmonic nanosensors**, Geoffrey P. Luke, The Univ. of Texas at Austin (USA); Jeffrey N. Myers, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . [8943-70]

1:45 pm: **Methylene blue conjugated microbubbles (MB2) as a dual modal contrast agent for photoacoustic and ultrasound imaging**, Mansik Jeon, Univ. at Buffalo (USA) and Pohang Univ. of Science and Technology (Korea, Republic of); Wentao Song, Univ. at Buffalo (USA); Elizabeth Huynh, Univ. of Toronto (Canada); Jungho Kim, Samsung Medison (Korea, Republic of); Jeesu Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Gang Zheng, Univ. of Toronto (Canada); Jungtaek Oh, Samsung Medison (Korea, Republic of); Jonathan Lovell, Univ. at Buffalo (USA); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) and Univ. at Buffalo (USA) [8943-71]

2:00 pm: **Photo-thermal stimuli responsive theranostic agents for signal enhanced photoacoustic imaging**, Yun-Sheng Chen, Soon Joon Yoon, Mary Dockery, Wolfgang Frey, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8943-72]

2:15 pm: **Optimizing properties of photoacoustic nanodroplets for photoacoustic and ultrasound image contrast**, Alexander Hannah, Donald VanderLaan, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8943-73]

2:30 pm: **Lipid-stabilized porphyrin-containing perfluorobutane nanodroplets: submicron ultrasound and photoacoustic contrast imaging agents**, Robert J. Paproski, Univ. of Alberta (Canada); Gang Zheng, Univ. of Toronto (Canada); Roger J. Zemp, Univ. of Alberta (Canada) [8943-74]

2:45 pm: **Nonlinear acoustic enhancement in integrated ultrasound/photoacoustic imaging with wideband absorptive nanoemulsion beads**, Chen-Wei Wei, Michael Lombardo, Jinjun Xia, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA) and Moscow State Univ. (Russian Federation); Camilo Perez, Kjersta Larson-Smith, Thomas J. Matula, Danilo C. Pozzo, Matthew O'Donnell, Univ. of Washington (USA) [8943-75]

3:00 pm: **Poly-N-isopropylacrylamide (PNIPAM) nanoclusters as photoacoustic imaging contrast agents**, Soon Joon Yoon, Yun-Sheng Chen, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8943-76]

Coffee Break Tue 3:15 pm to 3:45 pm

SESSION 12

Location: Room 306 (Esplanade) Tue 3:45 pm to 5:30 pm

Novel Technologies and Applications III

Session Chairs: **Martin Frenz**, Univ. Bern (Switzerland); **Günther Paltauf**, Karl-Franzens-Univ. Graz (Austria)

3:45 pm: **Patterned interrogation scheme for compressed sensing photoacoustic imaging using a Fabry Perot planar sensor**, Nam Trung Huynh, Edward Z. Zhang, Marta Betcke, Simon R. Arridge, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom) [8943-77]

4:00 pm: **Near infrared optical coherence photoacoustic microscopy (NIR-OC-PAM)**, Tan Liu, Xiaojing Liu, Florida International Univ. (USA); Hao F. Zhang, Northwestern Univ. (USA); Shuliang Jiao, Florida International Univ. (USA) [8943-78]

4:15 pm: **Two-wavelength identification of lipid in atherosclerotic plaques by intravascular photoacoustic imaging at 1.7 μm** , Min Wu, Krista Jansen, Antonius F. W. van der Steen, Gijs van Soest, Erasmus MC (Netherlands) [8943-79]

4:30 pm: **Vibrational photoacoustic tomography: chemical imaging beyond the ballistic regime**, Ji-Xin Cheng, Rui Li, Justin Rajesh Rajian, Pu Wang, Craig Jonathan Goergen, Purdue Univ. (USA) [8943-80]

4:45 pm: **Feasibility of modulation-encoded TOBE CMUTs for single-shot 3D photoacoustic imaging**, Ryan K. Chee, Roger J. Zemp, Univ. of Alberta (Canada) [8943-81]

5:00 pm: **Photoacoustic imaging with TOBE CMUTs**, Ryan K. Chee, Univ. of Alberta (Canada); Deepak Rishi, BITS Pilani (India); Alexander Sampaleanu, Roger J. Zemp, Univ. of Alberta (Canada) [8943-82]

5:15 pm: **Photoacoustic imaging with multi-frequency CMUT arrays**, Ryan K. Chee, Univ. of Alberta (Canada); Deepak Rishi, BITS Pilani (India); Alexander Sampaleanu, Roger J. Zemp, Univ. of Alberta (Canada) [8943-83]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. This session will also feature posters from select BIOS conferences. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Dual-modality photoacoustic and ultrasound imaging system for noninvasive sentinel lymph node detection: preliminary clinical results, Todd N. Erpelding, Philips Research North America (USA); Arie Krumholz, Haixin Ke, Alejandro Garcia-Urbe, Konstantin I. Maslov, Catherine Appleton, Julie A. Margenthaler, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . [8943-188]

Realtime clinically-oriented array-based in vivo combined photoacoustic and power doppler imaging, Tyler J. Harrison, Dean Jeffery, Edward Wiebe, Univ. of Alberta (Canada); Roger J. Zemp, Univ. of Alberta (Canada) . . [8943-189]

Source-receiver photoacoustic wave interferometry, Hakan Erkol, Esra Aytac Kiperçil, Burcin M. Unlu, Bogaziçi Univ. (Turkey) [8943-190]

Near-infrared optical-resolution photoacoustic microscopy at 1046 nm wavelength, Pengfei Hai, Junjie Yao, Yong Zhou, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-191]

PDT induced microvascular changes assessed by photoacoustic microscopy, Daniel J. Rohrbach, Hakeem Salem, Roswell Park Cancer Institute (USA); Connor Walsh, The Univ. of Rhode Island (USA); Ulas Sunar, Roswell Park Cancer Institute (USA) [8943-192]

Bimodal photoacoustic and optically mediated ultrasound microscopy for simultaneous bioimaging of function and structure, Pavel V. Subochev, Anna G. Orlova, Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [8943-193]

Lifetime-resolved photoacoustic imaging of activatable probes, Ekaterina Morgounova, Qi Shao, Sadie Johnson, Benjamin Hackel, Shai Ashkenazi, Univ. of Minnesota (USA) [8943-194]

Feasibility and potential of photoacoustic imaging for the non-invasive molecular profiling of cancer, Anant J. Shah, Erwin J. Alles, Carol Box, Suzanne Eccles, Simon Robinson, Nandita deSouza, Jeffrey C. Bamber, The Institute of Cancer Research (United Kingdom) [8943-195]

Characterisation of contrast agents for photoacoustic imaging, Thomas Stahl, Thomas Allan, Helen Hailes, Alethea Tabor, R. Barbara Pedley, Paul C. Beard, Univ. College London (United Kingdom) [8943-196]

Photoacoustic molecular imaging of angiogenesis using theranostic $\alpha\beta\gamma$ -targeted copper nanoparticles incorporating a Sn 2 lipase-labile fumagillin prodrug, Ruiying Zhang, Xin Cai, Xiaoxia Yang, Angana Senpan, John Stacy Allen, Gregory Lanza, Washington Univ. in St. Louis (USA); Dipanjan Pan, Univ. of Illinois at Urbana-Champaign (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-197]

Concurrent photoacoustic markers for direct three-dimensional ultrasound to video registration, Alexis Cheng, Xiaoyu Guo, Behnoosh Tavakoli, Jin U. Kang, Russell H. Taylor, Johns Hopkins Univ. (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) [8943-198]

Gold nanoparticle templated microbubbles for enhanced photoacoustic and ultrasound imaging, Jacob Dove, Todd W. Murray, Mark A. Borden, Univ. of Colorado at Boulder (USA) [8943-199]

Photoacoustic phasoscopy super-contrast imaging correlating optical absorption and scattering, Fei Gao, Xiaohua Feng, Yuanjin Zheng, Nanyang Technological Univ. (Singapore) [8943-200]

Photoacoustic active ultrasound element for catheter tracking, Xiaoyu Guo, Behnoosh Tavakoli, Jin U. Kang, Ralph Etienne-Cummings, Emad M. Boctor, Johns Hopkins Univ. (USA) [8943-201]

Wide-field imaging through turbid media, Timothy R. Hillman, Massachusetts Institute of Technology (USA); Toyohiko Yamauchi, Hamamatsu Photonics K.K. (Japan); Wonshik Choi, Korea Univ. (Korea, Republic of); Ramachandra R. Dasari, Massachusetts Institute of Technology (USA); YongKeun Park, KAIST (Korea, Republic of); Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8943-202]

Aggregate-enhanced trimodality porphyrin shell microbubbles, Elizabeth Huynh, Univ. Health Network (Canada); David Goertz, Sunnybrook Health Sciences Ctr. (Canada); Brian C. Wilson, Gang Zheng, Univ. Health Network (Canada) [8943-203]

Developing photoacoustic tomography system with the aid of the acoustically penetrable optical reflector, Changhui Li, Zijian Deng, Peking Univ. (China) [8943-204]

Photothermal bleaching and recovery analysis in photoacoustic microscopy, Chiye Li, Chi Zhang, Liang S. Gao, Washington Univ. in St. Louis (USA); Alejandro Garcia-Urbe, Washington Univ. in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-205]

Ultrasound modulated fluorescence based on fluorescent microbubbles, Yuan Liu, The Univ. of Texas at Arlington (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Jameel A. Feshitan, Univ. of Colorado (USA); Mingyuan Wei, The Univ. of Texas at Arlington (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Mark A. Borden, Univ. of Colorado (USA); Baohong Yuan, The Univ. of Texas at Arlington (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) [8943-206]

Ultrahigh-resolution photoacoustic microscopy via modulation of a pulsed laser source, Scott P. Mattison, Brian E. Applegate, Texas A&M Univ. (USA) [8943-207]

Real-time photoacoustic imaging with an acoustic camera using 2D-optical ultrasound detection, Robert Nuster, Günther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8943-208]

Handheld probe combining laser diode and ultrasound transducer array for ultrasound/photoacoustic imaging, Khalid Daoudi, Pim J. van den Berg, Univ. Twente (Netherlands); Olivier Rabot, Andreas Kohl, Quantel Laser Diode (France); Stephane Tisserand, Silios Technologies (France); Peter J. Brands, Esaote Europe B.V. (Netherlands); Wiendelt Steenbergen, Univ. Twente (Netherlands) [8943-209]

Accuracy of inversion schemes for multiwavelength quantitative photoacoustic imaging, Roman Hochuli, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom) [8943-210]

In vitro photoacoustic detection of hemoglobin oxygen saturation variation using a pulsed broadband supercontinuum laser source, Changho Lee, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8943-211]

Combined optical and mechanical scanning in optical-resolution photoacoustic microscopy, Lei Li, Chenghung Yeh, Song Hu, Lidai Wang, Brian T. Soetikno, Washington Univ. in St. Louis (USA); Ruimin Chen, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-212]

Model-based tomographic photoacoustic reconstructions in acoustically attenuating media, Xosé Luis Deán-Ben, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) [8943-213]

Quantification of optical attenuation coefficient based on continuous wavelet transform of photoacoustic signals measured by a focused broadband acoustic sensor, Takeshi Hirasawa, Shinpei Okawa, Masanori Fujita M.D., Toshihiro Kushibiki, Miya Ishihara, National Defense Medical College (Japan) [8943-214]

Simultaneous reconstruction of absorbed optical energy density and speed of sound in photoacoustic computed tomography, Chao Huang, Kun Wang, Robert W. Schoonover, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8943-215]

Freehand spatial-angular compounding of photoacoustic images, Hyun Jae Kang, Johns Hopkins Univ. (USA) and Johns Hopkins Univ. (USA); Muyinatu A. Lediju Bell, Johns Hopkins Univ. (USA) and Johns Hopkins Univ. (USA); Xiaoyu Guo, Russell H. Taylor, Johns Hopkins Univ. (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) [8943-216]

Photoacoustic measurement of stochastic microstructure using the spectral parameter, Shaohua Wang, Chao Tao, Nanjing Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA); Xiaojun Liu, Nanjing Univ. (China) and Institute of Acoustics (China) [8943-217]

Real-time photoacoustic and ultrasound parallel imaging system facilitated by GPU acceleration and code optimization, Jie Yuan, Nanjing Univ. (China); Guan Xu, Paul L. Carson, Xueding Wang, Univ. of Michigan Medical School (USA) [8943-218]

Functional connectivity in the mouse brain imaged by B-mode photoacoustic microscopy, Mohammadreza Avanaki, Wenxin Xing, Jun Xia, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-219]

64-line-sensor array: Fast imaging system for photoacoustic tomograph, Sibylle Gratt, Gerhild Wurzing, Robert Nuster, Guenther Paltauf, Karl-Franzens-Univ. Graz (Austria) [8943-220]

Gold nanorods combine photoacoustic and Raman imaging for detection and treatment of ovarian cancer, Jesse V. Jokerst, Sarah Bohndiek, Sanjiv S. Gambhir M.D., Stanford Univ. (USA) [8943-221]

Identification of red blood cell rouleaux formation using photoacoustic ultrasound spectroscopy, Fayruz Kibria, Eno Hysi, Eric M. Strohm, Michael C. Kolios, Ryerson Univ. (Canada) [8943-222]

Controlled surface modification and conjugation of nanoparticles for photoacoustic contrasting, Anton Liopo, Sergey A. Ermilov, André Conjusteau, Richard Su, Alexander Oraebsky, TomoWave Laboratories, Inc. (USA) . [8943-223]

Investigation of effective system designs for transcranial photoacoustic tomography of the brain, Kenji Mitsuhashi, Robert W. Schoonover, Chao Huang, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8943-224]

Full visibility photoacoustic imaging system using all-optical planar sensor arrays, Robert J. Ellwood, Edward Z. Zhang, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom) [8943-225]

Fiber-based remote photoacoustic imaging utilizing a Mach Zehnder interferometer with optical amplification, Armin Hochreiner, Johannes Bauer-Marschallinger, Peter Burgholzer, Thomas Berer, RECENDT GmbH (Austria) [8943-226]

Wednesday 5 February

SESSION 13

Location: Room 306 (Esplanade) . . . Wed 8:15 am to 10:00 am

Signal Processing and Image Reconstruction

Session Chairs: **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Qing Zhu**, Univ. of Connecticut (USA)

8:15 am: **Photoacoustic tissue characterization using signal envelope statistics and ultrasonic spectral parameters**, Eno Hysi, Dustin Dopsa, Michael C. Kolios, Ryerson Univ. (Canada) [8943-84]

8:30 am: **Modeling the shape of cylindrically focused transducers in three-dimensional photoacoustic tomography**, Daniel Queirós, Helmholtz Zentrum München GmbH (Germany); Xosé Luis Deán-Ben, Andreas Buehler, Daniel Razansky, Amir Rosenthal, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) [8943-85]

8:45 am: **Acoustic-speed correction of photoacoustic tomography by ultrasonic computed tomography based on optical excitation of elements of a full-ring transducer array**, Jun Xia, Chao Huang, Konstantin I. Maslov, Mark A. Anastasio, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-86]

Conference 8943 · Location: Room 306 (Esplanade)

9:00 am: **Adaptive detection of molecular agents in multispectral optoacoustic tomography**, Stratis Tzoumas, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Nikolaos C. Deliolanis, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) [8943-87]

9:15 am: **Fast tempo-spatial image reconstruction based on low-rank matrix estimation for dynamic photoacoustic computed tomography**, Kun Wang, Jun Xia, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) [8943-88]

9:30 am: **Spectrum analysis of photoacoustic signals for tissue classification**, Parag V. Chitnis, Ashwin Sampathkumar, Jonathan Mamou, Ernest J. Feleppa, Riverside Research Institute (USA) [8943-89]

9:45 am: **Spatial over-sampling and its influence on spatial resolution for photoacoustic tomography with finite sized detectors**, Peter Burgholzer, Heinz Roitner, Thomas Berer, Hubert Grün, RECENDT GmbH (Austria); Robert Nuster, Günther Paltauf, Karl-Franzens-Univ. Graz (Austria); Markus Haltmeier, Leopold-Franzens-Univ. Innsbruck (Austria) [8943-90]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 14

Location: Room 306 (Esplanade) .. Wed 10:30 am to 12:15 pm

Quantitative and Functional Imaging

Session Chairs: **Paul C. Beard**, Univ. College London (United Kingdom); **Mark A. Anastasio**, Washington Univ. in St. Louis (USA)

10:30 am: **Blood flow imaging using photoacoustic computed tomography**, Lidai Wang, Washington Univ. School of Medicine in St. Louis (USA); Jun Xia, Junjie Yao, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-91]

10:45 am: **Nonlinear photoacoustic spectroscopy of oxygenated and deoxygenated hemoglobin**, Amos Danielli, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Christopher P. Favazza, Mayo Clinic (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-92]

11:00 am: **Photoacoustic imaging of advanced renal cell carcinoma (RCC) tumor models for evaluating anti-angiogenic therapy efficacy**, Peng Shao, David W. Chapman, Ronald B. Moore, Roger J. Zemp, Univ. of Alberta (Canada) [8943-93]

11:15 am: **Resting-state functional connectivity imaging of the mouse brain using photoacoustic tomography**, Mohammad Avanaki, Jun Xia, Washington Univ. in St. Louis (USA); Hanlin Wan, Washington Univ. (USA); Adam Q. Bauer, Joseph P. Culver, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-94]

11:30 am: **Photoacoustic measurement of nonradiative relaxation time and its application for in vivo measurements of blood oxygenation**, Konstantin I. Maslov, Junjie Yao, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8943-95]

11:45 am: **Cancellous bone tissue imaging by photoacoustics and ultrasound modalities**, Lifeng Yang, Univ. of Electronic Science and Technology of China (China) and Univ. of Toronto (Canada); Bahman Lashkari, Joel W. Y. Tan, Andreas Mandelis, Univ. of Toronto (Canada) [8943-96]

12:00 pm: **In vivo quantification of retinal oxygen metabolic rate in rodent**, Wenzhong Liu, Northwestern Univ. (USA); Wei Song, Harbin Institute of Technology (China); Shuliang Jiao, Florida International Univ. (USA); Hao F. Zhang, Northwestern Univ. (USA) [8943-97]

Lunch/Exhibition Break Wed 12:15 pm to 1:30 pm

SESSION 15

Location: Room 306 (Esplanade) Wed 1:30 pm to 3:15 pm

Novel Approaches and Technological Enhancements I

Session Chairs: **Andreas Mandelis**, Univ. of Toronto (Canada); **Vasilis Ntziachristos**, Helmholtz Zentrum München GmbH (Germany)

1:30 pm: **Dual modality optoacoustic - laser ultrasound endoscopy system**, Dmitri Tsybouski, André Conjusteau, Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA) [8943-4]

1:45 pm: **Optoacoustic microscopy using probe beam deflection technique**, Edward Khachatryan, The Univ. of Texas at San Antonio (USA); Saher Maswadi, Dmitri Tsybouski, TomoWave Laboratories, Inc. (USA); Kelly L. Nash, Dhiraj Kumar Sardar, The Univ. of Texas at San Antonio (USA); Randolph Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA) [8943-99]

2:00 pm: **In vivo ultrasound and photoacoustic monitoring of burn skin regeneration promoted by adipose-derived stem cell treatment**, Seung Yun Nam, Eunna Chung, Laura J. Suggs, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8943-100]

2:15 pm: **Experimental investigation into the suitability of classes of exogenous contrast agents for thermoacoustic imaging**, Olumide Ogunlade, Paul C. Beard, Univ. College London (United Kingdom) [8943-101]

2:30 pm: **Handheld optical fiber parallel acoustic delay line (PADL) probe for photoacoustic tomography**, Young Cho, Cheng-Chung Chang, Texas A&M Univ. (USA); Mansik Jeon, Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) and The State Univ. of New York at Buffalo (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA); Jun Zou, Texas A&M Univ. (USA) [8943-102]

2:45 pm: **In vivo ultrasound-guided photoacoustic imaging of ischemic tissue regeneration enhanced by mesenchymal stem cells labeled with nanoparticles**, Seung Yun Nam, Laura M. Ricles, Laura J. Suggs, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) [8943-103]

3:00 pm: **All-optical photoacoustic microscopy system for remote characterization of biological tissues**, Ashwin Sampathkumar, Parag V. Chitnis, Riverside Research Institute (USA); Ronald H. Silverman, Columbia Univ. Medical Ctr. (USA) [8943-104]

Coffee Break Wed 3:15 pm to 3:45 pm

SESSION 16

Location: Room 306 (Esplanade) Wed 3:45 pm to 5:00 pm

Novel Approaches and Technological Enhancements II

Session Chairs: **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Wiendelt Steenbergen**, Univ. Twente (Netherlands)

3:45 pm: **Optical generation of narrowband high frequency ultrasound signals**, Shi-Yao Hung, National Taiwan Univ. (Taiwan); Bao-Yu Hsieh, National Taiwan Univ (Taiwan); Pai-Chi Li, National Taiwan Univ. (Taiwan) [8943-105]

4:00 pm: **Improving focusing efficiency in scattering media: spectrally filtered photoacoustic-guided wavefront shaping**, Thomas Chaigne, Ori Katz, Jérôme Gateau, A. Claude Boccara, Mathias Fink, Emmanuel Bossy, Sylvain Gigan, Institut Langevin (France) [8943-106]

4:15 pm: **Optical-fiber based all-optical 3D photoacoustic imaging system**, Yusuke Miida, Yuji Matsuura, Tohoku Univ. (Japan) [8943-107]

4:30 pm: **Non-contact photoacoustic tomography with a laser Doppler vibrometer**, Guan Xu, Univ. of Michigan Medical School (USA); Ting Feng, Nanjing Univ. (China) and Univ. of Michigan (USA); Cheng Wang, Shanghai Univ. of Technology (China) and Univ. of Michigan (USA); Xueding Wang, Univ. of Michigan Medical School (USA) [8943-108]

4:45 pm: **Photoacoustic imaging of a near-infrared fluorescent marker based on excited state lifetime modulation**, Julia Märk, Julius Wolff Institut (Germany) and Charité Universitätsmedizin Berlin (Germany); Jan G. Laufer, Julius Wolff Institut (Germany) and Berlin-Brandenburger Centrum für Regenerative Therapien, Charité (Germany) and Charité Universitätsmedizin Berlin (Germany) [8943-109]

SENO MEDICAL BEST PAPER AWARD

Location: Room 306 (Esplanade) 5:00 pm to 5:30 pm

Session Chairs: **Alexander A. Oraevsky**, TomoWave Laboratories, Inc. (USA); **Lihong V. Wang**, Washington Univ. in St. Louis (USA)

Prize donated by **Seno Medical (USA)**

Biophotonics and Immune Responses IX

Conference Chair: **Wei R. Chen**, Univ. of Central Oklahoma (USA)

Program Committee: **Yuncheng Ge**, Beijing Glass Research Institute (China); **Sandra O. Gollnick**, Roswell Park Cancer Institute (USA); **Yueqing Gu**, China Pharmaceutical Univ. (China); **Michael R. Hamblin**, Wellman Ctr. for Photomedicine (USA); **Tomas Hode**, Immunophotonics, Inc. (USA); **Yih-Chih Hsu**, Chung Yuan Christian Univ. (Taiwan); **Zheng Huang**, Univ. of Colorado Denver (USA); **Mladen Korbelik**, The BC Cancer Agency Research Ctr. (Canada); **Mark F. Naylor**, Dermatology Associates of San Antonio (USA); **Karl-Goran Tranberg**, CLS Ltd. (Sweden); **Valery V. Tuchin**, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); **Xunbin Wei**, Shanghai Jiao Tong Univ. (China); **Da Xing**, South China Normal Univ. (China); **Vladimir P. Zharov**, Univ. of Arkansas for Medical Sciences (USA)

Monday 3 February

SESSION 1

Location: Room 200 (Mezzanine) . . . Mon 8:30 am to 10:00 am

PDT and Vaccine

Session Chairs: **Mladen Korbelik**, The BC Cancer Agency Research Ctr. (Canada); **Michael R. Hamblin**, Wellman Ctr. for Photomedicine (USA)

8:30 am: **Controlling host's immunoregulatory cell populations secures the efficacy of photodynamic therapy-generated cancer vaccines** (*Invited Paper*), Mladen Korbelik, Judit Banath, The BC Cancer Agency Research Ctr. (Canada) [8944-1]

8:55 am: **Photodynamic therapy for melanoma: efficacy and immunologic effects** (*Invited Paper*), Pinar Avci, Gaurav K. Gupta, Masayoshi Kawakubo, Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) [8944-2]

9:20 am: **Glycated chitosan as a vaccine adjuvant**, Pinar Avci, Gaurav K. Gupta, Masayoshi Kawakubo, Ji Wang, Wellman Ctr. for Photomedicine (USA); Wei R. Chen, Univ. Central Oklahoma (USA); Tomas Hode, Immunophotonics, Inc. (USA); Mei X. Wu, Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) [8944-3]

9:40 am: **Therapeutic effect of PDT with SIRT1 related gene therapy**, Rumwald Leo G. Lecaros, Chung Yuan Christian Univ. (Taiwan); Leaf Huang, UNC Eshelman School of Pharmacy (USA) and Chung Yuan Christian Univ. (Taiwan); Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan) [8944-4]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 200 (Mezzanine) . . Mon 10:30 am to 11:55 am

Laser Immunotherapy

Session Chairs: **Tomas Hode**, Immunophotonics, Inc. (USA); **Mark F. Naylor**, Dermatology Associates of San Antonio (USA)

10:30 am: **In situ photoimmunotherapy and t-cell simulations in melanoma treatment** (*Invited Paper*), Wei R. Chen, Univ. of Central Oklahoma (USA); Mark F. Naylor, Dermatology Associates of San Antonio (USA); Robert E. Nordquist, Wound Healing of Oklahoma (USA) [8944-5]

10:55 am: **Effects of laser immunotherapy on tumor microenvironment**, Joseph T. Acquaviva III, Wei R. Chen, Melville B. Vaughan, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA); Eric Howard, The Univ. of Oklahoma Health Sciences Ctr. (USA) [8944-6]

11:15 am: **Effects of cyclophosphamide on laser immunotherapy for the treatment of metastatic cancer**, Cody F. Bahavar, Wei R. Chen, Univ. of Central Oklahoma (USA); Tomas Hode, Immunophotonics, Inc. (USA); Robert E. Nordquist, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA) [8944-7]

11:35 am: **Laser immunotherapy and the tumor-immune system interaction: a mathematical model and analysis**, Sean M. Laverty, Bryan Dawkins, Wei R. Chen, Univ. of Central Oklahoma (USA) [8944-8]

Lunch Break Mon 11:55 am to 1:30 pm

SESSION 3

Location: Room 200 (Mezzanine) Mon 1:30 pm to 3:45 pm

Detection of Immune Activities

Session Chairs: **Xunbin Wei**, Shanghai Jiao Tong Univ. (China); **Zhihong Zhang**, Britton Chance Ctr. for Biomedical Photonics (China)

1:30 pm: **Improvement for in vivo flow cytometer detection in ear skin by optical clearing agents** (*Invited Paper*), Xunbin Wei, Shanghai Jiao Tong Univ. (China); Dan Zhu, Huazhong Univ. of Science and Technology (China); Yimin Ding, Shanghai Jiao Tong Univ. (China); Jing Wang, Huazhong Univ. of Science and Technology (China) [8944-9]

1:55 pm: **In vivo ultrasensitive flow cytometry for theranostics of bacteremia** (*Invited Paper*), Ekaterina I. Galanzha, Univ. of Arkansas for Medical Sciences (USA) [8944-10]

2:20 pm: **Multi-color intravital optical imaging of tumor immunotherapy** (*Invited Paper*), Zhihong Zhang, Shuhong Qi, Qingming Luo, Britton Chance Ctr. for Biomedical Photonics (China) [8944-11]

2:45 pm: **Assessment of vascular changes induced by immune reaction by using laser speckle imaging with multi-exposure time** (*Invited Paper*), Vyacheslav Kalchenko, Yuri Kuznetsov, Dina Preise, Weizmann Institute of Science (Israel); Igor V. Meglinski, Univ. of Otago (New Zealand); Alon Harmelin, Weizmann Institute of Science (Israel) [8944-12]

3:05 pm: **Imaging marine virus CroV and its host Cafeteria roenbergensis with two-photon microscopy**, Bin Cao, The Univ. of Texas at El Paso (USA) and The Univ. of Texas at El Paso (USA); Yassel Acosta, Christian B. Honsaker, Seyedmohammadali Aghvami, Chuan Xiao, Chun Qiang Li, The Univ. of Texas at El Paso (USA) [8944-13]

3:25 pm: **Real-time in vivo imaging of circulating lymphocytes in high endothelial venules of lymph node**, Kibaek Choe, Yoonha Hwang, Howon Seo, Eunjo Song, Pilhan Kim, KAIST (Korea, Republic of) [8944-14]

Coffee Break Mon 3:45 pm to 4:20 pm

SESSION 4

Location: Room 200 (Mezzanine) Mon 4:20 pm to 6:00 pm

Novel Detection Technology and Nanotechnology

Session Chairs: **Hong Liu**, The Univ. of Oklahoma (USA); **Ekaterina I. Galanzha**, Univ. of Arkansas for Medical Sciences (USA)

4:20 pm: **Characterization study of an high-energy in-line phase contrast tomosynthesis prototype**, Di Wu, The Univ. of Oklahoma (USA); Aimin Yan, The Univ. of Alabama at Birmingham (USA); Yuhua Li, Molly Wong, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Xizeng Wu, The Univ. of Alabama at Birmingham (USA); Hong Liu, The Univ. of Oklahoma (USA) [8944-15]

4:40 pm: **Comparison of background removal methods in X-ray fluorescence analysis using gold nanoparticles**, Liqiang Ren, Di Wu, Yuhua Li, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA) [8944-16]

5:00 pm: **Anti-tumor immunological effects induced by laser-nanotechnology**, Wei R. Chen, Univ. of Central Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Feifan Zhou, South China Normal Univ. (China); Hong Liu, The Univ. of Oklahoma (USA); Tomas Hode, Immunophotonics, Inc. (USA) [8944-17]

5:20 pm: **Special antitumor immune effects of laser immunotherapy with SWNT-GC**, Feifan Zhou, South China Normal Univ. (China) [8944-18]

5:40 pm: **Enhanced photo-transfection efficiency on graphene coated substrates**, Patience Mthunzi, Council for Scientific and Industrial Research (South Africa); Kuang He, Univ. of Oxford (United Kingdom); Sandile Ngcobo, Council for Scientific and Industrial Research (South Africa); Jamie Warner, Univ. of Oxford (United Kingdom) [8944-19]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Effect of High-dose laser (532 nm) Irradiation on rat synovial fibroblasts, Leitong Pan, Shuying Yang, Cunbo Li, Xinzheng Zhang, Jingjun Xu, Nankai Univ. (China)[8944-20]

Prevention of nano-liposomal resveratrol on sodium nitroprusside-induced rabbit chondrocytes apoptosis, Ying yao Quan, Xiao ping Wang, The First Affiliated Hospital of Jinan Univ. (China); Zhi Ping Wang, Guangdong Pharmaceutical Univ. (China); Tong-Sheng Chen, South China Normal Univ. (China)[8944-21]

Application of OCT elastography for diagnosis of thyroid hydatoncus, Zhifang Li, Xiaona Lin, Hui Li, Fujian Normal Univ. (China)[8944-22]

Influence of optical parameters of tissue on photoacoustic signal: a pilot study, Wenming Xie, Yubin Liu, Zhifang Li, Hui Li, Fujian Normal Univ. (China)[8944-23]

Nanotechnology and phototherapy for cancer treatment, Joseph T. Acquaviva III, Univ. of Central Oklahoma (USA); Feifan Zhou, South China Normal Univ. (China) and Institute of Laser Life Science (China); Wei R. Chen, Univ. of Central Oklahoma (USA); Tomas Hode, Immunophotonics, Inc. (USA); Hong Liu, The Univ. of Oklahoma (USA)[8944-24]

In vivo and label-free evaluation of anticancer treatment by photoacoustic flow cytometry, Xunbin Wei, Rongrong Liu, Shanghai Jiao Tong Univ. (China)[8944-25]

Simultaneous delivery of melittin and paclitaxol for synergistic cancer chemoimmunotherapy based on peptide-controlled lipid nanoparticles, Chuan Huang, Honglin Jin, Yuan Qian, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China)[8944-26]

In vivo visualizing effector function of mixed cytokines preactivated NK in combined chemoimmunotherapy for B16 melanoma, Fei Yang, Lili Zhou, Shun Liu, Qingming Luo, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China)[8944-27]

Metabolic imaging of tumors treated by KillerRed fluorescent protein-based photodynamic therapy, Shuang Sha, Lingsong Qin, Anle Wang, Honglin Jin, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China)[8944-28]

Mechanistic studies of systemic immune responses induced by laser-nanotechnology, Wei R. Chen, Univ. of Central Oklahoma (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Tomas Hode, Immunophotonics, Inc. (USA); Hong Liu, The Univ. of Oklahoma (USA); Feifan Zhou, South China Normal Univ. (China)[8944-29]

Fluorescence in situ hybridization signal detection using statistical variance based on z stack pixel profile, Zheng Li, Liqiang Ren, Hong Liu, The Univ. of Oklahoma (USA)[8944-30]

A mathematical model of the dynamics of anti-tumor laser immunotherapy, Sean M. Lavery, Bryan Dawkins, Univ. of Central Oklahoma (USA)[8944-31]

Photostimulation regulates actin filament rearrangements by activating PI3K signaling pathway in macrophage, Zhijin Fan, Cuixia Lu, Sheng Song, Feifan Zhou, South China Normal Univ. (China)[8944-32]

Low-power laser irradiation (LPLI) attenuates microglial cytotoxicity through the activation of Src pathway, Sheng Song, South China Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (USA); Feifan Zhou, South China Normal Univ. (China)[8944-33]

Combination therapy of EGFR gene and photodynamic therapy to enhance oral cancer treatment efficacy, Chia-Hsien Yeh, Chung Yuan Christian Univ. (Taiwan); Leaf Huang, UNC Eshelman School of Pharmacy (USA); Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan)[8944-34]

Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VI

Conference Chairs: **Robert J. Nordstrom**, National Institutes of Health (USA); **Jean-Pierre Bouchard**, INO (Canada); **David W. Allen**, National Institute of Standards and Technology (USA)

Program Committee: **Anant Agrawal**, U.S. Food and Drug Administration (USA); **Gerald T. Fraser**, National Institute of Standards and Technology (USA); **Rongguang Liang**, College of Optical Sciences, The Univ. of Arizona (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Heidrun Wabnitz**, Physikalisch-Technische Bundesanstalt (Germany)

Saturday 1 February

SESSION 1

Location: Room 276 (Mezzanine) Sat 8:30 am to 10:10 am

Phantoms for Fluorescence Measurements

Session Chair: **David W. Allen**, National Institute of Standards and Technology (USA)

8:30 am: **Use of a standard reference material for validating near infrared optical imaging tissue phantom**, Maritoni Litorja, Michael W. Aiken, Aaron Urbas, National Institute of Standards and Technology (USA); Banghe Zhu, The Univ. of Texas Health Science Ctr. at Houston (USA) [8945-1]

8:50 am: **Polymer microfluidic phantoms for characterization of fluorescence laminar optical tomography (FLOT) system**, Jianting Wang, Chao-Wei Chen, Anthony Fouad, Siddarth Plakkot, Hyounguk Jang, Yu Chen, Univ. of Maryland, College Park (USA) [8945-2]

9:10 am: **Estimating the spatial resolution of fNIRS sensors for BCI purposes**, Rand Kasim M. Almajidy, Univ. of Freiburg Medical Ctr. (Germany) and Univ. of Luebeck (Germany); Robert D. Kirch, Olaf Christ, Ulrich G. Hofmann, Univ. of Freiburg Medical Ctr. (Germany) [8945-3]

9:30 am: **Development and characterization of a brain tumor mimicking fluorescence phantom**, Neda Haj-Hosseini, Linköping Univ. (Sweden); Benjamin Kistler, Univ. of Northwestern Switzerland (Switzerland) and Linköping Univ. (Sweden); Karin Wårdell, Linköping Univ. (Sweden) [8945-4]

9:50 am: **The development of a simplified epithelial tissue phantom for the evaluation of an autofluorescence mitigation algorithm**, Vivian W. Hou, Chenying Yang, Leonard Y. Nelson, Eric J. Seibel, Univ. of Washington (USA) and Human Photonics Lab. (USA) [8945-5]

Coffee Break Sat 10:10 am to 10:40 am

SESSION 2

Location: Room 276 (Mezzanine) . . . Sat 10:40 am to 11:40 am

Novel Phantom Design

Session Chair: **Jean-Pierre Bouchard**, INO (Canada)

10:40 am: **CI Slide: calibration slide for quantitative microscopy imaging in absorbance**, Fahime Sheikhzadeh, Anita Carraro, Jagoda Korbelik, Nasir Zulkafly, Alan Harrison, The BC Cancer Agency Research Ctr. (Canada); Michele Follen, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Calum MacAulay, Martial Guillaud, The BC Cancer Agency Research Ctr. (Canada) [8945-6]

11:00 am: **Construction of a digital and physical mouse model aimed at the study of electrical shock**, Thu Ahn Nguyen, The Catholic Univ. of America (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA); Jeffrey W. Shupp, MedStar Washington Hospital Ctr. (USA); Lauren Moffatt, MedStar Washington Hospital Ctr. (USA); Jessica C. Ramella-Roman, The Catholic Univ. of America (USA) [8945-7]

11:20 am: **3D printing method for freeform fabrication of optical phantoms simulating heterogeneous biological tissue**, Minjie Wang, Shuwei Shen, Erbao Dong, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8945-8]

Lunch/Exhibition Break Sat 12:00 pm to 1:30 pm

SESSION 3

Location: Room 276 (Mezzanine) Sat 1:30 pm to 2:50 pm

Spectral and Multimodal Phantoms

Session Chair: **Jean-Pierre Bouchard**, INO (Canada)

1:30 pm: **New polymer-based phantom for photoacoustic imaging**, Hideaki Iwazaki, Taiichiro Ida, Yasushi Kawaguchi, Advantest Corp. (Japan); Taiji Nishi, Materialdesign Corp. (Japan); Yukari Tanikawa, Naotaka Nitta, National Institute of Advanced Industrial Science and Technology (Japan) [8945-9]

1:50 pm: **Tissue phantoms for multimodal approaches: Raman spectroscopy and optoacoustics**, Merve Wollweber, Christian Suhr, Ann-Kathrin Kniggendorf, Bernhard Roth, Leibniz Univ. Hannover (Germany) [8945-10]

2:10 pm: **On mimicking diffuse reflectance spectra in the visible and near-infrared ranges for tissue-like phantom design**, Nicola Debernardi, Paraskevas Dunias, Benno van El, Andrew E. Statham, TNO (Netherlands) [8945-11]

2:30 pm: **Photon path depth in tissue phantoms: a comparison of visible and near-infrared (NIR) wavelengths**, Karin M. Asplund, Kenneth A. Schenkman M.D., Wayne A. Ciesielski, Univ. of Washington (USA); Lorilee S. L. Arakaki, Univ. of Washington Medical Ctr. (USA) [8945-12]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 4

Location: Room 276 (Mezzanine) Sat 3:40 pm to 5:00 pm

Phantoms in OCT

Session Chair: **David W. Allen**, National Institute of Standards and Technology (USA)

3:40 pm: **Multilayered disease-mimicking bladder phantom with realistic surface topology for optical coherence tomography**, Kristen L. Lurie, Jennifer T. Smith, Saara A. Khan, Audrey K. Ellerbee, Stanford Univ. (USA) [8945-13]

4:00 pm: **An anatomically correct phantom eye used in the development of wide-field optical coherence tomography**, Anthony T. Corcoran, Optos plc (United Kingdom) and Univ. of Glasgow (United Kingdom); Gonzalo Muyo, Jano I. van Hemert, Optos plc (United Kingdom); Andrew R. Harvey, Univ. of Glasgow (United Kingdom) [8945-14]

4:20 pm: **Phantoms towards dimensional metrology standards for depth-resolving optical medical imagers**, Jennifer Field, Robert C. Chang, Stevens Institute of Technology (USA); Daniel Stark, Jeeseong Hwang, Maritoni Litorja, National Institute of Standards and Technology (USA) . [8945-15]

4:40 pm: **Diamond-turned calibration standards for optical coherence tomography systems**, Amber M. Beckley, Ecole Polytechnique de Montréal (Canada); Mathias Strupler, Sainte-Justine Hospital Research Ctr. (Canada); Jean-Pierre Bouchard, Sylvain Dubois, Ozzy Mermut, INO (Canada); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) and Sainte-Justine Hospital Research Ctr. (Canada) [8945-16]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

The optimization of laser parameters in artificial optical cochlear, Yang Liu, Sasa Zhang, Shuo Jiang, lan Tian, Shandong Univ. (China) [8945-19]

Sunday 2 February

SESSION 5

Location: Room 222 (Mezzanine) Sun 8:30 am to 10:00 am

Standards and Phantoms in Biophotonics

Joint Session with Conferences 8936 and 8945

Session Chair: **Robert J. Nordstrom**, National Institutes of Health (USA)

8:30 am: **Special imaging techniques in tissue models for validation, safe application, education, and improvement of medical devices** (*Invited Paper*), Rudolf M. Verdaasdonk, Albert J. Van der Veen, John M. Klaessens, Vrije Univ. Medical Ctr. (Netherlands) [8936-21]

9:00 am: **Quantitative assessment of biophotonic imaging system performance with phantoms fabricated by rapid prototyping**, Jianting Wang, Univ. of Maryland, College Park (USA); James Coburn, U.S. Food & Drug Administration (USA); Nicholas Woolsey, Chia-Pin Liang, Univ. of Maryland, College Park (USA); Du Vinh Nguyen Le, McMaster Univ. (Canada); Jessica Ramella-Roman, The Catholic Univ. of America (USA); Yu Chen, Univ. of Maryland, College Park (USA); Joshua Pfefer, U.S. Food & Drug Administration (USA) [8936-22]

9:20 am: **Microfluidic channel devices as volumetric measurement phantoms in optical coherence tomography and confocal microscopy**, Jeeseong Hwang, Daniel Stark, Darwin Reyes, Michael Halter, National Institute of Standards and Technology (USA) [8945-17]

9:40 am: **Characterization of a novel time-domain non-contact tissue scanning system**, Heidrun Wabnitz, Mikhail Mazurenka, Physikalisch-Technische Bundesanstalt (Germany); Laura Di Sieno, Alberto Dalla Mora, Davide Contini, Gianluca Boso, Alberto Tosi, Politecnico di Milano (Italy); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Yoko Hoshi, Tokyo Metropolitan Institute of Medical Science (Japan); Yukari Tanikawa, National Institute of Advanced Industrial Science and Technology (Japan); Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany); Antonio Pifferi, Politecnico di Milano (Italy) and CNR, Istituto di Fotonica e Nanotecnologie (Italy) [8945-18]

Optical Elastography and Tissue Biomechanics

Conference Chairs: **Kirill V. Larin**, Univ. of Houston (USA); **David D. Sampson**, The Univ. of Western Australia (Australia)

Program Committee: **Jeffrey C. Bamber**, Institute of Cancer Research (United Kingdom); **A. Claude Boccara**, Institut Langevin (France); **Stephen A. Boppart M.D.**, Univ. of Illinois at Urbana-Champaign (USA); **Brett E. Bouma**, Wellman Ctr. for Photomedicine (USA); **Zhongping Chen**, Beckman Laser Institute and Medical Clinic (USA); **Donald D. Duncan**, Portland State Univ. (USA); **Kishan Dholakia**, Univ. of St. Andrews (United Kingdom); **Daniel S. Elson**, Imperial College London (United Kingdom); **Mathias Fink**, Institut Langevin (France); **Brendan F. Kennedy**, Univ. of Western Australia (Australia); **Sean J. Kirkpatrick**, Michigan Technological Univ. (USA); **Seemantini K. Nadkarni**, Harvard Medical School (USA); **Kentaro Nakamura**, Tokyo Institute of Technology (Japan); **Amy L. Oldenburg**, The Univ. of North Carolina at Chapel Hill (USA); **Francesco S. Pavone**, European Lab. for Non-linear Spectroscopy (Italy); **Giuliano Scarcelli**, Harvard Medical School (USA); **Gijs van Soest**, Erasmus MC (Netherlands); **Victor X. D. Yang**, Ryerson Univ. (Canada); **Seok Hyun A. Yun**, Wellman Ctr. for Photomedicine (USA); **Ruikang K. Wang**, Univ. of Washington (USA)

Saturday 1 February

WELCOME REMARKS

Location: Room 110 (Exhibit Level) 9:00 am to 9:10 am

Session Chairs: **Kirill V. Larin**, Univ. of Houston (USA);
David D. Sampson, The Univ. of Western Australia (Australia)

SESSION 1

Location: Room 110 (Exhibit Level) .. Sat 9:10 am to 10:20 am

Optical Coherence Elastography I: Tissue Mechanical Contrast

Session Chairs: **Kirill V. Larin**, Univ. of Houston (USA);
David D. Sampson, The Univ. of Western Australia (Australia)

9:10 am: **Optical coherence elastography techniques for assessing biomechanical properties of tissues and cells** (*Invited Paper*), Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8946-1]

9:40 am: **3D static and shear wave full-field optical coherence elastography of tissues**, Amir Nahas, Institut Langevin (France); Stephane Roux, Ecole Normale Supérieure de Cachan (France); Mickael Tanter, A. Claude Boccara, Institut Langevin (France) [8946-2]

10:00 am: **Optical coherence elastography on excised breast cancer specimens: comparison with OCT and histology**, Brendan F. Kennedy, Robert A. McLaughlin, Kelsey M. Kennedy, Alan Tien, Lixin Chin, The Univ. of Western Australia (Australia); Bruce Latham, Royal Perth Hospital (Australia); Christobel M. Saunders, David D. Sampson, The Univ. of Western Australia (Australia) . [8946-3]

Coffee Break Sat 10:20 am to 10:50 am

SESSION 2

Location: Room 110 (Exhibit Level) . Sat 10:50 am to 12:10 pm

Optical Coherence Elastography II: Novel Methods

Session Chairs: **Stephen A. Boppart M.D.**, Univ. of Illinois at Urbana-Champaign (USA);
Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA)

10:50 am: **Magnetomotive optical coherence elastography for micro-rheology of biological tissues and cells**, Vasilica Crecea, Adeel Ahmad, Benedikt W. Graf, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8946-4]

11:10 am: **Quantitative compression optical coherence elastography enabled by a high-resolution stress sensor**, Kelsey M. Kennedy, Lixin Chin, Robert A. McLaughlin, David D. Sampson, Brendan F. Kennedy, The Univ. of Western Australia (Australia) [8946-5]

11:30 am: **Visualization of ultrasonically induced shear wave propagation using phase sensitive optical coherence tomography**, Thu-Mai Nguyen, Univ. of Washington (USA); Shaozhen Song, Univ. of Washington (USA) and Univ. of Dundee (United Kingdom); Bastien Arnal, Emily Y. Wong, Matthew O'Donnell, Ruikang K. Wang, Univ. of Washington (USA) [8946-6]

11:50 am: **Visualization of shear wave propagation in cornea using optical coherence elastography**, Shang Wang, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) [8946-7]

Lunch/Exhibition Break Sat 12:10 pm to 1:40 pm

SESSION 3

Location: Room 110 (Exhibit Level) . . . Sat 1:40 pm to 3:10 pm

Ocular Biomechanics

Session Chairs: **Giuliano Scarcelli**, Wellman Ctr. for Photomedicine (USA); **Ruikang K. Wang**, Univ. of Washington (USA)

1:40 pm: **Corneal biomechanical properties from air-puff corneal deformation imaging** (*Invited Paper*), Susana Marcos, Consejo Superior de Investigaciones Científicas (Spain) [8946-8]

2:10 pm: **Air induced deformations: a tool for analysis of nonstructural properties of anterior segment of the human eye**, Karol Karnowski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) [8946-9]

2:30 pm: **Elastography methods applicable to the human eye**, Altaf A. Khan, Soledad Cortina, Univ. of Illinois at Chicago (USA); Wallace Chamon, Univ. of Illinois at Chicago (USA) and Univ. Federal de São Paulo (Brazil); Thomas J. Royston, Univ. of Illinois at Chicago (USA) [8946-10]

2:50 pm: **Corneal biomechanics with Brillouin microscopy**, Giuliano Scarcelli, Sebastien Besner, Seok Hyun Andy Yun, Harvard Medical School (USA) [8946-11]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 4

Location: Room 110 (Exhibit Level) . . . Sat 3:40 pm to 5:40 pm

Elastography Methods and Applications

Session Chairs: **Daniel S. Elson**, Imperial College London (United Kingdom); **A. Claude Boccara**, Institut Langevin (France)

3:40 pm: **GPU-accelerated video-rate optical coherence elastography**, Rodney W. Kirk, Brendan F. Kennedy, Lixin Chin, Kelsey M. Kennedy, David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia) [8946-12]

4:00 pm: **Simulation and optimization of shear wave detection by laser speckle contrast analysis for cm-depth elasticity imaging**, Sinan Li, Cheng Yi, Imperial College London (United Kingdom); Robert J. Eckersley, King's College London (United Kingdom); Daniel S. Elson, Mengxing Tang, Imperial College London (United Kingdom) [8946-13]

4:20 pm: **Laser speckle tracking for monitoring and analysis of retinal photocoagulation**, Eric Seifert, Katharina Bliedtner, Ralf Brinkmann, Medizinisches Laserzentrum Lübeck GmbH (Germany) [8946-14]

4:40 pm: **Ultrasound visualization of internal crystalline lens deformation using laser-induced microbubbles**, Andrei Karpiouk, Salavat Aglyamov, The Univ. of Texas at Austin (USA); Adrian Glasser, Univ. of Houston (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA) [8946-15]

5:00 pm: **Wide band optical elastography of in vivo human skin using geometrically focused surface waves**, Steven P. Kearney, Zoujun Dai, Thomas J. Royston, Univ. of Illinois at Chicago (USA) [8946-16]

5:20 pm: **Evaluation of fingerprint deformation using optical coherence tomography**, Henrique S. Gutierrez da Costa, Stanford Univ. (USA) and Univ. Federal do Paraná (Brazil); Luciano Silva, Univ. Federal do Paraná (Brazil); Audrey K. Ellerbee, Stanford Univ. (USA) [8946-17]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 110 (Exhibit Level) . . Sun 9:00 am to 12:00 pm

Sub-Cellular and Membrane Biomechanics

Session Chairs: **Francesco S. Pavone**, European Lab. for Non-linear Spectroscopy (Italy); **Seok Hyun Andy Yun**, Wellman Ctr. for Photomedicine (USA)

9:00 am: **New light on cell manipulation and rheology** (*Invited Paper*), Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8946-18]

9:30 am: **Ultra-fast optical manipulation of single proteins binding to the actin cytoskeleton**, Marco Capitanio, Univ. degli Studi di Firenze (Italy) and European Lab. for Non-linear Spectroscopy (Italy); Lucia Gardini, European Lab. for Non-linear Spectroscopy (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy) and National Institute of Optics (Italy) [8946-19]

9:50 am: **Dark-field Brillouin microscopy for elasticity imaging**, Giuseppe Antonacci, Imperial College London (United Kingdom); Matthew R. Foreman, Max-Planck-Institut für die Physik des Lichts (Germany) and Imperial College London (United Kingdom); Carl Paterson, Peter Török, Imperial College London (United Kingdom) [8946-20]

Coffee Break Sun 10:10 am to 10:40 am

10:40 am: **Linking cell shape, elasticity and fate**, Huabing Yin, Gordon McPhee, Xiaofei Yuan, Matt Dalby, Mathis Riehle, Univ. of Glasgow (United Kingdom) [8946-21]

11:00 am: **Membrane mechanics in erythrocytes infected with transgenic malaria parasites**, Poorya Hosseini, Zeinab Aboud, Youngwoon Choi, Peter T. C. So, Zahid Yaqoob, Massachusetts Institute of Technology (USA) . . . [8946-22]

11:20 am: **Non-gaussian dynamics of red blood cell membrane fluctuation using diffraction phase microscopy**, Hyunjoo Park, Sangyeon Cho, YongKeun Park, KAIST (Korea, Republic of) [8946-23]

11:40 am: **Rate-dependent dynamics of cellular membranes probed by laser tweezers and optical displacement sensing**, Nima Khatibzadeh, Beckman Laser Institute and Medical Clinic (USA); Alexander A. Spector, Johns Hopkins Univ. (USA); William E. Brownell, Baylor College of Medicine (USA); Bahman Anvari, Univ. of California, Riverside (USA) [8946-24]

Lunch/Exhibition Break Sun 12:00 pm to 1:30 pm

SESSION 6

Location: Room 110 (Exhibit Level) . . . Sun 1:30 pm to 3:20 pm

Optical Coherence Elastography III: Ultrasonic Loading

Session Chairs: **Victor X. D. Yang**, Ryerson Univ. (Canada); **Brendan F. Kennedy**, The Univ. of Western Australia (Australia)

1:30 pm: **Use of phase sensitive OCT to track and visualize dynamic mechanical wave propagation within tissue** (*Invited Paper*), Ruikang K. Wang, Univ. of Washington (USA) [8946-26]

2:00 pm: **Confocal acoustic radiation force optical coherence elastography**, Rui Li, Beckman Laser Institute and Medical Clinic (USA); Wenjuan Qi, Univ. of California, Irvine (USA); Teng Ma, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA) [8946-26]

2:20 pm: **Acoustic radiation force optical coherence elastography of phantoms and biological tissues based on focused ultrasound excitation**, Steven G. Adie, Yue Wang, Nathan D. Shemonski, Youbo Zhao, Jongsik Kim, Michael F. Insana, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [8946-27]

2:40 pm: **Model-based optical coherence elastography using acoustic radiation force**, Salavat Aglyamov, The Univ. of Texas at Austin (USA); Shang Wang, Univ. of Houston (USA); Andrei Karpiouk, The Univ. of Texas at Austin (USA); Jiasong Li, Univ. of Houston (USA); Stanislav Emelianov, The Univ. of Texas at Austin (USA); Kirill V. Larin, Univ. of Houston (USA) [8946-28]

3:00 pm: **Multiphysics simulation of optical coherence elastography images using combined optical and mechanical models**, Lixin Chin, Andrea Curatolo, Brendan F. Kennedy, The Univ. of Western Australia (Australia); Barry Doyle, The Univ. of Western Australia (Australia) and The Univ. of Edinburgh (United Kingdom); Peter R. T. Munro, Robert A. McLaughlin, David D. Sampson, The Univ. of Western Australia (Australia) [8946-29]

Coffee Break Sun 3:20 pm to 3:50 pm

SESSION 7

Location: Room 110 (Exhibit Level) . . . Sun 3:50 pm to 5:30 pm

Cellular Biomechanics and Applications

Session Chairs: **Amy L. Oldenburg**, The Univ. of North Carolina at Chapel Hill (USA); **Seemantini K. Nadkarni**, Harvard Medical School (USA)

3:50 pm: **Imaging the cellular response to transient shear stress using time-resolved digital holography**, Yoshihiko Arita, Maciej K. Antkowiak, Frank Gunn-Moore, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8946-30]

4:10 pm: **Dimensional characterisation of collagen constructs in situ**, Daniel J. Daly, Robin Taylor, James Reynolds, Bhaskar Chikkanna, Lein Applied Diagnostics Ltd. (United Kingdom); Robert A. Brown, Univ. College London (United Kingdom) [8946-31]

4:30 pm: **Optical rheology of blood coagulation**, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Markandey M. Tripathi, Harvard Medical School (USA) [8946-32]

4:50 pm: **Evaluation of blood coagulation parameters using optical thromboelastography (OTEG)**, Markandey M. Tripathi, Seemantini K. Nadkarni, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8946-33]

5:10 pm: **Rapid assessment of elevated level of protein content in meningitis using elasticity measurements**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) [8946-34]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Optical coherence tomography detection of shear wave propagation in MCF7 cell modules and carotid artery samples, Marjan Razani, Adrian Mariampillai, Ryerson Univ. (Canada); Tim-Rasmus Kiehl, Univ. Health Network (Canada); Victor Yang, Michael C. Kolios, Ryerson Univ. (Canada) [8946-35]

OCT-based air suction-indentation probe for tissue elasticity measurement, Yong-Ping Zheng, Like Wang, Tianjie Li, The Hong Kong Polytechnic Univ. (Hong Kong, China); Y. Y. Wang, Fudan Univ. (China) [8946-36]

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Conference Chairs: **Daniel L. Farkas**, SMI (USA); **Dan V. Nicolau**, McGill Univ. (Canada); **Robert C. Leif**, Newport Instruments (USA)

Conference Co-Chairs: **James F. Leary**, Purdue Univ. (USA); **Attila Tarnok**, Univ. Leipzig (Germany); **Rebecca R. Richards-Kortum**, Rice Univ. (USA)

Program Committee: **Vadim Backman**, Northwestern Univ. (USA); **Christopher H. Contag**, Stanford Univ. School of Medicine (USA); **Paul M. W. French**, Imperial College London (United Kingdom); **DaeGab Gweon**, KAIST (Korea, Republic of); **Charles P. Lin**, Wellman Ctr. for Photomedicine (USA); **Sacha Loiseau**, Mauna Kea Technologies (France); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Sebastian Wachsmann-Hogiu**, NSF Ctr. for Biophotonics Science and Technology (USA); **Warren S. Warren**, Duke Univ. (USA)

Monday 3 February

SESSION 1

Location: Room 300 (Esplanade) . . . Mon 8:00 am to 10:00 am

Functional Imaging of Biomolecules, Cells, and Tissues I

Session Chair: **Daniel L. Farkas**, SMI (USA)

8:00 am: **Fluorescence lifetime imaging of NADH and FAD reports therapeutic effects on pancreatic cancer metabolism**, Gregory Michel, Jason Castellanos M.D., Nipun Merchant, Melissa C. Skala, Vanderbilt Univ. (USA) [8947-1]

8:20 am: **Raman microbeam spectrometer noninvasively measures bioelements to monitor the tryptophan metabolic pathway**, Gregory Michel, Alan Bigelow, Jamie Harden, The Rockefeller Univ. (USA); James G. Krueger M.D., Rockefeller Univ (USA); Daniel S. Gareau, The Rockefeller Univ. (USA) [8947-2]

8:40 am: **Digital holographic microscopy for monitoring growth and treatment response in 3D in vitro tumor models**, Yuyu Li, Ljubica Petrovic, Jonathan P. Celli, Chandra S. Yelleswarapu, Univ. of Massachusetts Boston (USA) [8947-3]

9:00 am: **Optical monitoring of glucose demand and vascular delivery in a preclinical murine model**, Amy E. Frees, Narasimhan Rajaram, Samuel McCachren, Alex Vaz, Mark Dewhirst D.V.M., Nimmi Ramanujam, Duke Univ. (USA) [8947-4]

9:20 am: **Network signatures of nuclear and cytoplasmic density alterations in a model of pre- and post-metastatic colorectal cancer**, Dhwanil Damania, Hariharan Subramanian, Vadim Backman, Northwestern Univ. (USA); Eric Anderson, Melissa Wong, Owen J. T. McCarty, Kevin G. Phillips, Oregon Health & Science Univ. (USA) [8947-5]

9:40 am: **Endogenous two-photon excited fluorescence microscopy can elucidate metabolic changes in precancerous tissues**, Irene Georgakoudi, Antonio Varone, Joanna Xylas, Kyle P. Quinn, Tufts Univ. (USA); Margaret McLaughlin-Drubin, Karl Munger, Brigham and Women's Hospital (USA) . [8947-6]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 300 (Esplanade) . . Mon 10:30 am to 12:10 pm

Functional Imaging of Biomolecules, Cells, and Tissues II

Session Chair: **Daniel L. Farkas**, SMI (USA)

10:30 am: **In vivo imaging of spinal cord in contusion injury model mice by multiphoton microscopy**, Yusuke Oshima, Hideki Horiuchi, Tadanori Ogata, Atsuhiko Hikita, Hiromasa Miura, Takeshi Imamura, Ehime Univ. (Japan) . [8947-7]

10:50 am: **Chromophore behavior in aging bruises**, Richelle J. M. Hoveling, Ton G. van Leeuwen, Maurice C. Aalders, Academisch Medisch Ctr. (Netherlands) [8947-8]

11:10 am: **Temporally and spectrally encoded confocal microscopy (T-SECM)**, Jaehyun Hwang, Socheol Kim, Jung Heo, SuHo Ryu, Chulmin Joo, Yonsei Univ. (Korea, Republic of) [8947-9]

11:30 am: **Imaging infrared spectroscopy for fixation-free liver tumor detection**, James V. Coe, Heather C. Allen, Charles L. Hitchcock, The Ohio State Univ. (USA) [8947-10]

11:50 am: **High-speed stimulated Raman spectral imaging for digital staining of mouse cancer tissues**, Yoichi Otsuka, Shuya Satoh, Masafumi Kyogaku, Hiroyuki Hashimoto, Canon Inc. (Japan); Kazuyoshi Itoh, Osaka Univ. (Japan); Yasuyuki Ozeki, Univ. of Tokyo (Japan) [8947-11]

Lunch Mon 12:10 pm to 1:40 pm

SESSION 3

Location: Room 300 (Esplanade) Mon 1:40 pm to 3:00 pm

Spectral Imaging and Multiparameter Measurements I

Session Chair: **Daniel L. Farkas**, SMI (USA)

1:40 pm: **Monitoring cell-drug interaction by high-speed confocal Raman microscopy**, Jeon Woong Kang, Massachusetts Institute of Technology (USA); Freddy T. Nguyen, Univ. of Illinois at Urbana-Champaign (USA); Niyom Lue, Yongjin Sung, Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) [8947-12]

2:00 pm: **Beat frequency-multiplexed fluorescence lifetime measurements for high-speed confocal lifetime microscopy**, Jacky C. Chan, Eric D. Diebold, Brandon W. Buckley, Sien Mao, Najva Akbari, Bahram Jalali, Univ. of California, Los Angeles (USA) [8947-13]

2:20 pm: **Joint end-member and spatial hypothesis testing for estimating the number of components in multispectral FLIM data**, Omar Gutierrez-Navarro, Univ. Autonoma de San Luis Potosi (Mexico); Paritosh Pande, Texas A&M Univ. (USA); Daniel U. Campos-Delgado, Edgar Arce-Santana, Univ. Autonoma de San Luis Potosi (Mexico); Martin O. Mendez, Univ. Autonoma de San Luis Potosi (Mexico); Javier A. Jo, Texas A&M Univ. (USA) [8947-14]

2:40 pm: **Effects of surrounding media viscosity and particle size on optical trapping of microspheres**, Nima Khatibzadeh, Beckman Laser Institute and Medical Clinic, Univ. of California (USA); Yesenia Rocha, Univ. of California, Irvine (USA); Linda Z. Shi, Univ. of California, San Diego (USA); Micheal W. Berns, Beckman Laser Institute and Medical Clinic, Univ. of California (USA) and Univ. of California, San Diego (USA) [8947-15]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 4

Location: Room 300 (Esplanade) Mon 3:30 pm to 5:50 pm

Spectral Imaging and Multiparameter Measurements II

Session Chair: **Daniel L. Farkas**, SMI (USA)

3:30 pm: **Identification of inflammation sites in arthritic joints using hyperspectral imaging**, Lukasz A. Paluchowski, Matija Milanic, Norwegian Univ. of Science and Technology (Norway); Berit Grandaunet M.D., St. Olavs Hospital (Norway); Alvilde Dhainaut M.D., Norwegian Univ. of Science and Technology (Norway); Mari Hoff M.D., St. Olavs Hospital (Norway) and Norwegian Univ. of Science and Technology (Norway); Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway) [8947-16]

3:50 pm: **Toward in-vivo diagnosis of skin cancer using multimode imaging dermoscopy (SkinSpect): (I) clinical system development and validation**, Nicholas B. MacKinnon, Fartash Vasefi, Spectral Molecular Imaging Inc. (USA); Daniel L. Farkas, Spectral Molecular Imaging Inc. (USA) and Univ. of Southern California (USA) [8947-17]

4:10 pm: **Toward in-vivo diagnosis of skin cancer using multimode imaging dermoscopy (SkinSpect™): (II) molecular mapping of highly pigmented lesions**, Fartash Vasefi, Nicholas B. MacKinnon, Spectral Molecular Imaging Inc. (USA); Daniel L. Farkas, Spectral Molecular Imaging Inc. (USA) and Univ. of Southern California (USA) [8947-18]

4:30 pm: **Darkfield microscopy hyperspectral imager to detect single nanoparticles in breast cancer cells**, Stephane Marcet, Nicolas David, Photon etc. Inc. (Canada); David Rioux, Eric Bergeron, Ecole Polytechnique de Montreal (Canada); Marc Verhaegen, Photon etc. Inc. (Canada); Michel Meunier, Ecole Polytechnique de Montreal (Canada); Sebastien Blais-Ouellette, Photon etc. Inc. (Canada) [8947-19]

Conference 8947 · Location: Room 300 (Esplanade)

4:50 pm: **Multispectral imaging for diagnosis and treatment**, Gary E. Carver, Sarah A. Locknar, William A. Morrison, Omega Optical, Inc. (USA); Daniel L. Farkas, Spectral Molecular Imaging, Inc. (USA) [8947-20]

5:10 pm: **Bartonella henselae invades of human erythrocytes in vitro**, Gislaine Vieira-Damiani, Univ. Estadual de Campinas (Brazil); Marna Elise Ericson M.D., Univ. of Minnesota (USA); Vitor B. Pelegati, André A. de Thomaz, Hernandes F. Carvalho, Carlos Lenz Cesar, Marilene Neves, Tânia Benetti Soares, Paulo E. F. Velho, Univ. Estadual de Campinas (Brazil) [8947-21]

5:30 pm: **Holographic monitoring of radiationless deactivation of excited biomolecules**, Irina V. Semenova, Oleg S. Vasyutinskii, Alexandra D. Moskovtseva, Ioffe Physico-Technical Institute (Russian Federation) . . . [8947-22]

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Diffusion optical spectroscopy of cancerous and normal prostate tissues in time-resolved and frequency domain, Kenneth J. Zhou, Stony Brook Univ. (USA); Lin Wang, Columbia Univ. Medical Ctr. (USA) [8947-66]

Excitation and emission spectra criteria for distinguishing human Barrett's esophagus, normal and adenocarcinoma, Kenneth J. Zhou, Stony Brook Univ. (USA); Lin Wang, The Herbert Irving Comprehensive Cancer Ctr. (USA) and Kunmin Medical College (China) [8947-67]

Fluorescence lifetime imaging of lipids during 3T3-L1 cell differentiation, Young Sik Song, Dug Young Kim, Yonsei Univ. (Korea, Republic of) . . . [8947-68]

Effect of blue/red LED light combination on growth and morphogenesis of saccharum officinarum plantlets in vitro, Marina Medeiros Silva, Arquimedes L. de Oliveira, Ronaldo A. Oliveira-Filho, Artur S. Gouveia-Neto, Terezinha JR Camara, Lilia G. Willadino, Univ. Federal Rural de Pernambuco (Brazil) . [8947-69]

Cytometric analysis of retinopathies in retinal trypsin digests, Zahra Ghanian, Kevin Staniszewski, Reyhaneh Sepehr, Univ. of Wisconsin-Milwaukee (USA); Christine M. Sorenson, Univ. of Wisconsin School of Medicine (USA); Nader Sheibani, Univ. of Wisconsin School of Medicine (USA) [8947-70]

Ptychography: use of quantitative phase information for high-contrast label free time-lapse imaging of living cells, Rakesh Suman, Univ. of York (United Kingdom) and PhaseFocus (United Kingdom); Samuel Godden, Peter O'Toole, Univ. of York (United Kingdom) [8947-71]

Probing complex of influenza hemagglutinin with neutralizing antibody using terahertz spectroscopy technology, Yiwen Sun, Shenzhen Univ. (China) [8947-72]

Real time monitoring of superoxide dynamics in vivo through fluorescent proteins using a sensitive fiber probe, Yu-Chung Chang, Chuian-Fu Ken, Che-Wei Hsu, Ya-Ging Liu, National Changhua Univ. of Education (Taiwan) [8947-73]

Fluorescent cyanine probe for DNA detection and cellular imaging, Yongchao Zheng, Technical Institute of Physics and Chemistry (China) . [8947-74]

Fluorescence interference contrast microscopy based approach to study real time interaction of melittin with plasma membranes, Sharad Gupta, Indian Institute of Technology Indore (India) and Univ. of California, Riverside (USA); Dong Gui, Roya Zandi, Sarjeet Singh Gill, Umar Mohideen, Univ. of California, Riverside (USA) [8947-75]

Fluorescence enhancement of nanodiamond in living hela cells by microscopy imaging, Mei-Ling Zheng, Ying Lei, Technical Institute of Physics and Chemistry (China); Yong-Chao Zheng, Jin-Fang Zhi, Zhen-Sheng Zhao, Xuan-Ming Duan, Technical Institute of Physics and Chemistry (China) . [8947-76]

Assessment of the anti-cancer drug chemoresistance by Raman microspectroscopy and atomic force microscopy (AFM), Qifei Li, Lifu Xiao, Anhong Zhou, Utah State Univ. (USA) [8947-77]

Revisit laser scanning fluorescence microscopy performance under fluorescence-lifetime-limited regime, Antony C. Chan, Terence T. W. Wong, Kenneth K. Y. Wong, Edmund Y. Lam, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) [8947-78]

In-situ monitoring of brain tissue reaction of chronically implanted electrodes with an optical coherence tomography fiber system, Yijing Xie, Univ. Medical Ctr. Freiburg (Germany); Andreas Seifert, Albert-Ludwigs-Univ. Freiburg (Germany); Ulrich G. Hofmann, Univ. Medical Ctr. Freiburg (Germany) [8947-79]

Image and depth map quality metrics for phase contrast imaging, William A. Smith, Ka-Po Lam, James B. Richardson, Keele Univ. (United Kingdom) [8947-80]

In vivo quantitation of circulating tumor cells based on real-time confocal microscopy, Howon Seo, Yoonha Hwang, Kibaek Choe, Jinhyo Ahn, Eunjoo Song, Pilhan Kim, KAIST (Korea, Republic of) [8947-81]

Image processing with the radial Hilbert transform of photo-thermal imaging for carious detection, Yasser H. El-Sharkawy, Cairo Univ. (Egypt) . . . [8947-82]

Atherosclerosis staging: imaging using FLIM technique, Leticia B. Sicchieri, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Marina B. Barioni, Univ. de São Paulo (Brazil); Mônica N. Silva, Univ. Federal de São Paulo (Brazil); Andrea M. Monteiro, Antonio M. Neto, Amando S. Ito, Univ. de São Paulo (Brazil); Lilia C. Courrol, Univ. Federal de São Paulo (Brazil) [8947-83]

New blood markers for staging and prognostics of atherosclerosis, Leticia B. Sicchieri, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Mônica N. Silva, Univ. Federal de São Paulo (Brazil); Andrea M. Monteiro, Antonio M. Neto, Univ. de São Paulo (Brazil); Lilia C. Courrol, Univ. Federal de São Paulo (Brazil) [8947-85]

Efficacy of photodynamic therapy against larvae of Aedes aegypti by using confocal microscopy and fluorescence-lifetime imaging, Larissa M. de Souza, Univ. of São Paulo (Brazil); Natalia M. Inada, Sebastião Prataveira, Francisco E. G. Guimarães, Cristina Kurachi D.D.S., Juliano J. Corbi, Univ. de São Paulo (Brazil); Susana Trivinho Strixino, Univ. Federal de São Carlos (Brazil); Vanderelei Salvador Bagnato, Univ. de São Paulo (Brazil) [8947-86]

Quantitative microscopic Mueller matrix polarimetric imaging of red blood cells, Harshit Lakhota, The Univ. of Texas at Arlington (USA) and IISER-Kolkata (India); Mathias I. Ajaero, The Univ. of Texas at Arlington (USA); Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India); Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8947-87]

Toward noninvasive diagnosis of Duchenne muscular dystrophy by hyperspectral imaging: preclinical analysis of ex-vivo tissue specimens, Fartash Vasefi, Astrid Chamson-Reig, Lawson Health Research Institute (Canada); Jeffrey J. L. Carson, Lisa Hoffman, Lawson Health Research Institute (Canada) and Univ. of Western Ontario (Canada) [8947-88]

Tuesday 4 February

SESSION 5

Location: Room 300 (Esplanade) Tue 8:00 am to 10:10 am

Quantitative Cell and Tissue Analysis I

Session Chair: **James F. Leary**, Purdue Univ. (USA)

8:00 am: **Dental pulp stem cells (DPSCS) differentiation study by confocal Raman microscopy**, Hamideh Salehi, Univ. Montpellier 1 (France) [8947-23]

8:20 am: **The use of upconverting phosphors in point-of-care (POC) testing (Invited Paper)**, Hans J. Tanke, Claudia J. De Dood, Elisa M. Tjon Kon Fat, Paul Corstjens, Leiden Univ. Medisch Ctr. (Netherlands) [8947-24]

8:50 am: **Fluorescent lifetime imaging of surgical specimens using two-photon microscopy at MHz rates**, Michael G. Giacomelli, Massachusetts Institute of Technology (USA); Yuri Sheikine, Beth Israel Deaconess Medical Ctr. (USA) and Harvard Medical School (USA); Jeffrey Brooker, Thorlabs, Inc. (USA) and Advanced Imaging Group (USA); James Connolly, Beth Israel Deaconess Medical Ctr. (USA) and Harvard Medical School (USA); Alex E. Cable, Thorlabs Inc. (USA) and Advanced Imaging Group (USA); James Fujimoto, Massachusetts Institute of Technology (USA) [8947-25]

9:10 am: **Lifetime modulated lanthanide tags**, Robert C. Leif, Newport Instruments (USA); Yiqing Lu, Macquarie Univ. (Australia); Francisco M. Raymo, Univ. of Miami (USA); Sean Yang, Newport Instruments (USA) and Phoenix Flow Systems (USA); Dayong Jin, Macquarie Univ. (Australia) [8947-26]

9:30 am: **High-throughput measurement of the long excited-state lifetime of quantum dots in flow cytometry**, Eshan Dahal, Ruofan Cao, Patrick Jenkins, Jessica P. Houston, New Mexico State Univ. (USA) [8947-27]

9:50 am: **Android phone controlled handheld imaging system for biosensing applications**, Khalid M. Arif, Olaf Diegel, Massey Univ. (New Zealand) . [8947-28]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 6

Location: Room 300 (Esplanade) . . . Tue 10:40 am to 12:00 pm

Quantitative Cell and Tissue Analysis II

Session Chair: **James F. Leary**, Purdue Univ. (USA)

10:40 am: **Optical clearing based 3D visualization of cellular network in whole cortex of intact lymph node**, Eunjoo Song, Howon Seo, Kibaek Choe, Yoonha Hwang, Jinhyo Ahn, Pilhan Kim, KAIST (Korea, Republic of) . . . [8947-29]

11:00 am: **Diagnosis of myocardial infarction based on lectin-induced erythrocyte agglutination: a feasibility study**, Jozsef Bocsi, Kathleen Nieschke, Anja Mittag, Univ. of Leipzig (Germany); Thomas Reichert, GEMAK (Germany); Wiebke Laffers, Univ. of Bonn (Germany); Arkadiusz Pierzchalski, Joachim Piltz, Univ. Leipzig (Germany); Hans-Jürgen Esche, amtec Analysenmesstechnik GmbH (Germany); Günther Wolf, GEMAK (Germany); Ingo Dähnert, Attila Tarnok, Univ. Leipzig (Germany) . . . [8947-30]

11:20 am: **Flow cytometric assay for analysis of cytotoxic effects of potential drugs on human peripheral blood leukocytes**, Kathleen Nieschke, Univ. Leipzig (Germany); Anja Mittag, Prima BioMed GmbH (Germany); Karolina Golab, The Univ. of Chicago (USA); Arkadiusz Pierzchalski, Univ. Leipzig (Germany); Wojciech Kamysz, Medical Univ. of Gdansk (Poland); Jozsef Bocsi, Attila Tarnok, Univ. Leipzig (Germany) . . . [8947-31]

11:40 am: **A high-performance biometric signal and imaging processing method to reveal blood perfusion towards 3D oxygen saturation mapping**, Ryan Imms, Loughborough Univ. (United Kingdom); Michaël Trico, Polytech Paris-Sud (France); Vicente Azorin-Peris, Sijung Hu, Loughborough Univ. (United Kingdom) . . . [8947-32]

Lunch Break Tue 12:00 pm to 2:20 pm

SESSION 7

Location: Room 300 (Esplanade) Tue 2:20 pm to 3:00 pm

Biomedical Imaging with Advanced Microscopy using a DMD or other MEMS Micromirror

Joint Session with Conferences 8947 and 8979

Session Chairs: **Sara L. Best**, Univ. of Wisconsin School of Medicine and Public Health (USA); **Robert C. Leif**, Newport Instruments (USA)

2:20 pm: **Massively parallel confocal scanning imaging of the retina**, Kari V. Vienola, Boy Braaf, Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands) . . . [8979-19]

2:40 pm: **Miniaturized CARS microendoscope probe for label-free intraoperative imaging**, Xu Chen, Xi Wang, Zhengfan Liu, Xiaoyun Xu, Jie Cheng, Seng Weng, Michael J. Thrall, Kelvin Wong, Stephen Wong, The Methodist Hospital Research Institute (USA) . . . [8947-33]

Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 8

Location: Room 300 (Esplanade) Tue 3:30 pm to 5:30 pm

Biomedical Imaging using a DMD or other MEMS Micromirror

Joint Session with Conferences 8947 and 8979

Session Chairs: **Karel J. Zuzak**, Digital Light Innovations (USA); **Fartash Vasefi**, SMI (USA)

3:30 pm: **The use of hyperspectral imaging (HSI) in wound healing (Invited Paper)**, Javier La Fontaine, Lawrence Lavery, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Karel J. Zuzak, Digital Light Innovations (USA) . . . [8979-21]

4:10 pm: **DLP technology application: 3D head tracking and motion correction in medical brain imaging**, Oline V. Olesen, Massachusetts General Hospital (USA) and Technical Univ. of Denmark (Denmark); Jakob Wilm, Rasmus R. Paulsen, Technical Univ. of Denmark (Denmark); Liselotte Højgaard, Rigshospitalet (Denmark); Rasmus Larsen, Technical Univ. of Denmark (Denmark) . . . [8979-22]

4:30 pm: **Development of a spectrally-resolved fluorescence tomography system using a NIR swept laser and a digital micromirror array based detection system**, Jaedu Cho, Univ. of California, Irvine (USA); Seung Woan Jeon, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Orhan Nalcioglu, Gultekin Gulsen, Univ. of California, Irvine (USA) . . . [8947-34]

4:50 pm: **Using DMDs for focusing light through turbid media**, Sri Nivas Chandrasekaran, Hans Ligtenberg, Wiendelt Steenbergen, Ivo M. Vellekoop, Univ. Twente (Netherlands) . . . [8979-23]

5:10 pm: **Fabrication of topographic patterns by DMD-controlled photopolymerization and characterization for cellular migration**, Nelson Cardenas, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) . . . [8979-24]

Wednesday 5 February

SESSION 9

Location: Room 300 (Esplanade) . . . Wed 8:00 am to 10:00 am

Quantitative Cell and Tissue Analysis III

Session Chair: **Robert C. Leif**, Newport Instruments (USA)

8:00 am: **Ultra-high-throughput imaging flow cytometry using radiofrequency-tagged emission**, Eric D. Diebold, Brandon W. Buckley, Bahram Jalali, Univ. of California, Los Angeles (USA) . . . [8947-35]

8:20 am: **High-speed flow cytometric analysis of nanoparticle targeting to rare leukemic stem cells in peripheral human blood: preliminary in-vitro studies**, Christy L. Cooper, James F. Leary, Purdue Univ. (USA) . . . [8947-36]

8:40 am: **Imaging spontaneous enzyme-independent light generation from organic luminescent substrates in vitro and in vivo**, Joe Dragavon, Alexandra D. Holland, Institut Pasteur (France); Carolyn Sinow, Stanford Univ. (USA); Natasha Beeton-Kempen, Council for Scientific and Industrial Research (South Africa); Justin Jordaan, ReSyn Biosciences Ltd. (South Africa); Laurent Debarbieux, Régis Tournébeze, Spencer L. Shorte, Institut Pasteur (France) . . . [8947-37]

9:00 am: **Combining surface sensitive vibrational spectroscopy and fluorescence microscopy to study biological interfaces**, Chi Zhang, Joshua Jasensky, Jing Wu, Zhan Chen, Univ. of Michigan (USA) . . . [8947-38]

9:20 am: **10x10-pixel 606kS/s multipoint fluorescence correlation spectroscopy CMOS image sensor**, Keiichiro Kagawa, Taishi Takasawa, Bo Zhang, Min-Woong Seo, Kaita Imai, Shizuoka Univ. (Japan); Jotaro Yamamoto, Masataka Kinjo, Hokkaido Univ. (Japan); Susumu Terakawa M.D., Hamamatsu Univ. School of Medicine (Japan); Keita Yasutomi, Shoji Kawahito, Shizuoka Univ. (Japan) . . . [8947-39]

9:40 am: **TCSPC based approaches for multiparameter detection in living cells**, Karolina Jahn, Univ. of Potsdam (Germany); Volker Buschmann, Felix Koberling, PicoQuant GmbH (Germany); Carsten Hille, Univ. of Potsdam (Germany) . . . [8947-40]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 10

Location: Room 300 (Esplanade) . . Wed 10:30 am to 11:30 am

Quantitative Cell and Tissue Analysis IV

Session Chair: **Robert C. Leif**, Newport Instruments (USA)

10:30 am: **Nanoscale disorder of biological samples mapped by whole-slide spectral microscopy**, John E. Chandler, Hariharan Subramanian, Khushi Vyas, Lusik Cherkezyan, Vadim Backman, Northwestern Univ. (USA) . . . [8947-41]

10:50 am: **High-speed focal modulation microscopy for calcium imaging in thick tissues**, Shilpa Pant, Nanguang Chen, National Univ. of Singapore (Singapore) . . . [8947-42]

11:10 am: **The use of fluorescence fluctuation in polarization sensitive experiments**, Dror Fixler, Bar-Ilan Univ. (Israel) . . . [8947-43]

Lunch Break Wed 11:30 am to 1:00 pm

Conference 8947 · Location: Room 300 (Esplanade)

SESSION 11

Location: Room 300 (Esplanade) Wed 1:00 pm to 3:00 pm

Microscale Devices and Optical Manipulation of Cells I

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

1:00 pm: **Bacterial response to confinement in microfluidics**, Ben Libberton, Univ. of Liverpool (United Kingdom); Falco C. M. van Delft, Philips Research Nederland B.V. (Netherlands); Dan V. Nicolau, Univ. of Liverpool (United Kingdom) and McGill Univ. (Canada) [8947-44]

1:20 pm: **Quantitative, noninvasive, optical biomarkers of altered mitochondrial organization in precancerous tissues**, Irene Georgakoudi, Joanna Xylas, Antonio Varone, Tufts Univ. (USA); Kyle P. Quinn, Tufts Univ (USA); Margaret McLaughlin-Drubin, Karl Munger, Brigham and Women's Hospital (USA) [8947-45]

1:40 pm: **3D manipulation and visualization of in-vitro cells by optical tweezers and digital holographic microscopy**, Francesco Merola, Lisa Miccio, Istituto Nazionale di Ottica (Italy); Pasquale Memmolo, Istituto Nazionale di Ottica (Italy) and Ctr. for Advanced Biomaterials for Health Care, CRIB (Italy); Paolo A. Netti, Univ. degli Studi di Napoli Federico II (Italy); Giuseppe Coppola, Istituto per la Microelettronica e Microsistemi (Italy); Andrea Galli, Roberto Puglisi, Donatella Balduzzi, Istituto Sperimentale Italiano Lazzaro Spallanzani (Italy); Pietro Ferraro, Istituto Nazionale di Ottica (Italy) [8947-46]

2:00 pm: **Time-gated imaging of near-infrared quantum dots for in vivo cell tracking**, Sophie Bouccara, Emerson Giovanelli, Gary Sitbon, Nicolas Lequeux, Thomas Pons, Vincent Loriette, Alexandra Fragola, Ecole Supérieure de Physique et de Chimie Industrielles (France) and Lab. of Physics and Materials Research (LPEM) (France) [8947-47]

2:20 pm: **Quantitative sensing of microviscosity in protocells and amyloid materials using fluorescence lifetime imaging of molecular rotors**, Alex J. Thompson, Imperial College London (United Kingdom); Dora T.-Y. Tang, Univ. of Bristol (United Kingdom); Therese W. Herling, Univ. of Cambridge (United Kingdom); Rohaida C. Che Hak, Stephen Mann, Univ. of Bristol (United Kingdom); Tuomas P. J. Knowles, Univ. of Cambridge (United Kingdom); Marina K. Kuimova, Imperial College London (United Kingdom) [8947-48]

2:40 pm: **Asymmetric-detection time-stretch optical microscopy (ATOM) for high-contrast and high-speed microfluidic cellular imaging**, Terence T. W. Wong, Andy K. S. Lau, Matthew Y. H. Tang, Kenneth K. Y. Ho, Kenneth K. Y. Wong, Anderson H. C. Shum, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) [8947-49]

Coffee Break Wed 3:00 pm to 3:30 pm

SESSION 12

Location: Room 300 (Esplanade) Wed 3:30 pm to 5:30 pm

Microscale Devices and Optical Manipulation of Cells II

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

3:30 pm: **Multispectral sorter for rapid, nondestructive optical bioprospecting for algae biofuels**, Ryan W. Davis, Hauwen Wu, Sandia National Labs. (USA); Seema Singh, Sandia National Labs. (USA) and Joint BioEnergy Institute (USA) [8947-50]

3:50 pm: **Lens-free digital in-line holographic imaging for wide field-of-view, high-resolution and real-time monitoring of complex microscopic objects**, Richard Stahl, Geert Vanmeerbeeck, IMEC (Belgium); Gauthier Lafruit, IMEC (Belgium) and Univ. Hasselt (Belgium); Roeland Huys, Veerle Reumers, Andy Lambrechts, IMEC (Belgium); Masayuki Yashiro, Masashi Takemoto, Beatcraft, Inc. (Japan); Tomohisa Nagata, Shinichi Gomi, Kunitada Hatabayashi, Yasuhiro Oshima, Shigenori Ozaki, Tokyo Electron Ltd. (Japan); Naoki Nishishita, Shin Kawamata, Foundation for Biomedical Research and Innovation (Japan) [8947-51]

4:10 pm: **Plasmonic field localization by subwavelength metallic nanoaperture arrays for imaging biomolecular movement**, Wonju Lee, Yonsei Univ. (Korea, Republic of); Yoshiaki Kinoshita, Gakushuin Univ. (Japan); Youngjin Oh, Yonsei Univ. (Korea, Republic of); Kyujung Kim, Pusan National Univ. (Korea, Republic of); Takayuki Nishizaka, Gakushuin Univ. (Japan); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8947-52]

4:30 pm: **Video lensfree microscopy of 2D and 3D culture of cells**, Cédric P. Allier, Srikanth Vinjimore Kesavan, Jean-Guillaume Coutard, Fabrice Navarro, Mathilde Menneteau, CEA-LETI-Minatec (France); Bernard Chalmond, Univ. of Cergy Pontoise & CMLA (France) and Ecole Normale Supérieure de Cachan (France); Nathalie Picollet d'Hahan, Monika Dolega, Patricia Obeid, Xavier Gidrol, CEA (France); Brigitte David-Watine, Nelly Dubrulle, Spencer L. Shorte, Institut Pasteur (France); Boudewijn van der Sanden, Charles Di Natale, Lauriane Hamard, Didier Wion, CEA-LETI-Cliniatec (France); Jean-Marc Dinten, CEA-LETI-Minatec (France) [8947-53]

4:50 pm: **On measuring cell confluence in phase contrast microscopy**, Katherine P. Dempsey, Ka-Po Lam, Karina T. Wright, William A. Smith, James B. Richardson, Keele Univ. (United Kingdom) [8947-54]

5:10 pm: **Towards optical cell transfection inside a micro-flow tube**, Hans Georg Breunig, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Aisada Uchugonova, Univ. des Saarlandes (Germany); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany) [8947-55]

Thursday 6 February

SESSION 13

Location: Room 300 (Esplanade) Thu 8:00 am to 10:00 am

Microscale Devices and Optical Manipulation of Cells III

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

8:00 am: **Fast, 3D imaging via confocal line scanning of a Bessel beam using a single Galvo mirror**, Pengfei Zhang, James Werner, Peter Goodwin, Los Alamos National Lab. (USA) [8947-56]

8:20 am: **A new 3D tracking method for cell mechanics investigation exploiting the capabilities of digital holography in microscopy**, Lisa Miccio, Francesco Merola, Pasquale Memmolo, Istituto Nazionale di Ottica (Italy); Sabato Fusco, Istituto Italiano di Tecnologia (Italy) and Ctr. for Advanced Biomaterials for Health Care, CRIB (Italy); Paolo A. Netti, Istituto Italiano di Tecnologia (Italy); Pietro Ferraro, Istituto Nazionale di Ottica (Italy) [8947-57]

8:40 am: **Raman tweezers in microfluidic systems for analysis and sorting of living cells**, Zdenek Pilat, Jan Jezek, Jan Ka?ka, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) [8947-58]

9:00 am: **Viscoelastic property of the cell membrane influenced by the adhesion of macrophages on the matrix extracellular**, Samuel T. Souza, Lais C. Agra, Emiliano Barreto, Jandir M. Hickmann, Univ. Federal de Alagoas (Brazil); Eduardo J. S. Fonseca, Univ Federal de Alagoas (Brazil) [8947-84]

9:20 am: **Photodynamic therapy for treatment of chromoblastomycosis**, Dora P. Ramirez, Univ. de São Paulo (Brazil) and Univ. Federal de São Carlos (Brazil); Natalia M. Inada, Layla Pires, Univ. de São Paulo (Brazil); Mariana C. Geralde, Univ. de São Paulo (Brazil) and Univ. Federal de São Carlos (Brazil); Cristina Kurachi, Vanderlei Salvador Bagnato, Univ. de São Paulo (Brazil) [8947-60]

9:40 am: **Optical properties of red blood cells: an optical tweezer based analysis**, Nagesh B. V., Bangalore Univ. (India); Yogesha Lakkegowda, Bangalore Univ. (India) and Government Science College, Hassan (India); Prathibha R., Raman Research Institute (India); Praveen P., Sarbari Bhattacharya, Sharath Ananthamurthy, Bangalore Univ. (India) [8947-61]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 14

Location: Room 300 (Esplanade) . . . Thu 10:30 am to 11:50 am

Photonics Techniques for Regenerative Medicine

Session Chair: **Attila Tarnok**, Univ. Leipzig (Germany)

10:30 am: **Three-dimensional morphological imaging of human induced pluripotent stem cells by using low-coherence quantitative phase microscopy**, Toyohiko Yamauchi, Yumi Kakuno, Kentaro Goto, Tadashi Fukami, Norikazu Sugiyama, Hidenao Iwai, Yoshinori Mizuguchi, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan) [8947-62]

10:50 am: **Studying cell signalling in cells interacting with 3D matrices via image informatics**, Dimitrios S. Tzeranis, Massachusetts Institute of Technology (USA); Jin Guo, Chengpin Shen, Fudan Univ. (China); Ioannis V. Yannas, Peter T. C. So, Massachusetts Institute of Technology (USA) [8947-63]

11:10 am: **Automated 3D laser printing of cells and biomaterials for tissue engineering**, Florent Deloison, Helen Desrus, ALPHANOV (France); Muhammad Ali, Fabien Guillemot, TEAL: Tissue Engineering Assisted by Laser (France) [8947-64]

11:30 am: **Image-inspired fabrication of 3D biomimetic models of the extracellular matrix via multiphoton-excited photochemistry**, Paul J. Campagnola, Visar Ajeti, Ping-Jung Su, Quyen Tran, Jayne Squirrel, Brenda Ogle, Univ. of Wisconsin-Madison (USA) [8947-65]

Conference 8948
 Location: Room 308 (Esplanade)

Sunday - Tuesday 2 - 4 February 2014
 • Proceedings of SPIE Vol. 8948

Multiphoton Microscopy in the Biomedical Sciences XIV

Conference Chairs: **Ammasi Periasamy**, Univ. of Virginia (USA); **Peter T. C. So**, Massachusetts Institute of Technology (USA); **Karsten König**, Univ. des Saarlandes (Germany)

Program Committee: **Wolfgang Becker**, Becker & Hickl GmbH (Germany); **Guy C. Cox**, The Univ. of Sydney (Australia); **Alberto Diaspro**, Istituto Italiano di Tecnologia (Italy); **Chen-Yuan Dong**, National Taiwan Univ. (Taiwan); **Kevin W. Eliceiri**, Univ. of Wisconsin-Madison (USA); **Scott Fraser**, California Institute of Technology (USA); **Paul M. W. French**, Imperial College London (United Kingdom); **Hans C. Gerritsen**, Utrecht Univ. (Netherlands); **Enrico Gratton**, Univ. of California, Irvine (USA); **Min Gu**, Swinburne Univ. of Technology (Australia); **Stefan W. Hell**, Max-Planck-Institut für Biophysikalische Chemie (Germany); **Paul J. Campagnola**, Univ. of Wisconsin-Madison (USA); **Satoshi Kawata**, Osaka Univ. (Japan); **Fu-Jen Kao**, National Yang-Ming Univ. (Taiwan); **Arnd K. Krueger**, Spectra-Physics®, a Newport Corp. Brand (USA); **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA); **Steve M. McDonald**, Coherent, Inc. (USA); **Angelika C. Rueck**, Univ. Ulm (Germany); **Junle Qu**, Shenzhen Univ. (China); **Steven S. Vogel**, National Institutes of Health (USA); **Paul W. Wiseman**, McGill Univ. (Canada); **X. Sunney Xie**, Harvard Univ. (USA); **Bernhard Zimmermann**, Carl Zeiss Jena GmbH (Germany); **Warren R. Zipfel**, Cornell Univ. (USA)

Conference sponsored by:



BIOS

Sunday 2 February

OPENING REMARKS

Location: Room 308 (Esplanade) 8:15 am to 8:30 am

Ammasi Periasamy, Univ. of Virginia (USA)

KEYNOTE SESSION

Location: Room 308 (Esplanade) 8:30 am to 10:00 am

Session Chair: **Ammasi Periasamy**, Univ. of Virginia (USA)

- 8:30 am: **Adaptive optics from microscopy to nanoscopy** (*Keynote Presentation*), Martin Booth, Univ. of Oxford (United Kingdom) [8948-1]
- 9:00 am: **In vivo deep tissue multiphoton imaging** (*Keynote Presentation*), Chris Xu, Cornell Univ. (USA) [8948-2]
- 9:30 am: **Quantitative multiphoton imaging** (*Keynote Presentation*), Karsten König, Aisada Uchugonova, Hans Georg Breunig, Madlen Kloetzer, Univ. des Saarlandes (Germany); Martin Weinigel, Rainer Bückle, JenLab GmbH (Germany); Daria Gaidar, Univ. des Saarlandes (Germany); Jürgen M. Lademann, Charité Universitätsmedizin Berlin (Germany) [8948-3]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 1

Location: Room 308 (Esplanade) . . . Sun 10:30 am to 12:05 pm

SHG/THG Microscopy I

Session Chair: **Francesco Saverio Pavone**, European Lab. for Non-linear Spectroscopy (Italy)

- 10:30 am: **Differentiation of Col I and Col III isoforms in stromal models of ovarian cancer by analysis of second-harmonic generation polarization and emission directionality** (*Invited Paper*), Paul J. Campagnola, Karissa B. Tilbury, Chi-Hsiang Lien, Univ. of Wisconsin-Madison (USA); Shean-Jen Chen, National Cheng Kung Univ. (Taiwan) [8948-4]
- 10:50 am: **Motion-free polarization second-harmonic generation microscopy using a liquid crystal modulator**, Chi-Hsiang Lien, National Cheng Kung Univ. (Taiwan) and Univ. of Wisconsin-Madison (USA); Karissa B. Tilbury, Univ. of Wisconsin-Madison (USA); Shean-Jen Chen, National Cheng Kung Univ. (Taiwan); Paul J. Campagnola, Univ. of Wisconsin-Madison (USA) [8948-5]

- 11:05 am: **Nonlinear imaging and characterization of atherosclerotic arterial tissue using combined two photon fluorescence, second-harmonic generation and CARS microscopy**, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy); Christian Matthäus, Tobias Meyer, Annika Lattermann, Benjamin Dietzek, Institut für Photonische Technologien e.V. (Germany); Bernhard R. Brehm, Catholic Clinic, Koblenz (Germany); Jürgen Popp, Institut für Photonische Technologien e.V. (Germany); Francesco Saverio Pavone, European Lab. for Non-linear Spectroscopy (Italy) [8948-6]
- 11:20 am: **Second-harmonic generation reveals a relationship between metastatic potential and collagen fiber structure**, Kathleen A. Burke, Univ. of Rochester (USA); Ryan Dawes, Univ. of Rochester Medical Ctr. (USA); Mehar Cheema, Stony Brook Univ. (USA); Seth Perry, Edward Brown, Univ. of Rochester Medical Ctr. (USA) [8948-7]
- 11:35 am: **The study of radiation-induced damage and remodeling of extracellular matrix of rectum and bladder by second-harmonic generation microscopy**, Anna V. Maslennikova M.D., Institute of Applied Physics (Russian Federation) and Nizhny Novgorod state Medical Academy (Russian Federation); Natalya Yu. Ignatjeva, Lomonosov Moscow State Univ. (Russian Federation); Olga L. Zakharkina, Institute on Laser and Information Technologies (Russian Federation); Marina V. Kochueva M.D., Elena B. Kiseleva, Nizhny Novgorod State Medical Academy (Russian Federation); Vladislav V. Kamensky, Institute of Applied Physics (Russian Federation); Sergey S. Kuznetsov M.D., Kseniya V. Babak, Nizhny Novgorod State Medical Academy (Russian Federation) . . [8948-8]
- 11:50 am: **Towards a compact fiber laser for multimodal imaging**, Bai Nie, Ilyas Saytashev, Michigan State Univ. (USA); Andy Chong, Hui Liu, Cornell Univ. (USA); Sergey Arkhipov, Michigan State Univ. (USA); Frank W. Wise, Cornell Univ. (USA); Marcos Dantus, Michigan State Univ. (USA) [8948-9]
- Lunch Break Sun 12:05 pm to 1:30 pm

Conference 8948 · Location: Room 308 (Esplanade)

SESSION 2

Location: Room 308 (Esplanade) Sun 1:30 pm to 3:00 pm

SHG/THG Microscopy II

Session Chair: **Paul J. Campagnola**, Univ. of Wisconsin-Madison (USA)

1:30 pm: **In vivo time-lapse imaging of skin burn wound healing using second-harmonic generation microscopy**, Takeshi Yasui, Univ. of Tokushima (Japan); Ryosuke Tanaka, Osaka Univ. (Japan); Eiji Hase, Univ. of Tokushima (Japan); Shu-ichiro Fukushima, Tsutomu Araki, Osaka Univ. (Japan) . . . [8948-81]

1:45 pm: **Nonlinear imaging of collagen cross-links in developing tendon**, Carlo Amadeo C. Alonzo, Joanna Xylas, Joseph E. Marturano, Catherine K. Kuo, Irene Georgakoudi, Tufts Univ. (USA) [8948-11]

2:00 pm: **Photonic structure of chitin-protein organization in squid internal shell observed by second-harmonic generation (SHG) and electron microscopy**, Vitor B. Pelegati, Univ. Estadual de Campinas (Brazil) and National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil); Rafaela Rosa-Ribeiro, Univ. Estadual de Campinas (Brazil); Mariana O. Baratti, National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil); André A. de Thomaz, Diogo B. Almeida, Univ. Estadual de Campinas (Brazil); Carlos L. Cesar, Fernandes F. Carvalho, Univ. Estadual de Campinas (Brazil) and National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil) [8948-12]

2:15 pm: **Tunable pulse compensation for significant improvement of signal in nonlinear endomicroscopy imaging**, Gunnsteinn Hall, Wenxuan Liang, Johns Hopkins Univ. (USA); Ming-Jun Li, Corning Inc. (USA); Zaver Bhujwala, Kristine Glunde, Johns Hopkins Univ. (USA); Katherine Luby-Phelps, Mala Mahendroo, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Xingde Li, Johns Hopkins Univ. (USA) [8948-13]

2:30 pm: **Label-free multiphoton imaging using a compact femtosecond fiber laser mode-locked by carbon nanotube saturable absorber**, Khanh Q. Kieu, Soroush Mehravar, College of Optical Sciences, The Univ. of Arizona (USA); Roopa Gowda, Univ of Arizona (USA); Bhaskar Banerjee M.D., The Univ. of Arizona College of Medicine (USA); Robert A. Norwood, Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [8948-14]

2:45 pm: **Fiber array-based time-multiplexed multifocal multiphoton microscopy (TM-MMM): a new approach toward large numbers of time multiplexing**, Sunduck Kim, Hanyang Univ. (Korea, Republic of); Jiun-Yann Yu, California Institute of Technology (USA); Young Bo Shim, Hanyang Univ. (Korea, Republic of); Chin-Lin Guo, California Institute of Technology (USA); Young-Geun Han, Hanyang Univ. (Korea, Republic of) [8948-15]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 3

Location: Room 308 (Esplanade) Sun 3:30 pm to 5:10 pm

Technology Development and Applications I

Session Chair: **Aisada Uchugonova**, Univ. des Saarlandes (Germany)

3:30 pm: **Exploring the brain on multiple scales with correlative two-photon and light sheet microscopy (Invited Paper)**, Ludovico Silvestri, Anna Letizia Allegra Mascaro, Irene Costantini, Univ. degli Studi di Firenze (Italy); Leonardo Sacconi, National Institute of Optics (Italy); Francesco Saverio Pavone, Univ. degli Studi di Firenze (Italy) [8948-16]

3:50 pm: **Fiber-optic scanning nonlinear endomicroscopy (Invited Paper)**, Xingde Li, Wenxuan Liang, Gunnsteinn Hall, Jiefeng Xi, Johns Hopkins Univ. (USA); Ming-Jun Li, Corning Inc. (USA); Zaver Bhujwala, Kristine Glunde, Johns Hopkins Univ. (USA); Katherine Luby-Phelps, Mala Mahendroo, The Univ. of Texas Southwestern Medical Ctr. (USA) [8948-17]

4:10 pm: **Advances in laser sources for nonlinear imaging**, Darryl McCoy, Coherent Scotland Ltd. (United Kingdom); Marco F. Arrigoni, Coherent, Inc. (USA) [8948-18]

4:25 pm: **Latest advances in ultrafast laser sources for multiphoton microscopy**, Philip G. Smith, Spectra-Physics, a Newport Corp. Brand (USA) [8948-19]

4:40 pm: **3D-resolved optical targeting for photodynamic therapy**, Christopher J. Rowlands, Jackie Wu, Peter T. C. So, Massachusetts Institute of Technology (USA) [8948-20]

4:55 pm: **Improving the optical sectioning capability of temporally focused widefield two-photon microscopy**, Elijah Y. S. Yew, Singapore-MIT Alliance (Singapore); Peter T. C. So, Massachusetts Institute of Technology (USA) [8948-21]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Session Chairs: **Holly Aaron**, Univ. of California, Berkeley (USA); **Kevin W. Eliceiri**, Univ. of Wisconsin-Madison (USA); **Michael Börsch**, Friedrich-Schiller-Univ. Jena (Germany); **Alberto Diaspro**, Istituto Italiano di Tecnologia (Italy); **Chris Xu**, Cornell Univ. (USA)

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Multiphoton microscopy for skin wound healing study in terms of cellular metabolism and collagen regeneration, Gitanjal Deka, National Yang-Ming Univ. (Taiwan); Kazunori Okano, National Chiao Tung Univ. (Taiwan); Wei-Wen Wu, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [8948-71]

Influence of photon bunching on two-photon excited fluorescence, Henning Kurzke, Andreas Jechow, Michael Seefeldt, Axel Heuer, Ralf Menzel, Univ. Potsdam (Germany) [8948-72]

Revealing molecular structure and orientation with Stokes vector resolved second-harmonic generation microscopy, Nirmal Mazumder, National Yang-Ming Univ. (Taiwan); Lu Yun Xiang, National Yang Ming Univ. (Taiwan); Jianjun Qiu, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) [8948-73]

Shedding light into atherosclerosis: a quantitative study of nonlinear optical imaging in tracking plaque development, Leila B. Mostaco-Guidolin, Alex (Chun-Te) Ko, National Research Council Canada (Canada) and Univ. of Manitoba (Canada); Mark Hewko, Elicia Kohlenberg, Michael S. D. Smith, Bernie Schattka, National Research Council Canada (Canada); Masashi Shiomi, Kobe Univ. School of Medicine (Japan); Arkady Major, Univ. of Manitoba (Canada); Michael G. Sowa, National Research Council Canada (Canada) [8948-74]

Two-photon in vivo imaging of retinal microstructures, Adi Schejter, Nairouz Farah, Shy Shoham, Technion-Israel Institute of Technology (Israel) . . . [8948-75]

Super-nonlinear fluorescence microscopy for high-contrast deep tissue imaging, Lu Wei, Xinxin Zhu, Zhixing Chen, Wei Min, Columbia Univ. (USA) [8948-76]

Multiphoton microscopy with frequency-doubled compact femtosecond erbium-doped fiber laser, Lin Huang, Shau Poh Chong, Arthur Mills, David J. Jones, Shuo Tang, The Univ. of British Columbia (Canada) [8948-77]

Comparison of near-infrared confocal and multiphoton microscopy modalities in deep tissue imaging using cyanine contrast agents, Pinaki Sarder, Washington Univ. in St. Louis (USA); Siavash Yazdanfar, GE Global Research (USA); Walter J. Akers, Washington Univ. School of Medicine in St. Louis (USA); Gail P. Sudlow, Christopher Egbulefu, Washington Univ. in St. Louis (USA); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) [8948-78]

Assembly and characterization of a nonlinear optical microscopy for in vivo and ex vivo tissue imaging, Sebastião Pratavieira, Layla Pires, Ana Elisa Jorge, Clovis Grecco, Alessandro Cosci, Vanderlei Bagnato, Cristina Kurachi, Univ. de São Paulo (Brazil) [8948-79]

Multiphoton microscopy of ventricular changes in porcine acute and chronic myocardial infarction models, Carmen Kut, Farhad Pashakhanloo, Wenxuan Liang, Karl H. Schuleri M.D., Elliot R. McVeigh, Daniel A. Herzka, Xingde Li, The Johns Hopkins Hospital (USA) [8948-80]

A new approach to evaluate collagen morphology and pathological lipid deposition using multiphoton image statistics, Leila B. Mostaco-Guidolin, Alex (Chun-Te) Ko, National Research Council Canada (Canada) and Univ. of Manitoba (Canada); Fei Wang, National Research Council Canada (Canada); Hong Tian, National Research Council Canada (Canada) and Univ. of Manitoba (Canada); Mark Hewko, National Research Council Canada (Canada); Masashi Shiomi, Kobe Univ. School of Medicine (Japan); Arkady Major, Univ. of Manitoba (Canada); Michael G. Sowa, National Research Council Canada (Canada) [8948-82]

Back-reflected SHG detection in corneal histological sections, Ana Batista, Univ. de Coimbra (Portugal) and Univ. des Saarlandes (Germany); Miguel Morgado, Univ. de Coimbra (Portugal); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany) [8948-83]

Visualizing deuterated cholesterol uptake through the LDL endocytic pathway, Alba Alfonso Garcia, Univ. of California, Irvine (USA); Elna Ikonen, Univ. of Helsinki (Finland); Howard Riezman, Univ. de Genève (Switzerland); Eric O. Potma, Univ. of California, Irvine (USA) [8948-84]

Stepwise multiphoton activation fluorescence reveals a new method of melanoma imaging for dermatologists, Zhenhua Lai, Northeastern Univ. (USA); Christine Lian, Jie Ma, Brigham and Women's Hospital (USA); Zetong Gu, Northeastern Univ. (USA); Jingyi Yu, Harvard Univ. (USA); Charles DiMarzio, Northeastern Univ. (USA)[8948-85]

Diagnosis of basal cell carcinoma by two-photon excited fluorescence combined with lifetime imaging, Xiao Peng, Shunping Fan, Shenzhen Univ. (China); Yuan Lu, Shaoxiong Liu, The Sixth People's Hospital of Shenzhen (China); Junle Qu, Hanben Niu, Shenzhen Univ. (China)[8948-86]

Simultaneous selective two-photon microscopy using MHz rate pulse shaping and quadrature detection of the time-multiplexed signal, Ilyas Saytashev, Michigan State Univ. (USA); Bingwei Xu, Biophotonic Solutions, Inc. (USA); Marshall T. Bremer, Marcos Dantus, Michigan State Univ. (USA)[8948-87]

Intravital imaging of kidney pathology using two-photon microscopy and optical coherence tomography, Hengchang Guo, Univ. of Maryland, College Park (USA); Peter Andrews, Georgetown Univ. Medical Ctr. (USA); Hsing-Wen Wang, Zachary Langley, Jianting Wang, Phillip Liu, Qinggong Tang, Yu Chen, Univ. of Maryland, College Park (USA)[8948-88]

Trends in cytosolic lipid content for mammalian oocytes investigated by coherent anti-Stokes Raman scattering (CARS) microscopy, Joshua Jasensky, Alexander T. Khmaladze, Andrew Boughton, Jun Ding, Chi Zhang, David Lai, Jason E. Swain, Univ. of Michigan (USA); George W. Smith, Michigan State Univ. (USA); Zhan Chen, Gary D. Smith, Univ. of Michigan (USA)[8948-89]

Fast multiplexed time-resolved fluorescence microscopy for quantitative time-lapse FRET imaging in cells and deep tissue, Ming Zhao, College of Optical Sciences, The Univ. of Arizona (USA); Xiaoyang Wan, Univ. of Michigan (USA); Patricia S. Estes, Daniela C. Zarnescu, The Univ. of Arizona (USA); Weibin Zhou, Univ. of Michigan (USA); Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA)[8948-90]

In situ dissolution analysis of pharmaceutical dosage forms using coherent anti-Stokes Raman scattering (CARS) microscopy, Andrew L. Fussell, Erik T. Garbacik, Univ. Twente (Netherlands); Korbinian Loebmann, Univ. of Copenhagen (Denmark); Herman L. Offerhaus, Univ. Twente (Netherlands); Peter Kleinebudde, Heinrich-Heine-Univ. Düsseldorf (Germany); Clare J. Strachan, Univ. of Helsinki (Finland)[8948-91]

Annular beam-shaping for two-photon fluorescence microscopy: an investigation of the effect of annular beam-shaping on the point-spread-function in two-photon fluorescence microscopy, Johan Borglin, Göteborgs Univ. (Sweden); Nicholas J. Durr, Massachusetts Institute of Technology (USA); Onur Ferhanoglu, The Univ. of Texas at Austin (USA); Dag Hanstorp, Stina Guldbrand, Göteborgs Univ. (Sweden); Adela Ben-Yakar, The Univ. of Texas at Austin (USA); Marica B. Ericson, Göteborgs Univ. (Sweden)[8948-92]

Development of fluorescence lifetime imaging microscopy system based on a streak camera, Lixin Liu, Xidian Univ. (China); Heng Li, Shenzhen Univ. (China); Yahui Li, Xidian Univ. (China); Xiao Peng, Yonghong Shao, Junle Qu, Shenzhen Univ. (China)[8948-93]

TCSPC-based phosphorescence lifetime spectroscopy and imaging with metal complexes, Manoel Veiga, Volker Buschmann, Sebastian Tannert,

Integrated coherent Raman scattering and multiphoton microscopy for label-free imaging of the tooth, Zi Wang, Wei Zheng, Jian Lin, Chin-Ying (Stephen) Hsu, Zhiwei Huang, National Univ. of Singapore (Singapore)[8948-95]

Integrated optical coherence and multiphoton microscopy for in vivo assessment of engineered skin substitutes, Andrew J. Bower, Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA); Youbo Zhao, Beckman Institute for Advanced Science and Technology (USA); Ziad Mahmassani, Univ. of Illinois at Urbana-Champaign (USA); Eric J. Chaney, Marina Marjanovic, Beckman Institute for Advanced Science and Technology (USA); Minkyung Lee, Univ. of Illinois at Urbana-Champaign (USA); Benedikt W. Graf, Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA); Michael De Lísio, Hyunjoon Kong, Marni D. Boppert, Univ. of Illinois at Urbana-Champaign (USA); Stephen A. Boppert M.D., Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA)[8948-96]

Characterizing heterogeneity in single adipocytes using stimulated Raman scattering microscopy and transcriptome analysis, Aaron M. Streets, Yanyi Huang, Peking Univ. (China)[8948-97]

Rapid acquisition of lipid distribution in C. elegans by stimulated Raman scattering (SRS) microscopy, Tao Chen, Ang Li, Aaron M. Streets, Yanyi Huang, Peking Univ. (China)[8948-98]

Polarization-maintaining dichroic module for excitation polarization-dependent multiphoton microscopy, Erik Belanger, Amy Daradich, Raphael Turcotte, Gregory Sadetsky, Karine Bachand, Yves De Koninck, Daniel Cote, Ctr. de Recherche de l'Institut Univ. en Santé Mentale de Québec (Canada)[8948-99]

3D and time-lapse FLIM images of a Parhyale hawaiiensis embryo development from one cell stage, Vitor B. Pelegati, Univ. Estadual de Campinas (Brazil) and National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil); Mariana C. Artal, André A. de Thomaz, Diogo B. Almeida, Univ. Estadual de Campinas (Brazil); Mariana O. Baratti, National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil); Hernandes F. Carvalho, Carlos L. Cesar, Univ. Estadual de Campinas (Brazil) and National Institute of Science and Technology on Photonics Applied to Cell Biology (Brazil); Gisela A. Umbuzeiro, Univ. Estadual de Campinas (Brazil)[8948-100]

Hyperspectral imaging via spectral interferometric polarised coherent anti-Stokes Raman scattering, Brad Littleton, Thomas Kavanagh, Frederic Festy, David Richards, King's College London (United Kingdom)[8948-101]

Combined second-harmonic generation and sum-frequency generation microscopy reveals the chemical origin of the second-order optical response of collagen, Julie C. Hsu, Yang Han, Nien-Hui Ge, Eric O. Potma, Univ. of California, Irvine (USA)[8948-102]

Investigating backward scattered second-harmonic generation from various mouse collagen tissues, Mengzhe Shen, Yunxian Tian, The Univ. of British Columbia (Canada); Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Shuo Tang, The Univ. of British Columbia (Canada)[8948-103]

Signal-to-noise ratio improved in resonant scanning system by adding pulse splitter, Long Yan, Gordon Smith, David Fitzpatrick, Max Planck Florida Institute (USA)[8948-104]

Pulse splitter-based nonlinear microscopy for live-cardiomyocyte imaging, Zhonghai Wang, Wan Qin, Clemson Univ. (USA); Yonghong Shao, Shenzhen Univ. (China); Siyu Ma, Clemson Univ. (USA); Thomas K. Borg, Medical Univ. of South Carolina (USA); Bruce Z. Gao, Clemson Univ. (USA)[8948-105]

Investigations on the biological samples by using different techniques in apertureless near-field optical microscopy, Denis E. Tranca, Univ. Politehnica of Bucharest (Romania); Stefan G. Stanciu, Univ. Politehnica of Bucharest (Romania); Catalin Stoichita, Univ. Politehnica of Bucharest (Romania); Radu Hristu, Univ. Politehnica of Bucharest (Romania); Syed A. M. Tofail, Univ. of Limerick (Ireland); George A. Stanciu, Univ. Politehnica of Bucharest (Romania)[8948-106]

Determining the diffusion coefficient of fluorescent beads through phasor-FLIM, Alireza Lajevardipour, Andrew H. A. Clayton, Swinburne Univ. of Technology (Australia)[8948-107]

Monday 3 February

SESSION 4

Location: Room 308 (Esplanade) Mon 8:00 am to 9:35 am

Biomedical Applications of Coherent Raman I

Session Chair: **Annika M. Enejder**, Chalmers Univ. of Technology (Sweden)

8:00 am: **Vibrational imaging of newly synthesized proteins in live cells, tissues, and animals by stimulated Raman scattering microscopy** (*Invited Paper*), Lu Wei, Columbia Univ. (USA); Yong Yu, Baylor College of Medicine (USA); Yihui Shen, Columbia Univ. (USA); Meng C. Wang, Baylor College of Medicine (USA); Wei Min, Columbia Univ. (USA)[8948-22]

8:30 am: **Spectroscopic imaging unveils the essential role of cholesterol accumulation in cancer proliferation** (*Invited Paper*), Ji-Xin Cheng, Shuhua Yue, Junjie Li, Seung-Young Lee, Purdue Univ. (USA); Liang Cheng, Indiana Univ. (USA); Timothy Ratliff, Xiaoqi Liu, Purdue Univ. (USA)[8948-23]

8:50 am: **Stimulated Raman scattering microscopy of human brain tumor specimens**, Daniel A. Orringer, Univ. of Michigan Health System (USA); Minbiao Ji, Christian Freudiger, Harvard Univ. (USA); Sandro Santagata, Brigham and Women's Hospital (USA); Xiaoliang Sunney Xie, Harvard Univ. (USA); Nathalie Agar, Brigham and Women's Hospital (USA)[8948-24]

9:05 am: **Broadband hyperspectral coherent anti-Stokes Raman scattering microscopy for stain-free histological imaging with principal component analysis**, JingJiang Xu, The Univ. of Hong Kong (Hong Kong, China); Baoshan Guo, The Univ. of Hong Kong (Hong Kong, China) and TianJin Univ. (China); Kenneth K. Y. Wong, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China)[8948-25]

Conference 8948 · Location: Room 308 (Esplanade)

9:20 am: **High-speed, broadband coherent Raman imaging (CRI) of glioblastomas using broadband coherent anti-Stokes Raman scattering microspectroscopy**, Charles H. Camp Jr., John M. Heddeleston, Young J. Lee, Christopher M. Hartshorn, Angela R. Hight Walker, National Institute of Standards and Technology (USA); Justin Lathia, Jeremy M. Rich, The Cleveland Clinic (USA); Marcus T. Cicerone, National Institute of Standards and Technology (USA) [8948-26]

JENLAB YOUNG INVESTIGATOR AWARD PAPERS PRESENTATION

Location: Room 308 (Esplanade) 9:35 am to 10:05 am

SESSION 5

Location: Room 308 (Esplanade) . . Mon 10:30 am to 12:10 pm

Biomedical Applications of Coherent Raman II

Session Chair: **Ji-Xin Cheng**, Purdue Univ. (USA)

10:30 am: **Combining fluorescence and CARS microscopy to uncover cellular biomarkers of multiple sclerosis** (*Invited Paper*), Daniel Côté, Ctr. de Recherche de l'Institut Univ. en Santé Mentale de Québec (Canada) and Univ. Laval (Canada); Emilie Chamma, Ctr. de Recherche de l'Institut Univ. en Santé Mentale de Québec (Canada) and Univ. Laval. (Canada); Benoit Aubé, Yves De Koninck, Univ. Laval. (Canada); Steve Lacroix, Univ. Laval (Canada) . . . [8948-27]

10:50 am: **CARS microscopy of Alzheimer's diseased brain tissue** (*Invited Paper*), Annika M. Enejder, Juris Kiskis, Helen Fink, Lena Nyberg, Chalmers Univ. of Technology (Sweden); Jia-Yi Li, Wallenberg Neuroscience Ctr., Lund Univ. (Sweden) [8948-28]

11:10 am: **Simultaneous stimulated Raman scattering and higher harmonic generation imaging for liver disease diagnosis without labeling**, Jian Lin, Zi Wang, Wei Zheng, Zhiwei Huang, National Univ. of Singapore (Singapore) [8948-29]

11:25 am: **Imaging protein misfolding in Alzheimer's disease with SRS microscopy**, Minbiao Ji, Harvard Univ. (USA); Michal Arbel, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Christian Freudiger, Harvard Univ. (USA); Brian Bacskai, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Xiaoliang Sunney Xie, Harvard Univ. (USA) [8948-30]

11:40 am: **CARS microscopy of cancer cells in vitro and tumors in vivo**, Mathieu Laliberté, Institut National de la Recherche Scientifique (Canada); Youngjae Kim, André Archambault, Genia Photonics Inc. (Canada); François Légaré, Institut National de la Recherche Scientifique (Canada); Charles J. Doillon, Univ. Laval (Canada) [8948-31]

11:55 am: **Investigating cold-induced injury of sebaceous glands in a mouse model with coherent Raman imaging**, Yookyung Jung, Joshua Tam, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Hrak R. Jalian, Wellman Ctr. for Photomedicine (USA) and UCLA Medical Ctr. (USA); Anderson R. Rox, Conor L. Evans, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) [8948-32]

Lunch Break Mon 12:05 pm to 1:40 pm

SESSION 6

Location: Room 308 (Esplanade) Mon 1:40 pm to 2:45 pm

Coherent Raman Technical Development I

Session Chair: **Marcus T. Cicerone**, National Institute of Standards and Technology (USA)

1:40 pm: **CARS in the single-molecule limit** (*Invited Paper*), Eric O. Potma, Dmitry Fishman, Steven Yampolsky, Jordan Brocius, V. A. Apkarian, Univ. of California, Irvine (USA) [8948-33]

2:00 pm: **Microsecond scale spectroscopic imaging by parallel detection of stimulated Raman scattering**, ChienSheng Liao, Mikhail N. Slipchenko, Ping Wang, Purdue Univ. (USA); Chun-Rui Hu, Hefei National Lab. for Physical Sciences at Microscale (China); Robert A. Oglesbee, Ji-Xin Cheng, Purdue Univ. (USA) [8948-34]

2:15 pm: **Hyperspectral SRS imaging: data analysis and applications**, Dan Fu, Xiaoliang Sunney Xie, Harvard Univ. (USA) [8948-35]

2:30 pm: **Multimodal microscopy with high-resolution spectral focusing CARS**, Ruben Zadayan, Tommaso Baldacchini, Newport Corp. (USA) . . [8948-36]

AWARD PRESENTATION

Location: Room 308 (Esplanade) 2:45 pm to 3:00 pm

Session Chair: **Ammasi Periasamy**, Univ. of Virginia (USA)

Student Poster Session Competition

We are pleased to announce that a cash prize will be awarded to a graduate students or postdoctoral fellow who participated in the poster session competition within conference 8588: Multiphoton Microscopy in the Biomedical Sciences XIV.

Prize donated by:

Becker and Hickl/Boston Electronics, Carl Zeiss Microscopy LLC, Chroma Tech, Coherent Inc., ISS Inc., Leica Microsystems, Newport Corporation, Princeton Instruments, Semrock

JENLAB YOUNG INVESTIGATOR AWARD

We are pleased to announce that a prize in the amount of \$2000.00 will be awarded to a graduate student, postdoc, or scientist under the age of 32 within conference 8588: Multiphoton Microscopy in the Biomedical Sciences XIV.

Prize donated by **JenLab GmbH (Germany)**

Tuesday 4 February

SESSION 7

Location: Room 308 (Esplanade) Mon 3:25 pm to 5:30 pm

Coherent Raman Technical Development II

Session Chair: **Eric O. Potma**, Univ. of California, Irvine (USA)

3:25 pm: **Advances in speed, reliability, and utility of broadband CARS microscopy** (*Invited Paper*), Marcus T. Cicerone, Charles H. Camp Jr., Evangelose Gatzogiannis, Young Jong Lee, National Institute of Standards and Technology (USA) [8948-37]

3:45 pm: **Fiber bundle-based endomicroscopy prototype with two collection channels for simultaneous multimodal coherent anti-Stokes Raman scattering and second-harmonic generation imaging**, Zhengfan Liu, Beijing Institute of Technology (China) and Houston Methodist Research Institute (USA) and Weill Cornell Medical College (USA); Zachary A. Satira, The Methodist Hospital Research Institute (USA) and Rice Univ. (USA); Xi Wang, The Methodist Hospital Research Institute (USA) and Weill Cornell Medical College (USA); Xiaoyun Xu, Xu Chen, Kelvin K. Wong, Houston Methodist Research Institute (USA) and Weill Cornell Medical College (USA); Shufen Chen, Jianguo Xin, Beijing Institute of Technology (China); Stephen T. Wong, Houston Methodist Research Institute (USA) and Weill Cornell Medical College (USA) [8948-38]

4:00 pm: **High-performance fiber parametric oscillator for coherent Raman microscopy**, Erin S. Lamb, Simon Lefrancois, Cornell Univ. (USA); Minbiao Ji, Harvard Univ. (USA); William J. Wadsworth, Univ. of Bath (United Kingdom); X. Sunney Xie, Harvard Univ. (USA); Frank W. Wise, Cornell Univ. (USA) . . [8948-39]

4:15 pm: **Tunable dual-wavelength 2-picosecond light source for coherent Raman scattering microscopy**, Ingo Rimke, APE GmbH (Germany); Gregor F. M. Hehl, Univ. Stuttgart (Germany); Marcus Beutler, Peter Volz, APE GmbH (Germany); Andreas Volkmer, Univ. Stuttgart (Germany); Edlef Büttner, APE GmbH (Germany) [8948-40]

4:30 pm: **Fourth-order coherent Raman microspectroscopy for detection of material symmetry**, Mamoru Hashimoto, Hiroto Kanoh, Hirohiko Niioka, Tsutomu Araki, Osaka Univ. (Japan) [8948-41]

4:45 pm: **Deep-tissue chemical imaging using CARS microspectroscopy**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) [8948-42]

5:00 pm: **Multiphoton imaging of biological samples during freezing and heating**, Hans Georg Breunig, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany); Martin Weinigel, JenLab GmbH (Germany); Aisada Uchugonova, Univ. des Saarlandes (Germany); Karsten König, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany) [8948-43]

5:15 pm: **Imaging drug diffusion in living skin equivalent membranes using hyperspectral stimulated Raman scattering microscopy**, Julian J. Moger, Natalie L. Garrett, Univ. of Exeter (United Kingdom) [8948-44]

SESSION 8

Location: Room 308 (Esplanade) Tue 8:00 am to 9:55 am

FLIM/FRET/FCS I

Session Chair: **Peter T. C. So**,
Massachusetts Institute of Technology (USA)

- 8:00 am: **Recording transient fluorescence lifetime effects by TCSPC FLIM** (*Invited Paper*), Wolfgang Becker, Vladislav Shcheslavskiy, Becker & Hickl GmbH (Germany); Samuel Frere, Inna Slutsky, Tel Aviv Univ. (Israel) [8948-45]
- 8:20 am: **Fluorescence-guided tumour diagnosis, cell metabolism, and multispectral FLIM** (*Invited Paper*), Angelika C. Rueck, Carmen Hauser, Univ. Ulm (Germany); Adrian Ruehm, Max-Planck Institut für Intelligente Systeme (Germany); Herbert Stepp, Univ. Hospital Munich (Germany); S. Kalinina, Univ. Ulm (Germany) [8948-46]
- 8:40 am: **High-sensitivity single-molecule fluorescence detection using scanning single-molecule counting**, Mitsushiro Yamaguchi, Tetsuya Tanabe, Hidetaka Nakata, Takuya Hanashi, Kazutaka Nishikawa, Kunio Hori, Seiji Kondo, Olympus Corp. (Japan) [8948-47]
- 8:55 am: **FAK-cTERM/ α B-crystallin interaction by Förster resonance energy transfer (FRET)**, Aline M. dos Santos, Ctr. Nacional de Pesquisa em Energia e Materiais (Brazil); André A. de Thomaz, Univ. Estadual de Campinas (Brazil); Michelle B. M. Pereira, Ctr. Nacional de Pesquisa em Energia e Materiais (Brazil); Diogo B. Almeida, Vitor B. Pelegati, Mariana O. Baratti, Carlos L. Cesar, Univ. Estadual de Campinas (Brazil); Kleber G. Franchini, Ctr. Nacional de Pesquisa em Energia e Materiais (Brazil) and Univ. Estadual de Campinas (Brazil) . . . [8948-48]
- 9:10 am: **Decay pattern matching analysis for multi-label FLIM**, Benedikt Kraemer, PicoQuant GmbH (Germany); Thomas Niehoerster, Anna Loeschberger, Julius-Maximilians-Univ. Würzburg (Germany); Felix Koberling, Matthias Patting, PicoQuant GmbH (Germany); Markus Sauer, Julius-Maximilians-Univ. Würzburg (Germany); Rainer Erdmann, PicoQuant GmbH (Germany) [8948-49]
- 9:25 am: **Quantification of single FRET-labeled DNA and FoF1-ATP synthase by confocal FLIM-FRET microscopy and FCS/FCCS**, Nawid Zarrabi, Marc Renz, Friedrich-Schiller-Univ. Jena (Germany); Bertram Su, Wolfgang Becker, Becker & Hickl GmbH (Germany); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) [8948-50]
- 9:40 am: **Cryogenic confocal microscopy platform integrated with fluorescent lifetime imaging and spectroscopy**, Diogo B. Almeida, André A. de Thomaz, Vitor B. Pelegati, Fernandes F. Carvalho, Carlos L. Cesar, Univ. Estadual de Campinas (Brazil) [8948-51]
- Coffee Break Tue 9:55 am to 10:25 am

SESSION 9

Location: Room 308 (Esplanade) . . . Tue 10:25 am to 12:05 pm

FLIM/FRET/FCS II

Session Chair: **Angelika C. Rueck**, Univ. Ulm (Germany)

- 10:25 am: **Fluorescence lifetime imaging of pluripotent cells** (*Invited Paper*), Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Aisada Uchugonova, Univ. des Saarlandes (Germany); Caroline Augsburger, Katja Schenke-Layland, Eberhard Karls Univ. Tübingen (Germany) [8948-52]
- 10:45 am: **Regulatory conformational changes of the epsilon-subunit in single FRET-labeled FoF1-ATP synthase** (*Invited Paper*), Hendrik Sielaff, Friedrich-Schiller-Univ. Jena (Germany); Thomas M. Duncan, SUNY Upstate Medical Univ. (USA); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) [8948-53]
- 11:05 am: **Megapixel FLIM by multi-dimensional TCSPC**, Hauke Studier, Wolfgang Becker, Becker & Hickl GmbH (Germany) [8948-54]
- 11:20 am: **Fluorescence correlation spectroscopy measurement of the hydrodynamic radius of colloidal quantum dots excluding blinking**, André A. de Thomaz, Diogo B. Almeida, Vitor B. Pelegati, Fernandes F. Carvalho, Carlos L. Cesar, Univ. Estadual de Campinas (Brazil) [8948-55]
- 11:35 am: **Fluorescence lifetime imaging classifies breast cancer subtypes and predicts neoadjuvant therapy response in humans**, Alex J. Walsh, Melinda Sanders, Rebecca S. Cook, Melissa C. Skala, Vanderbilt Univ. (USA) [8948-56]
- 11:50 am: **A molecular imaging analysis of Cx43 association with Cdo during skeletal myoblast differentiation**, Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy); Daniele Nosi, Univ. degli Studi di Firenze (Italy); Raffaella Mercatelli, Istituto Nazionale di Ottica (Italy); Flaminia Chellini, Alessandro Pini, Lucia Formigli, Univ. degli Studi di Firenze (Italy); Franco Quercioli, Istituto Nazionale di Ottica (Italy) [8948-57]
- Lunch Break Tue 12:05 pm to 1:30 pm

SESSION 10

Location: Room 308 (Esplanade) Tue 1:30 pm to 2:55 pm

Technology Development and Applications II

Session Chair: **Fu-Jen Kao**, National Yang-Ming Univ. (Taiwan)

- 1:30 pm: **Expanding multiphoton excitation/absorption approaches into superresolution methods** (*Invited Paper*), Alberto Diaspro, Istituto Italiano di Tecnologia (Italy) [8948-58]
- 1:50 pm: **Origins of contrast in multiphoton microscopy imaging of melanoma** (*Invited Paper*), Mihaela Balu, Beckman Laser Institute and Medical Clinic (USA); Kristen M. Kelly, Christopher B. Zachary, Ronald M. Harris, Univ. of California, Irvine (USA); Tatiana B. Krasieva, Beckman Laser Institute and Medical Clinic (USA); Martin Weinigel, JenLab GmbH (Germany); Karsten Koenig, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany); Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8948-59]
- 2:10 pm: **Modulation of the pupil function of microscope objective lenses for multifocal multiphoton microscopy with a spatial light modulator**, Naoya Matsumoto, Hamamatsu Photonics K.K. (Japan); Shigetoshi Okazaki, Hamamatsu Univ. School of Medicine (Japan); Hisayoshi Takamoto, Takashi Inoue, Hamamatsu Photonics K.K. (Japan); Susumu Terakawa M.D., Hamamatsu Univ. School of Medicine (Japan) [8948-60]
- 2:25 pm: **A novel clinical multimodal multiphoton tomograph for AF, SHG, CARS, and FLIM**, Karsten König, Univ. des Saarlandes (Germany); Martin Weinigel, JenLab GmbH (Germany); Hans Georg Breunig, Univ. des Saarlandes (Germany) [8948-61]
- 2:40 pm: **Two-photon two-color excited fluorescence spectroscopy in fluorophores**, Oleg S. Shternin, Peter S. Shternin, Ioffe Physico-Technical Institute (Russian Federation); Karl-Heinz Gericke, Technische Univ. Braunschweig (Germany); Andrey G. Smolin, Ioffe Physico-Technical Institute (Russian Federation); Stefan Denicke, Sebastian Herbrich, Technische Univ. Braunschweig (Germany) [8948-62]
- Coffee Break Tue 2:55 pm to 3:25 pm

SESSION 11

Location: Room 308 (Esplanade) Tue 3:25 pm to 5:15 pm

Technology Development and Applications III

Session Chair: **Karsten König**, Univ. des Saarlandes (Germany)

- 3:25 pm: **Enhancing stimulated emission-based fluorescence detection with interferometric setup** (*Invited Paper*), Fu-Jen Kao, Po-Lin Lin, Jia-Huei Deng, National Yang-Ming Univ. (Taiwan) [8948-63]
- 3:45 pm: **Nonlinear deep-UV excitation microscopy for multicolor fluorescent protein imaging with high spatial resolution**, Katsumasa Fujita, Masahito Yamanaka, Kenta Saito, Nicholas Isaac Smith, Satoshi Kawata, Takeharu Nagai, Osaka Univ. (Japan) [8948-64]
- 4:00 pm: **Aperture design in focal modulation microscopy to improve modulation depth**, Yubo Duan, Shakil Rehman, Singapore-MIT Alliance (Singapore) and National Univ. of Singapore (Singapore); George Barbastathis, Massachusetts Institute of Technology (USA) and Singapore-MIT Alliance (Singapore); Nanguang Chen, National Univ. of Singapore (Singapore) and Singapore-MIT Alliance (Singapore) [8948-65]
- 4:15 pm: **An efficient method to study electric field distortions of a tightly focused beam in a medium with microscopic scattering particles**, Janaka C. Ranasinghesagara, Carole K. Hayakawa, Univ. of California, Irvine (USA); Mitchell A. Davis, Andrew K. Dunn, The Univ. of Texas at Austin (USA); Eric O. Potma, Vasan Venugopalan, Univ. of California, Irvine (USA) [8948-66]
- 4:30 pm: **Monitoring of cell metabolism and lipid production in 3D engineered human adipose tissues using label-free multiphoton microscopy**, Irene Georgakoudi, Tyler Chang, Tufts Univ. (USA); Maxwell Zimmerley, Ecole Polytechnique (France); Kyle P. Quinn, Tufts Univ. (USA); Emmanuel Beaurepaire, Ecole Polytechnique (France) [8948-67]
- 4:45 pm: **Video-rate cellular imaging of whole embryo with extended-field two-photon light-sheet microscopy**, Ming Zhao, College of Optical Sciences, The Univ. of Arizona (USA); Patricia S. Estes, The Univ. of Arizona (USA); Amit Ashok, Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA); Daniela C. Zarnescu, The Univ. of Arizona (USA); Weibin Zhou, Univ. of Michigan (USA); Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA) [8948-68]
- 5:00 pm: **Optimized delivery of femtosecond laser pulses through the hollow-core photonic crystal fiber for the temporally focused wide-field two-photon endomicroscope**, Heejin Choi, Peter T. C. So, Massachusetts Institute of Technology (USA) [8948-69]

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI

Conference Chairs: **Thomas G. Brown**, Univ. of Rochester (USA); **Carol J. Cogswell**, Univ. of Colorado at Boulder (USA); **Tony Wilson**, Univ. of Oxford (United Kingdom)

Program Committee: **Martin Booth**, Univ. of Oxford (United Kingdom); **G. J. Brakenhoff**, Univ. van Amsterdam (Netherlands); **José-Angel Conchello**, Harvard Univ. (USA); **Charles A. DiMarzio**, Northeastern Univ. (USA); **Raimund J. Ober**, The Univ. of Texas at Dallas (USA); **Chrysanthe Preza**, Univ. of Memphis (USA); **Monika Ritsch-Marte**, Innsbruck Medical Univ. (Austria)

Monday 3 February

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Simplified methods of design, implementation, and characterization of a spectrometer-based fd-oct, Panomsak Meemon, Kunakorn Palawong, Pornthep Pongchalee, Suranaree Univ. of Technology (Thailand) [8949-55]

Automatic segmentation of fluorescence lifetime microscopy images of cells using multi-resolution community detection, Dandan Hu, Pinaki Sarder, Peter Ronhovde, Washington Univ. in St. Louis (USA); Sandra Orthaus, PicoQuant GmbH (Germany); Samuel Achilefu, Zohar Nussinov, Washington Univ. in St. Louis (USA) [8949-56]

Super-resolution differential interference contrast microscopy by structured illumination, Jianling Chen, Yan Xu, Xiaohua Lv, Xiaomin Lai, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8949-57]

Axial response of a two-frequency scanning confocal microscope, Yung-Chin Chung, Jheng-Syong Wu, Chien Chou, Chang Gung Univ. (Taiwan) [8949-58]

New light field camera based on physical based rendering tracing, Ming-Han Chung, Shan-Ching Chang, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8949-59]

Real-time stroboscopic full-field optical coherence tomography based on graphics processing units, Kwan Seob Park, Hyeonggyu Kim, Ju Wan Kim, Hee Gyu Baek, Jae Hwi Lee, Youngjoo Chung, Byeong Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8949-60]

A new concept of stereoscopic imaging system using single optical channel and a deflector: pilot study, Won Hyuk Jang, Heesung Kang, Taeyoon Son, Jihoon Park, Eunkwon Jun, Byungjo Jung, Yonsei Univ. (Korea, Republic of) [8949-61]

High-resolution volumetric cell imaging based on interferometric multiple wavelength phase imaging technique, Jae Seok Park, Korea Photonics Technology Institute (Korea, Republic of); In Hee Shin, Hyeong Ju Park, Joo Beom Eom, Byeong-il Lee, Korea Photonics Technology Institute (Korea, Republic of) [8949-62]

Theoretical and experimental analysis of focusing fields in laser scanning fluorescence stereomicroscopy, Yan Long Yang, Xi'an Institute of Optics and Precision Mechanics (China); Tong Peng, Xi'an Institute of Optics and Precision Mechanics (China); Ming Lei, Xing Zhou, Runze Li, Di Wu, Baoli Yao, Xi'an Institute of Optics and Precision Mechanics (China); Tong Ye, The Univ. of Alabama at Birmingham (USA) [8949-63]

Selective plane microscopy with structured illumination based on spatial light modulators, Xing Zhou, Runze Li, Yan Long Yang, Ming Lei, Tong Peng, Di Wu, Baoli Yao, Xi'an Institute of Optics and Precision Mechanics (China); Tong Ye, The Univ. of Alabama at Birmingham (USA) [8949-64]

Beam propagation in superresolution microscopy: a three-dimensional simulation in biological cells, Yan Long Yang, Tong Peng, Xing Zhou, Shaohui Yan, Baoli Yao, Xi'an Institute of Optics and Precision Mechanics (China); Tong Ye, The Univ. of Alabama at Birmingham (USA) [8949-65]

Detecting jaundice by using digital image processing, Jorge Castro-Ramos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Carina Toxqui-Quitl, Univ. Politécnica de Tulancingo (Mexico); Fabian Villa Manriquez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Eber Orozco-Guillen, Univ. Politécnica de Sinaloa (Mexico); Alfonso Padilla-Vivanco, Univ. Politécnica de Tulancingo (Mexico) [8949-66]

Fast fluorescence holographic microscopy, Wan Qin, Clemson Univ. (USA); Yingying Li, Shenzhen Univ. (China) and Clemson Univ. (USA); Xiaoyi Yang, Clemson Univ. (USA); Xiang Peng, Shenzhen Univ. (China); Xinghua Qu, Tianjin Univ. (China); Bruce Z. Gao, Clemson Univ. (USA) [8949-68]

Amplitude, phase, and polarization control with a single spatial light modulator, Thomas G. Brown, Michael J Theisen, Stephen Head, Jonathan D Ellis, Univ of Rochester (USA) [8949-69]

Tuesday 4 February

SESSION 1

Location: Room 304 (Esplanade) Tue 8:30 am to 10:10 am

Instrumental Methods I

Session Chair: **Thomas G. Brown**, Univ. of Rochester (USA)

8:30 am: **A high-frame-rate, widefield optical-sectioning microscopy with finer axial resolution than confocal microscopy**, Jiun-Yann Yu, Daniel B. Holland, Yun Mou, Marco A. Allodi, Geoffrey A. Blake, Chin-Lin Guo, California Institute of Technology (USA) [8949-1]

8:50 am: **Design and application of the snapshot hyperspectral imaging Fourier transform (SHIFT) spectropolarimeter for fluorescence imaging**, Victoria C. Chan, College of Optical Sciences, The Univ. of Arizona (USA); Michael W. Kudenov, North Carolina State Univ. (USA); Chen Liang, Joe P. Zhou, DMetrix, Inc. (USA); Eustace L. Dereniak, College of Optical Sciences, The Univ. of Arizona (USA) [8949-2]

9:10 am: **Ultrafast laser scanning confocal microscope with variable aspect ratio field of view**, Ki Hyun Kim, Travis Jarrell, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) [8949-3]

9:30 am: **Modulated alignment dual-axis (mad) confocal microscopy for deep optical sectioning in tissues**, Steven Y. Leigh, Ye Chen, Jonathan T. Liu, Stony Brook Univ. (USA) [8949-4]

9:50 am: **Combined spatially chirped modulation and spectral encoding for improved imaging speed in confocal microscopy**, Soochool Kim, Jaehyun Hwang, Jung Heo, Suho Ryu, Chulmin Joo, Yonsei Univ. (Korea, Republic of) [8949-5]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 2

Location: Room 304 (Esplanade) . . . Tue 10:40 am to 12:00 pm

Computational and Compressive Imaging I

Session Chair: **Chrysanthe Preza**, Univ. of Memphis (USA)

10:40 am: **Correction of image artifacts caused by refractive index gradients in scanning laser optical tomography**, Georgios C. Antonopoulos, Raoul-Amadeus Lorbeer, Marko Heidrich, Tammo Ripken, Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) [8949-6]

11:00 am: **Portable advanced digital holographic off-axis camera for quantitative phase microscopy**, Zahra Monem Haghdoust, Christophe Moser, Christian D. Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8949-7]

11:20 am: **Extended penetration depth in optical imaging using array signal processing**, Jaeduck Jang, Jaeguyn Lim, Wooyoung Jang, Ji-Yeun Kim, Samsung Advanced Institute of Technology (Korea, Republic of) [8949-8]

11:40 am: **An efficient, rigorous model of optical microscopes employing incoherent illumination**, Peter R. T. Munro, Lixin Chin, Andrea Curatolo, David D. Sampson, The Univ. of Western Australia (Australia) [8949-9]

Lunch Break Tue 12:00 pm to 1:30 pm

SESSION 3

Location: Room 304 (Esplanade) Tue 1:30 pm to 3:10 pm

Instrumental Methods II

Session Chair: **Carol J. Cogswell**, Univ. of Colorado at Boulder (USA)

1:30 pm: **Sequential erosion tissue imaging (SETI)**, Benjamin L. Cox, Morgridge Institute for Research (USA) and Lab. for Optical and Computational Instrumentation (USA); Jeremy S. Bredfeldt, Lab. for Optical and Computational Instrumentation (USA) and Morgridge Institute for Research (USA); Kevin W. Eliceiri, Thomas R. Mackie, Lab. for Optical and Computational Instrumentation (USA) and Morgridge Institute for Research (USA) [8949-10]

1:50 pm: **Numerical spherical aberration correction method using spatial light modulator under deep-part fluorescence observation**, Yu Takiguchi, Hisayoshi Takamoto, Hamamatsu Photonics K.K. (Japan); Masamitsu Kanada, Hamamatsu Univ. School of Medicine (Japan); Takashi Inoue, Naoya Matsumoto, Hamamatsu Photonics K.K. (Japan); Susumu Terakawa, Hamamatsu Univ. School of Medicine (Japan) [8949-11]

2:10 pm: **The Gray Institute open microscopes applied to radiobiology and protein interaction studies**, Paul R. Barber, Univ. of Oxford (United Kingdom) and King's College London (United Kingdom); Iain D.C. Tullis, Univ. of Oxford (United Kingdom); Mark I. Rowley, King's College London (United Kingdom); Daniel Martins, Univ. of Oxford (United Kingdom); Gregory E. Weitsman, Katherine Lawler, Tony Ng, King's College London (United Kingdom); Borivoj Vojnovic, Univ. of Oxford (United Kingdom) [8949-12]

2:30 pm: **Characterizing and optimizing the tissue-imaging performance of confocal microscope architectures via monte-carlo scattering simulations**, Ye Chen, Danni Wang, Jonathan T. Liu, Stony Brook Univ. (USA) [8949-13]

2:50 pm: **Adaptive optics in microscopy**, Gregory Clouvel, Audrius Jasaitis Jr., Xavier Levecq, Imagine Optic SA (France) [8949-14]

Coffee Break Tue 3:10 pm to 3:40 pm

SESSION 4

Location: Room 304 (Esplanade) Tue 3:40 pm to 5:40 pm

Holographic Microscopy

Session Chair: **Martin J. Booth**, Univ. of Oxford (United Kingdom)

3:40 pm: **Computational lensfree color microscopy for wide field-of-view imaging**, Alon Greenbaum, Alborz Feizi, Najva Akbari, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8949-15]

4:00 pm: **High-contrast 3D microscopic imaging of deep layers in a biological medium**, Ahmad Faridian, Univ. Stuttgart (Germany); Giancarlo Pedrini, Wolfgang Osten, Institut für Technische Optik (Germany) [8949-17]

4:20 pm: **Self-interference fluorescence holography system with high signal-to-noise-ratio and violation of the lagrange invariant**, Xiaomin Lai, Huazhong Univ. of Science and Technology (China); Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) and Wuhan National Lab. for Optoelectronics (China) [8949-18]

4:40 pm: **Study of self-interference incoherent digital holography for the application of retinal imaging**, Jisoo Hong, Myung K. Kim, Univ. of South Florida (USA) [8949-19]

5:00 pm: **Flash extreme ultraviolet holographic microscopy in a table top setup**, Mario C. Marconi, Nils Monserud, Erik Malm, Colorado State Univ. (USA); Przemyslaw W. Wachulak, Military Univ. of Technology (Poland); Huiwen Xu, Ganesh Balakrishnan, The Univ. of New Mexico (USA); Weilun Chao, Erik Anderson, Lawrence Berkeley National Lab. (USA) . . . [8949-20]

5:20 pm: **Billion-pixel imaging via Fourier ptychographic microscopy**, Guoan Zheng, Univ. of Connecticut (USA) [8949-21]

Wednesday 5 February

SESSION 5

Location: Room 304 (Esplanade) . . . Wed 8:30 am to 10:10 am

Computational and Compressive Imaging II

Session Chair: **Charles A. DiMarzio**, Northeastern Univ. (USA)

8:30 am: **Quantifying melanin distribution using pump-probe microscopy and a 2D morphological autocorrelation transformation for melanoma diagnosis**, Francisco E. Robles, Jesse W. Wilson, Warren S. Warren, Duke Univ. (USA) [8949-22]

8:50 am: **Compressive sensing spectral domain optical coherence tomography with dispersion compensation**, Daguang Xu, Yong Huang, Jin U. Kang, Johns Hopkins Univ. (USA) [8949-23]

9:10 am: **Analysis of phase conjugation in a turbid medium**, Joseph L. Hollmann, Northeastern Univ. (USA); Snow H. Tseng, National Taiwan Univ. (Taiwan); Charles A. DiMarzio, Northeastern Univ. (USA) [8949-24]

9:30 am: **Image reconstruction methodologies for structured light based laser sheet microscope for thick tissue imaging**, Vijay Raj Singh, Dipanjan Bhattacharya, SMART-Singapore MIT Alliance for Research & Technology (Singapore); Paul Matsudaria, National Univ. of Singapore (Singapore); George Barbastathis, Peter T. C. So, Massachusetts Institute of Technology (USA) [8949-25]

9:50 am: **Further developments in addressing depth-variant 3D fluorescence microscopy imaging**, Sreya Ghosh, Univ. of Memphis (USA); Lutz Schafer, Advanced Imaging Methodology Consultation (Canada); Dietwald Schuster, Regensburg Univ. of Applied Sciences (Germany); Chrysanthe Preza, Univ. of Memphis (USA) [8949-26]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 6

Location: Room 304 (Esplanade) . . Wed 10:40 am to 12:00 pm

Quantitative Phase Imaging in Microscopy I

Session Chair: **Tony Wilson**, Univ. of Oxford (United Kingdom)

10:40 am: **Defocus-based quantitative phase imaging by coded illumination**, Aamod Shanker, Laura Waller, Univ. of California, Berkeley (USA) [8949-27]

11:00 am: **Near-common-path quantitative phase spectroscopy**, Poorya Hosseini, Youngwoon Choi, Zeinab About, Peter T. C. So, Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8949-28]

11:20 am: **Measuring thicknesses of fast dynamic processes using low-coherence interferometric microscopy**, Natan T. Shaked, Tel Aviv Univ. (Israel) [8949-29]

11:40 am: **A diffusion model for ultrasound modulated light in a turbid medium**, Joseph L. Hollmann, Northeastern Univ. (USA); Snow Tseng, National Taiwan Univ. (Taiwan); Charles A. DiMarzio, Northeastern Univ. (USA) . . [8949-30]

Lunch Break Wed 12:00 pm to 1:30 pm

Conference 8949 · Location: Room 304 (Esplanade)

SESSION 7

Location: Room 304 (Esplanade) Wed 1:30 pm to 3:10 pm

Wavefront Shaping and Structured Illumination

Session Chair: **Sharon V. King**, Univ. of Memphis (USA)

1:30 pm: **Wavefront shaping enhances light sheet microscopy with scattered light**, Jonathan Nylk, Claire Mitchell, Tom Vettenburg, Frank J. Gunn-Moore, Kishan Dholakia, Univ. of St. Andrews (United Kingdom). [8949-31]

1:50 pm: **Agile scanning using a MEMS focus control mirror in a commercial confocal microscope**, Sarah J. Lukes, Montana State Univ. (USA); David L. Dickensheets, Montana State Univ (USA). [8949-32]

2:10 pm: **Full field photothermal dynamics microscopy**, Guichen Tang, Fairfield Univ. (USA); Fanting Kong, Clemson Univ. (USA); Ying-Chih Chen, Hunter College (USA); Min Xu, Fairfield Univ. (USA). [8949-33]

2:30 pm: **Focused beam scatterometry for deep subwavelength metrology**, Thomas G. Brown, Michael J. Theisen, Stephen Head, Jonathan D. Ellis, Miguel A. Alonso, Steven R. Gillmer, Univ. of Rochester (USA). [8949-34]

2:50 pm: **Phase mask optimization for 3D parallax EDF microscopy**, Ingeborg E. Beckers, Michael Gierlack, Robert Höppel, Jürgen Landskron, Beuth Hochschule für Technik Berlin (Germany). [8949-35]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 8

Location: Room 304 (Esplanade) Wed 3:40 pm to 5:20 pm

Point Spread Function Engineering

Session Chair: **Monika Ritsch-Marte**, Medizinische Univ. Innsbruck (Austria)

3:40 pm: **OPC (optical phase conjugation)-assisted isotropic focusing**, Mooseok Jang, Changhui Yang, California Institute of Technology (USA). [8949-36]

4:00 pm: **Reducing depth-induced spherical aberration in 3D widefield fluorescence microscopy by wavefront coding using the squibic phase mask**, Nurmohammed Patwary, Univ. of Memphis (USA); Ana Doblas, Univ. de València (Spain); Sharon V. King, Chrysanthe Preza, Univ. of Memphis (USA). [8949-37]

4:20 pm: **Pinhole array implementation of star test polarimetry**, Brandon G. Zimmerman, Univ. of Rochester (USA) and The Institute of Optics (USA) and NASA Goddard Space Flight Ctr. (USA); Thomas G. Brown, Roshita Ramkhalawon, Univ. of Rochester (USA) and The Institute of Optics (USA). [8949-38]

4:40 pm: **Implementation of PSF engineering in high-resolution 3D microscopy imaging with a LCOS (reflective) SLM**, Sharon V. King, Univ. of Memphis (USA); Ana Doblas, Univ. de València (Spain); Nurmohammed Patwary, Univ. of Memphis (USA); Genaro Saavedra, Martínez-Corral Manuel, Univ. de València (Spain); Chrysanthe Preza, Univ. of Memphis (USA). [8949-39]

5:00 pm: **Investigation of the squibic phase mask design for depth-invariant widefield microscopy point-spread function engineering**, Ana Doblas, Univ. de València (Spain); Sharon V. King, Nurmohammed Patwary, Univ. of Memphis (USA); Genaro Saavedra, Manuel Martínez-Corral, Univ. de València (Spain); Chrysanthe Preza, Univ. of Memphis (USA). [8949-40]

Thursday 6 February

SESSION 9

Location: Room 304 (Esplanade) Thu 8:00 am to 10:00 am

Innovative Modes in Microscopy

Session Chair: **José-Angel Conchello**, Harvard Univ. (USA)

8:00 am: **Implementation of aberration correction in an adaptive optics STED microscope**, Brian R. Patton, Daniel Burke, Martin Booth, Univ. of Oxford (United Kingdom). [8949-41]

8:20 am: **Customized profile lens based linear response on-axis optical scanners for 3D laser scanning microscopy**, Zhenhua Lai, Yair J. Mega, Northeastern Univ. (USA); Xibin Yang, Jianfeng Zhu, Suzhou Institute of Biomedical Engineering and Technology (China); Zetong Gu, Northeastern Univ. (USA); Daxi Xiong, Suzhou Institute of Biomedical Engineering and Technology (China). [8949-42]

8:40 am: **Label-free molecular imaging**, Guoliang Huang, Tsinghua Univ. (China); Tongzhou Wang, Tsinghua Univ. School of Medicine (China); Yuliang Wang, Yaotuo Zhang, Tsinghua Univ. (China). [8949-43]

9:00 am: **Hyperspectral multipoint confocal microscope**, Andreas Velten, Univ. of Wisconsin-Madison (USA) and Morgridge Institute for Research (USA); William Vogt, Prairie Technologies, Inc. (USA); John G. White, Univ. of Wisconsin-Madison (USA); Thomas R. Mackie, Morgridge Institute for Research (USA) and Univ. of Wisconsin-Madison (USA); Mike Szulczewski, Prairie Technologies, Inc. (USA); Kevin W. Elliceiri, Univ. of Wisconsin-Madison (USA) and Morgridge Institute for Research (USA). [8949-44]

9:20 am: **In vivo stepwise multi-photon activation fluorescence imaging of melanin in human skin**, Zhenhua Lai, Zetong Gu, Saleh Abbas, Charles A. DiMarzio, Northeastern Univ. (USA). [8949-45]

9:40 am: **Noise removal techniques for microscope images: a comparison**, Carol J. Cogswell, Ramzi N. Zahreddine, Robert H. Cormack, Univ. of Colorado at Boulder (USA). [8949-46]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 10

Location: Room 304 (Esplanade) . . . Thu 10:30 am to 12:10 pm

Quantitative Phase Imaging in Microscopy II

Session Chair: **Raimund J. Ober**, The Univ. of Texas at Dallas (USA)

10:30 am: **High-resolution quantitative phase imaging with orientation-independent differential interference contrast (OI-DIC) microscope**, Michael I. Shribak, Marine Biological Lab. (USA). [8949-47]

10:50 am: **Phase unwrapping in interference microscopy: how to make time-sequential data meaningful**, Goldie L. Goldstein, Univ. of Arizona (USA); Katherine Creath, 4D Technology (USA) and Optineering (USA). [8949-48]

11:10 am: **Spectral-domain interferometry for quantitative DIC microscopy**, Yizheng Zhu, Chengshuai Li, Virginia Polytechnic Institute and State Univ. (USA). [8949-49]

11:30 am: **Portable interferometry**, Natan T. Shaked, Pinhas Girshovitz, Tel Aviv Univ. (Israel). [8949-50]

11:50 am: **Reflective interferometric system combining low-coherence spectral-domain phase microscopy and wide field holography for characterization of thin samples**, Reut Friedman, Natan T. Shaked, Tel Aviv Univ. (Israel). [8949-51]

Lunch Break Thu 12:10 pm to 1:40 pm

SESSION 11

Location: Room 304 (Esplanade) Thu 1:40 pm to 2:40 pm

Imaging Beyond the Diffraction Limit

Session Chair: **Thomas G. Brown**, Univ. of Rochester (USA)

1:40 pm: **Speckle-free sub-diffraction resolution quantitative phase imaging via structured illumination**, Shwetadwip Chowdhury, Joseph Izatt, Duke Univ. (USA). [8949-52]

2:00 pm: **Quantitative total internal reflection fluorescence microscopy: membrane-substrate separation distance measurement**, Marcelina Cardoso Dos Santos, Rodolphe Jaffiol, Vézy Cyrille, Univ. de Technologie Troyes (France). [8949-53]

2:20 pm: **Sub-diffraction-limited imaging of fluorescent protein expressed in living cells by saturated excitation (SAX) microscopy**, Masahito Yamanaka, Kenta Saito, Nicholas I. Smith, Satoshi Kawata, Takeharu Nagai, Katsumasa Fujita, Osaka Univ. (Japan). [8949-54]

Single Molecule Spectroscopy and Superresolution Imaging VII

Conference Chairs: Jörg Enderlein, Georg-August-Univ. Göttingen (Germany); Ingo Gregor, Georg-August-Univ. Göttingen (Germany); Zygmont Karol Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA), Texas Christian Univ. at Fort Worth (USA); Rainer Erdmann, PicoQuant GmbH Berlin (Germany); Felix Koberling, PicoQuant GmbH (Germany)

Program Committee: Sohail Ahmed, A*STAR Institute of Medical Biology (Singapore); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany); Christian Eggeling, Univ. of Oxford (United Kingdom); Paul M. W. French, Imperial College London (United Kingdom); Ewa M. Goldys, Macquarie Univ. (Australia); Johan Hofkens, Katholieke Univ. Leuven (Belgium); Zhen-Li Huang, Huazhong Univ. of Science and Technology (China); Thomas R. Huser, Univ. Bielefeld (Germany); Maria Teresa Neves-Petersen, International Iberian Nanotechnology Lab. (Portugal); Markus Sauer, Univ. Bielefeld (Germany); Shimon Weiss, Univ. of California, Los Angeles (USA); Andong Xia, Institute of Chemistry (China)

Saturday 1 February

WELCOME

Location: Room 307 (Esplanade) 9:00 am to 9:10 am

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

SESSION 1

Location: Room 307 (Esplanade) Sat 9:10 am to 10:30 am

New Developments in Methods and Systems I

Session Chair: **Rainer Erdmann**, PicoQuant GmbH (Germany)

9:10 am: **Mechanical manipulation of the electronic states of a single molecule by scanning force microscopy**, Sven Stöttinger, Gerald Hinze, Gregor Diezemann, Johannes Gutenberg Univ. Mainz (Germany); Ingo Oesterling, Klaus Müllen, Max-Planck-Institut für Polymerforschung (Germany); Thomas Basché, Johannes Gutenberg Univ. Mainz (Germany) [8950-1]

9:30 am: **Enhanced 3D localization of individual RNA transcripts via astigmatic imaging**, Evan P. Perillo, The Univ. of Texas at Austin (USA); Leyma De Haro, Jennifer S. Martinez, Los Alamos National Lab. (USA); Hsin-Chih Yeh, Andrew K. Dunn, The Univ. of Texas at Austin (USA); Douglas P. Shepherd, James H. Werner, Los Alamos National Lab. (USA) [8950-2]

9:50 am: **Spectroscopic and transport measurements of single molecules in solution using an electrokinetic trap** (*Invited Paper*), Quan Wang, William Esco Moerner, Stanford Univ. (USA) [8950-3]

10:10 am: **Multi-pulse two-color detection of exocytotic mucin release and swelling using Acridine Orange**, Dmytro Shumilov, Joseph D. Kimball, Texas Christian Univ. (USA); Rafal Fudala, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Irina Akopova, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Ignacy Gryczynski, Julian Borejdo, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Zygmont Gryczynski, Texas Christian Univ. (USA); Ryszard Grygorczyk, Univ. de Montréal (Canada) [8950-4]

Coffee Break Sat 10:30 am to 11:00 am

SESSION 2

Location: Room 307 (Esplanade) Sat 11:00 am to 1:00 pm

FCS

Session Chair: **Zygmont Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)

11:00 am: **Image classification based on high-content fluorescence correlation spectroscopy (HCS-FCS) measurements** (*Invited Paper*), Winfried Wiegraabe, Qingfeng E. Yu, Christopher J. Wood, Jeffrey J. Lange, Lucinda E. Maddera, Stowers Institute for Medical Research (USA) [8950-5]

11:20 am: **Determination of protein concentration on substrates using fluorescence fluctuation microscopy**, Antoine Delon, Richard De Mets, Christophe König-Barde, Martial Balland, Irène Wang, Univ. Joseph Fourier (France); Olivier Destaing, Institut Albert Bonniot (France) [8950-6]

11:40 am: **Single-molecule fluorescence spectroscopy in nanochannels**, Siddharth Ghosh, Jan Thiar, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [8950-7]

12:00 pm: **With photon patterns towards species selective microscopy**, Felix Koberling, Volker Buschmann, Benedikt Kraemer, Steffen Ruettinger, Marcelle Koenig, Sebastian Tannert, Matthias Patting, Rainer Erdmann, PicoQuant GmbH (Germany) [8950-8]

12:20 pm: **Development and application of two-dimensional fluorescence lifetime correlation spectroscopy (2D FLCS)**, Kunihiro Ishii, Tahei Tahara, RIKEN (Japan) [8950-9]

12:40 pm: **Quantifying aqueous membrane protein interactions using fluorescence correlation spectroscopy**, Sonny Ly, Feliza A. Bourguet, Nicholas O. Fischer, Matthew A. Coleman, Ted A. Laurence, Lawrence Livermore National Lab. (USA) [8950-10]

Lunch Break Sat 1:00 pm to 2:30 pm

SESSION 3

Location: Room 307 (Esplanade) Sat 2:30 pm to 3:30 pm

New Developments in Methods and Systems II

Session Chair: **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany)

2:30 pm: **Multiphoton cascade absorption in single molecule fluorescence saturation spectroscopy**, Rodolphe Jaffiol, Pascale Winckler, Univ. de Technologie Troyes (France) [8950-11]

2:50 pm: **Accelerated single photon emission from dye molecule driven gold nanoparticle dimers assembled on DNA**, Vincent Maillard, CNRS (France) and École Supérieure de Physique et de Chimie Industrielles (France); Mickael P. Busson, CNRS (France); Brice Rolly, Aix-Marseille Univ. (France); Petru Ghenuche, CNRS (France); Brian D. Stout, Aix-Marseille Univ. (France); Nicolas Bonod, Jerome Wenger, Sebastien Bidault, CNRS (France) [8950-12]

3:10 pm: **Versatile pulsed 560-nm laser source for FCS and FLCS**, Thomas Schoenau, Susanne Trautmann, Kristian Lauritsen, Haertel Romano, Klemme Dietmar, Rainer Erdmann, PicoQuant GmbH (Germany) [8950-13]

Coffee Break Sat 3:30 pm to 4:00 pm

SESSION 4

Location: Room 307 (Esplanade) Sat 4:00 pm to 5:20 pm

New Developments in Methods and Systems III

Session Chair: **Felix Koberling**, PicoQuant GmbH (Germany)

4:00 pm: **Multiplex fluorescence marker quantification with spectrally-resolved fluorescence lifetime imaging** (*Invited Paper*), Ingo Gregor, Georg-August-Univ. Göttingen (Germany); Fred Wouters, Gertrude Bunt, Universitätsmedizin Göttingen (Germany); Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [8950-14]

4:20 pm: **Metal-induced energy transfer: measuring quantum yields and molecular distances**, Narain V. S. Karedla, Alexey I. Chizhik, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [8950-15]

4:40 pm: **The regulatory switch of F1-ATPase studied by single-molecule FRET in the ABELtrap** (*Invited Paper*), Samuel D. Bockenbauer, Stanford Univ. (USA); Thomas M. Duncan, SUNY Upstate Medical Univ. (USA); William Esco Moerner, Stanford Univ. (USA); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) [8950-16]

5:00 pm: **Molecular modeling of the Förster resonance energy transfer in genetically encoded fuse proteins**, Maria G. Khrenova, Lomonosov Moscow State Univ. (Russian Federation) and A.N. Bach Institute of Biochemistry (Russian Federation); Alexander S. Goryashchenko, Victoria V. Zherdeva, A.N. Bach Institute of Biochemistry (Russian Federation); Alexander V. Nemukhin, Lomonosov Moscow State Univ. (Russian Federation); Alexander P. Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation) [8950-17]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 307 (Esplanade) . . . Sun 9:00 am to 10:20 am

Nanoscopy and Superresolution Microscopy I

Session Chair: **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany)

9:00 am: **Accelerating localization microscopy**, Patrick Fox-Roberts, Susan Cox, King's College London (United Kingdom) [8950-18]

9:20 am: **Optical processing techniques for measuring the position and orientation of single molecules, with applications to superresolution imaging**, Adam S. Backer, Mikael P. Backlund, Alex R. Diezmann, William Esco Moerner, Stanford Univ. (USA) [8950-19]

9:40 am: **mRNA quantification via second harmonic super resolution microscopy**, Jing Liu, Il-Hoon Cho, Ulhas Kadam, Joseph Irudayaraj, Purdue Univ. (USA) [8950-20]

10:00 am: **Full-field nonlinear structured illumination microscopy with STED**, Han Zhang, Ming Zhao, Yu Li, Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA) [8950-21]

Coffee Break Sun 10:20 am to 10:50 am

SESSION 6

Location: Room 307 (Esplanade) . . . Sun 10:50 am to 12:40 pm

Nanoscopy and Superresolution Microscopy II

Session Chair: **Ingo Gregor**, Georg-August-Univ. Göttingen (Germany)

10:50 am: **STED microscopy robust and simple (Invited Paper) STED microscopy robust and simple (Invited Paper)** [8950-53]

11:20 am: **STED microscopy of neuronal tissue** [8950-54]

11:40 am: **Time and polarization resolved CW STED photodeselection in molecular probes**, Elinor J. Bailey, Richard J. Marsh, Siân Culley, Univ. College London (United Kingdom); Emmi L. Kantola, Mircea Guinea, Tampere Univ. of Technology (Finland); Angus J. Bain, Univ. College London (United Kingdom) [8950-23]

12:00 pm: **Superresolution optical fluctuation imaging using unknown patterned illumination**, Minkwan Kim, Chung Hyun Park, YongKeun Park, Yong-Hoon Cho, KAIST (Korea, Republic of) [8950-24]

12:20 pm: **3D STED nanoscopy with adaptive optics**, Hugo G. Sinclair, Alexander Savell, Imperial College London (United Kingdom); Martin O. Lenz, Univ. Bordeaux 1 (France); James H. Clegg, Alice C. N. Brown, Imperial College London (United Kingdom); Daniel M. Davis, Manchester Univ. (United Kingdom); Christopher W. Dunsby, Mark A. A. Neil, Paul M. W. French, Imperial College London (United Kingdom) [8950-25]

Lunch Break Sun 12:40 pm to 2:00 pm

SESSION 7

Location: Room 307 (Esplanade) Sun 2:00 pm to 3:20 pm

Nanoscopy and Superresolution Microscopy III

Session Chair: **Felix Koberling**, PicoQuant GmbH (Germany)

2:00 pm: **Design and development of BODIPY-based photoswitchable fluorophores to visualize cell signaling with multispectral super resolution microscopy**, Amy M. Bittel, Andrew K. Nickerson, Li-Jung Lin, Xiaolin Nan, Summer L. Gibbs, Oregon Health & Science Univ. (USA) [8950-26]

2:20 pm: **A novel aligning method for stimulated emission depletion microscopy using fluorescence lifetime distribution**, Yifan Wang, Cuifang Kuang, Shuai Li, Xiang Hao, Peng Xiu, Xu Liu, Zhejiang Univ. (China) . . . [8950-27]

2:40 pm: **3D-superlocalization microscopy of single FoF1-ATP synthase in living Eschericia coli**, Anja Korn, Marc Renz, Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) [8950-28]

3:00 pm: **Photocontrollable rhodamine spirolactams for single-molecule imaging**, Marissa K. Lee, Stanford Univ. (USA); Prabin Rai, Jarrod Williams, Robert J. Twieg, Kent State Univ. (USA); William Esco Moerner, Stanford Univ. (USA) [8950-29]

YOUNG INVESTIGATOR AWARD

Location: Room 307 (Esplanade) 3:20 pm to 3:30 pm

Session Chair: **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)

Presentation of the PicoQuant Young Investigator Award by **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA) and **Rainer Erdmann**, PicoQuant GmbH (Germany)

Prize donated by **PicoQuant GmbH Berlin (Germany)**

SESSION 8

Location: Room 307 (Esplanade) Sun 4:00 pm to 5:20 pm

Nanoscopy and Superresolution Microscopy IV

Session Chair: **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA)

4:00 pm: **Superresolution imaging of ciliary microdomains in isolated olfactory sensory neurons using a custom STED microscope (Invited Paper)**, Stephanie A. Meyer, Baris Ozbay, Diego Restrepo, Emily A. Gibson, Univ. of Colorado Denver (USA) [8950-30]

4:20 pm: **Image scanning microscopy (ISM)**, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany) [8950-31]

4:40 pm: **Using dSTORM to probe the molecular architecture of filopodia**, Sohail Ahmed, Amy Chou, K. P. Sem, Sudaharan Thankiah, Graham Wright, John Lim, Srivats Hariharan, A*STAR Institute of Medical Biology (Singapore) [8950-52]

5:00 pm: **Development of fluorescence probes for super-resolution imaging based on intramolecular spirocyclization**, Mako Kamiya, Shin-nosuke Uno, The Univ. of Tokyo (Japan); Toshitada Yoshihara, Gunma Univ. (Japan); Mehmet C. Tarhan, Hiroyuki Fujita, The Univ. of Tokyo (Japan); Seiji Tobita, Gunma Univ. (Japan); Yasuteru Urano, The Univ. of Tokyo (Japan) [8950-32]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Doubling the lateral resolution of confocal scanning laser microscope using virtually structured detection, Rongwen Lu, Benquan Wang, Qiu-Xiang Zhang, Xincheng Yao, The Univ. of Alabama at Birmingham (USA) [8950-34]

SERS fiber probe fabricated by femtosecond laser with lateral surface silver coating on micro-fiber tips, Baokai Cheng, Xinwei Lan, Clemson Univ. (USA); Honglan Shi, Yinfa Ma, Qingbo Yang, Missouri Univ. of Science and Technology (USA); Lei Yuan, Hai Xiao, Clemson Univ. (USA) [8950-35]

Imaging antimicrobial peptides acting on nano structured lipid bilayer membranes using multimodal optical microscope, Hyunjun Kim, Suho Lee, Kyuhan Kim, Young-Duk Kim, Siyoung Q. Choi, Myung-Chul Choi, DaeGab Gweon, KAIST (Korea, Republic of) [8950-36]

Intrinsic blinking of red fluorescent proteins for superresolution imaging, Natalia V. Klementieva, Nizhny Novgorod State Medical Academy (Russian Federation); Nina G. Bozhanova, Konstantin A. Lukyanov, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation); Sergey A. Lukyanov, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation); Elena V. Zagaynova, Anton I. Pavlikov, Nizhny Novgorod State Medical Academy (Russian Federation); Alexander S. Mishin, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation) [8950-37]

Breaking the diffraction limit of wide-field microscopy using frequency shift, Xiang Hao, Cuifang Kuang, Xu Liu, Zhejiang Univ. (China) [8950-38]

Sub-diffraction-limited imaging by photobleaching imprinting microscopy (PIM), Liang S. Gao, Washington Univ. in St. Louis (USA); Alejandro Garcia-Urbe, Texas A&M Univ. (USA); Yan Liu, Chiye Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) [8950-39]

Subwavelength light manipulation via wavefront shaping in complex media, Jung-Hoon Park, Chunghyun Park, HyeonSeung Yu, KAIST (Korea, Republic of); Jimin Park, Seoul National Univ. (Korea, Republic of); Seungyong Han, Jonghwa Shin, Seung Hwan Ko, Ki Tae Nam, Yong-Hoon Cho, YongKeun Park, KAIST (Korea, Republic of) [8950-40]

Reverse saturable scattering of a single gold nanoparticle, Hsuan Lee, Hsueh-Yu Wu, Yen-Ta Huang, Tung-Yu Su, National Taiwan Univ. (Taiwan); Yasuo Yonemaru, Masahito Yamanaka, Ryosuke Oketani, Satoshi Kawata, Satoru Shoji, Katsumasa Fujita, Osaka Univ. (Japan); Shi-Wei Chu, National Taiwan Univ. (Taiwan) [8950-41]

FPGA-based real-time multichannel correlator for high-throughput fluorescence correlation spectroscopy, Sixia Gong, Ivan Labanca, Ivan Rech, Massimo Ghioni, Politecnico di Milano (Italy) [8950-42]

Localization of single biological molecules out of the focal plane, Lucia Gardini, European Lab. for Non-linear Spectroscopy (Italy); Marco Capitanio, European Lab. for Non-linear Spectroscopy (Italy) and Univ. of Florence (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Univ. of Florence (Italy) and Italian Institute of Optics (Italy) [8950-43]

Motionless focus control in PALM/STORM using adaptive optics, Audrius Jasaitis, Min-Kyung Kwon, Grégory Clouvel, Imagine Optic SA (France); Ignacio Izeddin, Ecole Normale Supérieure (France); Mohamed El Beheiry, Maxime Dahan, Institute Curie (France); Xavier Darzacq, Ecole Normale Supérieure (France); Xavier Levecq, Imagine Optic SA (France) [8950-44]

Sample drift correction for STORM microscopy without use of fixed fiduciary markers, Alexander A. Moiseev, Tatiana V. Vasilenkova, Grigory V. Gelikonov, Valentine M. Gelikonov, Institute of Applied Physics (Russian Federation) [8950-45]

3D single-molecule tracking using one- and two-photon excitation microscopy, Cong Liu, Evan P. Perillo, Quincy Zhuang, Khang T. Huynh, Judy M. Obliosca, Andrew K. Dunn, Hsin-Chih Yeh, The Univ. of Texas at Austin (USA) [8950-46]

Improved localization accuracy for fluorescence localization microscopy with statistical hypothesis testing of initial data, Alexander A. Moiseev, Tatiana V. Vasilenkova, Grigory V. Gelikonov, Valentine M. Gelikonov, Institute of Applied Physics (Russian Federation); Olesia M. Shirokova, Maria V. Vedunova, Nizhny Novgorod State Medical Academy (Russian Federation) [8950-47]

Quantifying local density of optical states of nanorods by fluorescence lifetime imaging, Jing Liu, Xunpeng Jiang, Purdue Univ. (USA); Satoshi Ishii, Purdue Univ. (USA) and National Institute of Information and Communications (Japan); Vladimir M. Shalaev, Joseph Irudayaraj, Purdue Univ. (USA) . . . [8950-48]

Three-dimensional single particle tracking on apical surface of live cells using prism-coupled light sheet microscopy, Yu Li, The Univ. of Arizona (USA); Ying S. Hu, Hu Cang, The Salk Institute for Biological Studies (USA) . . [8950-49]

Entropy-based calculations as a tool for denoising and resolution enhancement in fluorescence microscopy imaging, Idir Yahiatene, Univ. Bielefeld (Germany) and Ctr. for Biophotonics Science and Technology (Germany); Simon Hennig, Univ. Bielefeld (Germany); Thomas Huser, Univ. Bielefeld (Germany) and Ctr. for Biophotonics Science and Technology (Germany); John Rutledge, UC Davis Medical Ctr. (USA) [8950-50]

Fluorescent nanodiamonds for ultrasensitive detection, Joseph D. Kimball, Dmytro Shumilov, Texas Christian Univ. (USA); Badri P. Maliwa, Univ. of North Texas Health Science Ctr. (USA); T. W. Zerda, Texas Christian Univ. (USA); Rafal Fudala, Sangram Raut, Ignacy Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Eric Simanek, Texas Christian Univ. (USA); Julian Borejdo, Ryan Rich, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Irina Akopowa, Univ. of North Texas Health Science Ctr. (USA); Zygmunt Gryczynski, Texas Christian Univ. (USA) [8950-51]

Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics

Conference Chair: **Gerard L. Coté**, Texas A&M Univ. (USA)

Program Committee: **Brent D. Cameron**, The Univ. of Toledo (USA); **Werner Gellermann**, The Univ. of Utah (USA); **Jürgen M. Lademann**, Charité Universitätsmedizin Berlin (Germany); **Kristen C. Maitland**, Texas A&M Univ. (USA); **Michael J. McShane**, Texas A&M Univ. (USA); **Kenith E. Meissner**, Texas A&M Univ. (USA); **Babak Shadgan M.D.**, The Univ. of British Columbia (Canada); **Kexin Xu**, Tianjin Univ. (China); **Shaoqun Zeng**, Britton Chance Ctr. for Biomedical Photonics (China)

Monday 3 February

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x27476.xml>.

Characterization of BxPC3-transplanted mice by autofluorescence imaging and Raman spectroscopy, Masanori Sawa, Kwansai Gakuin Univ. (Japan) [8951-23]

Imaging the information flow with single cell resolution in neuronal networks, Xiuli Liu, Shaoqun Zeng, Huazhong Univ. of Science and Technology (China) [8951-30]

Novel noninvasive point-of-care device for real time hemoglobin monitoring, Ulrich Timm, Jens Kraittl, Helge Gewiss, Univ. Rostock (Germany); Kirstin Stupmann, German Red Cross Blood Donation Service (Germany); Sebastian Koball, Michael Hinz, Hartmut Ewald, Univ. Rostock (Germany) [8951-31]

Photon transport model of NIR light propagation in human finger tissue, for a point-of-care blood pressure measuring device, Arushi Varshney, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Chris Elliott, Leman Micro Devices SA (Switzerland); Philippe Renaud, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8951-32]

Switchable optical clearing window for monitoring development of diabetic angiopathy, Rui Shi, Yang Zhang, Min Chen, Ruilin Wang, Junbo Jin, Yuhua Lu, Huazhong Univ. of Science and Technology (China); Polina A. Timoshina, Huazhong Univ. of Science and Technology (China) and N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Dan Zhu, Huazhong Univ. of Science and Technology (China) [8951-33]

Pilot study to visualise and measure skin tissue oxygenation, erythema, total haemoglobin and melanin content using index maps in healthy controls, Ian Poxon, Mark Dickinson, Andrea K. Murray, The Univ. of Manchester (United Kingdom) [8951-34]

Quantitative measurement of biological substances in daily-life environment with the little-finger-size one-shot spectroscopic tomography, Akane Ishida, Sato Shun, Sho Nakada, Satoru Suzuki, Pradeep Abeygunawardhana, Kenji Wada, Akira Nishiyama, Ichirou Ishimaru, Kagawa Univ. (Japan) [8951-35]

Wide-field spectroscopic imaging of biological-substance distributions on entire faces by measuring middle infrared lights emitted from human bodies itself, Yo Suzuki, Wei Qi, Masaru Fujiwara, Hiroyuki Hiramatsu, Satoru Suzuki, Pradeep Abeygunawardhana, Kenji Wada, Akira Nishiyama, Ichiro Ishimaru, Kagawa Univ. (Japan) [8951-36]

Multiplexed biosensing using microspheres on a microstructured optical fiber tip, Tess Reynolds, Alexandre François, The Univ. of Adelaide (Australia); Stephen J. Nicholls, South Australian Health and Medical Research Institute (Australia); Tanya M. Monro, The Univ. of Adelaide (Australia) [8951-38]

High-speed dual-wavelength optical polarimetry for glucose sensing, Daniel T. Grunden, Casey W. Pirnstill, Gerard L. Coté, Texas A&M Univ. (USA) [8951-39]

PEGylation of Concanavalin A to decrease nonspecific interactions in a fluorescent glucose sensor, Alexander A. Abraham, Brian M. Cummins, Andrea K. Locke, Melissa A. Grunlan, Gerard L. Coté, Texas A&M Univ. (USA) . . [8951-40]

Multimodal techniques for rapid screening of intraarterial drug delivery, Rajinder P. Singh-Moon, Columbia Univ. Medical Ctr. (USA); Durba B. Chaudhuri, Boston Univ. (USA); Mei Wang, Columbia Univ. Medical Ctr. (USA); Robert M. Straubinger, Univ. at Buffalo (USA); Irving J. Bigio, Boston Univ. (USA); Shailendra Joshi, Columbia Univ. Medical Ctr. (USA) [8951-41]

Developing strategies to enhance loading efficiency of erythrosensors, Sandra C. Bustamante, Sarah C. Ritter, Kenith E. Meissner, Texas A&M Univ. (USA) [8951-42]

Biomarkers of chronic kidney disease in the urine of diabetic/hypertensive patients by means of Raman spectroscopy, Elzo E. S. Vieira, Jeyse A. M. Bispo, Colégio Tapajós (Brazil); Landulfo Silveira Jr., Adriana B. Fernandes, Univ. Camilo Castelo Branco (Brazil) [8951-43]

Wednesday 5 February

SESSION 1

Location: Room 310 (Esplanade) . . . Wed 8:30 am to 10:10 am

Perfusion and Oxygenation Imaging and Monitoring

Session Chair: **Babak Shadgan M.D.**, The Univ. of British Columbia (Canada)

8:30 am: **A simple and robust optical scheme for self-mixing low-coherence flowmeters**, Stefano Cattini, Luigi Rovati, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8951-1]

8:50 am: **Photoplethysmography beyond perfusion and oxygenation monitoring: pulse wave analysis for hepatic graft monitoring**, Tony J. Akl, Texas A&M Univ. (USA); Mark A. Wilson, Univ. of Pittsburgh (USA) and VA Pittsburgh Healthcare System (USA); M. Nance Ericson, Oak Ridge National Lab. (USA); Gerard L. Coté, Texas A&M Univ. (USA) [8951-2]

9:10 am: **Optical monitoring of skeletal muscle oxygenation and hemodynamics during exercise: a novel approach in exercise science**, Babak Shadgan, Behnam Molavi, The Univ. of British Columbia (Canada) [8951-3]

9:30 am: **Real-time imaging the blood flow using laser speckle: from basic to preclinic studies**, Pengcheng Li, Yaru Wang, Yang Wang, Jianjun Qiu, Hongyan Zhang, Britton Chance Ctr. for Biomedical Photonics, Huazhong Univ. of Science and Technology (China) [8951-4]

9:50 am: **High-resolution coherence domain depth-resolved nailfold capillaroscopy based on correlation mapping optical coherence tomography**, Hrebesh M. Subhash, Kai Neuhaus, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) [8951-5]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 2

Location: Room 310 (Esplanade) . . Wed 10:40 am to 12:00 pm

Sensing of Glucose and Other Blood Analytes

Session Chair: **Michael J. McShane**, Texas A&M Univ. (USA)

10:40 am: **Modeling the optical coupling across the anterior chamber of the eye towards polarimetric glucose sensing**, Casey W. Pirnstill, Gerard L. Coté, Texas A&M Univ. (USA) [8951-6]

11:00 am: **Influence of spectral bandwidth limitations of tuneable external-cavity based quantum cascade laser systems for clinical biofluid analysis**, Herbert M. Heise, Thorsten Vahlsing, Fachhochschule Südwestfalen (Germany) [8951-7]

11:20 am: **Blood analyte sensing using fluorescent dye-loaded red blood cells**, Sarah C. Ritter, Texas A&M Univ. (USA); Xiaole Shao, Timothy E. Glass, Univ. of Missouri (USA); Kenith E. Meissner, Texas A&M Univ. (USA) [8951-8]

11:40 am: **ConA-based glucose sensing using the long-lifetime azadioxatriangulenium fluorophore**, Brian M. Cummins, Texas A&M Univ. (USA); Jonathan Simpson, Univ. of Strathclyde (United Kingdom); Zygmont Gryczynski, Texas Christian Univ. (USA) and Univ. of North Texas Health Science Ctr. (USA); Thomas J. Sorensen, Bo W. Laursen, Univ. of Copenhagen (Denmark); Duncan Graham, David J. Birch, Univ. of Strathclyde (United Kingdom); Gerard L. Coté, Texas A&M Univ. (USA) [8951-9]

Lunch Break Wed 12:00 pm to 1:30 pm

SESSION 3

Location: Room 310 (Esplanade) Wed 1:30 pm to 3:10 pm

Point-of-Care Sensing and Imaging

Session Chair: **Aydogan Ozcan**, Univ. of California, Los Angeles (USA)

1:30 pm: **Blood cell diagnostics by a chip lensless microscope**, Rainer Riesenberger, Mario Kanka, Institut für Photonische Technologien e.V. (Germany) [8951-10]

1:50 pm: **Preliminary measurement results of an optical cavity based biosensor using chained differential detection**, Joshua Brake, Seung Kim, LeTourneau Univ. (USA) [8951-11]

2:10 pm: **Fluorescent imaging over an ultralarge field-of-view of 532 cm² using a flatbed scanner**, Zoltán S. Göröcs, Yuye Ling, Meng D. Yu, Dimitri Karahalios, Kian Mogharabi, Kenny Lu, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8951-12]

2:30 pm: **Label-free molecular sensing by SERS on nanoporous gold substrates**, Wei-Chuan Shih, Jing Lu, Jianbo Zeng, Fusheng Zhao, Univ. of Houston (USA) [8951-13]

2:50 pm: **Rapid identification of bacterial resistance to Ciprofloxacin using surface-enhanced Raman spectroscopy**, Evdokia Kastanos, Univ. of Nicosia (Cyprus); Katerina Hadjigeorgiou, Costas Pitris, Univ. of Cyprus (Cyprus) [8951-14]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 4

Location: Room 310 (Esplanade) Wed 3:40 pm to 5:20 pm

Global Point-of-Care Applications and Systems

Session Chair: **Kristen C. Maitland**, Texas A&M Univ. (USA)

3:40 pm: **Cost-effective fluorescence microscope for point of care read out of bead-based assays**, Alessandra J. Forcucci, Ina P. Pavlova, Michal Pawlowski, Rebecca R. Richards-Kortum, Tomasz S. Tkaczyk, Rice Univ. (USA) [8951-15]

4:00 pm: **Stick-on microscope for smartphones**, Woei Ming Lee, Australian National Univ. (Australia) [8951-16]

4:20 pm: **Simple microscopy on a smartphone for skin melanin diagnosis**, PoHan Tom Lin, C. K. Lee, National Taiwan Univ. (Taiwan) [8951-17]

4:40 pm: **Dual-wavelength excitation to reduce background fluorescence for fluorescence spectroscopic quantitation of erythrocyte zinc protoporphyrin-IX and protoporphyrin-IX from whole blood and oral mucosa**, Georg Hennig, Michael Vogeser, Lesca M. Holdt, Christian Homann, Michael Großmann, Herbert Stepp, Christian Gruber, Ilknur Erdogan, Stephan Hasmmüller, Uwe Hasbargen, Klinikum der Univ. München (Germany); Gary M. Brittenham, Columbia Univ. College of Physicians and Surgeons (USA) [8951-18]

5:00 pm: **Point-of-care optical tool to detect early stage of hemorrhage and shock**, Rajan Gurjar, David E. Wolf, Radiation Monitoring Devices, Inc. (USA); Michael Joyner, Mayo Clinic (USA); Suzannah L. Riccardi, Radiation Monitoring Devices, Inc. (USA); Blair Johnson, Mayo Clinic (USA); Norman Paradis, Dartmouth Medical Ctr. (USA); Christopher P. Johnson, Mayo Clinic (USA) [8951-19]

Thursday 6 February

SESSION 5

Location: Room 310 (Esplanade) Thu 8:40 am to 10:00 am

Cancer Detection Using Optical Techniques

Session Chair: **Daniel S. Gareau**, The Rockefeller Univ. (USA)

8:40 am: **Non-model-based approach for determining depth and concentration of deep fluorescent lesions in turbid media**, Kolbein Kolste, Stephen Kanick, Thayer School of Engineering at Dartmouth (USA); Pablo Valdes, Geisel School of Medicine (USA); Brian Wilson, Ontario Cancer Institute (Canada); Keith Paulsen, Thayer School of Engineering at Dartmouth (USA); David Roberts, Dartmouth Hitchcock Medical Ctr. (USA); Frederic Leblond, Ecole Polytechnique de Montréal (Canada) [8951-20]

9:00 am: **In vivo hyperspectral imaging of cervical neoplasia**, Chaojian Wang, Wenli Zheng, Univ. of Science and Technology of China (China); Yanggao Bu, The 105th Hospital of the People's Liberation Army (China); Shufang Chang, Chongqing Medical Univ. (China); Qingping Tong, The 105th Hospital of the People's Liberation Army (China); Shiwu Zhang, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8951-22]

9:20 am: **Measurement of the human esophageal cancer in an early stage with Raman spectroscopy**, Yasuhiro Maeda, Mika Ishigaki, Akinori Taketani, Bibin B. Andriana, Kwansei Gakuin Univ. (Japan); Ryu Ishihara, Osaka Medical Ctr. for Cancer and Cardiovascular Diseases (Japan); Hidetoshi Sato, Kwansei Gakuin Univ. (Japan) [8951-24]

9:40 am: **Raman endoscopy for the in situ investigation of advancing colorectal tumors in live model mice**, Akinori Taketani, Mika Ishigaki, Bibin B. Andriana, Hidetoshi Sato, Kwansei Gakuin Univ. (Japan) [8951-25]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 6

Location: Room 310 (Esplanade) Thu 10:30 am to 11:30 am

Drug Identification, Analysis, and Tracking

Session Chair: **Patrick D. O'Neal**, Louisiana Tech Univ. (USA)

10:30 am: **Multiwavelength pulse plethysmography for real-time drug delivery monitoring**, Pratik Adhikari, Isidro B. Magaña, Patrick D. O'Neal, Louisiana Tech Univ. (USA) [8951-27]

10:50 am: **Fiber-enhanced Raman sensing of pharmaceutical drugs**, Torsten Frosch, Di Yan, Juergen Popp, Institut für Photonische Technologien e.V. (Germany) [8951-28]

11:10 am: **Raman sensing of drug interference in malaria research**, Torsten Frosch, Jürgen Popp, Friedrich-Schiller-Univ. Jena (Germany) . [8951-29]

Biomedical Applications of Light Scattering IX

Conference Chairs: **Adam Wax**, Duke Univ. (USA); **Vadim Backman**, Northwestern Univ. (USA)

Program Committee: **Irving J. Bigio**, Boston Univ. (USA); **Stephen A. Boppart M.D.**, Univ. of Illinois at Urbana-Champaign (USA); **Bernard Choi**, Beckman Laser Institute and Medical Clinic (USA); **Dirk J. Faber**, Academisch Medisch Ctr. (Netherlands); **Steven L. Jacques**, Oregon Health & Science Univ. (USA); **Lev T. Perelman**, Harvard Univ. (USA); **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (USA); **Bruce J. Tromberg**, Beckman Laser Institute and Medical Clinic (USA)

Saturday 1 February

SESSION 1

Location: Room 309 (Esplanade) Sat 8:50 am to 10:10 am

Novel Techniques I

Session Chair: **Lev T. Perelman**, Harvard Univ. (USA)

8:50 am: **Rapid Stokes imaging of turbid media using 2 photoelastic modulators and sequential time gating**, Sanaz Alali, Tiyanu Yang, I. Alex Vitkin, Univ. of Toronto (Canada) [8952-1]

9:10 am: **Localized differential heterodyne dynamic light scattering system**, LiDek Chou, Univ. of California, Irvine (USA) and Chang Gung Univ. (Taiwan); Li-Ping Yu, Chien Chou, Chang Gung Univ. (Taiwan) [8952-2]

9:30 am: **Biochemical component identification by light scattering techniques in whispering gallery mode optical resonance based sensor**, Vladimir A. Saetchnikov, Elina A. Tcherniavskaia, Belarusian State Univ. (Belarus); Anton V. Saetchnikov, Belarusian State Univ. (Belarus) and Ruhr-Univ. Bochum (Germany); Gustav Schweiger, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8952-3]

9:50 am: **Improving Raman scattering spectroscopy through fluctuation analysis**, Christoph Bennenhei, Univ. Oldenburg (Germany); Idir Yahiatène, Univ. Bielefeld (Germany); Walter Neu, Hochschule Emden-Leer (Germany); Thomas R. Huser, Univ. Bielefeld (Germany); Frank Chuang, NSF Ctr. for Biophotonics Science and Technology (USA) [8952-4]

Coffee Break Sat 10:10 am to 10:40 am

SESSION 2

Location: Room 309 (Esplanade) . . . Sat 10:40 am to 11:50 am

Novel Techniques II

Session Chair: **Irving J. Bigio**, Boston Univ. (USA)

10:40 am: **Minimally invasive photopolymerization in tissue cavities**, Andreas Schmocker, Azadeh Khoushabi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Benjamin Gantenbein-Ritter, Samantha Chan, Univ. Bern (Switzerland); Dominique Pioletti, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Constantin Schizas, Ctr. Hospitalier Univ. Vaudois (Switzerland); Harald M. Bonél, Inselspital, Univ. Bern (Switzerland); Pierre-Etienne Bourban, Jan-Anders E. Månson, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8952-5]

11:00 am: **Refractive index determination of single sub micrometer vesicles in suspension using dark-field microscopy**, Edwin van der Pol, F. A. W. Coumans, A. N. Böing, A. Sturk, R. Nieuwland, Ton G. van Leeuwen, Academic Medical Ctr., Univ. of Amsterdam (Netherlands) [8952-6]

11:20 am: **Method for rapid multi-diameter single fiber reflectance and fluorescence spectroscopy through a fiber bundle** (*Invited Paper*), Arjen Amelink, Chris L. Hoy, Ute A. Gamm, Henricus JCM Sterenberg, Dominic J. Robinson, Erasmus MC (Netherlands) [8952-7]

Lunch Break Sat 11:50 am to 1:20 pm

SESSION 3

Location: Room 309 (Esplanade) Sat 1:20 pm to 3:00 pm

Theory I

Session Chair: **Vadim Backman**, Northwestern Univ. (USA)

1:20 pm: **Subdiffractional length-scale sensitivity of spectroscopic microscopy**, Lusik Cherkezyan, Ilker R. Capoglu, Hariharan Subramanian, John E. Chandler, Vadim Backman, Northwestern Univ. (USA) [8952-8]

1:40 pm: **Propagation and scattering of coherent circularly polarized light in turbid random medium**, Alexander Doronin, Callum Macdonald, Igor V. Meglinski, Univ. of Otago (New Zealand) [8952-9]

2:00 pm: **Measuring depth dependent optical properties using diffuse reflectance spectroscopy**, Ricky J. Hennessy, Manu Sharma, Mia K. Markey, James W. Tunnell, The Univ. of Texas at Austin (USA) [8952-10]

2:20 pm: **Comparison among optical blood perfusion measurement modalities: a theoretical study**, Renzhe Bi, Jing Dong, Kijoon Lee, Nanyang Technological Univ. (Singapore) [8952-11]

2:40 pm: **Multispectral and time-domain diffuse optical tomography data processing by using a material basis and Mellin-Laplace transform**, Lionel Hervé, Anne Planat-Chrétien, Agathe Puszka, Michel Berger, CEA-LETI-Minatec (France); Laura Di Sieno, Alberto Dalla Mora, Davide Contini, Gianluca Boso, Politecnico di Milano (Italy); Jean-Marc Dinten, CEA-LETI-Minatec (France) [8952-12]

Coffee Break Sat 3:00 pm to 3:30 pm

SESSION 4

Location: Room 309 (Esplanade) Sat 3:30 pm to 4:50 pm

Theory II

Session Chair: **Vadim Backman**, Northwestern Univ. (USA)

3:30 pm: **Subdiffusion regime reflectance measured by enhanced backscattering to quantify tissue phase function and ultrastructure**, Andrew J. Radosevich, Nikhil N. Mutyal, Ji Yi, Elizabeth Horcher, Northwestern Univ. (USA) [8952-13]

3:50 pm: **Comparison of two Monte Carlo models of propagation of coherent polarized light in turbid scattering media**, Alexander Doronin, Univ. of Otago (New Zealand); Andrew J. Radosevich, Vadim Backman, Northwestern Univ. (USA); Igor V. Meglinski, Univ. of Otago (New Zealand) [8952-14]

4:10 pm: **FDTD simulation of an optical absorber based on CPML absorbing boundary condition**, Sergio Cantero, Yian Huang, Snow H. Tseng, National Taiwan Univ. (Taiwan) [8952-15]

4:30 pm: **A measurement-based analytical approach to the forward solution and the determination of the source strength in bioluminescence imaging**, Aytac Demirkiran, Hakan Erkol, Nasire Uluc, Esra Aytac-Kiperçil, Mehmet Burcin Unlu, Bogaziçi Üniv. (Turkey) [8952-16]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 309 (Esplanade) Sun 8:40 am to 10:10 am

Speckle Imaging and Dynamic Light Scattering I

Session Chair: **Bernard Choi**,
Beckman Laser Institute and Medical Clinic (USA)

8:40 am: **Quantifying the relationship between decorrelation time and blood flow velocity in vivo using sidestream dark field-laser speckle contrast imaging**, Annemarie Nadort, Academisch Medisch Ctr. (Netherlands) and Macquarie Univ. (Australia); Rutger G. Woolthuis, Koen Kalkman, Academisch Medisch Ctr. (Netherlands); Ton G. van Leeuwen, Academic Medical Ctr., Univ. of Amsterdam (Netherlands); Dirk J. Faber, Academisch Medisch Ctr. (Netherlands) [8952-17]

9:00 am: **Optical properties assessment of liquid phantoms using fiber based frequency-modulated light scattering interferometry**, Liang Mei, Gabriel Somesfalean, Lund Univ. (Sweden); Sune Svanberg, Lund Univ. (Sweden) and Ctr. for Optical and Electromagnetic Research, South China Normal Univ. (China) [8952-18]

9:20 am: **Detecting apoptosis in vivo and ex vivo using spectroscopic OCT and dynamic light scattering**, Golnaz Farhat, Univ. of Toronto (Canada); Anoja Giles, Sunnybrook Health Sciences Ctr. (Canada); Adrian Mariampillai, Victor X. D. Yang, Biophotonics and Bioengineering Lab., Ryerson Univ. (Canada); Gregory J. Czarnota, Sunnybrook Health Sciences Ctr. (Canada); Michael C. Kolios, Ryerson Univ. (Canada) [8952-19]

9:40 am: **Multimodal optical neural imaging system incorporating laser speckle contrast imaging (Invited Paper)**, Ofer Levi, Univ. of Toronto (Canada) [8952-20]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 6

Location: Room 309 (Esplanade) . . . Sun 10:40 am to 12:00 pm

Speckle Imaging and Dynamic Light Scattering II

Session Chair: **Bernard Choi**,
Beckman Laser Institute and Medical Clinic (USA)

10:40 am: **Scattering orientation imaging and fast tomography via spatial frequency synthesis: towards optical diffusion tensor imaging**, Kyle P. Nadeau, Adam R. Gardner, Elliott Kwan, Tyler B. Rice, Vasana Venugopalan, Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) [8952-21]

11:00 am: **Speckle reduction using wavefront modulation in optical coherence tomography images**, Christian M. Oh, Koji Hirota, Md. Rezuhanul Haque, Jonathan Ma, Univ. of California, Riverside (USA); Yan Wang, Harvard Medical School (USA) and Massachusetts General Hospital (USA); M. Shahidul Islam, B. Hyle Park, Univ. of California, Riverside (USA) [8952-22]

11:20 am: **Biodynamic imaging to predict lymphoma response to therapy**, Ran An, Michael Childress, John J. Turek, David Nolte, Purdue Univ. (USA) [8952-23]

11:40 am: **Impact of spatial averaging of dynamic speckle on relative blood flow-speed measurement**, Julio C. Ramirez-San-Juan, Emilia M. Mendez-Aguilar, Noemi Salazar-Hermenegildo, Angel Fuentes-Garcia, Rubén Ramos-Garcia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Bernard Choi, Beckman Laser Institute and Medical Clinic (USA) [8952-24]

Lunch Break Sun 12:00 pm to 1:30 pm

SESSION 7

Location: Room 309 (Esplanade) Sun 1:30 pm to 3:00 pm

Clinical and Pre-clinical Studies

Session Chair: **Adam Wax**, Duke Univ. (USA)

1:30 pm: **Probing tissue multifractality using multi-resolution analysis for early detection of cancer (Invited Paper)**, Nirmalya Ghosh, Nandan K. Das, Subhasri Chatterjee, Indian Institute of Science Education and Research Kolkata (India); Asima Pradhan, Indian Institute of Technology Kanpur (India); Prasanta K. Panigrahi, Indian Institute of Science Education and Research Kolkata (India); I. Alex Vitkin, Univ. of Toronto (Canada) [8952-25]

2:00 pm: **Depth-resolved dynamics of aceto-whitening in rabbit cornea studied by 1300-nm optical coherence tomography**, Peggy Khoo, Stephen J. Matcher, Shweta Mittar, Kroto Research Institute, Univ. of Sheffield (United Kingdom); Hai Lu Zeng, Kroto Research Institute, Univ. of Sheffield (United Kingdom) and Nanoscience & Technology Ctr., Univ. of Sheffield (United Kingdom); Deepa K. Kasaragod, Kroto Research Institute, Univ. of Sheffield (United Kingdom) [8952-26]

2:20 pm: **The study of dynamics of breast cancer oxygenation under neoadjuvant chemotherapy**, Anna G. Orlova, Institute of Applied Physics (Russian Federation); Anna V. Maslennikova, Nizhny Novgorod State Medical Academy (Russian Federation) and Institute of Applied Physics (Russian Federation); German Yu. Golubjatnikov, Institute of Applied Physics (Russian Federation); Natalia G. Ponomareva, Nizhny Novgorod State Medical Academy (Russian Federation); Tatiana I. Pryanikova, Institute of Applied Physics (Russian Federation); Sergey S. Kuznetsov, Nizhny Novgorod State Medical Academy (Russian Federation); Natalia M. Shakhova, Institute of Applied Physics (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation); Ilya V. Turchin, Institute of Applied Physics (Russian Federation) [8952-27]

2:40 pm: **Application of angle-resolved low coherence interferometry (a/LCI) to inflammatory bowel disease**, Tyler K. Drake, Marthony Robins, Jane Onken III, Cynthia D. Guy, Adam Wax, Duke Univ. (USA) [8952-28]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 8

Location: Room 309 (Esplanade) Sun 3:30 pm to 4:50 pm

In Vitro Cell Studies

Session Chair: **Adam Wax**, Duke Univ. (USA)

3:30 pm: **Rapid and label-free identification of individual bacterium with Fourier transform light scattering**, YoungJu Jo, Jae Hwang Jung, Jee Woong Lee, KAIST (Korea, Republic of); Seon Ae Shin, Seoul National Univ. (Korea, Republic of); Youngchan Kim, KAIST (Korea, Republic of); Ki Tae Nam, Seoul National Univ. (Korea, Republic of); Ji-Ho Park, YongKeun Park, KAIST (Korea, Republic of) [8952-29]

3:50 pm: **Time-lapsed study of mitochondrial swelling by angular-domain scattering interferometry and Raman spectroscopy**, Dustin W. Shipp, Ruobing Qian, Ashley E. Cannaday, Andrew J. Berger, Univ. of Rochester (USA) [8952-30]

4:10 pm: **Diagnostic features in two-dimensional light scattering patterns of normal and dysplastic cervical cell nuclei**, Dizem Arifler, Kemal Saracoglu Foundation (Cyprus); Calum MacAulay, The BC Cancer Agency Research Ctr. (Canada); Michele Follen, Texas Tech Univ. Health Sciences Ctr (USA); Martial Guillaud, The BC Cancer Agency Research Ctr. (Canada) [8952-31]

4:30 pm: **Investigation of the correlation between acetic acid-induced structural changes and backscattering of epithelial cells based on three-dimensional refractive index distributions of living cells**, Jing-Wei Su, Wei-Chen Hsu, Kung-Bin Sung, Institute of Biomedical Electronics and Bioinformatics, National Taiwan Univ. (Taiwan) [8952-32]



POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

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A noninvasive diffuse reflectance calibration-free method for absolute determination of exogenous biochemicals concentration in biological tissues, Alexander V. Lappa, Anton N. Kulikovskiy, Artem N. Kulikovskiy, Oleg Busarov, Chelyabinsk State Univ. (Russian Federation) [8952-41]

A laminar optical tomography system for early cervical cancer diagnosis, Shanshan Cui, Mengyu Jia, Lingling Liu, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) [8952-42]

Three-dimensional mappings of radiance in turbid media, Lingling Liu, Chenxi Li, Xi Yi, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) [8952-43]

An adaptive extended Kalman filter for imaging pharmacokinetic-rate in tumors using fluorescence diffuse optical tomography method, Xin Wang, Xi Yi, Linhui Wu, Tianjin Univ. (China); Limin Zhang, Feng Gao, Huijuan Zhao, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China) [8952-44]

3D reconstruction of internal structure of animal body using near-infrared light, Trung Nghia Tran, Kohei Yamamoto, Graduate School of Information Science and Technology, Hokkaido Univ. (Japan); Takeshi Namita, Graduate School of Medicine, Kyoto Univ. (Japan); Yuji Kato, Koichi Shimizu, Graduate School of Information Science and Technology, Hokkaido Univ. (Japan) [8952-45]

Mapping local anisotropy axis for scattering media using backscattering Mueller matrix imaging, Hui Ma, Honghui He, Nan Zeng, Minghao Sun, E. Du, Yihong Guo, Ran Liao, Yonghong He, Graduate School at Shenzhen, Tsinghua Univ. (China) [8952-46]

Mueller matrix polar decomposition for anisotropic medium: origin of depolarization, retardance, and diattenuation, Hui Ma, Yihong Guo, Nan Zeng, Honghui He, Celong Liu, E. Du, Yonghong He, Graduate School at Shenzhen, Tsinghua Univ. (China) [8952-47]

Noninvasive blood flow assessment in diabetic foot ulcer subjects using laser speckle contrast imaging technique, Jayanthi Anavai Kandaswami, Sri Ramaswamy Memorial Univ. (India); Sujatha N., Ramasubba Reddy M., Indian Institute of Technology Madras (India); Narayanamoorthy V. B., Sundaram Medical Foundation (India) [8952-48]

Monday 3 February

SESSION 9

Location: Room 309 (Esplanade) . . . Mon 8:30 am to 10:10 am

Low-coherence Light Scattering I

Session Chair: **Dirk J. Faber**, Academisch Medisch Ctr. (Netherlands)

8:30 am: **Study of chromatin compaction by inverse spectroscopic optical coherence tomography as one mechanism in colorectal field carcinogenesis** (*Invited Paper*), Ji Yi, Yolanda Stypula, Andrew J. Radosevich, Nikhil N. Mutyal, Northwestern Univ. (USA); Hemant K. Roy, Boston Medical Ctr. (USA); Vadim Backman, Northwestern Univ. (USA) [8952-33]

9:00 am: **Performance comparison of different metrics for spectroscopic optical coherence tomography**, Volker Jaedicke, Semih A?caer, Ruhr-Univ. Bochum (Germany); Francisco E. Robles, Duke Univ. (USA); Nils C. Gerhardt, Ruhr-Univ. Bochum (Germany); Hubert Welp, Technische Fachhochschule Georg Agricola zu Bochum (Germany); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [8952-34]

9:20 am: **Detection of early ocular disease using two dimensional angle-resolved low coherence interferometry combined with optical coherence tomography**, Sanghoon Kim, Stephanie Heflin, Sina Farsiu, Vadim Y. Arshavsky, Adam Wax, Duke Univ. (USA) [8952-35]

9:40 am: **Deep tissue multispectral multiple scattering low coherence interferometry** (*Invited Paper*), Thomas E. Matthews, Adam Wax, Duke Univ. (USA) [8952-36]

Coffee Break Mon 10:10 am to 10:40 am

SESSION 10

Location: Room 309 (Esplanade) . . Mon 10:40 am to 12:10 pm

Low-coherence Light Scattering II

Session Chair: **Dirk J. Faber**, Academisch Medisch Ctr. (Netherlands)

10:40 am: **Dynamic light scattering optical coherence tomography imaging of cerebral blood flow and intracellular motility** (*Invited Paper*), Jonghwan Lee, Weicheng Wu, David A. Boas, Harvard Medical School (USA) [8952-37]

11:10 am: **Diffusion-sensitive imaging of gold nanorods in extracellular matrix with polarization-sensitive OCT**, Raghav K. Chhetri, The Univ. of North Carolina at Chapel Hill (USA); Wei-Chen Wu, Joseph B. Tracy, North Carolina State Univ. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) [8952-38]

11:30 am: **Light energy enhancement in turbid media**, Youngwoon Choi, Timothy R. Hillman, Massachusetts Institute of Technology (USA); Wonjun Choi, Korea Univ. (Korea, Republic of); Niyom Lue, Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA); Wonshik Choi, Korea Univ. (Korea, Republic of); Zahid Yaqoob, Massachusetts Institute of Technology (USA) [8952-39]

11:50 am: **Scattering changes during neuronal apoptosis using pathlength multiplexed scattering angle resolved optical coherence tomography**, Bingqing Wang, Biwei Yin, Jordan Dwelle, H. Grady Rylander III, Mia K. Markey, Thomas E. Milner, The Univ. of Texas at Austin (USA) [8952-40]

Optical Methods in Developmental Biology II

Conference Chairs: **Andrew M. Rollins**, Case Western Reserve Univ. (USA); **Cecilia W. Lo**, Univ. of Pittsburgh (USA); **Scott E. Fraser**, California Institute of Technology (USA)

Program Committee: **Michael A. Choma M.D.**, Yale School of Medicine (USA); **Anjul M. Davis**, Thorlabs Inc. (USA); **Mary E. Dickinson**, Baylor College of Medicine (USA); **Robert G. Gourdie**, Virginia Polytechnic Institute and State Univ. (USA); **Michael W. Jenkins**, Case Western Reserve Univ. (USA); **Bradley B. Keller**, Univ. of Louisville (USA); **Kirill V. Larin**, Univ. of Houston (USA); **Kersti K. Linask**, Univ. of South Florida (USA); **Charles D. Little**, The Univ. of Kansas Medical Ctr. (USA); **Lars Thrane**, Technical Univ. of Denmark (Denmark); **Ruikang K. Wang**, Univ. of Washington (USA); **Michiko Watanabe**, Case Western Reserve Univ. (USA); **Talât Mesud Yelbuz**, Medizinische Hochschule Hannover (Germany)

Saturday 1 February

SESSION 1

Location: Room 111 (Exhibit Level) . . Sat 8:30 am to 10:30 am

Structural and Molecular Imaging

Session Chair: **Michael A. Choma M.D.**, Yale School of Medicine (USA)

8:30 am: **Confocal imaging of whole mammalian embryos reveals novel insights into molecular and cellular mechanisms of organ development** (*Invited Paper*), Lisa L Sandell, Univ. of Louisville (USA) [8953-1]

9:00 am: **4D multiplexed functional imaging in deep tissue during embryo development** (*Invited Paper*), Ming Zhao, College of Optical Sciences, The Univ. of Arizona (USA); Xiaoyang Wan, Weibin Zhou, Univ. of Michigan (USA); Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA) [8953-2]

9:30 am: **Quantifying microvasculature during remodeling of yolk sac in developing mouse embryo**, Narendran Sudheendran, Kirill V. Larin, Prathamesh Kulkarni, Univ. of Houston (USA); Mary E. Dickinson, Irina V. Larina, Baylor College of Medicine (USA); Badrinath Roysam, Univ. of Houston (USA) [8953-3]

9:50 am: **Optical tissue clearing improves usability of optical coherence tomography (OCT) for high-throughput analysis of the internal structure and 3D morphology of small biological objects such as vertebrate embryos**, Lars Thrane, Thomas Martini Jørgensen, Technical Univ. of Denmark (Denmark); Jörg Männer, Georg-August-Univ. of Göttingen (Germany) [8953-4]

10:10 am: **Enhancing imaging depth by multi-angle imaging of embryonic structures**, Narendran Sudheendran, Chen Wu, Univ. of Houston (USA); Irina Larina, Mary Dickinson, Baylor College of Medicine (USA); Kirill V. Larin, Univ. of Houston (USA) [8953-5]

Coffee Break Sat 10:30 am to 11:00 am

SESSION 2

Location: Room 111 (Exhibit Level) . Sat 11:00 am to 12:30 pm

Developmental Cardiology I

Session Chair: **Kirill V. Larin**, Univ. of Houston (USA)

11:00 am: **Simultaneous real-time quantification of blood flow and vascular growth in the chick embryo using optical coherence tomography** (*Invited Paper*), William J. Kowalski, Nikola C. Teslovich, Carnegie Mellon Univ. (USA); Chia-Yuan Chen, National Taiwan Univ. of Science and Technology (Taiwan); Bradley B. Keller, Univ. of Louisville (USA); Kerem Pekkan, Carnegie Mellon Univ. (USA) [8953-6]

11:30 am: **3D correction of conduction velocity mapping in the early embryonic heart using integrated OCT and OM**, Pei Ma, Yves T. Wang, Shi Gu, Michiko Watanabe, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8953-7]

11:50 am: **Optical methods for cardiac electrophysiology studies in embryonic hearts**, Yves T. Wang, Shi Gu, Case Western Reserve Univ. (USA); Andreas A. Werdich, Brigham and Women's Hospital (USA); Pei Ma, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) [8953-8]

12:10 pm: **Gigavoxel timelaps microscopy of angiogenic sprouting**, Urs Utzinger, Brenda Baggett, The Univ. of Arizona (USA); James B Hoying, University of Louisville (USA); Jeffrey A Weiss, University of Utah (USA) [8953-9]

Lunch Break Sat 12:30 pm to 2:00 pm

SESSION 3

Location: Room 111 (Exhibit Level) . . . Sat 2:00 pm to 4:20 pm

Congenital Defects and Reproductive Biology

Session Chair: **Michael W. Jenkins**, Case Western Reserve Univ. (USA)

2:00 pm: **Early abnormal cardiac function linked to alcohol-induced congenital heart defects** (*Invited Paper*), Ganga H. Karunamuni, Shi Gu, Yong Qiu Doughman, Lindsay M. Peterson, Yves T. Wang, Pei Ma, Katherine Mai, Case Western Reserve Univ. (USA); Kersti K. Linask, Univ. of South Florida (USA); Michael W. Jenkins, Andrew M. Rollins, Michiko Watanabe, Case Western Reserve Univ. (USA) [8953-10]

2:30 pm: **Optical coherence tomography and optical angiography reveal novel embryo heart dynamic outflow tract physiology**, Brendan Huang, Constance Weismann, Yale School of Medicine (USA); Stephan Jonas, RWTH Aachen (Germany); Tangji Tong, Michael A. Choma M.D., Yale School of Medicine (USA) [8953-11]

2:50 pm: **Binge consumption of ethanol during pregnancy leads to significant developmental delay of mouse embryonic brain**, Narendran Sudheendran, Univ. of Houston (USA); Shameena Bake, Rajesh Miranda, Texas A&M Health Science Ctr. (USA); Kirill V. Larin, Univ. of Houston (USA) [8953-12]

Coffee Break Sat 3:10 pm to 3:40 pm

3:40 pm: **In vivo 3D imaging of medaka fish using SD-OCT for gender differentiation**, Fanny M. Gladys, Yiheng Lim, Masaru Matsuda, Barry Cense, Ctr. for Optical Research and Education, Utsunomiya Univ. (Japan) [8953-13]

4:00 pm: **Assessment of imaging parameters correlated with the effects of freezing on embryo development**, Livia Zarnescu, Helge Sudkamp, Barry Behr, Thomas M. Baer, Audrey K. Ellerbee, Stanford Univ. (USA) [8953-14]

SESSION 4

Location: Room 111 (Exhibit Level) . . . Sat 4:40 pm to 6:20 pm

Developmental Cardiology II

Session Chair: **Lars Thrane**, Technical Univ. of Denmark (Denmark)

4:40 pm: **Rapid pulsatile flow measurements using Doppler optical coherence tomography**, Lindsay M. Peterson, Shi Gu, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) [8953-15]

5:00 pm: **Functional analysis of drosophila heart development using optical coherence microscopy**, Aneesh Alex, Lehigh Univ. (USA); Aironng Li, Massachusetts General Hospital (USA) and Harvard Medical Center (USA); Nicole M. Pirozzi, Lehigh Univ (USA); Fengqiang Li, Lehigh Univ. (USA); Rudolph E Tanzi, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Chao Zhou, Lehigh Univ. (USA) [8953-16]

5:20 pm: **Real-time off-axis photoacoustic microscopy for dynamic imaging of the zebrafish embryo cardiac cycle**, Scott P. Mattison, Ryan T. Maxson, Texas A&M Univ. (USA); Ryan L. Shelton, Univ. of Illinois at Urbana-Champaign (USA); Brian E. Applegate, Texas A&M Univ. (USA) [8953-17]

5:40 pm: **Measurement of strain in early stage chicken embryonic heart in vivo using spectral domain optical coherence tomography**, Zhenhe Ma, Fengwen Wang, Northeastern Univ. at Qinhuangdao (China) [8953-18]

6:00 pm: **Mouse embryo manipulations with OCT guidance**, Monica D. Garcia, Saba H. Syed, Baylor College of Medicine (USA); Andrew J. Coughlin, Rice University (USA); Shang Wang, Univ of Houston (USA); Jennifer L. West, Rice University (USA); Mary E. Dickinson, Baylor College of Medicine (USA); Kirill V. Larin, Univ of Houston (USA) and Baylor College of Medicine (USA); Irina V. Larina, Baylor College of Medicine (USA) [8953-19]

Sunday 2 February

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

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BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

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See full Hot Topics presentation listing on page 17.

Infrared imaging-based measurement technique for enzymatic reaction of glucokinase, Juan P. Staforelli, María J. Gallardo, Pablo F. Meza, Sergio N. Torres, Claudio E. Reyes, Héctor A. Mella, Ctr. for Optics and Photonics, Univ. de Concepción (Chile) [8953-20]

Anti-translational research: from the bedside back to the bench for reflectance confocal microscopy, Daniel S. Gareau, The Rockefeller Univ. (USA) [8953-21]

Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X

Conference Chairs: **Alexander N. Cartwright**, Univ. at Buffalo (USA); **Dan V. Nicolau**, McGill Univ. (Canada)

Program Committee: **Vamsy P. Chodavarapu**, McGill Univ. (Canada); **Piotr A. Grodzinski**, National Cancer Institute (USA); **Sung Jin Kim**, Univ. of Miami (USA); **Brian D. MacCraith**, Dublin City Univ. (Ireland); **Paulo C. Morais**, Univ. de Brasília (Brazil); **Paras N. Prasad**, Univ. at Buffalo (USA); **Sharon M. Weiss**, Vanderbilt Univ. (USA)

Monday 3 February

POSTERS-MONDAY

Location: Room 103 (Exhibit Level) Mon 5:30 pm to 7:30 pm

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Near-field analysis of CdSe quantum dot conjugated core-shell nanoparticle complexes, Taehwang Son, Yonsei Univ. (Korea, Republic of); Saji T. Kochuveedu, Dong Ha Kim, Ewha Womans Univ. (Korea, Republic of); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8954-30]

Imaging mesenchymal stem cells containing single wall nanotube nanopores in a 3D scaffold using photo-thermal optical coherence tomography, Valerie Barron, Emma Connolly, Hrebesh M. Subhash, Martin Leahy, National Univ. of Ireland, Galway (Ireland); Niall Rooney, Proxy Biomedical Ltd. (Ireland); Frank Barry, Mary Murphy, National Univ. of Ireland, Galway (Ireland) [8954-31]

Imaging resolution improvement with plasmonic nanostructures to break an optical diffraction limit, Kyujung Kim, Pusan National Univ. (Korea, Republic of) [8954-32]

Au/Cu₂-xSe nanoparticles with tailored localized surface plasmon resonance as contrast agents for in vivo photoacoustic imaging, Changho Lee, Kyungpook National Univ. (Korea, Republic of); Xin Liu, Wing-Cheung Law, The State Univ. of New York at Buffalo (USA); Mansik Jeon, Chulhong Kim, Pohang Univ. of Science and Technology (POSTECH) (Korea, Republic of); Mark T. Schihart, Paras N. Prasad, The State Univ. of New York at Buffalo (USA) [8954-33]

Nanoparticles characterization using HDR-NTA image analysis, Raul E. Cachau, Frederick National Lab. for Cancer Research (USA); Bradford C. Braden, Bowie State Univ. (USA); Jack R. Collins, Frederick National Lab. for Cancer Research (USA); Jose R. Casas-Finet, MedImmune LLC (USA) [8954-34]

Soft nanomaterials characterization using low-voltage-high-contrast electron microscopy and advanced image reconstruction techniques, Raul E. Cachau, Frederick National Lab. for Cancer Research (USA); Bradford C. Braden, Bowie State Univ. (USA); Jack R. Collins, Igor Topol, Frederick National Lab. for Cancer Research (USA); Jose R. Casas-Finet, MedImmune LLC (USA) [8954-35]

Wednesday 5 February

SESSION 1

Location: Room 252 (Mezzanine) . . . Wed 8:40 am to 10:10 am

Nanoscale Imaging and Nanospectroscopy I

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo (USA)

8:40 am: **Enhanced coherent anti-Stokes Raman scattering imaging using silica microspheres**, X. Huang, X. N. He, L. J. Jiang, Y. Gao, Y. S. Zhou, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [8954-1]

9:00 am: **Engineering fluorescence lifetime with fano-resonant plasmonic system**, Xiaolong Wang, Olivier Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8954-2]

9:20 am: **Two dimensional multispectral imager based on tiled arrangement of metallic nanohole arrays**, Mohamadreza Najiminaini, Lawson Health Research Institute (Canada) and Simon Fraser Univ. (Canada) and Schulich School of Medicine and Dentistry, Univ. of Weste (Canada); Bozena Kaminska, Simon Fraser Univ. (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Schulich School of Medicine and Dentistry, Univ. of Weste (Canada) [8954-3]

9:40 am: **Nanoscale soft x-ray absorption and phase contrast imaging (Invited Paper)**, Carmen S. Menoni, Jaroslav Nedjil, Nils Monserud, Isela Howlett, Colorado State Univ. (USA) and NSF Ctr. for Extreme Ultraviolet Science and Technology (USA); David Carlton, Weilun Chao, Erik Anderson, Lawrence Berkeley Lab. (USA) and Ctr. for X-Ray Optics (USA); Mario Marconi, Jorge J. Rocca, Colorado State Univ. (USA) and NSF Ctr. for Extreme Ultraviolet Science and Technology (USA) [8954-4]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 2

Location: Room 252 (Mezzanine) . . Wed 10:40 am to 12:20 pm

Nanoscale Imaging and Nanospectroscopy II

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo (USA)

10:40 am: **Plasmonic crystal based solid substrate for biomedical application of SERS**, Carlo F. Morasso, Dora Mehn, Silvia Picciolini, Renzo Vanna, Marzia Bedoni, Furio Gramatica, Fondazione Don Carlo Gnocchi ONLUS (Italy); Paola Pellacani, Ana Frangolho, Gerardo Marchesini, Andrea Valsesia, Plasmore s.r.l (Italy) [8954-5]

11:00 am: **Highly-sensitive measurement of single DNA translocation through an ultraviolet light spot on silicon nanopore**, Hirohito Yamazaki, Shinji Kimura, Mutsumi Tsukahara, Keiko Esashika, Toshiharu Saiki, Keio Univ. (Japan) [8954-6]

11:40 am: **Total internal reflection fluorescence polarization imaging of red blood cells**, Harshit Lakhotia, The Univ. of Texas at Arlington (USA) and IISER-Kolkata (India); Mathias Ajaeroh, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8954-7]

12:00 pm: **Intra- and extracellular plasmon-enhanced fluorescent Ag@SiO₂ nanoparticles ionic sensor**, Jeremie Asselin, Carl Roy, Denis Boudreau, Younes Messaddeq, Univ. Laval (Canada) [8954-8]

Lunch Break Wed 12:20 pm to 1:50 pm

SESSION 3

Location: Room 252 (Mezzanine) Wed 1:50 pm to 5:00 pm

Nanoscale Imaging and Nanospectroscopy III

Session Chair: **Alexander N. Cartwright**, Univ. at Buffalo (USA)

1:50 pm: **Ultrafast subnanometric spatial accuracy of a fleeting quantum probe interaction with a biomolecule: innovating concept of a quantum scalpel for spatio-temporal radiation biomedicine** (*Keynote Presentation*), Yann A. Gauduel, Victor Malka, Ecole Nationale Supérieure de Techniques Avancées - Ecole Polytechnique (France) [8954-9]

2:30 pm: **Plasmonic nanoparticle-enhanced lensfree holographic cytometry**, Qingshan Wei, Euan McLeod, Univ. of California, Los Angeles (USA) and California NanoSystems Institute (CNSI) (USA); Hangfei Qi, Zhe Wan, Univ. of California, Los Angeles (USA); Ren Sun, Aydogan Ozcan, Univ. of California, Los Angeles (USA) and California NanoSystems Institute (CNSI) (USA) [8954-10]

Coffee Break Wed 3:30 pm to 4:00 pm

4:00 pm: **Photothermal optical coherence tomography for depth-resolved imaging of mesenchymal stem cells via single wall carbon nanotubes**, Hrebesh M. Subhash, Emma Connolly, Mary Murphy, Valerie Barron, Martin Leahy, National Univ. of Ireland, Galway (Ireland) [8954-11]

4:20 pm: **Photo-switchable quantum dots based on reversible FRET**, Qirui Fan, Jessica Winter, The Ohio State Univ. (USA) [8954-12]

4:40 pm: **Live cell imaging based on surface plasmon-enhanced fluorescence microscopy using random nanostructures**, Youngjin Oh, Wonju Lee, Yonsei Univ. (Korea, Republic of); Sook Young Kim, Jeon-Soo Shin, Yonsei Univ. (Korea, Republic of) and College of Medicine (Korea, Republic of); Donghyun Kim, Yonsei Univ. (Korea, Republic of) [8954-13]

Thursday 6 February

SESSION 4

Location: Room 252 (Mezzanine) Thu 8:30 am to 10:00 am

Biosensing with Nanostructures and Nanoparticles I

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

8:30 am: **Nanoparticles as a theragnostic device for colorectal cancer** (*Invited Paper*), Paulo C. Morais, Ricardo B. Azevedo, Zulmira G. M. Lacava, Univ. de Brasília (Brazil) [8954-14]

9:00 am: **High-sensitivity fluorescence imaging with micro/nanostructured terraces**, Falco C. M. van Delft, Philips Research Nederland B.V. (Netherlands); Serban Dobroiu, Dan V. Nicolau, Univ. of Liverpool (United Kingdom) . . [8954-15]

9:20 am: **Improving of enzyme immunoassay for detection and quantification of the target molecules using silver nanoparticles**, Vasyl Syrvatka, Yuriy Slyvchuk, Ivan Gevkan, Ivan Rozgoni, Institute of Animal Biology NAAS (Ukraine) [8954-16]

9:40 am: **Symmetries and biology: a new approach to biosensing**, Mathieu L. Juan, Xavi Vidal, Gabriel Molina-Terriza, Macquarie Univ. (Australia) [8954-17]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 5

Location: Room 252 (Mezzanine) . . . Thu 10:30 am to 12:20 pm

Biosensing with Nanostructures and Nanoparticles II

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

10:30 am: **Towards a versatile technique for tracking nanoparticle-mucus interaction: a step on the road** (*Invited Paper*), Marc Schneider, Philipps-Univ. Marburg (Germany); Noha Nafee, Philipps-Univ. Marburg (Germany) and Alexandria Univ. (Egypt) [8954-18]

11:00 am: **Efficient antibody-antigen sensing platform using plasmon field effect transistor**, Hossein Shokri Kojori, Univ. of Miami (USA); Juhung Yun, The State Univ. of New York at Buffalo (USA); Younghun Paik, Univ. of Miami (USA); Joondong Kim, Kunsan National Univ. (Korea, Republic of); Sung Jin Kim, Univ. of Miami (USA) and Biomedical Nanotechnology Institute (USA) [8954-19]

11:20 am: **Core-shell quantum dots for biosensing**, Junjie Zhu, Nanjing Univ. (China) [8954-20]

11:40 am: **Advanced photonic crystal structures for enhanced sensitivity of biosensing devices**, Vojtech Vozda V, Roman Antos, Martin Veis, Charles Univ. in Prague (Czech Republic) [8954-21]

12:00 pm: **Quantum dot microarrays for analyte sensing and cellular dynamics**, Mihaela Delcea, Raghavendra Palankar, Nikolay Medvedev, ZIK HIKE, Univ. of Greifswald (Germany) [8954-22]

Lunch Break Thu 12:20 pm to 2:10 pm

SESSION 6

Location: Room 252 (Mezzanine) Thu 2:10 pm to 3:10 pm

Biosensing with Nanostructures and Nanoparticles III

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

2:10 pm: **Improved performance of highly multiplexed silicon-on-insulator microring sensor chips by surface structure implementation**, Sam Werquin, Peter Bienstman, Ghent Univ. (Belgium) [8954-23]

2:30 pm: **Amplification and modulation of fluorescent signals by using hybridization chain reactions for multiplexed sensing of biomolecules in a one-pot**, Takahiro Nishimura, Yusuke Ogura, Kenji Yamada, Yuko Ohno, Jun Tanida, Osaka Univ. (Japan) [8954-24]

2:50 pm: **Polymer slab waveguides for the optical detection of nanoparticles in evanescent field based biosensors**, Nuria Teiggell Beneitez, Univ. Gent (Belgium); Jeroen Missinne, Ghent Univ. (Belgium); Jean Schleipen, Joke Orsel, Menno Prins, Philips Research Nederland B.V. (Netherlands); Geert Van Steenberge, Ghent Univ. (Belgium) [8954-26]

Coffee Break Thu 3:10 pm to 3:40 pm

SESSION 7

Location: Room 252 (Mezzanine) Thu 3:40 pm to 4:40 pm

Biosensing with Nanostructures and Nanoparticles IV

Session Chair: **Dan V. Nicolau**, McGill Univ. (Canada)

3:40 pm: **Surface-enhanced Raman scattering (SERS) for detection of phenylketonuria for newborn screening**, Mehdi Javanmard, Ronald Davis, Stanford Univ. (USA) [8954-27]

4:00 pm: **About the role of nonspecific binding: a comparison among flow through and flow over assays in nanoporous material**, Paolo Bettotti, Neeraj Kumar, Marina Scarpa, Elena Froner, Univ. degli Studi di Trento (Italy) [8954-28]

4:20 pm: **Three-photon fluorescence nanothermometers based on intensity and spectral shift using Yb/Tm co-doped NaNbO₃ nanocrystals**, Kagola Upendra Kumar, Wagner Ferreira da Silva, Wesley Queiroz Santos, Carlos Jacinto da Silva, Univ. Federal de Alagoas (Brazil) [8954-29]

Colloidal Nanoparticles for Biomedical Applications IX

Conference Chairs: **Wolfgang J. Parak**, Philipps-Univ. Marburg (Germany); **Marek Osinski**, The Univ. of New Mexico (USA); **Kenji I. Yamamoto M.D.**, National Ctr. for Global Health and Medicine (Japan)

Program Committee: **Antigoni Alexandrou**, Ecole Polytechnique (France); **Jesus M. de la Fuente**, Univ. de Zaragoza (Spain); **James B. Delehanty III**, U.S. Naval Research Lab. (USA); **Niko Hildebrandt**, Institut d'Électronique Fondamentale (France); **Jennifer A. Hollingsworth**, Los Alamos National Lab. (USA); **Thomas M. Jovin M.D.**, Max-Planck-Institut für Biophysikalische Chemie (Germany); **Antonios G. Kanaras**, Univ. of Southampton (United Kingdom); **Hedi Mattoussi**, The Florida State Univ. (USA); **Igor Medintz**, U.S. Naval Research Lab. (USA); **Paul Mulvaney**, The Univ. of Melbourne (Australia); **Jay L. Nadeau**, McGill Univ. (Canada); **Subramanian Tamil Selvan**, A*STAR Institute of Materials Research and Engineering (Singapore); **Claudia Tortiglione**, Istituto di Cibernetica Eduardo Caianiello (Italy); **Tania Q. Vu**, Oregon Health & Science Univ. (USA); **Horst Weller**, Univ. Hamburg (Germany)

Saturday 1 February

WELCOME

Location: Room 112 (Exhibit Level) . . . Sat 8:15 am to 8:20 am

Wolfgang J. Parak, Philipps-Univ. Marburg (Germany)

SESSION 1

Location: Room 112 (Exhibit Level) . . Sat 8:20 am to 10:10 am

Synthesis and Conjugation I

Session Chair: **Marek Osinski**, The Univ. of New Mexico (USA)

8:20 am: **Lipid-modified PAMAM dendrimers as a tool for the design of nanoparticle-based multimodal MRI contrast agents**, Adriano Boni, Giuseppe Bardi, Alice Bertero, Istituto Italiano di Tecnologia (Italy); Claudia Innocenti, Univ. degli Studi di Firenze (Italy); Mauro Gemmi, Alessandro Gozzi, Angelo Bifone, Istituto Italiano di Tecnologia (Italy) [8955-1]

8:40 am: **Encoded nanospheres as biomarkers for the ratiometric detection of cystic fibrosis (Invited Paper)**, Iván Castelló-Serrano, Georgiana Stoica, Emilio J. Palomares, ICIQ - Institut Català d'Investigació Química (Spain) [8955-2]

9:10 am: **Toward efficient modification of large gold nanoparticles with DNA (Invited Paper)**, Ron Gill, Kristian Göeken, Univ. Twente (Netherlands) . . . [8955-3]

9:40 am: **Conjugated polymer nanoparticles as biological imaging agents (Invited Paper)**, Mark A. Green, King's College London (United Kingdom) . [8955-4]

Coffee Break Sat 10:10 am to 10:35 am

SESSION 2

Location: Room 112 (Exhibit Level) . Sat 10:35 am to 12:25 pm

Synthesis and Conjugation II

Session Chair: **Antonios G. Kanaras**, Univ. of Southampton (United Kingdom)

10:35 am: **Characterization of single gold nanoclusters**, Dorota Buczynska, Lukasz Bujak, Nicolaus Copernicus Univ. (Poland); Fadi H. Aldeek, Hedi Mattoussi, Florida State Univ. (USA); Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland) [8955-5]

10:55 am: **Impact of solvent mixture solvents on iron nanoparticles generated by laser ablation**, Mbarek Chakif, Andreas Ostendorf, Evgeny Gurevich, Ruhr-Univ. Bochum (Germany) [8955-6]

11:15 am: **Stabilization and size control of ligand-free gold and alloy nanoparticles in the presence of highly-diluted electrolytes (Invited Paper)**, Christoph Rehbock, Vivian Merk, Lisa Gamrad, Jurij Jakobi, Univ. Duisburg-Essen (Germany); Daniela Tiedemann, Ulrike Taylor, Wilfried Kues, Detlef Rath, Friedrich-Loeffler-Institut (Germany); Stephan Barcikowski, Univ. Duisburg-Essen (Germany) [8955-7]

11:45 am: **Controlled synthesis of gold nanoaggregates**, Desiree F. Van Haute, Jacob M. Berlin, City of Hope Beckman Research Institute (USA) [8955-8]

12:05 pm: **Design of bivalent gold nanoparticle-oligonucleotide-peptide conjugates for duplex and triplex hybridization**, Lisa Gamrad, Anna Ziefuß, Christoph Rehbock, Stephan Barcikowski, Univ. Duisburg-Essen (Germany); Ulrike Taylor, Roberto Mancini, Detlef Rath, Friedrich-Loeffler-Institut (Germany) [8955-9]

Lunch Break Sat 12:25 pm to 2:00 pm

SESSION 3

Location: Room 112 (Exhibit Level) . . . Sat 2:00 pm to 3:00 pm

Synthesis and Conjugation III

Session Chair: **Jesus M. de la Fuente**, Univ. de Zaragoza (Spain)

2:00 pm: **Multidentate oligomeric ligands to enhance the biocompatibility of iron oxide and semiconductor nanoparticles**, Wentao Wang, Goutam Palui, Xin Ji, Fadi H. Aldeek, Hedi Mattoussi, Florida State Univ. (USA) [8955-10]

2:20 pm: **Gold nanorods as multifunctional agents in DNA systems**, Joanna Olesiak-Banska, Marta Gordel, Katarzyna Matczyszyn, Wroclaw Univ. of Technology (Poland); Joseph Zyss, Ecole Normale Supérieure de Cachan (France); Marek J. Samoc, Wroclaw Univ. of Technology (Poland) [8955-11]

2:40 pm: **Multidentate polymeric ligands for long-term bioimaging using highly stable and functionalized quantum dots**, Emerson Giovannelli, École Supérieure de Physique et de Chimie Industrielles (France); Eleonora Muro, Ecole Supérieure de Physique et de Chimie Industrielles (France); Gary Sitbon, Mohamed Hanafi, École Supérieure de Physique et de Chimie Industrielles (France); Thomas Pons, Benoît Dubertret, Nicolas Lequeux, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8955-13]

Coffee Break Sat 3:00 pm to 3:30 pm

SESSION 4

Location: Room 112 (Exhibit Level) . . . Sat 3:30 pm to 5:50 pm

Synthesis and Conjugation IV

Session Chair: **Daive Prospero**, Univ. degli Studi di Milano-Bicocca (Italy)

3:30 pm: **Peptide-modified gold nanoparticles for improved cancer therapeutics (Invited Paper)**, Celina Yang, Mehrnoosh Neshatian, Devika B. Chithrani, Ryerson Univ. (Canada) [8955-14]

4:00 pm: **Controlling the orientation of DNA-assembled gold nanorods**, Jessica M. Smith, Leslie Hamachi, Vivian E. Ferry, Univ. of California, Berkeley (USA); Young-Wook Kim, Univ. of California, San Francisco (USA); Somin E. Lee, Lawrence Berkeley National Lab. (USA); Paul Alivisatos, Univ. of California, Berkeley (USA) [8955-15]

4:20 pm: **Synthesis of metallic magnetic nanorods protected by noble metal shell (Invited Paper)**, Katerina Soulantica, Sergio Lentijo-Mozo, Teresa Hungria-Hernandez, Benoît Cormary, Reasmey P. Tan, Pier-Francesco Fazzini, Marc Reaspaud, Univ. de Toulouse (France); Christophe Gatel, Ctr. d'Élaboration de Matériaux et d'Études Structurales, CNRS (France) [8955-16]

4:50 pm: **Temperature: the "ignored" factor at the nano-bio interface**, Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) [8955-17]

5:10 pm: **Delivery of tobramycin coupled to iron oxide nanoparticles across the biofilm of mucoidal Pseudomonas aeruginosa and investigation of its efficacy**, Leisha M Armijo, Yekaterina I. Brandt, Antonio C. Rivera, The Univ. of New Mexico (USA); Nathaniel C. Cook, The Univ. of New Mexico (USA); John B. Plumley, Nathan J. Withers, Michael Kopciuch, Gennady A. Smolyakov, The Univ. of New Mexico (USA); Dale L. Huber, Sandia National Labs. (USA); Hugh D. Smyth, The Univ. of Texas at Austin (USA); Marek Osinski, The Univ. of New Mexico (USA) [8955-18]

5:30 pm: **Magnetically triggered active hybrid-nanocomposites**, Marc Behl, Muhammad Y. Razzaq, Karl Kratz, Andreas Lendlein, Helmholtz-Zentrum Geesthacht (Germany) [8955-19]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 112 (Exhibit Level) . . Sun 8:00 am to 10:30 am

Optical Properties: Interaction of Light with Particles I

Session Chair: **Thomas A. Klar**, Johannes Kepler Univ. Linz (Austria)

8:00 am: **Optical properties and surface chemistry of quantum dots, polymeric and upconversion nanoparticles** (*Invited Paper*), Soheil Hatami, Martin Kaiser, Christian Würth, BAM Federal Institute for Materials Research and Testing (Germany); Susanne Leubner, Technische Univ. Dresden (Germany); Thomas Behnke, Marko Moser, Ralf Schneider, BAM Federal Institute for Materials Research and Testing (Germany); Nikolai Gaponik, Alexander Eychmüller, Technische Univ. Dresden (Germany); Ute Resch-Genger, Bundesanstalt für Materialforschung und -prüfung (Germany) [8955-20]

8:30 am: **Nonthermal damage caused by shining light on intracellular plasmonic nanoparticles** (*Invited Paper*), Samantha Chadwick, Martin Volk, Univ. of Liverpool (United Kingdom); Ian A. Prior, Univ of Liverpool (United Kingdom); Mathias Brust, Univ. of Liverpool (United Kingdom) [8955-21]

9:00 am: **Colloidal hybrid metal oxide nanoparticles: from in silico to in vivo: cellular imaging quantification and biomedical applications** (*Invited Paper*), Marie Helene Delville, Institut de Chimie de la Matière Condensée de Bordeaux-CNRS (France) and CENBG-CNRS (France); Quentin Le Trequesser, Institut de Chimie de la Matière Condensée de Bordeaux-CNRS (France); Sonia L. C. Pinho, Institut de Chimie de la Matière Condensée de Bordeaux, -CNRS (France) and CICECO, Univ. of Aveiro (Portugal); Emeline Ribot, Ctr. National de la Recherche Scientifique (France); Pierre Voisin, Ctr. de Résonance Magnétique des Systèmes Biologiques-CNRS (France); João Rocha, Univ. de Aveiro (Portugal); Herve Seznec, CENBG-CNRS (France) [8955-22]

9:30 am: **DNA templated optical antennas for surface-enhanced spectroscopy and biochemical sensing** (*Invited Paper*), Sebastian Bidault, Institut Langevin-CNRS (France) [8955-23]

10:00 am: **Combining ligand design and photo-ligation to provide optimal quantum dot-bioconjugates for sensing and imaging** (*Invited Paper*), Naiqian Zhan, Goutam Palui, Malak Safi, Hedi Mattoussi, Florida State Univ. (USA) [8955-24]

Coffee Break Sun 10:30 am to 10:55 am

SESSION 6

Location: Room 112 (Exhibit Level) . Sun 10:55 am to 12:35 pm

Optical Properties: Interaction of Light with Particles II

Session Chair: **Alf B. Mews**, Univ. Hamburg (Germany)

10:55 am: **Interactions of gold nanoparticles with biological cell barriers** (*Invited Paper*), Rute F. Fernandes, Neil Smyth, Antonios G. Kanaras, Univ. of Southampton (United Kingdom) [8955-25]

11:25 am: **Plasmonics with silver nanowires** (*Invited Paper*), Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland) [8955-26]

11:55 am: **The use of real-time optical feedback to improve outcomes**, Isidro B. Magaña, Pratik Adhikari, Raghuvara B. Yendluri, Louisiana Tech Univ. (USA); Glenn P. Goodrich, Jon A. Schwartz, Nanospectra Biosciences, Inc. (USA); Patrick D. O'Neal, Louisiana Tech Univ. (USA) [8955-27]

12:15 pm: **Photoluminescence quantum yield of CdSe-ZnS/CdS/ZnS core-multishell quantum dots approaches 100% due to enhancement of charge carrier confinement**, Pavel S. Samokhvalov, Pavel Linkov, National Research Nuclear Univ. MEPhI (Russian Federation); Igor R. Nabiev, Univ. de Reims Champagne-Ardenne (France) and National Research Nuclear Univ. "MEPhI" (Russian Federation) [8955-28]

Lunch Break Sun 12:35 pm to 2:10 pm

SESSION 7

Location: Room 112 (Exhibit Level) . . . Sun 2:10 pm to 5:10 pm

Optical Properties: Interaction of Light with Particles III

Session Chair: **Hedi Mattoussi**, The Florida State Univ. (USA)

2:10 pm: **Plasmonic biodegradable gold nanoclusters with high NIR-absorbance for biomedical imaging**, Robert Stover, Avinash Murthy, Sai Gourisankar, Gohay Nie, Miguel Martinez, Soon Joon Yoon, Pratixa P. Joshi, Stanislav Y. Emelianov, Konstantin V. Sokolov, Keith P. Johnston, The Univ. of Texas at Austin (USA) [8955-29]

2:30 pm: **Toward point-of-care diagnostics with quantum dots, FRET, and paper substrates** (*Invited Paper*), Eleonora Petryayeva, Hyungki Kim, Miao Wu, W. Russ Algar, The Univ. of British Columbia (Canada) [8955-30]

Coffee Break Sun 3:00 pm to 3:30 pm

3:30 pm: **Biophotonic logic devices that use multiple fluorescent (Förster) resonance energy transfer relays from a single quantum dot bioconjugate** (*Invited Paper*), Jonathan C. Claussen, U.S. Naval Research Lab. (USA) and George Mason Univ. (USA); W. Russ Algar, The Univ. of British Columbia (Canada); Niko Hildebrandt, Institut d'Électronique Fondamentale (France); Kimihiro Susumu, U.S. Naval Research Lab. (USA) and Sotera Defense Solutions (USA); Mario G. Ancona, Igor L. Medintz, U.S. Naval Research Lab. (USA) [8955-31]

4:00 pm: **Direct detection of multiexciton dynamics in single colloidal quantum dots**, Thomas S. Bischof, Mounqi G. Bawendi, Massachusetts Institute of Technology (USA) [8955-32]

4:20 pm: **Interferometric measurements of cavitation bubbles around laser irradiated gold nanoparticles**, Florian Rudnitzki, Norbert Linz, Sebastian Freidank, Alfred Vogel, Gereon Hüttmann, Univ. zu Lübeck (Germany) . . [8955-33]

4:40 pm: **Droplet-based high-throughput screening assays using quantum dot barcode labels** (*Invited Paper*), Ralph A. Sperling, Institut für Mikrotechnik Mainz (Germany) and Harvard Univ. (USA); Adam R. Abate, Harvard Univ. (USA) and Univ. of California, San Francisco (USA); David A. Weitz, Harvard Univ. (USA) [8955-70]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Antitumor efficacy of curcumin nanosuspension in H22 cells and H22 tumor bearing mice, Zhiping Wang, Guangdong Pharmaceutical Univ. (China); Tongsheng Chen, South China Normal Univ. (China) [8955-39]

Iron oxide nanoparticles in different modifications for antimicrobial phototherapy, Elena S. Tuchina, Vjacheslav I. Kochubey, Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) [8955-59]

NaGdF₄ nanocrystals as multifunctional diagnostic agents, Mateusz Banski, Bartłomiej Sojka, Agnieszka Noculak, Wroclaw Univ. of Technology (Poland); Jana Tulinska, Slovak Medical Univ. (Slovakia); Artur P. Podhorodecki, Jan Misiewicz, Wroclaw Univ. of Technology (Poland) [8955-60]

CdTe quantum dots conjugated to monoclonal antibodies for investigation of A and B antigens on red blood cells membrane, Paulo Eusébio Cabral Filho, Maria Isabela A. Pereira, Univ. Federal de Pernambuco (Brazil); Heloise P. Fernandes, André A. de Thomaz, Univ. Estadual de Campinas (Brazil); Rogério Tavares Ribeiro, Univ. Federal de Pernambuco (Brazil); Hernandes F. Carvalho, Univ. Estadual de Campinas (Brazil); Beate Saegesser Santos, Univ. Federal de Pernambuco (Brazil); Carlos Lenz Cesar, Maria de Lourdes Barjas-Castro, Univ. Estadual de Campinas (Brazil); Adriana Fontes, Univ. Federal de Pernambuco (Brazil) [8955-61]

Quantum dots conjugated to lectins as nanoprobe for cell surface carbohydrates detection in human mammary glands, Camila G. Andrade, Paulo Eusébio Cabral Filho, Denise P. L. A. Tenório, Beate Saegesser Santos, Eduardo I. C. Beltrão, Adriana Fontes, Luiz B. Carvalho Jr., Univ. Federal de Pernambuco (Brazil) [8955-62]

Photoradiation study of gold nanospheres and rods in Vero and Hela cell lines, Poorani G. Ganathan, Singaravelu Ganesan, Prakasa Rao Aruna, Anna Univ. Chennai (India) [8955-63]

Point-of-care test for protein content analysis in punctate liquids based on gold nanoparticles, Gero Göbel, Technische Fachhochschule Wildau (Germany); Robert Lange, Limetec Biotechnologies GmbH (Germany); Fred Lisdat, Technische Fachhochschule Wildau (Germany) [8955-64]

Stimuli-induced, directed actuation of micro/nanoparticles from a multiblock copolyester urethane, Christian Wischke, Andreas Lendlein, Helmholtz-Zentrum Geesthacht (Germany) [8955-65]

Self-assembled peptide fibril films as templates for the directed organisation of CdSe@ZnS quantum dots at the chloroform-water interface, Emannouil Kasotakis, Univ. of Crete (Greece) and Foundation for Research and Technology-Hellas (Greece); Athanasia Kostopoulou, Miguel Spuch-Calvar, Maria Androulidaki, Foundation for Research and Technology-Hellas (Greece); Nikolaos Pelekanos, Univ. of Crete (Greece) and Foundation for Research and Technology-Hellas (Greece); Antonios G. Kanaras, Univ. of Southampton (United Kingdom); Alexandros Lappas, Foundation for Research and Technology-Hellas (Greece); Anna Mittraki, Univ. of Crete (Greece) and Foundation for Research and Technology-Hellas (Greece) [8955-66]

Tuning nanoparticle membranes: new ways for bioconjugation, shielding, and ligand counting, Jan-Philipp Merkl, Univ. Hamburg (Germany); Naiqian Zhan, The Florida State Univ. (USA); Johannes Ostermann, Univ. Hamburg (Germany); Goutam Palui, The Florida State Univ. (USA); Christian Schmidtke, Hauke Klouft, Horst Weller, Univ. Hamburg (Germany); Hedi Mattoussi, The Florida State Univ. (USA) [8955-67]

Nanotech cream for cutaneous treatment: a toxicology and permeability study, M. Colombo, B. Santini, Univ. degli Studi di Milano-Bicocca (Italy); G. Alessio, Univ. degli Studi di Milano-Bicocca (Italy) and Univ. degli Studi di Milano (Italy); I. Zanoni, Univ. degli Studi di Milano-Bicocca (Italy); M. Bedoni, F. Gramatica, C. Pignatari, Fondazione Don Carlo Gnocchi (Italy); M. C. Tosca, Ospedale Niguarda (Italy); R. Allevi, Univ. degli Studi di Milano (Italy); D. Prosperi, Univ. degli Studi di Milano-Bicocca (Italy) [8955-68]

Exploring the use of colloidal gold for nonthermal photodynamic cancer therapies, S. Chadwick, M. Brust, M. Volk, I. A. Prior, Univ. of Liverpool (United Kingdom) [8955-69]

PEGylated magnetic graphene oxide for dual targeted delivery of doxorubicin and photothermal therapy, Jyh-Ping Chen, Pin-Yi Lin, Chang Gung Univ. (Taiwan) [8955-72]

Quantum dots (QDs) restrain human cervical carcinoma HeLa cell proliferation through inhibition of the ROCK-c-Myc signaling, Sijin Liu, State Key Lab. of Environmental Chemistry and Ecotoxicology (China) [8955-73]

Monday 3 February

SESSION 8

Location: Room 112 (Exhibit Level) . Mon 8:00 am to 10:00 am

Optical Properties: Interaction of Light with Particles IV

Session Chair: **Ute Resch-Genger**, Bundesanstalt für Materialforschung und -prüfung (Germany)

8:00 am: **Plasmonic-driven thermal sensing**, Ester Polo, Pablo del Pino, Beatriz Pelaz, Maria Valeria Grazú Bonavía, Jesus M. de la Fuente, Univ. de Zaragoza (Spain) [8955-34]

8:20 am: **Gold nanosponges: plasmonic properties of single-nanoporous gold nanoparticles** (*Invited Paper*), Cynthia Vidal, Johannes Kepler Univ. Linz (Austria); Dong Wang, Peter Schaaf, Technische Univ. Ilmenau (Germany); Calin Hrelescu, Thomas A. Klar, Johannes Kepler Univ. Linz (Austria) . . . [8955-35]

8:50 am: **Small upconversion fluorescent nanoparticles for photoactivation** (*Invited Paper*), Yong Zhang, Muthu Kumara Gnanasammandhan Jayakumar, Akshaya Bansal, National Univ. of Singapore (Singapore) [8955-36]

9:20 am: **Large nonlinear and linear optical responses in a hybrid nano-biomaterial engineered from bacteriorhodopsin and semiconductor quantum dots**, Alyona Sukhanova, National Research Nuclear Univ. MEPhI (Russian Federation) and Univ. de Reims Champagne-Ardenne (France); Yuri P. Rakovich, Ctr. de Fisica de Materiales (Spain) and IKERBASQUE, Basque Foundation for Science (Spain); Vladimir Alexandrovich Oleinikov, National Research Nuclear Univ. MEPhI (Russian Federation); Igor R. Nabiev, Univ. de Reims Champagne-Ardenne (France) and National Research Nuclear Univ. "MEPhI" (Russian Federation) [8955-37]

9:40 am: **Noncytotoxic Mn-doped ZnSe/ZnS quantum dots for biomedical applications**, John B. Plumley, Brian A. Akins, Gema Alas, Madalyn Fetrow, Priyanka Jain, Jane Nguyen, Stephanie Yang, Yekaterina I. Brandt, Gennady A. Smolyakov, Wojciech Ornatowski, Erin D. Milligan, Marek Osinski, The Univ. of New Mexico (USA) [8955-38]

Coffee Break Mon 10:00 am to 10:20 am

SESSION 9

Location: Room 112 (Exhibit Level) Mon 10:20 am to 12:10 pm

Biomedical Applications I

Session Chair: **Pablo del Pino**, Univ. de Zaragoza (Spain)

10:20 am: **Nanocapsules of perfluorooctyl bromide for theranostics: from formulation to in vivo targeting** (*Invited Paper*), Nicolas Tsapis, Univ. Paris-Sud 11 (France) [8955-40]

10:50 am: **Dendronized magnetic nano-objects for MRI and hyperthermia** (*Invited Paper*), Sylvie Begin, Institut de Physique et Chimie des Matériaux de Strasbourg (France); Claire Billotey, Univ. Jean Monnet Saint-Etienne (France); Delphine Felder, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [8955-41]

11:20 am: **Investigation of magnetic field enriched surface enhanced resonance Raman scattering performance using Fe₃O₄@Ag nanoparticles for malaria diagnosis**, Clement Yuen, Quan Liu, Nanyang Technological Univ. (Singapore) [8955-42]

11:40 am: **Iron-oxide colloidal nanoclusters: from fundamental physical properties to diagnosis and therapy** (*Invited Paper*), Alexandros Lappas, Athanasia Kostopoulou, Foundation for Research and Technology-Hellas (Greece); Konstantinos Brintakis, Foundation for Research and Technology-Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Alessandro Lascialfari, Univ. degli studi di Milano (Italy) and Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (Italy); Makis Angelakeris, Aristotle Univ. of Thessaloniki (Greece); Marianna Vasilakaki, Kalliopei Trohidou, National Ctr. for Scientific Research Demokritos (Greece) [8955-43]

Lunch Break Mon 12:10 pm to 1:30 pm

Conference 8955 · Location: Room 112 (Exhibit Level)

SESSION 10

Location: Room 112 (Exhibit Level) . . Mon 1:30 pm to 3:20 pm

Biomedical Applications II

Session Chair: **Mathias Brust**, Univ. of Liverpool (United Kingdom)

1:30 pm: **Direct observation of specific uptake of individual fluorescing gold nanoparticles** (*Invited Paper*), Nadine Bohn, Tim Hadler, Maximilian Brohmann, Alf B. Mews, Univ. Hamburg (Germany) [8955-44]

2:00 pm: **Specific markers, micro-environmental anomalies and tropism: opportunities for gold nanorods targeting of tumors in laser-induced hyperthermia**, Francesca Tatini, Fulvio Ratto, Consiglio Nazionale delle Ricerche

2:20 pm: **Magneto-plasmonic nanoclusters for capture and photoacoustic detection of cancer cells**, Chun-Hsien Wu, Jason R. Cook, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA); Konstantin V. Sokolov, The Univ. of Texas at Austin (USA) and M.D. Anderson Cancer Ctr. (USA) [8955-46]

2:40 pm: **Multimodal near-IR contrast agents for immune cell tracking**, Pratixa P. Joshi, Soon Joon Yoon, Yun-Sheng Chen, The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, Konstantin V. Sokolov, The Univ. of Texas at Austin (USA) and M. D. Anderson Cancer Ctr. (USA) [8955-47]

3:00 pm: **DNA as molecular local thermal probe for magnetic hyperthermia analysis**, Jorge T. Dias, Maria Moros, Univ. de Zaragoza (Spain); Pablo del Pino, Univ. de Zaragoza (Spain) and Fundación ARAID (Spain); Sara Rivera, Maria Valeria Grazú Bonavía, Univ. de Zaragoza (Spain); Jesus M. de la Fuente, Univ. de Zaragoza (Spain) and Fundación ARAID (Spain) [8955-48]

Coffee Break Mon 3:20 pm to 3:40 pm

SESSION 11

Location: Room 112 (Exhibit Level) . . Mon 3:40 pm to 5:10 pm

Biomedical Applications III

Session Chair: **Igor R. Nabiev**, Univ. de Reims Champagne-Ardenne (France)

3:40 pm: **Internalization and functionalization of bio-compatible chitosan gold nanoparticles in NG108 neuronal cells**, Samantha K Franklin, The Univ. of Texas at San Antonio (USA) and Air Force Research Lab. (USA); Hope Thomas Beier, Bennett L. Ibey, Air Force Research Lab. (USA); Kelly L. Nash, The Univ. of Texas at San Antonio (USA) [8955-49]

4:00 pm: **Gold nanoparticles based colorimetric nanodiagnosics for cancer and infectious diseases**, Paola Valentini, Stefano Persano, Stefania Sabella, Pier Paolo Pompa, Istituto Italiano di Tecnologia (Italy) [8955-50]

4:20 pm: **Spatiotemporal control of signaling pathways using magnetic nanoparticles** (*Invited Paper*), Zoher Gueroui, Ecole Normale Supérieure (France) [8955-51]

4:50 pm: **Intracellular light-induced release of signaling molecules from gold-coated liposomes**, Gabriel V. Orsinger, Joshua D. Williams, Marek Romanowski, The Univ. of Arizona (USA) [8955-52]

Tuesday 4 February

SESSION 12

Location: Room 112 (Exhibit Level) . . Tue 8:10 am to 12:00 pm

Biomedical Applications IV

Session Chair: **Kenji I. Yamamoto M.D.**, National Ctr. for Global Health and Medicine (Japan)

8:10 am: **Insights into the cellular response following photothermal therapy** (*Invited Paper*), Pablo del Pino, Jesus M. de la Fuente, Univ. de Zaragoza (Spain); Beatriz Pelaz, Philipps Univ. Marburg (Germany); Marta Perez, Univ. de Zaragoza (Spain); Eva Galvez, Instituto de Carboquímica CSIC (Spain); Julian Pardo, Univ. de Zaragoza (Spain); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) [8955-53]

8:40 am: **Noninvasive high-speed imaging of fast physiological processes in awake and freely moving mice** (*Invited Paper*), Oliver T. Bruns, Thomas S. Bischof, Daniel K. Harris, Mounqi G. Bawendi, Massachusetts Institute of Technology (USA) [8955-54]

9:10 am: **Noninvasive detection of cervical cancer based on blood plasma surface-enhanced Raman spectroscopy**, Shangyuan Feng, Fujian Normal Univ. (China) [8955-55]

9:30 am: **Quantitative visualization and evaluation of size effect on cellular uptake of spherical gold nanoparticles (AuNPs) by using multiphoton laser scanning microscopy** (*Invited Paper*), Marc Schneider, Philipps-Univ. Marburg (Germany); Ke Li, Huazhong Univ. of Science and Technology (China) . . [8955-56]

Coffee Break Tue 10:00 am to 10:30 am

10:30 am: **Engineering apoferritin nanocages for intracellular delivery of chemotherapeutics at cancer cells** (*Invited Paper*), Davide Prosperi, Michela Bellini, Univ. degli Studi di Milano-Bicocca (Italy); Serena Mazzucchelli, Univ. degli Studi di Milano (Italy); Miriam Colombo, Paolo Tortora, Univ. degli Studi di Milano-Bicocca (Italy); Fabio Corsi, Univ. degli Studi di Milano (Italy) . . [8955-57]

11:00 am: **Light-addressable amperometric electrodes for enzyme sensors based on direct quantum dot-electrode contacts** (*Invited Paper*), Fred Lisdat, Technische Fachhochschule Wildau (Germany) [8955-58]

11:30 am: **Poly(dopamine) capsomes as advanced cell mimics: performing confined (cascade) enzymatic reactions in parallel** (*Invited Paper*), Leticia Hosta-Rigau, Aarhus Univ. (Denmark) [8955-71]

OCEAN OPTICS YOUNG INVESTIGATOR AWARD PRESENTATION

Location: Room 112 (Exhibit Level) . . 12:00 pm to 12:15 pm

The Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a \$1,000 cash prize to the Young Investigator and \$2,000 Ocean Optics equipment credit to the laboratory where the work was performed.

Prize donated by **Ocean Optics**

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Conference Chairs: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis (USA); **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA)

Program Committee: **Bohumil Bednar**, Merck & Co., Inc. (USA); **Mikhail Y. Berezin**, Washington Univ. School of Medicine in St. Louis (USA); **Richard B. Dorshow**, MediBeacon, LLC (USA); **Paul M. W. French**, Imperial College London (United Kingdom); **Yueqing Gu**, China Pharmaceutical Univ. (China); **Hisataka Kobayashi**, National Institutes of Health (USA); **Ashok Kumar Mishra**, Indian Institute of Technology Madras (India); **D. Michael Olive**, LI-COR Biosciences (USA); **Gabor Patonay**, Georgia State Univ. (USA); **Attila Tarnok**, Univ. Leipzig (Germany); **Yasuteru Urano**, The Univ. of Tokyo (Japan)

Sunday 2 February

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

MGdLuF₃:Nd³⁺ (M=K,Na) nanoparticles for trimodal medical imaging, L. Christopher Mimun, Univ. of Texas at San Antonio (USA); G. A. Kumar, Univ. of Texas at San Antonio (USA); Brian Yust, Univ. of Texas at San Antonio (USA); Madhab Pokhrel, Chris Rightsell, Ashish Dhanale, Liang Tang, Univ. of Texas at San Antonio (USA); Ai-Ling Lin, Univ. of Texas Health Science Ctr. at San Antonio (USA); Dhiraj K. Sardar, Univ. of Texas at San Antonio (USA) [8956-38]

Partitioned carbon nanotubes as perspective nanomaterial for energy conversion, Olga E. Glukhova, Anna S. Kolesnikova, Michael M. Slepchenkov, NG Chernyshevsky Saratov State Univ. (Russian Federation) [8956-39]

Unit coefficient of thermal conductivity of carbon nanotubes with positions of their use as a material for nano-emitters, Olga E. Glukhova, Anna S. Kolesnikova, Michael M. Slepchenkov, Georgy V. Savostyanov, Anton E. Talanov, NG Chernyshevsky Saratov State Univ. (Russian Federation) [8956-40]

Theoretical investigation of bilayer fullerene C60@C540 in term of its biomedical application, Olga E. Glukhova, Anna S. Kolesnikova, Michael M. Slepchenkov, Vladislav V. Shunaev, NG Chernyshevsky Saratov State Univ. (Russian Federation) [8956-41]

Coaxial electrohydrodynamic atomization of curcumin-loaded microparticles for sustained drug release, Shuai Yuan, Ting Si, Univ. of Science and Technology of China (China); Zhongfa Liu, Ronald X. Xu, The Ohio State Univ. (USA) [8956-42]

Monday 3 February

SESSION 1

Location: Room 305 (Esplanade) . . . Mon 8:30 am to 10:20 am

NIR Fluorescence in Therapeutics

Session Chair: **Samuel Achilefu**, Washington Univ. School of Medicine in St. Louis (USA)

8:30 am: **Application strategies of photo-immunotherapy (PIT) for treating solid cancers** (*Invited Paper*), Hisataka Kobayashi, National Institutes of Health (USA) [8956-1]

9:00 am: **Upconversion luminescence targeted imaging of tumor xenografts in vivo**, Majid Badieirostami, Conroy Sun, Lei Xing, Stanford Univ. (USA) [8956-2]

9:20 am: **Monitoring intraperitoneal metastases using microendoscopy**, Bryan Q. Spring, Adnan O. Abu-Yousif, Akilan Palanisami, Xiang Zheng, Imran Rizvi, Zhiming Mai, Sriram Anbil, R. B. Sears, Lawrence B. Mensah, Ruth Goldschmidt, Sultan S. Erdem, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Esther Oliva, Massachusetts General Hospital (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) and Harvard Medical School (USA) [8956-3]

9:40 am: **Real-time visualization of pancreatic leak using a chymotrypsin-activated fluorescent probe during pancreatic surgery**, Takeaki Ishizawa M.D., Yasuteru Urano, Mako Kamiya, Masayo Sakabe, Suguru Yamashita M.D., Nobuhiro Harada M.D., Atsushi Shimizu M.D., Junichi Kaneko M.D., Taku Aoki M.D., Yoshihiro Sakamoto M.D., Yasuhiko Sugawara M.D., Kiyoshi Hasegawa M.D., Norihiro Kokudo M.D., The Univ. of Tokyo (Japan) [8956-4]

10:00 am: **Gx1-conjugated endostar nanoparticle: a new drug delivery system for anti-colorectal cancer in vivo**, Qian Zhang, Xidian Univ. (China) and Life Sciences Research Ctr., School of Life Sciences and Technology (China); Yaqian Li, Harbin Univ. of Science and Technology (China); Xiaolong Liang, Peking Univ. (China); Xin Yang, Yang Du, Jie Tian, Institute of Automation (China) [8956-5]

Coffee Break Mon 10:20 am to 10:50 am

SESSION 2

Location: Room 305 (Esplanade) . . Mon 10:50 am to 12:30 pm

NIR Fluorescence in Imaging

Session Chair: **Gabor Patonay**, Georgia State Univ. (USA)

10:50 am: **Correcting for plasma input function differences in dual-tracer fluorescence receptor concentration imaging**, Kenneth M. Tichauer, Illinois Institute of Technology (USA); Mamadou Diop, Univ. of Western Ontario (Canada) and Medical Biophysics (Canada); Jonathan T. Elliott, Kimberley S. Samkoe, Dartmouth College (USA) and Thayer School of Engineering (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Keith St. Lawrence, Univ. of Western Ontario (Canada) and Medical Biophysics (Canada); Brian W. Pogue, Dartmouth College (USA) and Thayer School of Engineering (USA) [8956-6]

11:10 am: **Ultrasmall lanthanide-doped nanoparticles as multimodal platforms**, Brian G Yust, Francisco J. Pedraza, Dhiraj K. Sardar, Univ. of Texas at San Antonio (USA) [8956-7]

11:30 am: **Bodipy and curcumin modified molecular contrast agent for photoacoustic imaging**, Samir Laoui, Stephanie Bellinger Buckley, Olivier Dantiste, Univ. of Massachusetts Boston (USA); Jen-Chieh Tseng, Dana-Farber Cancer Institute (USA) and Lurie Family Imaging Ctr. (USA); Jonathan Rochford, Chandra S. Yelleswarapu, Univ. of Massachusetts Boston (USA) [8956-8]

11:50 am: **Photothermal optical coherence tomography and therapy in targeted mouse brain tumors using gold nanostars**, Jung Heo, Yonsei Univ. (Korea, Republic of) and Mechanical Engineering (Korea, Republic of); Eunji Jang, Yonsei Univ. (Korea, Republic of) and Chemical and Biomolecular Engineering (Korea, Republic of); Eun-Kyung Lim, Yonsei Univ. (Korea, Republic of) and YUHS-KRIBB Medical Convergence Research Institute (Korea, Republic of); Yong-Min Huh, Yonsei Univ. (Korea, Republic of) and Severance Biomedical Science Institute (Korea, Republic of); Seungjoo Haam, Yonsei Univ. (Korea, Republic of) and Chemical and Biomolecular Engineering (Korea, Republic of); Seung-Jae Oh, Jin-Suck Suh, Yonsei Univ. (Korea, Republic of) and YUHS-KRIBB Medical Convergence Research Institute (Korea, Republic of); Chulmin Joo, Yonsei Univ. (Korea, Republic of) and Mechanical Engineering (Korea, Republic of) [8956-9]

12:10 pm: **One-step microencapsulation of drugs and imaging agents by tri-axial electro-flow focusing**, Ting Si, Hanxin Feng, Yang Li, Xisheng Luo, Univ. of Science and Technology of China (China); Ronald X. Xu, Ohio State Univ. (USA) [8956-10]

Lunch Break Mon 12:30 pm to 2:00 pm

SESSION 3

Location: Room 305 (Esplanade) Mon 2:00 pm to 3:30 pm

Nanoparticles in Therapeutics

Session Chair: **Hisataka Kobayashi**, National Cancer Institute (USA)

2:00 pm: **Mediating the potent ROS toxicity of acrolein in neurons involved in secondary spinal cord injury with silica nanoparticles and a natural product approach** (*Invited Paper*), Desiree White-Schenk, Riyi Shi, James F. Leary, Purdue Univ. (USA) [8956-11]

2:30 pm: **Nanoparticle-enhanced x-ray therapy for cancer**, Renat R Letfullin, Rose-Hulman Institute of Technology (USA) and Radiological Technologies Univ. (USA); Colin E. W. Rice, Univ. of Minnesota (USA) and School of Physics & Astronomy (USA); Thomas F. George, Univ. of Missouri–St. Louis (USA); Marziya Yashkarova, Semey State Univ. named after Shakarim (Kazakhstan); Kunnaz Murzagulova, ROMAT (Kazakhstan) [8956-12]

2:50 pm: **Multiplexed detection of cell-surface cancer biomarkers with targeted SERS-coded nanoparticles**, Yu Wang, Madhura Som, Altaz Khan, Ye Chen, Danni Wang, Jonathan T. Liu, Stony Brook Univ. (USA) [8956-13]

3:10 pm: **Development of highly-sensitive fluorescent thermometer based on thermo-responsive polymers and nanoparticles for intracellular thermal imaging**, Mingyuan Wei, Bingbing Cheng, The Univ. of Texas at Arlington (USA); Venugopal Bandiy, Univ. of North Texas (USA); Yuan Liu, The Univ. of Texas at Arlington (USA); Francis D'Souza, Univ. of North Texas (USA); Kytai T. Nguyen, Baohong Yuan, The Univ. of Texas at Arlington (USA) [8956-14]

Coffee Break Mon 3:30 pm to 4:00 pm

SESSION 4

Location: Room 305 (Esplanade) Mon 4:00 pm to 5:40 pm

Novel Bioprobes

Session Chair: **Paul M. W. French**, Imperial College London (United Kingdom)

4:00 pm: **Magneto-plasmonic nanoclusters with high-NIR absorbance for tracking, detection, and capture of rare cells**, Konstantin V. Sokolov, Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Chun-Hsien Wu, Jason Cook, Stanislav Emelianov, The Univ. of Texas at Austin (USA) [8956-15]

4:20 pm: **Novel bio-imaging techniques using optical highlighter fluorescent proteins**, Wei Min, Xinxin Zhu, Columbia Univ. (USA) [8956-16]

4:40 pm: **Initial formal toxicity evaluation of APC-2, a novel fluorescent tracer agent for real-time measurement of glomerular filtration rate in preparation for a first-in-man clinical trial**, Richard B. Dorshow, Joseph E. Bugaj, MediBeacon LLC (USA) [8956-17]

5:00 pm: **Microencapsulation of curcumin in PLGA microcapsules by coaxial flow focusing**, Fan Lei, Ting Si, Xishen Luo, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8956-18]

5:20 pm: **Novel copper quenched fluorescent activatable molecular probes**, Dolonchampa Maji, Mingzhou Zhou, Washington Univ. School of Medicine in St. Louis (USA); Pinaki Sarder, Washington Univ. in St. Louis (USA); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA) [8956-43]

Tuesday 4 February

SESSION 5

Location: Room 305 (Esplanade) Tue 9:00 am to 10:40 am

Nanoparticles in Imaging

Session Chair: **Yasuteru Urano**, The Univ. of Tokyo (Japan)

9:00 am: **Quantifying the surface chemistry of 3D matrices in situ**, Dimitrios S. Tzeranis, Peter T. C. So, Ioannis V. Yannas, Massachusetts Institute of Technology (USA) [8956-19]

9:20 am: **In vivo molecular mapping of an AOM-treated mouse model of colon carcinogenesis**, Sarah J. Leung, Photini F Rice, Univ. of Arizona (USA); Jennifer K. Barton, Univ. of Arizona (USA) [8956-20]

9:40 am: **Reevaluation of biotin-streptavidin conjugation in fret applications: buffer solution strongly influences the transfer efficiency**, Bahar Saremi, The Univ. of Texas at Arlington (USA); Mingyuan Wei, Yuan Liu, Baohong Yuan, Univ. of Texas at Arlington (USA) [8956-21]

10:00 am: **Detection of colorectal cancer using nir quantum dots as contrast agents in a mouse model**, Jordan L. Carbarry, Jennifer Barton, Urs Utzinger, The Univ. of Arizona (USA) [8956-22]

10:20 am: **Measurement of absolute fluorescence quantum yields in the near-infrared and infrared spectral region**, Ute Resch-Genger, Bundesanstalt für Materialforschung und -prüfung (Germany) [8956-23]

Coffee Break Tue 10:40 am to 11:10 am

SESSION 6

Location: Room 305 (Esplanade) . . . Tue 11:10 am to 12:10 pm

Nonbleaching and Ultrasmall Fluorescent Tags

Session Chair: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA)

11:10 am: **NIR to NIR upconversion in KYb₂F₇: RE³⁺ (RE = Tm, Er) nanoparticles for biological imaging**, Francisco J. Pedraza, Brian G. Yust, Annette Rodriguez, Andrew Tsien, Colleen Witt, Dhiraj K. Sardar, Univ. of Texas at San Antonio (USA) [8956-24]

11:30 am: **Synthesis of biocompatible SiO₂ coating on luminescent nanoparticles of ZrO₂:Er-Yb and Y₂O₃:Er-Yb**, Tzarara Lopez Luke, Ctr de Investigaciones en Óptica AC (Mexico); Andrea Martinez, Centro Univ. de los Lagos (Mexico); Andrea Ceja, Ctr. de Investigaciones en Óptica AC (Mexico); Ruben Rodriguez, Centro Univ. de los Lagos (Mexico); Ana Lilia Gonzalez Yebra, Beariz Gonzalez Yebra, Univ. de Guanajuato (Mexico); Pedro Salas, Univ. Nacional Autónoma de México (Mexico) and Ctr. de Fisica Aplicada y Tecnologia Avanzada (Mexico); Elder De La Rosa Cruz, Ctr. de Investigaciones en Óptica AC (Mexico) [8956-25]

11:50 am: **(Bio)hybrid materials based on optically active nanoparticles**, Manuela Reitzig, Juliana P. L. Goncalves, Fraunhofer IZFP-D (Germany); Afnan Q. Shaikh, Fraunhofer IZFP-D (Germany) and Max Bergmann Ctr. of Biomaterials (Germany); Daria Kovalenko, Susan Derenko, Thomas Härtling, Jörg Opitz, Fraunhofer IZFP-D (Germany) [8956-26]

Lunch Break Tue 12:10 pm to 2:00 pm

**NANO/BIOPHOTONICS PROGRAM TRACK
PLENARY SESSION**

Location: Room 305 (Esplanade Level) Tue 2:00 to 3:00 pm

2:00 to 2:15 pm: **Welcome and Introduction**
Dan Nicolau, McGill Univ. (Canada)

2:15 to 3:00 pm: **Direct laser writing: biomimetic photonics and superresolution nanolithography** (*Plenary*), Min Gu, Swinburne Univ. of Technology (Australia) [8954-101]

Coffee Break Tue 3:00 pm to 3:40 pm

SESSION 7

Location: Room 305 (Esplanade) Tue 3:40 pm to 6:00 pm

Nonbleaching and Ultrasmall Fluorescent Tags

Joint Session with Conferences 8956 and 8997

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

- 3:40 pm: **Targeted decoration of axonal membranes with ND particles for luminescent and ODMR neural synapse imaging** (*Invited Paper*), Milo? Nesladek, IMEC (Belgium); Elena Gjorgievska, Univ. Hasselt (Belgium); Silvyia M. Ojovan, The Hebrew Univ. of Jerusalem (Israel); Julia Micova, Jan Stursa, Mirek Ledvina, Academy of Sciences of the Czech Republic (Czech Republic); Micha Spira, The Hebrew Univ. of Jerusalem (Israel) [8997-2]
- 4:10 pm: **Nanoscale nuclear magnetic resonance with a nitrogen-vacancy spin sensor** (*Invited Paper*), H. Jonathon Mamin, Moonhee Kim, Mark H. Sherwood, Charles T. Rettner, IBM Almaden Research Ctr. (USA); Kenichi Ohno, David D. Awschalom, Univ. of California, Santa Barbara (USA); Daniel Rugar, IBM Almaden Research Ctr. (USA) [8997-3]
- 4:40 pm: **Use of upconversion fluorescent nanoparticles for imaging and detection** (*Invited Paper*), Yong Zhang, Muthu Kumara G. Jayakumar, Kai Huang, National Univ. of Singapore (Singapore) [8997-4]
- 5:10 pm: **Ultrabright and bleaching-resistant hybrid gold nanoparticles for confocal and two-photon fluorescence imaging**, Patrice L. Baldeck, Univ. Joseph Fourier (France) [8956-27]
- 5:30 pm: **Cell apoptosis induced by upconversion UV emission from rare-earth doped nanoparticles** (*Invited Paper*), Gengxu Chen, East China Normal Univ. (China) and State Key Lab. of Precision Spectroscopy (China) and Univ. Stuttgart (Germany); Roman L. Kolesov, Kangwei Xia, Andrea Zappe, Rolf Reuter, Univ. Stuttgart (Germany); E. Wu, Heping Zeng, East China Normal Univ. (China) and State Key Lab. of Precision Spectroscopy (China); Jörg Wrachtrup, Univ. Stuttgart (Germany) [8997-5]

Wednesday 5 February

SESSION 8

Location: Room 305 (Esplanade) . . . Wed 8:30 am to 10:20 am

Novel Applications of Fluorescent Nanoparticles

Session Chair: **Richard B. Dorshow**, MediBeacon, LLC (USA)

- 8:30 am: **Use of fluorescent NIR dyes in silica nanoparticles and as enzyme substrates in bioanalytical applications** (*Invited Paper*), Gabor Patonay, Maged Henary, Gala Chapman, Garfield Beckford, Georgia State Univ. (USA); Holly Ellis, Auburn Univ. (USA) [8956-28]
- 9:00 am: **Optical nucleic acid switches for sensing in cell**, Ambra Giannetti, Sara Tombelli, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy); Barbara Adinolfi, Paola Nieri, Univ. di Pisa (Italy); Greta Varchi, Istituto per la Sintesi Organica e la Fotoreattività (Italy); Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy) [8956-29]
- 9:20 am: **Effects of ICG concentration and particle diameter on photophysical properties of ICG-doped nanoparticles**, Jason Crovisier, Baharak Bahmani, Reema Saleh, Valentine Vullev, Bahman Anvari, Univ. of California, Riverside (USA) [8956-30]
- 9:40 am: **Heterogeneous nanostructures for plasmonic interaction with luminescence and quantitative surface-enhanced Raman spectroscopy**, Gautom K. Das, Sudheendra Lashkmana, Ian M. Kennedy, Univ. of California, Davis (USA) [8956-31]
- 10:00 am: **SERS substrates with star-like gold nanoparticles for sensing low concentration molecules**, Elder De La Rosa Cruz, Leonardo Perez Mayen, Tzarara Lopez-Luke, Ctr. de Investigaciones en Óptica AC (Mexico); Andrea Ceja, Ctr de Investigaciones en Óptica AC (Mexico) [8956-32]
- Coffee Break Wed 10:20 am to 10:50 am

SESSION 9

Location: Room 305 (Esplanade) . . Wed 10:50 am to 12:40 pm

Fluorescent Molecular Probes

Session Chair: **Mikhail Y. Berezin**, Washington Univ. School of Medicine in St. Louis (USA)

- 10:50 am: **Rapid imaging of tiny tumors in resected human breast and lung tissues by topically applying a novel fluorescence probe for GGT** (*Invited Paper*), Yasuteru Urano, Univ. of Tokyo (Japan) and Graduate School of Medicine (Japan) and Japan Science and Technology Agency (Japan) . . [8956-33]
- 11:20 am: **The role of the chromophore electronic structure and electrostatic interactions in photoconversion of red fluorescent proteins**, Alexander Mikhaylov, Mikhail Drobizhev, Lauren Barnett, Geoffrey Wicks, Montana State Univ. (USA); Yuriy Stepanenko, Institute of Physical Chemistry of Polish Academy of Sciences (Poland); Thomas E. Hughes, Patrik R. Callis, Aleksander Rebane, Montana State Univ. (USA) [8956-34]
- 11:40 am: **A multidimensional screening method for the selection of two photon-enhanced fluorescent proteins**, Caleb Stoltzfus, Aleksander Rebane, Thomas Hughes, Lauren Barnett, Mikhail Drobizhev, Alexandr Mikhailov, Geoffrey Wicks, Montana State Univ. (USA) [8956-35]
- 12:00 pm: **The study of hydrogen peroxide level under cisplatin action using genetically encoded sensor hyper**, Anna G. Orlova, Institute of Applied Physics (Russian Federation); Anna V. Maslennikova M.D., Institute of Applied Physics (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation); Anastasia S. Belova, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation) and Institute of Applied Physics (Russian Federation); Ekaterina A. Sergeeva M.D., Institute of Applied Physics (Russian Federation); Anna A. Brilkina, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Natalia M. Mishina, Nizhny Novgorod State Medical Academy (Russian Federation) and Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation); Natalia M. Shakhova M.D., Institute of Applied Physics (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation) [8956-36]
- 12:20 pm: **Efficient delivery of antigen and near infrared dye to mature dendritic cells for tumor immunotherapy**, Honglin Jin, Yuan Qian, Sha Qiao, Chuan Huang, Zhihong Zhang, Huazhong Univ. of Science and Technology (China) [8956-37]

Plasmonics in Biology and Medicine XI

Conference Chairs: **Tuan Vo-Dinh**, Fitzpatrick Institute For Photonics, Duke Univ. (USA); **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA)

Program Committee: **A. Claude Boccara**, Ecole Supérieure de Physique et de Chimie Industrielles (France); **Michael T. Canva**, Lab. Charles Fabry (France); **Volker Deckert**, Institut für Photonische Technologien e.V. (Germany); **Bruce S. Dunn**, Univ. of California, Los Angeles (USA); **Christopher D. Geddes**, Univ. of Maryland, Baltimore (USA); **Zygmunt Karol Gryczynski**, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); **Naomi J. Halas**, Rice Univ. (USA); **Ho-Pui A. Ho**, The Chinese Univ. of Hong Kong (Hong Kong, China); **Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Laura Maria Lechuga**, Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Boris Mizaikoff**, Univ. Ulm (Germany); **Shuming Nie**, Emory Univ. (USA); **Krishanu Ray**, Univ. of Maryland School of Medicine (USA); **Wei-Chuan Shih**, Univ. of Houston (USA); **Weihong Tan**, Univ. of Florida (USA); **Andrew Taton**, Univ. of Minnesota, Twin Cities (USA); **Richard P. Van Duyn**, Northwestern Univ. (USA); **Jeffrey I. Zink**, Univ. of California, Los Angeles (USA)

Saturday 1 February

SESSION 1

Location: Room 226 (Mezzanine) Sat 8:50 am to 10:10 am

Plasmonics and SERS I

Session Chair: **Tuan Vo-Dinh**,
Fitzpatrick Institute for Photonics, Duke Univ. (USA)

8:50 am: **Low-cost, high-sensitivity SERS nano-bio-chip for kinase profiling, drug monitoring and environmental detection: a translational platform technology**, Yi Chen, Logan Liu, Univ. of Illinois at Urbana-Champaign (USA) [8957-1]

9:10 am: **Plasmonic gold nanostar probe for pH monitoring**, Yang Liu, Tuan Vo-Dinh, Hsiangkuo Yuan, Duke Univ. (USA) [8957-2]

9:30 am: **Biosensing the progression of Huntington's disease using SERS**, Anna Huefner, Cavendish Lab., Univ. of Cambridge (United Kingdom); Wei-Li Kuan, Roger A. Barker, John van Geest Ctr. for Brain Repair, Univ. of Cambridge (United Kingdom); Sumeet Mahajan, Institute of Life Sciences, Univ. of Southampton (United Kingdom) [8957-3]

9:50 am: **A biocompatible microneedle-based probe for in vivo intradermal surface-enhanced Raman scattering measurements**, Clement Yuen, Quan Liu, Nanyang Technological Univ. (Singapore) [8957-4]

Coffee Break Sat 10:10 am to 10:40 am

SESSION 2

Location: Room 226 (Mezzanine) . . . Sat 10:40 am to 12:00 pm

Plasmonics and SERS II

Session Chair: **Tuan Vo-Dinh**,
Fitzpatrick Institute for Photonics, Duke Univ. (USA)

10:40 am: **Plasmonic molecular sentinel nanoprobe for disease biomarker detection**, Hsin-Neng Wang, Andrew M. Fales, Janna K. Register, Tuan Vo-Dinh, Duke Univ. (USA) [8957-5]

11:00 am: **Bifunctional nanoparticles for surface-enhanced Raman spectroscopy-based leukemia biomarker detection**, Dora Mehn, Carlo Morasso, Renzo Vanna, Fondazione Don Carlo Gnocchi (Italy); Domitilla Schiumarini, Fondazione Don Carlo Gnocchi (Italy); Marzia Bedoni, Fondazione Don Carlo Gnocchi (Italy); Fabio Ciceri, IRCCS Ospedale San Raffaele (Italy); Furio Gramatica, Fondazione Don Carlo Gnocchi (Italy) [8957-6]

11:20 am: **Application of SERS spectroscopy for detection of trace components in urinary deposits**, Milda Pucetaite, Martynas Velicka, Valdas Sablinskas, Vilnius Univ. (Lithuania) [8957-7]

11:40 am: **Biomolecular sensing for cancer diagnostics using highly reproducible SERS substrates**, Anna Chiara De Luca, Consiglio Nazionale delle Ricerche (Italy); Peter Reader-Harris, Michael Mazilu, School of Physics and Astronomy, Univ. of St Andrews (United Kingdom); Stefano Manago, Stefania Mariggio, Daniela Corda, Consiglio Nazionale delle Ricerche (Italy); Andrea Di Falco, School of Physics and Astronomy, Univ. of St Andrews (United Kingdom) [8957-8]

Lunch Break Sat 12:00 pm to 1:50 pm

SESSION 3

Location: Room 226 (Mezzanine) Sat 1:50 pm to 3:10 pm

Plasmonic Biosensing I

Session Chair: **Joseph R. Lakowicz**,
Univ. of Maryland School of Medicine (USA)

1:50 pm: **Plasmonic spectra of individual subwavelength particles under the IR microscope: cells and airborne dust**, James V. Coe, The Ohio State Univ. (USA) [8957-9]

2:10 pm: **Application of innovative plasmonic nanostructures in bioanalytics**, Karina Weber, Dana Cialla, Friedrich-Schiller Univ. (Germany) and Institut für Photonische Technologien e.V. (Germany); Martin Jahn, Izabella Hidi, Andreea Radu, Sophie Zierbock, Institute of Physical Chemistry and Abbe Ctr. of Photonics, Friedrich-Schiller Univ. (Germany); Uwe Huebner, Institut für Photonische Technologien e.V. (Germany); Jürgen Popp, Friedrich-Schiller Univ. (Germany) and Institut für Photonische Technologien e.V. (Germany) . . . [8957-10]

2:30 pm: **Fano-resonant mid-infrared metasurfaces: a new platform for bio-sensing and vibrational fingerprinting of proteins and cells**, Gennady B. Shvets, Nihal Arju, Glen Kelp, Alexander B. Khanikaev, Albert Lee, Konstantin Sokolov, Institute for Fusion Studies, The Univ. of Texas at Austin (USA) [8957-11]

2:50 pm: **Application of lattice plasmon waves in a coupled bilayer plasmonic nanoantenna array for surface-enhanced Raman spectroscopy**, S. Hamed Shams Mousavi, Farshid Ghasemi, Ali Asghar Eftekhari, Ali Adibi, Georgia Institute of Technology (USA) [8957-13]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 4

Location: Room 226 (Mezzanine) Sat 3:40 pm to 6:00 pm

Plasmonic Biosensing II

Session Chair: **Tuan Vo-Dinh**, Fitzpatrick Institute for Photonics,
Duke Univ. (USA)

3:40 pm: **Plasmonic improvement of microcavity biomedical sensor spectroscopic characteristics**, Vladimir A. Saetchnikov, Elina A. Tcherniavskaia, Belarusian State Univ. (Belarus); Anton V. Saetchnikov, Belarusian State Univ. (Belarus) and Ruhr-Univ. Bochum (Germany); Gustav Schweiger, Andreas Ostendorf, Reza Ghadiri, Ruhr-Univ. Bochum (Germany) [8957-14]

4:00 pm: **Leaky surface plasmon waves in SPR sensing systems**, Shivani Sital, Anjali Baliyan, Enakshi K. Sharma, Univ. of Delhi South Campus (India) [8957-15]

4:20 pm: **Multispectral imaging for high-throughput surface plasmon resonance biosensors**, Alexandra Sereda, Lab. Charles Fabry, Institut d'Optique Graduate School (France) and HORIBA Scientific (France); Julien Moreau, Michael Canva, Lab. Charles Fabry, Institut d'Optique Graduate School (France); Emmanuel Maillart, HORIBA Scientific (France) [8957-16]

4:40 pm: **Plasmonic nano-optical tweezers with in-situ sensing capability**, Jiajie Chen, Zhiwen Kang, Haifei Lu, Haixi Zhang, Ho-Pui Ho, The Chinese Univ. of Hong Kong (Hong Kong, China) [8957-17]

5:00 pm: **Three-dimensional metallic nanostructures for bulk and bio SPR sensing applications**, Mohamadreza Najjiminani, Lawson Health Research Institute (Canada) and School of Engineering Science, Simon Fraser Univ. (Canada) and Schulich School of Medicine and Dentistry, The Univ. of Western Ontario (Canada); Erden Ertorer, The Univ. of Western Ontario (Canada); Hao Jiang, Bozena Kaminska, Simon Fraser Univ. (Canada); Silvia Mittler, The Univ. of Western Ontario (Canada); Jeffrey J. L. Carson, Lawson Health Research Institute (Canada) and Schulich School of Medicine and Dentistry, The Univ. of Western Ontario (Canada) [8957-18]

5:20 pm: **DNA sensing with dynamic plasmonic antennas**, Laurent Lermusiaux, Vincent Maillard, Mickaël Busson, Institut Langevin, ESPCI, ParisTech (France); Eric Larquet, Lab. d'Enzymologie et Biochimie Structurales (France); Sébastien Bidault, Institut Langevin, ESPCI, ParisTech (France) [8957-19]

5:40 pm: **DNA-aptamer optical biosensors based on a LPG-SPR optical fibre platform for point-of-care diagnostic**, Luis Coelho, INESC Porto (Portugal) and Univ. do Porto (Portugal); Raquel B. Queirós, INESC Porto (Portugal); José L. Santos, Univ. do Porto (Portugal) and INESC Porto (Portugal); Diana Viegas, Pedro A. S. Jorge, INESC Porto (Portugal) [8957-20]

SESSION 6

Location: Room 226 (Mezzanine) . . . Sun 10:40 am to 12:00 pm

Plasmonics and Nanophotonics

Session Chair: **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA)

10:40 am: **Interactions between localized surface plasmons and molecular resonances**, Güllis Zengin, Tina Gschneidner, Tomasz J. Antosiewicz, Peter Johansson, Kasper Moth-Poulsen, Timur Shegai, Mikael Käll, Chalmers Univ. of Technology (Sweden) [8957-26]

11:00 am: **Variation of the photothermal effect for cancer cell inactivation with localized surface plasmon resonance on Au nanorings of different geometries**, Yi-Chou Tu, Che-Kuan Chu, Yu-Wei Chang, Hung-Yu Tseng, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . [8957-27]

11:20 am: **Using hybrid modes in surface plasmon resonance bio-sensors for low-concentration target probing**, Mitradeep Sarkar, Maha Chamtour, Alexandra Sereda, Julien Moreau, Mondher Besbes, Anne-Lise Coutrot, Michael T. Canva, Lab. Charles Fabry, Institut d'Optique Graduate School (France) [8957-28]

11:40 am: **In-vivo gold nanorod imaging for brain tumor delineation**, Kevin C. Seekell, Will Eldridge, Duke Univ. (USA); Christy Wilson, Gerald Grant, Stanford Univ. (USA); Adam Wax, Duke Univ. (USA) [8957-29]

Lunch Break Sun 12:00 pm to 1:30 pm

SESSION 7

Location: Room 226 (Mezzanine) Sun 1:30 pm to 3:10 pm

Plasmonic Nanostructures

Session Chair: **Joseph R. Lakowicz**, Univ. of Maryland School of Medicine (USA)

1:30 pm: **Size and wavelength dependency of saturable and reverse saturable scattering by a single gold nanosphere embedded in dielectric material**, Yen-Ta Huang, Hsueh-Yu Wu, Hsuan Lee, National Taiwan Univ. (Taiwan); Ryosuke Oketani, Yasuo Yonemaru, Osaka Univ. (Japan); Tung-Yu Su, National Taiwan Univ. (Taiwan); Masahito Yamanaka, Satoshi Kawata, Satoru Shoji, Katsumasa Fujita, Osaka Univ. (Japan); Shi-Wei Chu, National Taiwan Univ. (Taiwan) and Molecular Imaging Ctr., National Taiwan Univ. (Taiwan) [8957-30]

1:50 pm: **Three-dimensional light manipulation using plasmonic micro projector**, Chia Min Chang, National Taiwan Univ. (Taiwan) and Academia Sinica (Taiwan); Ming Lun Tseng, National Taiwan Univ. (Taiwan); Bo Han Cheng, Academia Sinica (Taiwan); Cheng Hung Chu, You Zhe Ho, Hsin Wei Huang, Hung-Kuei Tsai, Kuang Sheng Chung, I-Da Chiang, Yueh-Hung Cheng, National Taiwan Univ. (Taiwan); Yung-Chiang Lan, National Cheng Kung Univ. (Taiwan); Ding-Wei Huang, National Taiwan Univ. (Taiwan); Ai Qun Liu, Nanyang Technological Univ. (Singapore); Din Ping Tsai, National Taiwan Univ. (Taiwan) and Academia Sinica (Taiwan) [8957-31]

2:10 pm: **Manufacture and characterization of silver nanoparticles coated with silicon oxide to kill E. coli bacteria**, Rodrigo E. Jones Estrada, Jesus I. Salomon Garcia, Instituto Politécnico Nacional (Mexico); Diogo B. Almeida, Univ. Estadual de Campinas (Brazil); Ernesto Jimenez Villar, Univ. Federal de Pernambuco (Brazil); Tupak E. García Fernández, Univ. Autónoma de la Ciudad de México (Mexico); Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil); Eugenio Rodriguez Gonzalez, Instituto Politécnico Nacional (Mexico) [8957-32]

2:30 pm: **Dual-mode spectroscopy using plasmon waveguide resonance sensors for thin film investigation**, Farshid Bahrami, Univ. of Toronto (Canada); Mathieu Maisonneuve, Michel Meunier, Ecole Polytechnique de Montréal (Canada); J. Stewart Aitchison, Mo Mojahedi, Univ. of Toronto (Canada) [8957-33]

2:50 pm: **Physical mechanism of Au nanopore formation on the pyramidal array**, Seong Soo Choi, Tokutaro Yamaguchi, Myoung Jin Park, Sun Moon Univ. (Korea, Republic of); NamKyou Park, Seoul National Univ. (Korea, Republic of) [8957-34]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for extraordinary achievements in biophotonics technology development that show strong promise or potential impact in Biology, Medicine, and Biomedical Optics. The award targets achievements that span disciplines and may include elements of basic research, technology development, and clinical translation. Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 5

Location: Room 226 (Mezzanine) Sun 8:30 am to 10:10 am

Plasmonics and Fluorescence

Session Chair: **Krishanu Ray**, Univ. of Maryland School of Medicine (USA)

8:30 am: **Indium-based nanoparticles as plasmonic enhancers in the UV region**, Joanie Gagnon, François Magnan, Frederic-Georges Fontaine, Denis Boudreau, Univ. Laval (Canada) [8957-21]

8:50 am: **Metal-enhanced fluorescence of chlorophylls in light-harvesting complexes coupled to silver nanowires**, Magdalena A. Twardowska, Dorota Kowalska, Maria Olejnik, Nikodem F. Czechowski, Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland) [8957-22]

9:10 am: **Plasmonic hybrid nanostructure with controlled interaction strength**, Justyna K. Grzelak, Bartosz Krajnik, Nicolaus Copernicus Univ. (Poland); Mark D. Thoreson, Purdue Univ. (USA); Piotr Nyga, Institute of Optoelectronics, Military Univ. of Technology (Poland); Vladimir M. Shalaev, Birc Nanotechnology Ctr., Purdue Univ. (USA); Sebastian Mackowski, Nicolaus Copernicus Univ. (Poland) [8957-23]

9:30 am: **Dependency of metal-enhanced fluorescence on surface roughness**, Alexandre François, Beniamino Sciacca, Agnieszka Zuber, Elizaveta Klantsataya, Tanya M. Monro, The Univ. of Adelaide (Australia) [8957-24]

9:50 am: **Metal-enhanced fluorescence: effect of surface coating**, Marjorie Lismont, Univ. of Liège (Belgium); Alexandre François, Institute for Photonics and Advanced Sensing (Australia); Laurent A. Dreesen, Univ. of Liège (Belgium); Tanya M. Monro, Institute for Photonics and Advanced Sensing (Australia) [8957-25]

Coffee Break Sun 10:10 am to 10:40 am

Bioinspired, Biointegrated, Bioengineered Photonic Devices II

Conference Chairs: Luke P. Lee, Univ. of California, Berkeley (USA); John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA);
Seok Hyun Andy Yun, Wellman Ctr. for Photomedicine (USA)

Program Committee: David Erickson, Cornell Univ. (USA); Malte C. Gather, Technische Univ. Dresden (Germany); Viktoria Greanya, Defense
Threat Reduction Agency (USA); Hongrui Jiang, Univ. of Wisconsin-Madison (USA)

Saturday 1 February

KEYNOTE SESSION

Location: Room 220 (Mezzanine) 9:00 am to 10:00 am

Session Chair: **John A. Rogers**,
Univ. of Illinois at Urbana-Champaign (USA)

9:00 am: **Silk biomaterials: a versatile material platform for photonics**
(*Invited Paper*), Fiorenzo G. Omenetto, Tufts Univ. (USA) [8958-1]

Coffee Break Sat 10:00 am to 10:30 am

SESSION 1

Location: Room 220 (Mezzanine) . . . Sat 10:30 am to 12:00 pm

Biomimetic Photonics

Session Chair: **Luke P. Lee**, Univ. of California, Berkeley (USA)

10:30 am: **Bio-inspired photonic materials**, Mathias Kolle, Massachusetts
Institute of Technology (USA) and Harvard School of Engineering and Applied
Sciences (USA); Joanna Aizenberg, Harvard School of Engineering and Applied
Sciences (USA) [8958-2]

10:50 am: **Self-formed ultraefficient resonators from mollusk shells**, Young L.
Kim, Seung Ho Choi, Purdue Univ. (USA) [8958-3]

11:10 am: **Biologically inspired microscope slides for neurochemical
detection**, Young-Jae Oh, Jae-Jun Kim, Ki-Hun Jeong, KAIST (Korea,
Republic of) [8958-4]

11:30 am: **Toward bioinspired nanostructures for selective vapor sensing**
(*Invited Paper*), Radislav A. Potyrailo, GE Global Research (USA) [8958-5]

Lunch Break Sat 12:00 pm to 1:30 pm

SESSION 2

Location: Room 220 (Mezzanine) Sat 1:30 pm to 3:10 pm

Photonics of the Eye

Session Chair: **Hongrui Jiang**, Univ. of Wisconsin-Madison (USA)

1:30 pm: **Learning from nature: the retina as a discrete optical system**
(*Invited Paper*), Jochen R. Guck, Technische Univ. Dresden (Germany) and Univ.
of Cambridge (United Kingdom); Zuzanna Blaszcak, Univ. of Cambridge (United
Kingdom); Moritz Kreysing, Ludwig-Maximilians-Univ. München (Germany) and
Max-Planck-Institut für molekulare Zellbiologie und Genetik (Germany) . . [8958-6]

2:00 pm: **An ultrawide-angle artificial reflecting superposition compound
eye**, Chi-Chieh Huang, Hewei Liu, Univ. of Wisconsin-Madison (USA); John A.
Rogers, Univ. of Illinois at Urbana-Champaign (USA); Hongrui Jiang, Univ. of
Wisconsin-Madison (USA) [8958-7]

2:20 pm: **Spectral and frequency-domain collagen detection of spherical
ocular tissue**, Zhengtuo Zhao, Zidong Li, Rui Liu, Univ. of Michigan-Dearborn
(USA); Qiyin Fang, McMaster Univ. (Canada); Fu-Jiou Lo, Univ. of Michigan-
Dearborn (USA) [8958-8]

2:40 pm: **Bio-inspired hemispherical compound eye camera** (*Invited Paper*),
Jianliang Xiao, Univ. of Colorado Boulder (USA); Young Min Song, Yizhu Xie,
Viktor Malyarchuk, Univ. of Illinois at Urbana-Champaign (USA); Kenneth B.
Crozier, Harvard Univ. (USA); Yonggang Huang, Northwestern Univ. (USA);
John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) [8958-9]

Coffee Break Sat 3:10 pm to 3:40 pm

SESSION 3

Location: Room 220 (Mezzanine) Sat 3:40 pm to 5:30 pm

Biomaterials and Photonics

Session Chair: **Malte C. Gather**, Technische Univ. Dresden (Germany)

3:40 pm: **Micovascular integration into porous polyHEMA scaffold**,
Eugenia H. Cho, Bruce Klitzman, Alina Boico, Duke Univ. Medical Ctr. (USA);
Natalie A. Wisniewski, Rebecca Gant, Kristen L. Helton, PROFUSA, Inc. (USA);
Nga L. Brown, Janna K. Register, Tuan Vo-Dinh, Duke Univ. (USA); Thies
Schroeder, Duke Univ. Medical Ctr. (USA) [8958-10]

4:00 pm: **Implantable bioabsorbable waveguide based oximetry**,
Sedat Nizamoglu, Harvard Medical School (USA) and Massachusetts General
Hospital (USA) and Ozyegin Univ. (Turkey); Myunghwan Choi, Harvard Medical
School (USA) and Massachusetts General Hospital (USA) and KAIST (Korea,
Republic of); Malte C. Gather, Harvard Medical School (USA) and Massachusetts
General Hospital (USA) and Technische Univ. Dresden (Germany); Robert W.
Redmond, Harvard Medical School (USA) and Massachusetts General Hospital
(USA); Seok Hyun A. Yun, Harvard Medical School (USA) and Massachusetts
General Hospital (USA) and KAIST (Korea, Republic of) [8958-11]

4:20 pm: **Azobenzene based polymers as photoactive supports for cell
growth applications**, Licinio Rocha, Commissariat à l'Énergie Atomique
(France); Cristina M. Palus, "Gheorghe Asachi" Technical Univ. of Iasi (Romania);
Elena Resmerita, Matthieu Hamel, Commissariat à l'Énergie Atomique (France);
Norica Nichita, Institute of Biochemistry of the Romanian Academy (Romania);
Nicolae Hurdac, "Gheorghe Asachi" Technical Univ. of Iasi (Romania); Anca
Rusu, Commissariat à l'Énergie Atomique (France) [8958-12]

4:40 pm: **Smart transdermal vaccine delivery systems using intravital
microscopic imaging**, Ki Su Kim, Havad Medical School (USA); Hyemin Kim,
Pohang Univ. of Science and Technology (Korea, Republic of); Sei Kwang Hahn,
Pohang Univ. of Science and Technology (Korea, Republic of) and Harvard
Medical School (USA); Seok-Hyun A. Yun, Harvard Medical School
(USA) [8958-13]

5:00 pm: **Shaping light for biomedicine** (*Invited Paper*), Kishan Dholakia, Univ.
of St. Andrews (United Kingdom) [8958-14]

BIOS HOT TOPICS AND AWARDS ANNOUNCEMENT

Location: Room 134 (Exhibit Level) . . . Sat 7:00 to 9:00 pm

Hear the latest technical breakthroughs and promising technologies for
biomedical applications from leading worldwide experts. Access to Hot Topics
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Britton Chance Biomedical Optics Award

The Britton Chance Biomedical Optics Award is presented annually in
recognition of outstanding lifetime contributions to the field of biomedical
optics through the development of innovative, high impact technologies. The
award particularly honors pioneering contributions to optical methods and
devices that have facilitated advancements in biology or medicine. Honorarium
of \$2,000 presented annually.

Biophotonics Technology Innovator Award

The Biophotonics Technology Innovator Award is presented annually for
extraordinary achievements in biophotonics technology development that
show strong promise or potential impact in Biology, Medicine, and Biomedical
Optics. The award targets achievements that span disciplines and may include
elements of basic research, technology development, and clinical translation.
Honorarium of \$2,000 presented annually.

See full Hot Topics presentation listing on page 17.

Sunday 2 February

SESSION 4

Location: Room 220 (Mezzanine) Sun 9:00 am to 10:10 am

Energy Harvesting Device

Session Chair: **Viktoria Greanya**,
Defense Threat Reduction Agency (USA)

9:00 am: **Optofluidic bioenergy: photobioreactors for solar energy conversion and to probe photosynthetic function** (*Invited Paper*), David D. Sinton, Univ. of Toronto (Canada) [8958-15]

9:30 am: **Biologically inspired asymmetric micro/nanostructures from firefly light organ for highly efficient light extraction**, Jae-Jun Kim, Dongmin Keum, Ki-Hun Jeong, KAIST (Korea, Republic of) [8958-16]

9:50 am: **Diatom-inspired nanophotonic light trapping structure for solar harvesting**, Xiangfan Chen, Chen Wang, Evan C. Baker, Cheng Sun, Northwestern Univ. (USA) [8958-17]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 5

Location: Room 220 (Mezzanine) . . . Sun 10:40 am to 12:00 pm

Biosensors

Session Chair: **Wooyoung Jang**, Samsung (Korea, Republic of)

10:40 am: **Smartphone-based molecular and chemical diagnostics** (*Invited Paper*), David Erickson, Cornell Univ. (USA) [8958-18]

11:10 am: **Optical EEG (OEEG): a novel technique toward plug-and-play noninvasive brain imaging and human-machine interfacing**, Ehsan Kamrani, Harvard Medical School (USA) and Polystim Neurotech. Lab., Polytechnique Montréal (Canada); Seok Hyun A. Yun, Harvard Medical School (USA) . . [8958-19]

11:30 am: **Optofluidic bio-lasers: bridging photonics, nanotechnology, and biology** (*Invited Paper*), Xudong Fan, Univ. of Michigan (USA) [8958-20]

POSTERS-SUNDAY

Location: Room 103 (Exhibit Level) . . . Sun 5:30 pm to 7:30 pm

Conference attendees are invited to attend the BIOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

When Birnam Wood comes to Dunsinane: copying nature in medical research, Bradley S. Tice, Advanced Human Design (USA) [8958-21]

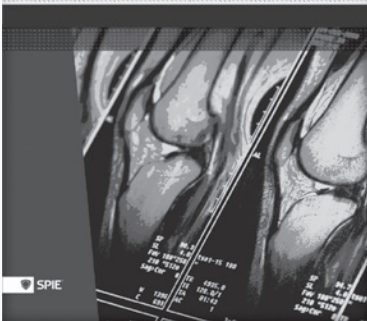
Algorithmic complexity and plant genetics, Bradley S. Tice, Advanced Human Design (USA) [8958-22]

SPIE Journals—Serving the biomedical optics community

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NEW

Journal of
Medical Imaging



SPIE will launch the *Journal of Medical Imaging* (JMI) in early 2014.

Maryellen Giger, Editor-in-chief

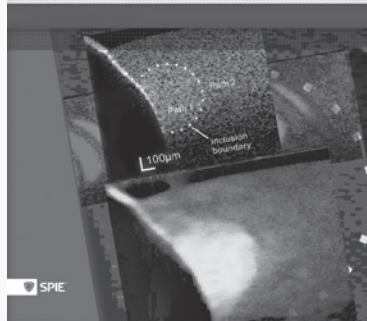
JMI covers fundamental and translational research and applications focused on photonics in medical imaging, which continue to yield physical and biomedical advancements in early detection, diagnostics, and therapy of disease, as well as in the understanding of normal.

JMI will be published online and in print, with free access to the online version through 2015.

SPIE.org/JMI

NEW

Journal of
Biomedical Optics

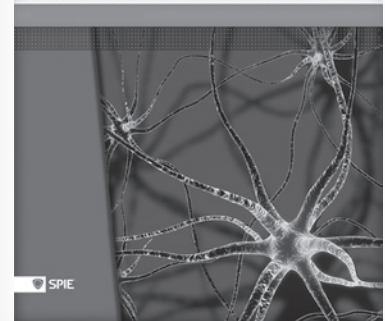


Lihong V. Wang, Editor-in-Chief

The *Journal of Biomedical Optics* (JBO), founded in 1996, publishes significant articles that report on the use of modern optical technology for improved health care and biomedical research.

SPIE.org/JBO

Neurophotonics



SPIE will launch *Neurophotonics* in mid-2014.

David A. Boas, Editor-in-chief

At the interface of optics and neuroscience, *Neurophotonics* covers cutting-edge technological advances and the impact on neuroscience and clinical applications.

Neurophotonics will be published online and in print, with free access to the online version through 2015.

SPIE.org/Neurophotonics

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TRANSLATIONAL RESEARCH

SPIE Photonics West

Symposium Chair



Bruce Tromberg
Beckman Laser Institute
and Medical Clinic (USA)

Highlighting 200 BIOS papers at SPIE Photonics West

The global community recognizes the need for advances in technology to meet challenges in health care. Translational research highlights papers from BIOS that address the latest photonics technologies, tools, and devices that have high potential for clinical use.

Photonic Therapeutics and Diagnostics

(ordered by conference paper number)

Saturday 1 February · 9:30 AM

Conference 8926A: Photonics in Dermatology and Plastic Surgery
Session 1: Optical Monitoring of Wounds

Monitoring the influence of compression therapy on pathophysiology and structure of a swine scar model using multispectral imaging system

Paper 8926-6

Pejman Ghassemi, The Catholic Univ. of America (USA), et al.

Sunday 2 February · 11:00 AM

Conference 8926A: Photonics in Dermatology and Plastic Surgery
Session 6: Optical Microscopy and Optical Coherence Tomography

Noninvasive monitoring and differentiation of cell death processes of human keratinocytes in living engineered skin tissue

Paper 8926-25

Youbo Zhao, Univ. of Illinois at Urbana-Champaign (USA), et al.

Sunday 2 February · 2:40 PM

Conference 8926A: Photonics in Dermatology and Plastic Surgery
Session 7: Model-Based Analysis of Optical Data

Enhanced diagnostic of skin conditions by polarized laser speckles: phantom studies and computer modeling

Paper 8926-32

Lioudmila Tchivaleva, The BC Cancer Agency Research Ctr. (Canada), et al.

Saturday 1 February · 9:15 AM

Conference 8926B: Therapeutics and Diagnostics in Urology
Session 9: Tissue Imaging I

Polarized light imaging for localizing the bladder morphological complications in outlet obstruction disease

Paper 8926-43

Sanaz Alali, Univ. of Toronto (Canada), et al.

Saturday 1 February · 3:50 PM

Conference 8926C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
Session 4: Practical Results of Novel Imaging Technology in Head and Neck Lesions

Widefield fluorescence imaging as an auxiliary tool to select the biopsy site for actinic cheilitis diagnosis

Paper 8926-130

Cristina Kurachi, Univ. de São Paulo (Brazil), et al.

Sunday 2 February · 8:50 AM

Conference 8926C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
Session 5: PDT and Related Technology for Malignant and Pre-Malignant Head and Neck Lesions

Plasmonic nanobubble theranostics for intra-operative and preventive treatment of head and neck squamous cell carcinoma

Paper 8926-136

Ekaterina Y. Lukianova-Hleb, Rice Univ. (USA), et al.

Translational Research Lunchtime Forum

Sunday 2 February 2014

12:30 to 2:00 pm · Location: Room 300 (Esplanade)

Discussion Facilitator:

Bruce J. Tromberg, Beckman Laser Institute and Medical Ctr.

Join your colleagues in a discussion of outcomes-based studies that can change the lives of patients. Select participants from the Translational Research virtual symposium will have the opportunity to present their methodology and findings. These speakers will demonstrate the use of optical/light-based techniques that are innovative and clever and can change the outcome for patients in a positive and life-giving way.

Best Paper Awards in the category of evidence-based medicine will be presented.

Sponsored by:



Through the generosity of OCT News, boxed lunches will be provided to the first 100 forum attendees.

Saturday 1 February · 3:45 PM

Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 16: Multimodality OCT

Fiber-based combined OCT and two-photon luminescence imaging system for detection of thin-cap fibroatheroma

Paper 8926-78

Tianyi Wang, The Univ. of Texas at Austin (USA), et al.

Sunday 2 February · 8:40 AM

Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 17: Light and Sound

Intravascular ultrasound and photoacoustic imaging for atherosclerotic plaque characterization and local therapy guidance

Paper 8926-84

Doug Yeager, The Univ. of Texas at Austin (USA), et al.

Sunday 2 February · 11:30 AM

Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 18: Advanced OCT

Analysis of intravascular OCT stent images using machine learning

Paper 8926-91

David L. Wilson, Case Western Reserve Univ. (USA), et al.

Sunday 2 February · 1:40 PM

Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 19: Tissue Characterization

Optical coherence tomography tissue type (OC3T) imaging: clinical validation

Paper 8926-93

Takeyoshi Kameyama, Erasmus MC (Netherlands), et al.

Translational Research Presentations

Sunday 2 February · 2:20 PM
Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 19: Tissue Characterization

Foam cells and thin-cap fibroatheroma artifacts: optical coherence tomography versus histology

Paper 8926-95
Jennifer E. Phipps, The Univ. of Texas Health Science Ctr. at San Antonio (USA), et al.

Sunday 2 February · 2:40 PM
Conference 8926D: Diagnostic and Therapeutic Applications of Light in Cardiology
Session 19: Tissue Characterization

Optical properties of atherosclerotic tissue types from computational intravascular OCT

Paper 8926-96
David L. Wilson, Case Western Reserve Univ. (USA), et al.

Sunday 2 February · 9:40 AM
Conference 8927A: Endoscopic Microscopy IX
Session 1: Spectral Encoding I

Development of tissue marking system for image-guided biopsy in spectrally-encoded confocal endomicroscopy platform

Paper 8927-4
Nima Tabatabaei, Harvard Medical School (USA), et al.

Sunday 2 February · 10:00 AM
Conference 8927A: Endoscopic Microscopy IX
Session 1: Spectral Encoding I

Spectrally-encoded confocal endomicroscopy capsule for diagnosis of eosinophilic esophagitis

Paper 8927-5
Nima Tabatabaei, Harvard Medical School (USA), et al.

Sunday 2 February · 2:40 PM
Conference 8927A: Endoscopic Microscopy IX
Session 3: OCT Probes

Tethered capsule endomicroscopy for image-guided biopsy in surveillance of Barrett's esophagus progression

Paper 8927-11
Michalina J. Gora, Harvard Medical School (USA), et al.

Sunday 2 February · 3:50 PM
Conference 8927A: Endoscopic Microscopy IX
Session 4: Fluorescence/Spectroscopy

Diffuse optical spectroscopy probe for therapy monitoring in colorectal cancer

Paper 8927-16
Martijn van de Giessen, Leids Univ. Medical Ctr. (Netherlands), et al.

Sunday 2 February · 4:30 PM
Conference 8927A: Endoscopic Microscopy IX
Session 4: Fluorescence/Spectroscopy

Multispectral scanning fiber endoscope with concurrent autofluorescence background mitigation for improved target-to-background ratio

Paper 8927-18
Chenyang Yang, Univ. of Washington (USA), et al.

Monday 3 February · 11:10 AM
Conference 8927A: Endoscopic Microscopy IX
Session 6: Multiphoton Microscopy

Development of a miniaturized side-looking probe based two-photon microscopy and optical coherence tomography

Paper 8927-26
Taejun Wang, Pohang Univ. of Science and Technology (Korea, Republic of), et al.

Monday 3 February · 2:20 PM
Conference 8927A: Endoscopic Microscopy IX
Session 7: Advanced Microscopy II

Ultrahigh-speed endoscopic swept source optical coherence tomography using a VCSEL light source and micromotor catheter

Paper 8927-30
Tsung-Han Tsai, Massachusetts Institute of Technology (USA), et al.

Saturday 1 February · 11:10 AM
Conference 8927B: Optical Techniques in Pulmonary Medicine
Session 10: Animal Models

Optical monitoring of physiologic and metabolic effects of sodium sulfide (NaSH) poisoning and treatment with hydroxocobalamin and cobinamide

Paper 8927-40
Marius C. Viseroi, Beckman Laser Institute and Medical Clinic (USA), et al.

Saturday 1 February · 11:50 AM
Conference 8927B: Optical Techniques in Pulmonary Medicine
Session 10: Animal Models

Structural and polarization sensitive optical frequency domain imaging with motorized endoscopic catheter

Paper 8927-42
Jianan Li, Vrije Univ. Amsterdam (Netherlands), et al.

Saturday 1 February · 1:10 PM
Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
Session 3: Operative and Post-op Therapy I

Quantitative, spectrally-resolved intraoperative imaging system for neurosurgical guidance in brain tumor surgery: pre-clinical and clinical results

Paper 8928-8
Pablo A. Valdes, Dartmouth College (USA), et al.

Saturday 1 February · 4:00 PM
Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
Session 4: Operative and Post-op Therapy II

5-ALA based photodynamic management of glioblastoma

Paper 8928-13
Adrian Rühm, Klinikum der Univ. München (Germany), et al.

Saturday 1 February · 4:40 PM
Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
Session 4: Operative and Post-op Therapy II

Integrated optical spectroscopy system to guide brain needle biopsies

Paper 8928-15
Andreanne Goyette, Ecole Polytechnique de Montréal (Canada), et al.

Saturday 1 February · 5:00 PM
Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
Session 4: Operative and Post-op Therapy II

Quantitative optical-sectioning microscopy of 5-ALA-induced PpIX in human low-grade gliomas

Paper 8928-16
Daphne Meza, Stony Brook Univ. (USA), et al.

Sunday 2 February · 8:00 AM
Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
Session 5: Optical Spectroscopy and Tomography: Pre-Clinical

Combining ICA and Granger causality: a novel tool for investigation of brain dynamics and brain oscillations from fNIRS measurements

Paper 8928-17
Zhen Yuan, Univ. of Macau (Macao, China), et al.

Saturday 1 February · 3:00 PM
 Conference 8928A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
 Poster Session Saturday
Multimodal intraoperative optical spectroscopy probe for tissue characterization during brain tumor resection
 Paper 8928-32
 Jeanne Mercier, Ecole Polytechnique de Montréal (Canada), et al.

Monday 3 February · 9:50 AM
 Conference 8928B: Neurophotonics
 Session 7: Novel Photonic/Optoelectronic Methods and Applications I
Laser-acupuncture for autism/autism spectrum disorder: a randomized sham controlled trial
 Paper 8928-39
 Shahzad Anwar, Anwar Shahs Trust for Cerebral Palsy & Paralysis (Pakistan), et al.

Monday 3 February · 5:30 PM
 Conference 8928B: Neurophotonics
 Poster Session Monday
Cerebral hemodynamics in patients with obstructive sleep apnea syndrome monitored with near-infrared spectroscopy (NIRS) during positive airways pressure (CPAP) therapy: a pilot study
 Paper 8928-69
 Zhongxing Zhang, Univ. of Zürich (Switzerland), et al.

Monday 3 February · 5:30 PM
 Conference 8928B: Neurophotonics
 Poster Session Monday
Pilot study to compare the cerebral hemodynamics between patients with obstructive sleep apnea syndrome (OSA) and periodic limb movement syndrome (PLMS) during nocturnal sleep with near-infrared spectroscopy (NIRS)
 Paper 8928-70
 Zhongxing Zhang, Univ. of Zürich (Switzerland), et al.

Sunday 2 February · 9:10 AM
 Conference 8929: Lasers in Dentistry XX
 Session 1: Lasers in Diagnostics and Caries
Guided fluorescence diagnosis of childhood caries: preliminary measures correlate with depth of carious decay
 Paper 8929-3
 Mary Timoshchuk, Univ. of Washington (USA), et al.

Sunday 2 February · 5:00 PM
 Conference 8929: Lasers in Dentistry XX
 Session 4: Lasers in Periodontal Treatment and LLLT
Effect of simvastatin versus Low Level Laser Therapy (LLLT) on bone regeneration in rabbit's tibia
 Paper 8929-18
 Mostafa E. Gheith, Cairo Univ. (Egypt), et al.

Saturday 1 February · 8:45AM
 Conference 8930: Ophthalmic Technologies XXIV
 Session 1: Small Animal Models
In vivo mouse corneal imaging with confocal microscopy and two-photon microscopy
 Paper 8930-2
 Jun Ho Lee, Pohang Univ. of Science and Technology (Korea, Republic of), et al.

Sunday 2 February · 9:15AM
 Conference 8930: Ophthalmic Technologies XXIV
 Session 6: Ocular Biometry and Eye Models
Accuracy evaluation of scleral lens thickness and radius of curvature using high-resolution SD- and SS-OCT
 Paper 8930-25
 Kirsten Carter, Univ. of Waterloo (Canada), et al.

Sunday 2 February · 9:30 AM
 Conference 8930: Ophthalmic Technologies XXIV
 Session 6: Ocular Biometry and Eye Models
Correlation of glaucoma severity with OCT-derived reference-free RNFL attenuation coefficients
 Paper 8930-26
 Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands), et al.

Sunday 2 February · 2:30 PM
 Conference 8930: Ophthalmic Technologies XXIV
 Session 8: Ophthalmic Surgery: Image-Guided and Therapy
Transscleral selective laser trabeculoplasty (SLT) without a gonioscopy lens
 Paper 8930-38
 Michael Belkin, Tel Aviv Univ. (Israel), et al.

Sunday 2 February · 2:45PM
 Conference 8930: Ophthalmic Technologies XXIV
 Session 8: Ophthalmic Surgery: Image-Guided and Therapy
Non-damaging laser therapy of the macula: titration algorithm and tissue response
 Paper 8930-39
 Daniel V. Palanker, Stanford Univ. (USA), et al.

Sunday 2 February · 5:30 PM
 Conference 8930: Ophthalmic Technologies XXIV
 Poster Session Sunday
Cost-effective instrumentation for quantitative depth measurement of optic nerve head using stereo fundus image pair and image cross correlation techniques
 Paper 8930-45
 Luis A. V. Carvalho, Univ. de São Paulo (Brazil), et al.

Saturday 1 February · 11:25AM
 Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
 Session 2: Photodynamic Therapy II
PDT for targeting drug-resistance associated with stromal interactions and epithelial-mesenchymal transition in pancreatic cancer
 Paper 8931-7
 Jonathan P. Celli, Massachusetts General Hospital (USA), et al.

Saturday 1 February · 12:05PM
 Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
 Session 2: Photodynamic Therapy II
Parameter determination for BPD mediated vascular PDT
 Paper 8931-9
 Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA), et al.

Saturday 1 February · 2:00 PM
 Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
 Session 3: Photodynamic Therapy III
Real-time monitoring of photo-immunotherapy using optical coherence tomography
 Paper 8931-12
 Chia-Pin Liang, Univ. of Maryland, College Park (USA), et al.

Saturday 1 February · 4:50 PM
 Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
 Session 4: Photodynamic Therapy IV
Multimodal imaging of skin cancer for treatment planning
 Paper 8931-21
 Ulas Sunar, Roswell Park Cancer Institute (USA), et al.

Sunday 2 February · 10:15AM
 Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
 Session 5: Photodynamic Therapy V
Photodynamic effect of photosensitizer-loaded hollow silica nanoparticles for hepatobiliary malignancies: an in vitro and in vivo study
 Paper 8931-28
 Xiaofeng Deng, The Second Xiangya Hospital (China), et al.

Translational Research Presentations

Sunday 2 February · 12:05PM

Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
Session 6: Photodynamic Therapy VI

Photodynamic therapy of cervical intraepithelial neoplasia

Paper 8931-32

Natalia Mayumi Inada, Univ. de São Paulo (Brazil), et al.

Sunday 2 February · 2:00 PM

Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
Session 7: Photodynamic Therapy VII

Diffuse optical tomography using multichannel robotic platform for interstitial PDT

Paper 8931-35

Anna V. Sharikova, The Univ. of Pennsylvania Health System (USA), et al.

Monday 3 February · 5:30 PM

Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
Poster Session Monday

Optimization of topical PDT using ALA and metil-ALA mixtures evaluated by fluorescence spectroscopy and widefield fluorescence imaging

Paper 8931-41

Priscila Fernanda Campos Menezes, Univ. de São Paulo (Brazil), et al.

Monday 3 February · 5:30 PM

Conference 8931: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIII
Poster Session Monday

Anisotropic modeling for IR navigation-based PDT dosimetry

Paper 8931-43

Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA), et al.

Saturday 1 February · 8:10 AM

Conference 8932: Mechanisms for Low-Light Therapy IX
Session 1: Mechanisms and Dosimetry

Application and possible mechanisms of combining LLLT, Infrared hyperthermia, and ionizing radiation in the treatment of cancer

Paper 8932-1

Edward H. Abraham, Artesian Cancer Ctr. (USA), et al.

Saturday 1 February · 8:40 AM

Conference 8932: Mechanisms for Low-Light Therapy IX
Session 1: Mechanisms and Dosimetry

Near infrared laser therapy for stroke: does it penetrate the skull?

Paper 8932-2

Paul A. Lapchak, Cedars-Sinai Medical Ctr. (USA), et al.

Saturday 1 February · 4:20 PM

Conference 8932: Mechanisms for Low-Light Therapy IX
Session 4: Animal Studies I

Treating metabolic syndrome's metaflammation with low level light therapy: preliminary results

Paper 8932-18

Tania M. Yoshimura, Univ. de São Paulo (Brazil), et al.

Sunday 2 February · 2:40 PM

Conference 8932: Mechanisms for Low-Light Therapy IX
Session 7: Clinical Studies

Comparison of clinical effectiveness of laser acupuncture and amytryptalin in diabetic peripheral neuropathy (DPN): a sham controlled randomized clinical trial

Paper 8932-37

Shahzad Anwar, Anwar Shah's First C.P. and Paralysis Clinic and Research Ctr. (Pakistan), et al.

Clinical Technologies and Systems

(ordered by conference paper number)

Monday 3 February · 10:30 AM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Session 2: Catheter/Endoscopic

Intravascular optical coherence tomography imaging at 3200 frames per second

Paper 8934-7

Tianshi Wang, Erasmus MC (Netherlands), et al.

Monday 3 February · 10:45AM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Session 2: Catheter/Endoscopic

Tethered Capsule OCT Endomicroscopy

Paper 8934-8

Michalina J. Gora, Wellman Ctr. for Photomedicine (USA), et al.

Tuesday 4 February · 2:15PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Session 7: OCT New Technology II

Depth-resolved attenuation coefficient estimation from beam-shape corrected OCT scans of phantoms

Paper 8934-44

Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands), et al.

Wednesday 5 February · 1:30 PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Session 11: Pre-Clinical Applications

Pre-clinical study design for cancer detection with full-field optical coherence tomography

Paper 8934-69

Katharine Grieve, Institut Langevin (France), et al.

Monday 3 February · 5:30 PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Poster Session Monday

Maximum likelihood estimation of blood velocity using Doppler optical coherence tomography

Paper 8934-88

Aaron C. Chan, The Univ. of Hong Kong (Hong Kong, China), et al.

Monday 3 February · 5:30 PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Poster Session Monday

Speckle reduction for OCT images using wave atoms thresholding filtering

Paper 8934-98

Yongzhao Du, Beckman Laser Institute and Medical Clinic (USA), et al.

Monday 3 February · 5:30 PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Poster Session Monday

Towards using spectral domain optical coherence tomography for dental wear monitoring

Paper 8934-115

Adrian Bradu, Univ. of Kent (United Kingdom), et al.

Monday 3 February · 5:30 PM

Conference 8934: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XVIII
Poster Session Monday

Monitoring of hemodynamic signals post optogenetic stimulation via optical coherence tomography

Paper 8934-126

Seth Frye, Univ. of Wisconsin-Milwaukee (USA), et al.

Monday 3 February · 5:30 PM
 Conference 8934: Optical Coherence Tomography and Coherence Domain
 Optical Methods in Biomedicine XVIII
 Poster Session Monday
**Validation of a new real-time in-situ optical coherence
 tomography with modified oral probe by comparing with the
 certified CE marking optical coherence tomography dermatology
 probe**
 Paper 8934-128
 Dara B. Rashed, Eastman Dental Institute (United Kingdom), et al.

Sunday 2 February · 8:50 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 1: Fluorescence Systems
**Autofluorescence Microscopy with sub-300 nm Excitation for
 Cellular Diagnostics**
 Paper 8935-1
 Urs Utzinger, The Univ. of Arizona (USA), et al.

Sunday 2 February · 1:00 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 3: Global Health Technologies II
Rapid transdermal bloodless and reagent-free malaria detection
 Paper 8935-7
 Ekaterina Y. Lukianova-Hleb, Rice Univ. (USA), et al.

Sunday 2 February · 2:50 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 4: Treatment Modalities and Image-Guided Surgery
**Optically enhanced blood-brain-barrier crossing of plasmonic-
 active nanoparticles in preclinical brain tumor animal models**
 Paper 8935-13
 Hsiangkuo Yuan, Duke Univ. (USA), et al.

Sunday 2 February · 4:20 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 4: Treatment Modalities and Image-Guided Surgery
**Real-time three-dimensional fluorescence imaging for surgical
 guidance**
 Paper 8935-16
 Peng Liu, Univ. of Science and Technology of China (China), et al.

Sunday 2 February · 4:40 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 4: Treatment Modalities and Image-Guided Surgery
Image-guided plasma therapy for cutaneous wound
 Paper 8935-17
 Zhiwu Zhang, Univ. of Science and Technology of China (China), et al.

Sunday 2 February · 5:00 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 4: Treatment Modalities and Image-Guided Surgery
A goggle navigation system for cancer resection surgery
 Paper 8935-18
 Junbin Xu, Univ. of Science and Technology of China (China), et al.

Monday 3 February · 9:50 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 5: Raman Devices and Methods
**Device for 3 dimensional, real time and intraoperative evaluation
 of surgical margin status**
 Paper 8935-25
 The-Quyen Nguyen, Vanderbilt Univ. (USA), et al.

Monday 3 February · 10:40 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 6: Scattering, Reflectance, and Polarimetric Techniques
**Reflectance confocal microscopy of oral epithelial tissue using an
 electrically tunable lens**
 Paper 8935-26
 Kristen C. Maitland, Texas A&M Univ. (USA), et al.

Monday 3 February · 11:00 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 6: Scattering, Reflectance, and Polarimetric Techniques
Mueller polarimetry for the detection of cancers
 Paper 8935-27
 Hui Ma, Graduate School at Shenzhen, Tsinghua Univ. (China), et al.

Monday 3 February · 11:40 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 6: Scattering, Reflectance, and Polarimetric Techniques
**Endoscopic 3x3 and 4x4 Mueller matrix polarimetric tissue
 imaging system**
 Paper 8935-29
 Ji Qi, Imperial College London (United Kingdom), et al.

Monday 3 February · 1:50 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 7: Biosensing and Imaging I
**The Application of Surgical Navigation System Using Optical
 Molecular Imaging Technology in Orthotopic Breast Cancer and
 Metastasis Studies**
 Paper 8935-31
 Chongwei Chi, Institute of Automation (China), et al.

Monday 3 February · 5:20 PM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 8: Biosensing and Imaging II
**Using tissue phantoms to determine the relationship between
 blood vessel depth and size from thermal images**
 Paper 8935-40
 Jason R. Case, The Univ. of North Carolina at Charlotte (USA), et al.

Tuesday 4 February · 8:50 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 9: Coherence Techniques I
**Motion tracking to enable pre-surgical margin mapping of basal
 cell carcinoma using optical imaging modalities: initial feasibility
 study using optical coherence tomography**
 Paper 8935-42
 Megan Duffy, Guy's and St Thomas' NHS Foundation Trust (United Kingdom),
 et al.

Tuesday 4 February · 9:30 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 9: Coherence Techniques I
**Linear source spectral-domain OCT for diagnosis of ocular and
 skin diseases**
 Paper 8935-44
 Linbo Liu, Nanyang Technological Univ. (Singapore), et al.

Tuesday 4 February · 10:40 AM
 Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical
 Guidance Systems XII
 Session 10: Coherence Techniques II
**Combined NIR absorption spectroscopy and OCT for
 neurovascular bundle proximity sensing during dental implant
 surgery**
 Paper 8935-46
 Jessie R. Weber, INO (Canada), et al.

Translational Research Presentations

Tuesday 4 February · 11:20 AM
Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII
Session 10: Coherence Techniques II

In vivo intra-operative breast tumor margin detection using a portable OCT system with a handheld surgical imaging probe
Paper 8935-48
Sarah J. Erickson-Bhatt, Univ. of Illinois at Urbana-Champaign (USA), et al.

Tuesday 4 February · 1:50 PM
Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII
Session 11: Endoscopic Devices and Methods

System for clinical photometric stereo endoscopy
Paper 8935-51
Nicholas J. Durr, Massachusetts Institute of Technology (USA), et al.

Tuesday 4 February · 2:30 PM
Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII
Session 11: Endoscopic Devices and Methods

A catheter-based fluorescence tomography platform
Paper 8935-53
Farouk Naouzi, Univ. of California, Irvine (USA), et al.

Sunday 2 February · 5:30 PM
Conference 8935: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XII
Poster Session Sunday

A surgical navigation system imaging software for sentinel lymph node detection
Paper 8935-66
Jinzuo Ye, Institute of Automation (China), et al.

Saturday 1 February · 10:30 AM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 2: OCT Systems

Non-invasive optical volumetric imaging of tissue microstructures and microcirculations in vivo
Paper 8936-6
Ruikang Wang, Univ. of Washington (USA), et al.

Saturday 1 February · 3:00 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 3: Quality of Biomedical Imaging Technologies

Reproducibility analysis of measurements with a mechanical semiautomatic eye model for evaluation of intraocular lenses
Paper 8936-14
Elisabet Rank, Fachhochschule Technikum Wien (Austria), et al.

Saturday 1 February · 3:20 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 3: Quality of Biomedical Imaging Technologies

Novel yet effective motion artefact reduction method for continuous physiological monitoring
Paper 8936-15
Abdullah Alzahrani, Loughborough Univ. (United Kingdom), et al.

Sunday 2 February · 3:10 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 7: Biomedical Imaging Technologies II

A novel combined frequency-domain near-infrared spectroscopy and diffuse correlation spectroscopy system
Paper 8936-18
Erin M. Buckley, Massachusetts General Hospital (USA), et al.

Saturday 1 February · 5:10 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 4: Biomedical Imaging Technologies I

A digital broad bandwidth frequency-domain Diffuse Optical Spectroscopy (dDOS) system for multiplexed measurements in turbid media
Paper 8936-20
Justin Jung, Boston Univ. (USA), et al.

Sunday 2 February · 10:20 AM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 6: Intraoperative Systems

Intra-operative optical imaging of breast tumor margins
Paper 8936-23
Nimmi Ramanujam, Duke Univ. (USA), et al.

Sunday 2 February · 10:50 AM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 6: Intraoperative Systems

Design and validation of Intra-operative guidance of surgery
Paper 8936-24
Anita Mahadevan-Jansen, Vanderbilt Univ. (USA), et al.

Sunday 2 February · 11:20 AM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 6: Intraoperative Systems

Intraoperative imaging and fluorescence image guidance in oncologic surgery using a wearable fluorescence goggle system
Paper 8936-25
Suman B. Mondal, Washington Univ. in St Louis (USA), et al.

Sunday 2 February · 11:40 AM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 6: Intraoperative Systems

Optical design of fluorescence imaging system for image guided surgery
Paper 8936-26
Nan Zhu, College of Optical Sciences, The Univ. of Arizona (USA), et al.

Sunday 2 February · 12:00 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 6: Intraoperative Systems

Scanning fiber endoscope with multi fluorescence-reflectance imaging channels for guiding biopsy
Paper 8936-27
Chenyang Yang, Univ. of Washington (USA), et al.

Sunday 2 February · 2:30 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 7: Biomedical Imaging Technologies II

System design and evaluation of the array confocal fluorescence microscope
Paper 8936-31
Shaun Pacheco, College of Optical Sciences, The Univ. of Arizona (USA), et al.

Sunday 2 February · 4:00 PM
Conference 8936: Design and Quality for Biomedical Technologies VI
Session 8: Optics for Biomedical Imaging Technologies

Optical systems engineering and manufacturing for biomedical technologies: examples and applications
Paper 8936-33
Peter Triebel, JENOPTIK Optical Systems GmbH (Germany), et al.

Saturday 1 February · 8:20 AM
Conference 8937: Multimodal Biomedical Imaging IX
Session 1: Imaging in Surgical Procedures

A surgical navigation system for noncontact diffuse optical tomography and intraoperative cone-beam CT
Paper 8937-2
Michael J. Daly, Univ. of Toronto (Canada), et al.

Saturday 1 February · 9:20 AM
Conference 8937: Multimodal Biomedical Imaging IX
Session 1: Imaging in Surgical Procedures

Multimodal and multiview imaging of cutaneous tissue structural and functional parameters
Paper 8937-5
Wenqi Ren, Univ. of Science and Technology of China (China), et al.

Saturday 1 February · 11:40 AM
Conference 8937: Multimodal Biomedical Imaging IX
Session 2: Microscopy

In-vivo widefield imaging of a fluorescent deoxy-glucose bioprobe: guiding multiphoton microscopy in oral epithelial neoplasia

Paper 8937-10
Rahul Pal, The Univ. of Texas Medical Branch (USA), et al.

Saturday 1 February · 1:40 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 3: Multimodal Tomography/Spectroscopy Imaging

A parallel framework for simultaneous FNIRS/fMRI fusion

Paper 8937-12
Zhen Yuan, Univ. of Florida (USA), et al.

Saturday 1 February · 2:20 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 3: Multimodal Tomography/Spectroscopy Imaging

Dual-mode dynamic imaging of breast cancer

Paper 8937-14
Shiwu Zhang, Univ. of Science and Technology of China (China), et al.

Saturday 1 February · 3:00 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 3: Multimodal Tomography/Spectroscopy Imaging

Validation of temperature-modulated fluorescence tomography in vivo

Paper 8937-16
Tiffany C. Kwong, Univ. of California, Irvine (USA), et al.

Saturday 1 February · 4:30 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 4: Agents, Reconstruction, and Analysis

One-step microencapsulation of nanoparticles and perfluorocarbon in microbubbles for controlled activation and image-guided therapy

Paper 8937-19
Guangbin Li, Univ. of Science and Technology of China (China), et al.

Saturday 1 February · 5:10 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 4: Agents, Reconstruction, and Analysis

Microencapsulation of drugs and imaging agents in multiple compartments by compound-fluidic electro-flow focusing

Paper 8937-21
Chuansheng Yin, Univ. of Science and Technology of China (China), et al.

Saturday 1 February · 5:30 PM
Conference 8937: Multimodal Biomedical Imaging IX
Session 4: Agents, Reconstruction, and Analysis

A fast and effective reconstruction method for fluorescence tomography based on sparsity adaptive subspace pursuit

Paper 8937-22
Jinzuo Ye, Institute of Automation (China), et al.

Sunday 2 February · 5:30 PM
Conference 8937: Multimodal Biomedical Imaging IX
Poster Session Sunday

Combining 3D optical and dual energy x-ray imaging to measure lipid, water, protein body composition

Paper 8937-38
Serghei Malkov, Univ. of California, San Francisco (USA), et al.

Sunday 2 February · 5:30 PM
Conference 8937: Multimodal Biomedical Imaging IX
Poster Session Sunday

Developing and testing a multisource and detector reflectance diffuse optical tomography system

Paper 8937-40
Murat Canpolat, Akdeniz Üniv. (Turkey), et al.

Saturday 1 February · 10:00 AM
Conference 8938: Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XIV
Session 1: Optical Fibers and Sensors I

Fiber optic enables point of care bioanalysis 250 miles from earth

Paper 8938-5
Ozzy Mermut, INO (Canada), et al.

Sunday 2 February · 5:50 PM
Conference 8939: Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry
Session 6: Methods II

Understanding the TERS effect with on-line tunneling and force feedback using multiprobe AFM/NSOM with Raman integration

Paper 8939-11
Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel), et al.

Sunday 2 February · 8:00 AM
Conference 8939: Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry
Session 3: Oncology I

Classification of oral cancers using Raman spectroscopy of serum

Paper 8939-14
Aditi Sahu, Advanced Ctr. for Treatment, Research & Education in Cancer (India), et al.

Sunday 2 February · 9:40 AM
Conference 8939: Biomedical Vibrational Spectroscopy VIII: Advances in Research and Industry
Session 3: Oncology I

Investigating the biochemical progression of liver disease through fibrosis, cirrhosis, dysplasia, and hepatocellular carcinoma using Fourier transform infrared spectroscopic imaging

Paper 8939-19
Hari Sreedhar, Univ. of Illinois at Chicago (USA), et al.

Tuesday 4 February · 4:50 PM
Conference 8940: Optical Biopsy XII
Session 4: Fluorescence Methods

Noninvasive diagnosis of oral cancer by Stokes shift spectroscopy

Paper 8940-20
Jeyasingh Ebenezer, Jamal Mohamed College (India), et al.

Wednesday 5 February · 8:00 AM
Conference 8940: Optical Biopsy XII
Session 5: Novel Methods and Instrumentation I

Quantitative photonic pathology for cancer diagnosis and prognosis

Paper 8940-22
Michael Reilly, Fairfield Univ. (USA), et al.

Wednesday 5 February · 8:40 AM
Conference 8940: Optical Biopsy XII
Session 5: Novel Methods and Instrumentation I

Parametric study of different contributors to tumor thermal profiles

Paper 8940-24
Michal Tepper, Tel Aviv Univ. (Israel), et al.

Wednesday 5 February · 10:50 AM
Conference 8940: Optical Biopsy XII
Session 6: Novel Methods and Instrumentation II

Measurement of fluorescent probes concentration ratio in the cerebrospinal fluid for early detection of Alzheimer's disease

Paper 8940-29
Osnat Harbater, Tel Aviv Univ. (Israel), et al.

Translational Research Presentations

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

(ordered by conference paper number)

Monday 3 February · 4:40 PM

Conference 8941A: Optical Interactions with Tissue and Cells XXV
Session 4: Ultrafast Pulse Laser Interactions

Comparison of human serum and bovine serum albumins on oxidation dynamics induced by talaporfin sodium photosensitization reaction with albumin rich conditions: solution experiments

Paper 8941-15

Mariko Kurotsu, Keio Univ. (Japan), et al.

Tuesday 4 February · 9:40 AM

Conference 8941A: Optical Interactions with Tissue and Cells XXV
Session 5: Photothermal Effects

Acute cell death rate of vascular smooth muscle cells during or after short heating up to 20 s ranging 50 to 60°C as a basic study of thermal angioplasty

Paper 8941-12

Machiko Shinozuka, Keio Univ. (Japan), et al.

Tuesday 4 February · 1:40 PM

Conference 8941A: Optical Interactions with Tissue and Cells XXV
Session 7: Numerical Methods and Theory

Theory and experiments on time-resolved reflectance from adult heads for functional tomographic imaging of brain activities

Paper 8941-27

Tadatoshi Tanifuji, Kitami Institute of Technology (Japan), et al.

Tuesday 4 February · 3:00 PM

Conference 8941A: Optical Interactions with Tissue and Cells XXV
Session 8: Photochemical Effects

Photosensitization reaction along depth of a culture well with high concentration of talaporfin sodium for extra-cellular photodynamic therapy study

Paper 8941-31

Masahiro Yajima, Keio Univ. (Japan), et al.

Tuesday 4 February · 5:20 PM

Conference 8941A: Optical Interactions with Tissue and Cells XXV
Session 9: Optical Properties of Tissues

Optical signature of multiCellular tumor spheroid using index-mismatch- induced spherical aberrations

Paper 8941-36

Corinne Lorenzo, Institut des Technologies Avancées en Sciences du Vivant, CNRS (France), et al.

Sunday 2 February · 10:00 AM

Conference 8941B: Terahertz and Ultrashort Electromagnetic Pulses for Biomedical Applications
Session 10: Terahertz Technologies I

Terahertz spectroscopy for classification of burn wounds in a standardized porcine model

Paper 8941-52

M. Hassan Arbab, Univ. of Washington (USA), et al.

Sunday 2 February · 8:30 AM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 1: Clinical Applications of Imaging I

Light-enhanced transesophageal echocardiography for evaluating central hemodynamics: towards a clinical prototype

Paper 8943-1

Li Li, Massachusetts General Hospital, Harvard Medical School (USA), et al.

Sunday 2 February · 8:45AM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 1: Clinical Applications of Imaging I

In vivo imaging of human microcirculation with linear-array based photoacoustic tomography: a feasibility study for clinical application

Paper 8943-2

Hreesh M. Subhash, National Univ. of Ireland, Galway (Ireland), et al.

Sunday 2 February · 9:45AM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 1: Clinical Applications of Imaging I

Feasibility of transcranial photoacoustic imaging for interventional guidance of endonasal surgeries

Paper 8943-6

Muyinatu A. Lediju Bell, Johns Hopkins Univ. (USA), et al.

Sunday 2 February · 11:45AM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 2: Microscopy and Endoscopy I

Circulating tumor cell detection using photoacoustic spectral methods

Paper 8943-12

Eric M. Strohm, Ryerson Univ. (Canada), et al.

Sunday 2 February · 2:15PM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 3: Small Animal Tomography

Cellulose nanoparticles: photoacoustic contrast agents that biodegrade to simple sugars

Paper 8943-17

Jesse V. Jokerst, Stanford Univ. (USA), et al.

Sunday 2 February · 3:00 PM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 3: Small Animal Tomography

Real-time photoacoustic monitoring of stroke

Paper 8943-20

Moritz Kneipp, Technische Univ. München (Germany), et al.

Sunday 2 February · 4:00 PM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 4: Novel Technologies and Applications I

Photoacoustic imaging of brachytherapy seeds in an ex vivo prostate with transurethral light delivery

Paper 8943-22

Muyinatu A Lediju Bell, Johns Hopkins Univ. (USA), et al.

Monday 3 February · 2:45PM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 7: Ultrasonic Encoding and Wavefront Engineering

Acousto-optic imaging using quantum memories in cryogenic rare earth ion doped crystals

Paper 8943-47

Alexander Doronin, Univ. of Otago (New Zealand), et al.

Monday 3 February · 4:00 PM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 8: Novel Technologies and Applications II

Functional pitch of a liver: fatty liver disease diagnosis with photoacoustic spectrum analysis

Paper 8943-50

Guan Xu, Univ. of Michigan Medical School (USA), et al.

Tuesday 4 February · 8:45AM

Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 9: Monitoring of Therapy

Photoacoustic imaging of mesenchymal stem cells in living mice via silica-coated gold nanorods

Paper 8943-58

Jesse V. Jokerst, Stanford Univ. (USA), et al.

Tuesday 4 February · 11:30 AM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 10: Microscopy and Endoscopy II

Multimodality photoacoustic and Raman imaging of magnetically-trapped tumor cells

Paper 8943-67
Wei Shi, Univ. of Alberta (Canada), et al.

Tuesday 4 February · 11:45AM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 10: Microscopy and Endoscopy II

Label-free mouse brain imaging by high-speed functional photoacoustic microscopy

Paper 8943-68
Junjie Yao, Washington Univ. in St. Louis (USA), et al.

Tuesday 4 February · 1:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 11: Molecular Imaging Using Contrast Agents

Alternative to the sentinel lymph node biopsy: ultrasound-guided spectroscopic photoacoustic imaging of molecularly-activatable plasmonic nanosensors

Paper 8943-70
Geoffrey P. Luke, The Univ. of Texas at Austin (USA), et al.

Tuesday 4 February · 4:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 12: Novel Technologies and Applications III

Vibrational photoacoustic tomography: chemical imaging beyond the ballistic regime

Paper 8943-80
Ji-Xin Cheng, Purdue Univ. (USA), et al.

Wednesday 5 February · 4:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Session 16: Novel Approaches and Technological Enhancements II

Non-contact photoacoustic tomography with a laser Doppler vibrometer

Paper 8943-108
Guan Xu, Univ. of Michigan Medical School (USA), et al.

Sunday 2 February · 5:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Sunday

Absolute photoacoustic thermography in deep tissue

Paper 8943-136
Junjie Yao, Washington Univ. in St. Louis (USA), et al.

Sunday 2 February · 5:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Sunday

Transparent broadband ultrasonic detector for functional photoacoustic imaging

Paper 8943-145
Hao Li, Northwestern Univ. (USA), et al.

Monday 3 February · 5:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Monday

In vivo photoacoustic imaging of prostate brachytherapy seeds

Paper 8943-149
Muyinatu A. Lediju Bell, Johns Hopkins Univ. (USA), et al.

Monday 3 February · 5:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Monday

Theoretical and experimental investigation of multispectral photoacoustic osteoporosis detection method

Paper 8943-165
Idan Steinberg, Tel Aviv Univ. (Israel), et al.

Monday 3 February · 5:30 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Monday

FPGA implementation of undecimated wavelet transform denoising and Fourier deconvolution for photoacoustic microscopy

Paper 8943-177
Ryan T. Maxson, Texas A&M Univ. (USA), et al.

Tuesday 4 February · 6:00 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Tuesday

Dual-modality photoacoustic and ultrasound imaging system for noninvasive sentinel lymph node detection: preliminary clinical results

Paper 8943-188
Todd N. Erpelding, Philips Research North America (USA), et al.

Tuesday 4 February · 6:00 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Tuesday

Real-time photoacoustic and ultrasound parallel imaging system facilitated by GPU acceleration and code optimization

Paper 8943-218
Jie Yuan, Nanjing Univ. (China), et al.

Tuesday 4 February · 6:00 PM
Conference 8943: Photons Plus Ultrasound: Imaging and Sensing 2014
Poster Session Tuesday

Gold nanorods combine photoacoustic and Raman imaging for detection and treatment of ovarian cancer

Paper 8943-221
Jesse V. Jokerst, Stanford Univ. (USA), et al.

Monday 3 February · 8:55AM
Conference 8944: Biophotonics and Immune Responses IX
Session 1: PDT and Vaccine

Photodynamic therapy for melanoma: efficacy and immunologic effects

Paper 8944-2
Pinar Avci, Wellman Ctr. for Photomedicine (USA), et al.

Monday 3 February · 9:20 AM
Conference 8944: Biophotonics and Immune Responses IX
Session 1: PDT and Vaccine

Glycated chitosan as a vaccine adjuvant

Paper 8944-3
Pinar Avci, Wellman Ctr. for Photomedicine (USA), et al.

Monday 3 February · 9:40 AM
Conference 8944: Biophotonics and Immune Responses IX
Session 1: PDT and Vaccine

Therapeutic effect of PDT with SIRT1 related gene therapy

Paper 8944-4
Rumwald Leo G. Lecaros, Chung Yuan Christian Univ. (Taiwan), et al.

Monday 3 February · 5:30 PM
Conference 8944: Biophotonics and Immune Responses IX
Poster Session Monday

Combination therapy of EGFR gene and photodynamic therapy to enhance oral cancer treatment efficacy

Paper 8944-34
Chia-Hsien Yeh, Chung Yuan Christian Univ. (Taiwan), et al.

Saturday 1 February · 11:20 AM
Conference 8945: Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VI
Session 2: Novel Phantom Design

3D printing method for freeform fabrication of optical phantoms simulating heterogeneous biological tissue

Paper 8945-8
Minjie Wang, Univ. of Science and Technology of China (China), et al.

Translational Research Presentations

Biomedical Spectroscopy, Microscopy, and Imaging

(ordered by conference paper number)

Monday 3 February · 8:00 AM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 1: Functional Imaging of Biomolecules, Cells, and Tissues I

Fluorescence lifetime imaging of NADH and FAD reports therapeutic effects on pancreatic cancer metabolism

Paper 8947-1

Alex J. Walsh, Vanderbilt Univ. (USA), et al.

Monday 3 February · 3:50 PM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 4: Spectral Imaging and Multiparameter Measurements II

Toward in-vivo diagnosis of skin cancer using multimode imaging dermoscopy (SkinSpect): (I) clinical system development and validation

Paper 8947-17

Nicholas B. MacKinnon, Spectral Molecular Imaging Inc. (USA), et al.

Monday 3 February · 4:10 PM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 4: Spectral Imaging and Multiparameter Measurements II

Toward in-vivo diagnosis of skin cancer using multimode imaging dermoscopy (SkinSpect™): (II) molecular mapping of highly pigmented lesions

Paper 8947-18

Fartash Vasefi, Spectral Molecular Imaging Inc. (USA), et al.

Monday 3 February · 4:50 PM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 4: Spectral Imaging and Multiparameter Measurements II

Multispectral imaging for diagnosis and treatment

Paper 8947-20

Gary E. Carver, Omega Optical, Inc. (USA), et al.

Monday 3 February · 5:10 PM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 4: Spectral Imaging and Multiparameter Measurements II

Bartonella henselae invades of human erythrocytes in vitro

Paper 8947-21

Gislaine Vieira-Damiani, Univ. Estadual de Campinas (Brazil), et al.

Tuesday 4 February · 11:20 AM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 6: Quantitative Cell and Tissue Analysis II

Flow cytometric assay for analysis of cytotoxic effects of potential drugs on human peripheral blood leukocytes

Paper 8947-31

Kathleen Nieschke, Univ. Leipzig (Germany), et al.

Tuesday 4 February · 2:40 PM

Conference 8947: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII

Session 7: Biomedical Imaging with Advanced Microscopy using a DMD or other MEMS Micromirror: Joint Session with Conferences 8947 and 8979

Miniaturized CARS Microendoscope Probe Design for Label-free Intraoperative Imaging

Paper 8947-33

Xu Chen, The Methodist Hospital Research Institute (USA), et al.

Sunday 2 February · 10:50 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 1: SHG/THG Microscopy I

Motion-free polarization second-harmonic generation microscopy using a liquid crystal modulator

Paper 8948-5

Chi-Hsiang Lien, National Cheng Kung Univ. (Taiwan), et al.

Sunday 2 February · 3:50 PM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 3: Technology Development and Applications I

Fiber-optic scanning nonlinear endomicroscopy

Paper 8948-17

Xingde Li, Johns Hopkins Univ. (USA), et al.

Monday 3 February · 8:30 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 4: Biomedical Applications of Coherent Raman I

Spectroscopic imaging unveils the essential role of cholesterol accumulation in cancer proliferation

Paper 8948-23

Ji-Xin Cheng, Purdue Univ. (USA), et al.

Monday 3 February · 8:50 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 4: Biomedical Applications of Coherent Raman I

Stimulated Raman scattering microscopy of human brain tumor specimens

Paper 8948-24

Daniel A. Orringer, Univ. of Michigan Health System (USA), et al.

Monday 3 February · 11:25 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 5: Biomedical Applications of Coherent Raman II

Imaging protein misfolding in Alzheimer's disease with SRS microscopy

Paper 8948-30

Minbiao Ji, Harvard Univ. (USA), et al.

Monday 3 February · 11:40 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 5: Biomedical Applications of Coherent Raman II

CARS microscopy of cancer cells in vitro and tumors in vivo

Paper 8948-31

Mathieu Laliberté, Institut National de la Recherche Scientifique (Canada), et al.

Monday 3 February · 3:45 PM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 7: Coherent Raman Technical Development II

Fiber bundle-based endomicroscopy prototype with two collection channels for simultaneous multimodal coherent anti-Stokes Raman scattering and second-harmonic generation imaging

Paper 8948-38

Zhengfan Liu, Beijing Institute of Technology (China), et al.

Tuesday 4 February · 11:35 AM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Session 9: FLIM/FRET/FCS II

Fluorescence lifetime imaging classifies breast cancer subtypes and predicts neoadjuvant therapy response in humans

Paper 8948-56

Alex J. Walsh, Vanderbilt Univ. (USA), et al.

Sunday 2 February · 5:30 PM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV

Poster Session Sunday

Development of fluorescence lifetime imaging microscopy system based on a streak camera

Paper 8948-93

Lixin Liu, Xidian Univ. (China), et al.

Sunday 2 February · 5:30 PM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV
Poster Session Sunday

Rapid acquisition of lipid distribution in *C. elegans* by stimulated Raman scattering (SRS) microscopy

Paper 8948-98
Tao Chen, Peking Univ. (China), et al.

Sunday 2 February · 5:30 PM

Conference 8948: Multiphoton Microscopy in the Biomedical Sciences XIV
Poster Session Sunday

Investigating backward scattered second-harmonic generation from various mouse collagen tissues

Paper 8948-103
Mengzhe Shen, The Univ. of British Columbia (Canada), et al.

Tuesday 4 February · 4:00 PM

Conference 8949: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI
Session 4: Holographic Microscopy

High-contrast 3D microscopic imaging of deep layers in a biological medium

Paper 8949-17
Ahmad Faridian, Univ. Stuttgart (Germany), et al.

Wednesday 5 February · 1:50 PM

Conference 8949: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI
Session 7: Wavefront Shaping and Structured Illumination

Agile scanning using a MEMS focus control mirror in a commercial confocal microscope

Paper 8949-32
Sarah J. Lukes, Montana State Univ. (USA), et al.

Wednesday 5 February · 2:10 PM

Conference 8949: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXI
Session 7: Wavefront Shaping and Structured Illumination

Full field photothermal dynamics microscopy

Paper 8949-33
Guichen Tang, Fairfield Univ. (USA), et al.

Sunday 2 February · 9:40 AM

Conference 8950: Single Molecule Spectroscopy and Superresolution Imaging VII
Session 5: Nanoscopy and Superresolution Microscopy I

mRNA quantification via second harmonic super resolution microscopy

Paper 8950-20
Jing Liu, Purdue Univ. (USA), et al.

Wednesday 5 February · 4:00 PM

Conference 8951: Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics
Session 4: Global Point-of-Care Applications and Systems

Stick-on microscope for smartphones

Paper 8951-16
Woei Ming Lee, Australian National Univ. (Australia), et al.

Thursday 6 February · 9:00 AM

Conference 8951: Optical Diagnostics and Sensing XIV: Toward Point-of-Care Diagnostics
Session 5: Cancer Detection Using Optical Techniques

In vivo hyperspectral imaging of cervical neoplasia

Paper 8951-22
Chaojian Wang, Univ. of Science and Technology of China (China), et al.

Saturday 1 February · 10:40 AM

Conference 8952: Biomedical Applications of Light Scattering IX
Session 2: Novel Techniques II

Minimally invasive photopolymerization in tissue cavities

Paper 8952-5
Andreas Schmocker, Ecole Polytechnique Fédérale de Lausanne (Switzerland), et al.

Saturday 1 February · 11:20 AM

Conference 8952: Biomedical Applications of Light Scattering IX
Session 2: Novel Techniques II

Method for rapid multidiameter single-fiber reflectance and fluorescence spectroscopy through a fiber bundle

Paper 8952-7
Arjen Amelink, Erasmus MC (Netherlands), et al.

Sunday 2 February · 11:20 AM

Conference 8952: Biomedical Applications of Light Scattering IX
Session 6: Speckle Imaging and Dynamic Light Scattering II

Biodynamic imaging to predict lymphoma response to therapy

Paper 8952-23
Ran An, Purdue Univ. (USA), et al.

Sunday 2 February · 1:30 PM

Conference 8952: Biomedical Applications of Light Scattering IX
Session 7: Clinical and Pre-clinical Studies

Probing tissue multifractality using multi-resolution analysis for early detection of cancer

Paper 8952-25
Nirmalya Ghosh, Indian Institute of Science Education and Research Kolkata (India), et al.

Sunday 2 February · 4:10 PM

Conference 8952: Biomedical Applications of Light Scattering IX
Session 8: In Vitro Cell Studies

Diagnostic features in two-dimensional light scattering patterns of normal and dysplastic cervical cell nuclei

Paper 8952-31
Dizem Arifler, Kemal Saracoglu Foundation (Cyprus), et al.

Sunday 2 February · 5:30 PM

Conference 8952: Biomedical Applications of Light Scattering IX
Poster Session Sunday

A noninvasive diffuse reflectance calibration-free method for absolute determination of exogenous biochemicals concentration in biological tissues

Paper 8952-41
Alexander V. Lappa, Chelyabinsk State Univ. (Russian Federation), et al.

Sunday 2 February · 5:30 PM

Conference 8952: Biomedical Applications of Light Scattering IX
Poster Session Sunday

Noninvasive blood flow assessment in diabetic foot ulcer subjects using laser speckle contrast imaging technique

Paper 8952-48
Jayanthi Anavai Kandaswami, Sri Ramaswamy Memorial Univ. (India), et al.

Translational Research Presentations

Nano/Biophotonics

(ordered by conference paper number)

Thursday 6 February · 9:40 AM

Conference 8954: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X

Session 4: Biosensing with Nanostructures and Nanoparticles I

Symmetries and biology: a new approach to biosensing

Paper 8954-17

Mathieu L. Juan, Macquarie Univ. (Australia), et al.

Thursday 6 February · 12:00 PM

Conference 8954: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X

Session 5: Biosensing with Nanostructures and Nanoparticles II

Quantum dot microarrays for analyte sensing and cellular dynamics

Paper 8954-22

Mihaela Delcea, ZIK HIKE, Univ. of Greifswald (Germany), et al.

Thursday 6 February · 3:40 PM

Conference 8954: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications X

Session 7: Biosensing with Nanostructures and Nanoparticles IV

Surface-enhanced Raman scattering (SERS) for detection of phenylketonuria for newborn screening

Paper 8954-27

Mehdi Javanmard, Stanford Univ. (USA), et al.

Saturday 1 February · 3:30 PM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 4: Synthesis and Conjugation IV

Peptide-modified gold nanoparticles for improved cancer therapeutics

Paper 8955-14

Celina Yang, Ryerson Univ. (Canada), et al.

Sunday 2 February · 11:55 AM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 6: Optical Properties: Interaction of Light with Particles II

The use of real-time optical feedback to improve outcomes

Paper 8955-27

Isidro B. Magaña, Louisiana Tech Univ. (USA), et al.

Monday 3 February · 2:20 PM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 10: Biomedical Applications II

Magneto-plasmonic nanoclusters for capture and photoacoustic detection of cancer cells

Paper 8955-46

Chun-Hsien Wu, The Univ. of Texas at Austin (USA), et al.

Monday 3 February · 2:40 PM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 10: Biomedical Applications II

Multimodal near-IR contrast agents for immune cell tracking

Paper 8955-47

Pratixa P. Joshi, The Univ. of Texas at Austin (USA), et al.

Monday 3 February · 4:00 PM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 11: Biomedical Applications III

Gold nanoparticles based colorimetric nanodiagnostics for cancer and infectious diseases

Paper 8955-50

Paola Valentini, Istituto Italiano di Tecnologia (Italy), et al.

Monday 3 February · 4:50 PM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 11: Biomedical Applications III

Intracellular light-induced release of signaling molecules from gold-coated liposomes

Paper 8955-52

Gabriel V. Orsinger, The Univ. of Arizona (USA), et al.

Tuesday 4 February · 8:40 AM

Conference 8955: Colloidal Nanoparticles for Biomedical Applications IX

Session 12: Biomedical Applications IV

Noninvasive high-speed imaging of fast physiological processes in awake and freely moving mice

Paper 8955-54

Oliver T. Bruns, Massachusetts Institute of Technology (USA), et al.

Monday 3 February · 8:30 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 1: NIR Fluorescence in Therapeutics

Application strategies of photo-immunotherapy (PIT) for treating solid cancers

Paper 8956-1

Hisataka Kobayashi, National Institutes of Health (USA), et al.

Monday 3 February · 9:40 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 1: NIR Fluorescence in Therapeutics

Real-time visualization of pancreatic leak using a chymotrypsin-activated fluorescent probe during pancreatic surgery

Paper 8956-4

Takeaki Ishizawa, The Univ. of Tokyo (Japan), et al.

Monday 3 February · 11:50 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 2: NIR Fluorescence in Imaging

Photothermal optical coherence tomography and therapy in targeted mouse brain tumors using gold nanostars

Paper 8956-9

Jung Heo, Yonsei Univ. (Korea, Republic of), et al.

Monday 3 February · 12:10 PM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 2: NIR Fluorescence in Imaging

One-step microencapsulation of drugs and imaging agents by tri-axial electro-flow focusing

Paper 8956-10

Ting Si, Univ. of Science and Technology of China (China), et al.

Monday 3 February · 2:50 PM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 3: Nanoparticles in Therapeutics

Multiplexed detection of cell-surface cancer biomarkers with targeted SERS-coded nanoparticles

Paper 8956-13

Yu Wang, Stony Brook Univ. (USA), et al.

Monday 3 February · 4:40 PM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 4: Novel Bioprobes

Initial formal toxicity evaluation of APC-2, a novel fluorescent tracer agent for real-time measurement of glomerular filtration rate in preparation for a first-in-man clinical trial

Paper 8956-17

Richard B. Dorshow, MediBeacon LLC (USA), et al.

Monday 3 February · 5:00 PM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications

Session 4: Novel Bioprobes

Microencapsulation of curcumin in PLGA microcapsules by coaxial flow focusing

Paper 8956-18

Fan Lei, Univ. of Science and Technology of China (China), et al.

Tuesday 4 February · 9:00 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications
Session 5: Nanoparticles in Imaging

Quantifying the surface chemistry of 3D matrices in situ

Paper 8956-19

Dimitrios S. Tzeranis, Massachusetts Institute of Technology (USA), et al.

Tuesday 4 February · 9:20 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications
Session 5: Nanoparticles in Imaging

In vivo molecular mapping of an AOM-treated mouse model of colon carcinogenesis

Paper 8956-20

Sarah J. Leung, Univ. of Arizona (USA), et al.

Wednesday 5 February · 9:20 AM

Conference 8956: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications
Session 8: Novel Applications of Fluorescent Nanoparticles

Effects of ICG concentration and particle diameter on photophysical properties of ICG-doped nanoparticles

Paper 8956-30

Jason Crovisier, Univ. of California, Riverside (USA), et al.

Saturday 1 February · 8:50 AM

Conference 8957: Plasmonics in Biology and Medicine XI
Session 1: Plasmonics and SERS I

Low-cost, high-sensitivity SERS nano-bio-chip for kinase profiling, drug monitoring and environmental detection: a translational platform technology

Paper 8957-1

Yi Chen, Univ. of Illinois at Urbana-Champaign (USA), et al.

Sunday 2 February · 11:40 AM

Conference 8957: Plasmonics in Biology and Medicine XI
Session 6: Plasmonics and Nanophotonics

In-vivo gold nanorod imaging for brain tumor delineation

Paper 8957-29

Kevin C. Seekell, Duke Univ. (USA), et al.

Saturday 1 February · 9:00 AM

Conference 8958: Bioinspired, Bioengineered Photonic Devices II
Session Key: Keynote Session

Silk biomaterials: a versatile material platform for photonics

Paper 8958-1

Fiorenzo G. Omenetto, Tufts Univ. (USA), et al.



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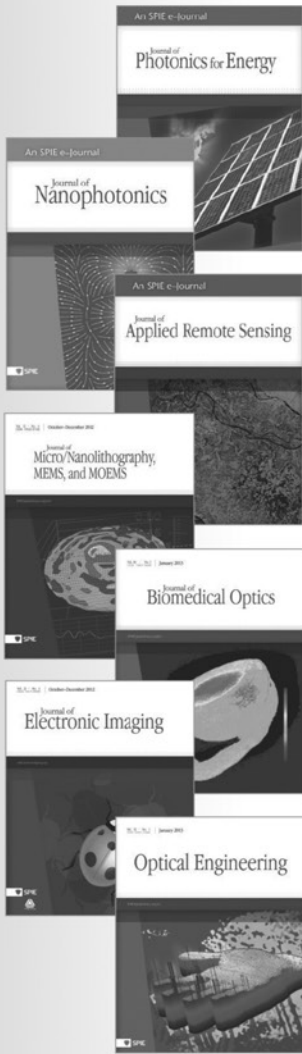
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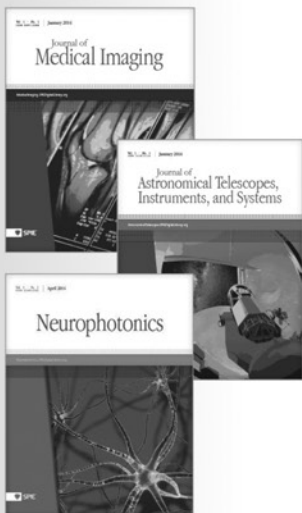
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LASE

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Laser Source Engineering

Program Chair: **Gregory J. Quarles**, Optoelectronics Management Network (USA)

8959	Solid State Lasers XXIII: Technology and Devices (Clarkson, Shori)	194
8960	Laser Resonators, Microresonators, and Beam Control XVI (Kudryashov, Paxton, Ilchenko, Aschke, Washio)	198
8961	Fiber Lasers XI: Technology, Systems, and Applications (Ramachandran, Shaw)	202
8962	High Energy/Average Power Lasers and Intense Beam Applications VIII (Davis, Heaven, Schriempf)	208
8963	High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III (Dorsch)	210

Nonlinear Optics

8964	Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIII (Vodopyanov, Kalisky)	213
8983	Organic Photonic Materials and Devices XVI (Tabor, Kajzar, Kaino, Koike)	272
8984	Ultrafast Phenomena and Nanophotonics XVIII (Betz, Elezzabi, Song, Tsen)	275

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, session chairs, and authors who have so generously given their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

8965	High-Power Diode Laser Technology and Applications XII (Zediker)	217
8966	Vertical External Cavity Surface Emitting Lasers (VECSELs) IV (Moloney)	220
8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç, Piprek, Yoon, Fujioka)	281
9001	Vertical-Cavity Surface-Emitting Lasers XVIII (Gunter, Le)	329
9002	Novel In-Plane Semiconductor Lasers XIII (Belyanin, Smowton)	330
9003	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII (Streubel, Jeon, Tu)	333

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA) and **Alberto Piqué**, U.S. Naval Research Lab. (USA)

8967	Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	222
8968	Laser-based Micro- and Nano-Processing VIII (Klotzbach, Washio, Arnold)	226
8969	Synthesis and Photonics of Nanoscale Materials XI (Geohegan, Träger, Dubowski)	229
8970	Laser 3D Manufacturing (Helvajian, Piqué, Wegener, Gu)	231
8973	Micromachining and Microfabrication Process Technology XIX (Maher, Resnick)	241
8974	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (von Freymann, Schoenfeld, Rumpf)	243
8975	Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII (Shea, Ramesham)	246

Laser Applications

8967	Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	222
8971	Free-Space Laser Communication and Atmospheric Propagation XXVI (Hemmati, Boroson)	233
8972	Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XIV (Heisterkamp, Herman, Meunier, Nolte)	235
8999	Complex Light and Optical Forces VIII (Andrews, Galvez, Glückstad, Soskin)	324
9000	Laser Refrigeration of Solids VII (Epstein, Seletskiy, Sheik-Bahae)	327

LASE

LASE Daily Conference Schedule

LASE The science and the sources of all types of lasers and their applications.

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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LASE Poster Session
6:00 to 8:00 pm

LASE Plenary Session
10:20 am to 12:30 pm

Laser Source Engineering

Program Chair: **Gregory J. Quarles**, Optoelectronics Management Network (USA)

8959 **Solid State Lasers XXIII: Technology and Devices** (Clarkson, Shori)

8960 **Laser Resonators, Microresonators, and Beam Control XVI** (Kudryashov, Paxton, Ilchenko, Aschke, Washio)

8961 **Fiber Lasers XI: Technology, Systems, and Applications** (Ramachandran, Shaw)

8962 **High Energy/Average Power Lasers and Intense Beam Applications VIII** (Davis, Heaven, Schriempf)

8963 **High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III** (Dorsch)

Nonlinear Optics

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8965 **High-Power Diode Laser Technology and Applications XII** (Zediker)

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8986 **Gallium Nitride Materials and Devices IX** (Chyi, Nanishi, Morkoç, Piprek, Yoon, Fujioka)

9002 **Novel In-Plane Semiconductor Lasers XIII** (Belyanin, Smowton)

8980 **Physics and Simulation of Optoelectronic Devices XXII** (Witzigmann, Osinski, Henneberger, Arakawa)

9003 **Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII** (Streubel, Jeon, Tu)

LASE Daily Conference Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
			LASE Poster Session 6:00 to 8:00 pm	LASE Plenary Session 10:20 am to 12:30 pm	

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian**, The Aerospace Corp. (USA) and **Alberto Piqué**, U.S. Naval Research Lab. (USA)

8967 Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	
8969 Synthesis and Photonics of Nanoscale Materials XI (Geohegan, Träger, Dubowski)	8968 Laser-based Micro- and Nano-Processing VIII (Klotzbach, Washio, Arnold)
8974 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (von Freymann, Schoenfeld, Rumpf)	
8975 Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII (Shea, Ramesham)	8970 Laser 3D Manufacturing (Helvajian, Piqué, Wegener, Gu)
	8973 Micromachining and Microfabrication Process Technology XIX (Maher, Resnick)

Laser Applications

8971 Free-Space Laser Communication and Atmospheric Propagation XXVI (Hemmati, Boroson)	8999 Complex Light and Optical Forces VIII (Andrews, Galvez, Glückstad, Soskin)
8972 Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications XIV (Heisterkamp, Herman, Meunier, Nolte)	
8967 Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (Nakata, Xu, Roth, Neuenschwander)	
	9000 Laser Refrigeration of Solids VII (Epstein, Seletskiy, Sheik-Bahae)

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LASE

Solid State Lasers XXIII: Technology and Devices

Conference Chairs: **W. Andrew Clarkson**, Univ. of Southampton (United Kingdom); **Ramesh K. Shori**, Naval Air Warfare Ctr. Weapons Div. (USA)

Program Committee: **Patrick A. Berry**, Air Force Research Lab. (USA); **Marc Eichhorn**, Institut Franco-Allemand de Recherches de Saint-Louis (France); **Dennis G. Harris**, MIT Lincoln Lab. (USA); **Norman Hodgson**, Coherent, Inc. (USA); **Helena Jelinková**, Czech Technical Univ. in Prague (Czech Republic); **Christian Kränkel**, Univ. Hamburg (Germany); **Jacob I. Mackenzie**, Univ. of Southampton (United Kingdom); **Markus Pollnau**, Univ. Twente (Netherlands); **Narasimha S. Prasad**, NASA Langley Research Ctr. (USA); **David H. Titterton**, Defence Science and Technology Lab. (United Kingdom)

Sunday 2 February

SESSION 1

Location: Room 132 (Exhibit Level) . . Sun 8:30 am to 10:30 am

Single Crystal Fiber/Waveguide Lasers I

Session Chair: **Ramesh K. Shori**,
Naval Air Warfare Ctr. Weapons Div. (USA)

8:30 am: **Single-crystal fiber optics: a review** (*Invited Paper*),
James A. Harrington, Rutgers, The State Univ. of New Jersey (USA) . . . [8959-1]

9:00 am: **Coilable single crystals fibers of doped-YAG for high power fiber laser applications** (*Invited Paper*), Gisele Maxwell, Bennett Ponting, Nazila Soleimani, Eminet Gebremichael, Shasta Crystals (USA) . . . [8959-2]

9:30 am: **Cladded single crystal fiber for high power lasers** (*Invited Paper*),
Brandon Shaw, U.S. Naval Research Lab. (USA) . . . [8959-3]

10:00 am: **Yb:YAG single crystal fiber image amplifier** (*Invited Paper*), Jian Liu, Peng Wan, Lih-Mei Yang, Shuang Bai, PolarOnyx, Inc. (USA) . . . [8959-4]

Coffee Break Sun 10:30 am to 11:00 am

SESSION 2

Location: Room 132 (Exhibit Level) . Sun 11:00 am to 11:30 am

Single Crystal Fiber/Waveguide Lasers II

Session Chair: **Ramesh K. Shori**,
Naval Air Warfare Ctr. Weapons Div. (USA)

11:00 am: **Double clad YAG crystalline fiber waveguides for diode pumped high power lasing** (*Invited Paper*), Xiaodong Mu, Stephanie Meissner, Helmuth E. Meissner, Onyx Optics Inc. (USA); Anthony W. Yu, NASA Goddard Space Flight Ctr. (USA) . . . [8959-5]

Lunch Break Sun 11:30 am to 1:00 pm

SESSION 3

Location: Room 132 (Exhibit Level) . . . Sun 1:00 pm to 3:00 pm

Eye Safe and Mid-IR Lasers I

Session Chair: **Patrick A. Berry**, Air Force Research Lab. (USA)

1:00 pm: **Increased efficiency of Er:YAG lasers at 1645 nm using narrow bandwidth diode lasers and dual-wavelength resonant pumping**, Haro Fritsche, Oliver Lux, Casey Schuett, Technische Univ. Berlin (Germany); Stefan W. Heinemann, Marcus Dziedzina, Wolfgang Gries, DirectPhotonics Industries GmbH (Germany); Hans Joachim Eichler, Technische Univ. Berlin (Germany) . . . [8959-7]

1:20 pm: **High-brightness monolithic diode-pumped Er:YAG laser system at 2.94 μm with 400W peak power**, Maximilian Harlander, Arne Heinrich, Clemens Hagen, Bernhard Nussbaumer, Pantec Engineering AG (Liechtenstein) . . [8959-8]

1:40 pm: **Diode-pumped and passively Q-switched Er:YAG laser emitting at 1617 nm**, Adrien Aubourg, Lab. Charles Fabry (France); Julien Didierjean, Nicolas Aubry, FiberCryst (France); François Balembos, Patrick Georges, Lab. Charles Fabry (France) . . . [8959-9]

2:00 pm: **Ho:YAG laser resonantly-pumped by a 1126-nm Yb-fiber laser**, Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation); Alexei Lagutchev, Purdue Univ. (USA); Evgeny G. Gerasimov, VOSPI Ctr. (Russian Federation); Andrey A. Machnev, Pavel B. Novozhylov, National Research Univ. of Electronic Technology (Russian Federation) . . . [8959-10]

2:20 pm: **Ultra-high-gain 2- μm amplifiers: single-frequency or broadband**, Alex Y. Dergachev, Q-Peak Inc. (USA) . . . [8959-11]

2:40 pm: **Tuneable mid-infrared diamond Raman laser**, Alexander Sabella, Defence Science and Technology Organisation (Australia) and Macquarie Univ. (Australia); James Piper, Richard P. Mildren, Macquarie Univ. (Australia) [8959-12]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 4

Location: Room 132 (Exhibit Level) . . . Sun 3:30 pm to 4:50 pm

Eye Safe and Mid-IR Lasers II

Session Chair: **Patrick A. Berry**, Air Force Research Lab. (USA)

3:30 pm: **Comparison of Er:YAG and Er:Y₂O₃ for lasing at near-3-micron wavelength**, John Vetovec, Drew A. Copeland, Amardeep S. Litt, Aqwest, LLC (USA) . . . [8959-13]

3:50 pm: **Polycrystalline Cr:ZnSe laser pumped by efficient Tm:YLF laser**, Lukasz F. Gorajek, Jan K. Jabczynski, Military Univ. of Technology (Poland) . . . [8959-14]

4:10 pm: **Spectroscopy and mid-IR lasing of Cr²⁺ ions in ZnSe/ZnS crystals under visible excitation**, Jeremy M. Peppers, Tetyana Konak, Dmitry V. Martyshkin, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) . . . [8959-15]

4:30 pm: **Single-frequency operation of a resonantly pumped 1.645 μm Er:YAG Q-switched laser**, Ran Wang, Qing Ye, Chunqing Gao, Beijing Institute of Technology (China) . . . [8959-16]

SESSION 5

Location: Room 132 (Exhibit Level) . . . Sun 4:50 pm to 6:10 pm

Airborne and Space Qualified Lasers

Session Chair: **Narasimha S. Prasad**,
NASA Langley Research Ctr. (USA)

4:50 pm: **Feasibility and performance study for a space-borne 1645 nm OPO for French-German satellite mission MERLIN**, Marie J. Livrozet, Florian Elsen, Jochen Wüppen, Jens Löhring, Fraunhofer-Institut für Lasertechnik (Germany); Christian Büdenbender, Andreas Fix, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Bernd Jungbluth, Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) . . . [8959-17]

5:10 pm: **In-space performance of the Mercury Laser Altimeter (MLA) laser transmitter**, Anthony W. Yu, Xiaoli Sun, Steven X. Li, NASA Goddard Space Flight Ctr. (USA) . . . [8959-18]

5:30 pm: **Self-Raman Nd:VO₄ laser and electro-optic technology for space-based sodium lidar instrument**, Michael A. Krainak, Anthony W. Yu, Diego Janches, Sarah L. Jones, Branimir Blagojevic, NASA Goddard Space Flight Ctr. (USA) . . . [8959-19]

5:50 pm: **INNOSLAB-based single-frequency MOPA for airborne lidar detection of CO₂ and methane**, Jens Löhring, Jörg Luttmann, Raphael Kasemann, Michael Schösser, Jürgen Klein, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany); Axel Amediek, Christian Büdenbender, Andreas Fix, Martin Wirth, Mathieu Quatrevalet, Gerhard Ehret, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . [8959-20]

Monday 3 February

SESSION 6

Location: Room 132 (Exhibit Level) . Mon 8:00 am to 10:00 am

Visible and UV Lasers

Session Chair: **Narasimha S. Prasad,**
NASA Langley Research Ctr. (USA)

8:00 am: **Narrow linewidth 257 nm nanosecond laser source based on hybrid MOPA,** Xavier Délen, Loic Deyra, Lab. Charles Fabry (France); Aurelien Benoit, EOLITE Systems (France); Marc Hanna, François Balembois, Lab. Charles Fabry (France); Benjamin Cocquelin, Damien Sangla, François Salin, EOLITE Systems (France); Julien Didierjean, FiberCryst (France); Patrick Georges, Lab. Charles Fabry (France)[8959-21]

8:20 am: **High-power UV from a thin-disk laser system,** Sven M. Joosten, Ronald Busch, Stefan Marzenell, TRUMPF Laser Marking Systems AG (Switzerland); Dirk H. Sutter, TRUMPF Laser GmbH & Co. KG (Germany); Carsten Ziolk, TRUMPF Laser Marking Systems AG (Switzerland)[8959-22]

8:40 am: **>220W output power at 355nm from a Q-switched diode-pumped solid-state laser,** Young Key Kwon, Nerijus Slavinskis, Nick Hay, Powerlase Photonics Ltd. (United Kingdom)[8959-23]

9:00 am: **180W at 1kHz, 532nm SHG from LBO crystals using Nd:YAG laser for material processing,** Yoshinori Tamaoki, Yoshinori Kato, Koichi Iyama, Toshiyuki Kawashima, Hamamatsu Photonics K.K. (Japan); Noriaki Miyanaaga, Osaka Univ. (Japan)[8959-24]

9:20 am: **Multi-kW IR and green nanosecond thin-disk lasers,** Christian Stolzenburg, Wolfgang Schüle, Tina Gottwald, Veit Angrick, Montasser Bouzid, Vincent Kuhn, Sven-Silvius Schad, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany)[8959-25]

9:40 am: **High-energy picosecond light source based on cryogenically conduction cooled Yb-doped laser amplifier,** Pawel Sikocinski, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Taisuke Miura, Jambunathan Venkatesan, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Michal Chyla, Patricie Severová, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Akira Endo, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[8959-26]

Coffee BreakMon 10:00 am to 10:30 am

SESSION 7

Location: Room 132 (Exhibit Level) Mon 10:30 am to 12:20 pm

Disk Lasers

Session Chair: **W. Andrew Clarkson,**
Univ. of Southampton (United Kingdom)

10:30 am: **400W Nd:YAG composite ceramic thin-disc laser in 10ns pulse at 167kHz,** Koichi Iyama, Osaka Univ. (Japan) and ALPROT (Japan) and Hamamatsu Photonics K.K. (Japan); Hiroyuki Furukawa, Haik Chosrowjan, Toshimitsu Sakurai, ALPROT (Japan) and Institute for Laser Technology (Japan); Koji Tsubakimoto, Hidetsugu Yoshida, Hisanori Fujita, Osaka Univ. (Japan); Masayuki Fujita, ALPROT (Japan) and Institute for Laser Technology (Japan); Noriaki Miyanaaga, Osaka Univ. (Japan); Yoshinori Tamaoki, Yoshinori Kato, Toshiyuki Kawashima, ALPROT (Japan) and Hamamatsu Photonics K.K. (Japan)[8959-27]

10:50 am: **Development of high-purity single-crystal diamond for optical components in thin-disk systems,** Andrew M. Bennett, Benjamin J. Wickham, Element Six Ltd. (United Kingdom)[8959-28]

11:10 am: **50-mJ, 1-kHz Yb:YAG thin-disk regenerative amplifier with 969-nm pulsed pumping,** Michal Chyla, Taisuke Miura, Martin Smrz, Ondrej Novák, Patricie Severová, Akira Endo, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[8959-29]

11:30 am: **Green sub-ps laser exceeding 400 W of average power,** Bastian Gronloh, Peter Russbuehldt, Bernd Jungbluth, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany)[8959-30]

11:50 am: **Near fundamental mode high-power thin-disk laser (Invited Paper),** Sven-Silvius Schad, Tina Gottwald, Vincent Kuhn, TRUMPF Laser GmbH & Co. KG (Germany); Viorel Negoita, TRUMPF Photonics (USA); Alexander Killi, Klaus Wallmeroth, TRUMPF Laser GmbH & Co. KG (Germany)[8959-31]

Lunch Break Mon 12:20 pm to 1:40 pm

SESSION 8

Location: Room 132 (Exhibit Level) . . Mon 1:40 pm to 3:00 pm

High Power CW and Pulsed Lasers I

Session Chair: **Dennis G. Harris,** MIT Lincoln Lab. (USA)

1:40 pm: **200W output power at 10ps from a scalable Z-slab Nd:YAG laser,** Young Key Kwon, Simon P. Chard, Nick Hay, Powerlase Photonics Ltd. (United Kingdom)[8959-32]

2:00 pm: **High-average power diode-pumped Nd:glass laser amplifiers,** Jay Doster, Faming Xu, Ryan Feeler, Northrop Grumman Cutting Edge Optronics (USA)[8959-34]

2:20 pm: **Front-end for ELI-Beamlines' 100J cryogenically-cooled Yb:YAG multi-slab amplifier with temporal pulse shaping capability,** Jonathan T. Green, Jack A. Naylor, Tomas Mazanec, Martin Horacek, Pavel Bakule, Bedrich Rus, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[8959-35]

2:40 pm: **High-pulse-energy mode-locked picosecond oscillator,** Yang Chao, Meng Chen, Gang Li, Beijing Univ. of Technology (China)[8959-36]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 9

Location: Room 132 (Exhibit Level) . . Mon 3:30 pm to 4:30 pm

High Power CW and Pulsed Lasers II

Session Chair: **Dennis G. Harris,** MIT Lincoln Lab. (USA)

3:30 pm: **High single-pulse energy, passively Q-switched Nd:YAG laser for defence applications,** Marc W. Smillie, Mark Silver, Stephen T. Lee, Trevor J. Cook, Thales Optronics Ltd. (United Kingdom)[8959-37]

3:50 pm: **Compact nanosecond pulsed single stage Yb-doped fiber amplifier,** Enkeleda Balliu, Magnus Engholm, Mid Sweden Univ. (Sweden); Jonas Hellström, Gunnar Elgcróna, Håkan Karlsson, Cobolt AB (Sweden)[8959-38]

4:10 pm: **A 1 Joule, 10ns, 110Hz, 1064nm laser using standard components,** Jay Doster, Faming Xu, Ryan Feeler, Northrop Grumman Cutting Edge Optronics (USA)[8959-39]

SESSION 10

Location: Room 132 (Exhibit Level) . . Mon 4:30 pm to 6:10 pm

Ultrafast Lasers I

Session Chair: **Jacob I. Mackenzie,**
Univ. of Southampton (United Kingdom)

4:30 pm: **Near- infrared, mode-locked waveguide lasers with multi-GHz repetition rates,** Amol Choudhary, Univ. of Southampton (United Kingdom); Alexander A. Lagatsky, Univ. of St. Andrews (United Kingdom); Ziyang Y. Zhang, Kejia J. Zhou, Q. Wang, Richard A. Hogg, The Univ. of Sheffield (United Kingdom); Pradeesh Kannan, Univ. of Southampton (United Kingdom); Edik U. Rafailov, Univ. of Dundee (United Kingdom); Wilson Sibbett, The Univ. of Sheffield (United Kingdom); Christian T. A. Brown, Univ. of St. Andrews (United Kingdom); David P. Shepherd, Univ. of Southampton (United Kingdom) .[8959-40]

4:50 pm: **28 W, 217-fs regenerative bulk amplifier based on Yb:CAIGdO₄,** Matthias Kemnitzer, High Q Laser, a Newport Corp. Brand (Austria); Etienne Caracciolo, Univ. degli Studi di Pavia (Italy); Annalisa Guandalini, High Q Laser, a Newport Corp. Brand (Austria); Federico Pirzio, Univ. degli Studi di Pavia (Italy); Juerg Aus-der-Au, High Q Laser, a Newport Corp. Brand (Austria); Antonio Agnesi, Univ. degli Studi di Pavia (Italy)[8959-41]

5:10 pm: **Megawatt peak power level sub-100 fs Yb:KGW oscillator,** Haitao Zhao, Arkady Major, Univ. of Manitoba (Canada)[8959-42]

5:30 pm: **Femtosecond Innoslab amplifier with 300W average power and pulse energies in the mJ-regime,** Torsten G. Mans, Roswitha Graf, Jan Dolkemeyer, Claus Schnitzler, AMPHOS GmbH (Germany)[8959-43]

5:50 pm: **Jitter-compensated Yb:YAG thin-disc laser as a pump for the broadband OPCPA front-end of the ELI-Beamlines system,** Roman Antipenkov, Jonathan T. Green, Frantisek Batysta, Jack A. Naylor, Charalampos Zervos, Jakub Novák, Pavel Bakule, Bedrich Rus, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[8959-44]



Tuesday 4 February

SESSION 11

Location: Room 132 (Exhibit Level) . . Tue 8:30 am to 10:10 am

Ultrafast Lasers II

Session Chair: **Jacob I. Mackenzie**,
Univ. of Southampton (United Kingdom)

8:30 am: **Picosecond DPSS laser technology for OPCPA pumping**,
Andreas Vaupel, Nathan Bodnar, Benjamin Webb, Lawrence Shah,
Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of
Central Florida (USA) [8959-45]

8:50 am: **All-fiber concept for ultrashort pulses from a passively Q-switched Nd:YVO₄ microchip laser**, Reinhold Lehneis, Alexander Steinmetz, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8959-46]

9:10 am: **Femtosecond Cr:ZnS laser at 2.37 μm mode-locked by carbon nanotubes**, Nikolai Tolstik, Norwegian Univ. of Science and Technology (Norway); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland); Evgeni Sorokin, Technische Univ. Wien (Austria); Irina T. Sorokina, Norwegian Univ. of Science and Technology (Norway) [8959-47]

9:30 am: **High-power directly diode-pumped femtosecond Yb:KGW lasers with optimized parameters**, Guang-Hoon Kim, Juhee Yang, S. A. Chizhov, E. G. Sall, A. V. Kulik, V. E. Yashin, Uk-Song Kang, Korea Electrotechnology Research Institute (Korea, Republic of) [8959-48]

9:50 am: **Compact thin-disk picosecond regenerative amplifier at 1 kHz with VBG compressor**, Jakub Novák, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Pavel Bakule, Jonathan T. Green, Petr Hříbek, Bedrich Rus, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8959-49]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 12

Location: Room 132 (Exhibit Level) . Tue 10:40 am to 12:20 pm

Novel Concepts I

Session Chair: **David H. Titterton**,
Defence Science and Technology Lab. (United Kingdom)

10:40 am: **Modeling of a CW Nd:YVO₄ laser longitudinally pumped by high power VCSEL modules at 808 nm**, Arkady Major, Ehsan Alimohammadian, Univ. of Manitoba (Canada) [8959-50]

11:00 am: **Resonator free Er-Yb laser based on photo-thermo-refractive (PTR) glass**, Sergey Ivanov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [8959-51]

11:20 am: **Single-frequency, fully integrated, miniature DPSS laser based on monolithic resonator**, Grzegorz Dudzik, Jaroslaw Z. Sotor, Karol Krzempek, Grzegorz J. Sobon, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) [8959-52]

11:40 am: **Broadly tunable, longitudinally diode-pumped Alexandrite laser**, Michael Strotkamp, Ulrich Witte, Alexander Munk, Andrea Hartung, Stefan Gausmann, Stefan Hengesbach, Martin Traub, Fraunhofer-Institut für Lasertechnik (Germany); Josef Höffner, Leibniz-Institut für Atmosphärenphysik e.V. (Germany); Hans-Dieter Hoffmann, Bernd Jungbluth, Fraunhofer-Institut für Lasertechnik (Germany) [8959-53]

12:00 pm: **Novel design of compact solid state resonators by way of volume Bragg gratings**, Brian Anderson, George B. Venus, Daniel Ott, Ivan B. Divliansky, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8959-54]

Lunch/Exhibition Break Tue 12:20 pm to 1:40 pm

SESSION 13

Location: Room 132 (Exhibit Level) . . . Tue 1:40 pm to 3:00 pm

Novel Concepts II

Session Chair: **David H. Titterton**,
Defence Science and Technology Lab. (United Kingdom)

1:40 pm: **100W Nd:YAG rotating cavity laser**, Matthew Eckold, Jacob I. Mackenzie, W. Andrew Clarkson, Univ. of Southampton (United Kingdom) [8959-55]

2:00 pm: **Development of Nd,Cr co-doped laser materials for solar-pumped lasers**, Takayo Ogawa, Satoshi Wada, RIKEN (Japan); Mikio Higuchi, Hokkaido Univ. (Japan) [8959-56]

2:20 pm: **Yb:CaGdAlO₄ laser under high pumping power: high performances and singularities**, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Frédéric Druon, M. Olivier, François Balembois, Patrick Georges, Lab. Charles Fabry (France) and Univ. Paris Sud (France); Nicolas Aubry, Julien Didierjean, FiberCryst (France); Anael Jaffres, Pascal Loiseau, Ecole Nationale Supérieure de Chimie de Paris (France) [8959-57]

2:40 pm: **Antireflective surface structures on optics for high-energy lasers**, Lynda E. Busse, U.S. Naval Research Lab. (USA); Catalin M. Florea, Sotera Defense Solutions, Inc. (USA); Leslie B. Shaw, Shyam S. Bayya, U.S. Naval Research Lab. (USA); Menelaos K. Poutous, Ishwar D. Aggarwal, The Univ. of North Carolina at Charlotte (USA); Jasbinder S. Sanghera, U.S. Naval Research Lab. (USA) [8959-58]

Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 14

Location: Room 132 (Exhibit Level) . . . Tue 3:30 pm to 6:10 pm

Laser Material and Characterization

Session Chair: **Helena Jelinková**,
Czech Technical Univ. in Prague (Czech Republic)

3:30 pm: **Insights into the anisotropic optical properties of monoclinic Yb-doped borate laser crystals**, Yannick G. Petit, Véronique Jubera, Marie Chavoutier, Hassan Ajrouche, Institut de Chimie de la Matière Condensée de Bordeaux (France); Arthur Le Camus, Univ. Bordeaux 1 (France) and Ctr. National de la Recherche Scientifique (France); Alain Garcia, O. Viraphong, Philippe Veber, Institut de Chimie de la Matière Condensée de Bordeaux (France); Bertrand Ménaert, Patricia Segonds, Institut NÉEL (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Joseph Fourier (France); Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Lionel S. Canioni, Inka B. Manek-Hönninger, Univ. Bordeaux 1 (France) and Ctr. National de la Recherche Scientifique (France) [8959-59]

3:50 pm: **Optic axes dispersion in double tungstate crystals and laser operation at 2 μm**, Romain Cattour, Univ. Bordeaux 1 (France) and French-German Research Institute of Saint-Louis (ISL) (France); Inka B. Manek-Hönninger, Marc Tondusson, Univ. Bordeaux 1 (France); Philippe Veber, Institut de Chimie de la Matière Condensée de Bordeaux (France); Todor K. Kalkandjiev, Conerefringent optics SL (Spain); Daniel Rytz, FEE GmbH (Germany); Lionel S. Canioni, Univ. Bordeaux 1 (France); Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) [8959-60]

4:10 pm: **Abnormal beam-profile behavior in the Nd:YAG ceramic regenerative amplifier**, Andrey V. Okishev, Univ. of Rochester (USA) . . [8959-61]

4:30 pm: **Spectroscopic characterization and energy transfer process in cobalt and cobalt-iron co-doped ZnSe/ZnS crystals**, Jeremy M. Peppers, Dmitry V. Martyshkin, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) [8959-62]

4:50 pm: **Spectroscopic characterization of Fe²⁺-doped II-VI ternary and quaternary mid-IR laser active powders**, Alan D. Martinez, Dmitry V. Martyshkin, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) [8959-63]

5:10 pm: **Spectroscopic characterization of laser properties: isolating the best methods for accurate measurements and calculations**, Simi A. George, Joseph S. Hayden, SCHOTT North America, Inc. (USA) [8959-64]

5:30 pm: **Simulation of birefringence in laser crystals**, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) and ASLD GmbH (Germany); Thomas Graupeter, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8959-65]

5:50 pm: **Spectroscopic properties of Pr-doped PbCl₂ for eye-safe 1.6μm laser applications**, Ivy K. Jones, Uwe H. Hömmerich, EIEI Brown, Hampton Univ. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA) [8959-66]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Optical path difference of slanted edge diode-pumped Yb:YAG/YAG thin-disk laser, Hamed Aminpour, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8959-67]

Solid funnel for diode-pumped high power Nd:YAG slab amplifier, Jonghoon Yi, Yoonho Lee, Yeungnam Univ. (Korea, Republic of); Hyeon Cheor Lee, Doosan DST Co., Ltd. (Korea, Republic of); Soo Sang Lee, Doosan Infracore Co., Ltd. (Korea, Republic of); Jung Hwan Lee, Agency for Defense Development (Korea, Republic of) [8959-68]

DPSS MOPA laser system generating 300 mJ with one nanosecond pulse, Frank F. Wu, Irvine Photonic Systems (USA) [8959-69]

A high-peak power, low-jitter, single-frequency, eyesafe laser: a concept design, Frank F. Wu, Irvine Photonic Systems (USA) [8959-70]

Self-adaptive, passively Q-switched, diode-side-pumped Nd:YAG slab laser, Mateusz Kaskow, Waldemar Zendzian, Lukasz F. Gorajek, Jan K. Jabczynski, Jacek Kwiatkowski, Military Univ. of Technology (Poland) [8959-71]

Multiline possibility of Nd:YAlO₃ laser in spectral range 1.3-1.5 μm, Michal Nemeč, Martin Fibrich, Jan Sulc, Tomas Hambalek, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic) [8959-72]

Spectroscopic and lasing properties of Pr:YAlO₃ material at cryogenic temperature, Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Jan Sulc, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic) [8959-73]

Measurement of thermal effects in solid-state laser gain medium by digital holography, Xiaoyuan Peng, Enlight Technologies, Inc. (USA); Yang Yu, Weijuan Qu, Chee Yuen Cheng, Saw Soon Yong, Yong Poo Chia, Ngee Ann Polytechnic (Singapore) [8959-74]

Zero-phonon-line pumped 100-kHz Yb:YAG thin disk regenerative amplifier, Taisuke Miura, Martin Smrz, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Siva Sankar Nagisetty, Czech Technical Univ. in Prague (Czech Republic) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Ondrej Novák, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Michal Chyla, Patricie Severová, Czech Technical Univ. in Prague (Czech Republic) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Akira Endo, Tomás Moček, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8959-75]

Operation of multi-passed Yb:YAG laser with edge-pumped disks, John Vetrovec, Drew A. Copeland, Amardeep S. Litt, Aqwest, LLC (USA); Detao Du, General Atomics Aeronautical Systems, Inc. (USA) [8959-76]

Diode pumped tunable lasers based on Tm:CaF₂ and Tm:Ho:CaF₂ ceramics, Jan Sulc, Michal Nemeč, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Maxim E. Doroshenko, Pavel P. Fedorov, Vyacheslav V. Osiko, A. M. Prokhorov General Physics Institute (Russian Federation) [8959-77]

Gain-switched Fe:ZnMgSe laser oscillation under cryogenic temperature, Helena Jelinková, Czech Technical Univ. in Prague (Czech Republic); Maxim E. Doroshenko, A. M. Prokhorov General Physics Institute (Russian Federation); Michal Nemeč, Jan Sulc, Michal Jelínek M.D., David Vyhřídál M.D., Václav Kubeček, Czech Technical Univ. in Prague (Czech Republic); Yuri A. Zagoruiko, Nazar O. Kovalenko, A. S. Gerasimenko, Vyacheslav M. Puzikov, Vitaliy K. Komar, Institute for Single Crystals (Ukraine) [8959-78]

Spectroscopic studies of Er³⁺ emission in co-doped phosphate glasses, Simi A. George, SCHOTT North America, Inc. (USA) [8959-79]

Multi-annular channel liquid cooled Nd:YAG thin disk laser medium, Jian Mu, Guoying Feng, Huomu Yang, Shouhuan Zhou, Sichuan Univ. (China) . . . [8959-80]



Laser Resonators, Microresonators, and Beam Control XVI

Conference Chairs: **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation); **Alan H. Paxton**, Air Force Research Lab. (USA); **Vladimir S. Ilchenko**, OEwaves, Inc. (USA)

Conference Co-Chairs: **Lutz Aschke**, LIMO Lissotschenko Mikrooptik GmbH (Germany); **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

Program Committee: **Andrea M. Armani**, The Univ. of Southern California (USA); **Yanne K. Chembo**, FEMTO-ST (France); **Jean-Claude M. Diels**, The Univ. of New Mexico (USA); **Hans Joachim Eichler**, Laser- und Medizin-Technologie GmbH, Berlin (Germany); **Andrew Forbes**, CSIR National Laser Ctr. (South Africa); **Pierre Galarnau**, INO (Canada); **Thomas Graf**, Univ. Stuttgart (Germany); **Tobias J. Kippenberg**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **James R. Leger**, Univ. of Minnesota, Twin Cities (USA); **Andrey B. Matsko**, OEwaves, Inc. (USA); **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy); **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Michelle L. Povinelli**, The Univ. of Southern California (USA); **Michael J. Scaggs**, Neoteric Concepts, LLC (USA); **Lan Yang**, Washington Univ. in St. Louis (USA)

Monday 3 February

SESSION 1

Location: Room 124 (Exhibit Level) . Mon 8:00 am to 10:05 am

Microcavity Combs

Session Chair: **Vladimir S. Ilchenko**, OEwaves, Inc. (USA)

8:00 am: **Nonlinear dynamics of comb generation in optical microresonators** (*Invited Paper*), Tobias Hansson, Daniele Modotto, Stefano Wabnitz, Univ. degli Studi di Brescia (Italy) [8960-1]

8:25 am: **Chip-scale ultrafast solitons and frequency comb mode-locking** (*Invited Paper*), Chee Wei Wong, Shu-Wei Huang, Columbia Univ. (USA); Sylvain Combrié, Thales Research & Technology (France); Pierre Colman, DTU Fotonik (Denmark); Alfredo De Rossi, Technical Univ. of Denmark (France); Chad A. Husko, The Univ. of Sydney (Australia); Lute Maleki, Andrey B. Matsko, OEwaves, Inc. (USA); James F. McMillan, Jinghui Yang, Heng Zhou, Columbia Univ. (USA) [8960-2]

8:50 am: **Two-cycle pulse generation from mode-locked Kerr frequency combs based on an integrated dispersion-flattened micro-resonator** (*Invited Paper*), Lin Zhang, Anuradha M. Agarwal, Lionel C. Kimerling, Jurgen Michel, Massachusetts Institute of Technology (USA) [8960-3]

9:15 am: **Kerr comb generation from the perspective of spatial dissipative structures** (*Invited Paper*), Aurélien Collet, Irina Balakireva, Khalidoun Saleh, Rémi Henriët, Laurent Larger, Yanne K. Chembo, FEMTO-ST (France) . . . [8960-4]

9:40 am: **Microresonator Kerr frequency combs: mean-field model and temporal cavity solitons** (*Invited Paper*), Stephane Coen, The Univ. of Auckland (New Zealand) [8960-5]

Coffee Break Mon 10:05 am to 10:25 am

SESSION 2

Location: Room 124 (Exhibit Level) Mon 10:25 am to 12:00 pm

Nonlinear Optics with Microcavities

Session Chair: **Andrey B. Matsko**, OEwaves, Inc. (USA)

10:25 am: **Non-Lorentzian pump resonances in whispering gallery optical parametric oscillators**, Ingo Breunig, Anni Bückle, Christoph S. Werner, Albert-Ludwigs-Univ. Freiburg (Germany); Karsten Buse, Albert-Ludwigs-Univ. Freiburg (Germany) and Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8960-6]

10:45 am: **Multicolour emission in silica whispering gallery mode microspherical resonators** (*Invited Paper*), Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy); Daniele Farnesi, Museo Storica della Fisica e Ctr Studi e Ricerche Enrico Fermi (Italy); Andrea Barucci, Simone Berneschi, Istituto di Fisica Applicata Nello Carrara (Italy); Giancarlo C. Righini, Museo Storica della Fisica e Ctr Studi e Ricerche Enrico Fermi (Italy); Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy) [8960-7]

11:10 am: **Quantum correlations in silicon nitride cavities** (*Invited Paper*), Michal F. Lipson, Cornell Univ. (USA) [8960-8]

11:35 am: **Phase-matching and polarization in on- and off-axial uniaxial whispering gallery mode resonators** (*Invited Paper*), Harald G. L. Schwefel, Max-Planck-Institut für die Physik des Lichts (Germany) [8960-9]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 3

Location: Room 124 (Exhibit Level) . . Mon 1:30 pm to 3:00 pm

Microcavity Optomechanics

Session Chair: **Nan Yu**, Jet Propulsion Lab. (USA)

1:30 pm: **Brillouin cavity optomechanics with microfluidic devices** (*Invited Paper*), Gaurav Bahl, Univ. of Illinois at Urbana-Champaign (USA); Kyu H. Kim, Univ. of Michigan (USA); Kewen Han, Univ. of Illinois at Urbana-Champaign (USA); Wonsuk Lee, Jing Liu, Xudong Fan, Tal E. Carmon, Univ. of Michigan (USA) [8960-10]

1:55 pm: **Direct spectral and temporal control of the resonant optical propulsion of dielectric microspheres in evanescent fiber couplers**, Yangcheng Li, The Univ. of North Carolina at Charlotte (USA); Alexey V. Maslov, Univ. of Nizhni Novgorod (Russian Federation); Ana M. Jofre, Vasily N. Astratov, The Univ. of North Carolina at Charlotte (USA) [8960-11]

2:15 pm: **Resonant enhancement of optical forces associated with the excitation of whispering gallery modes in microparticles** (*Invited Paper*), Alexey V. Maslov, Michael I. Bakunov, Univ. of Nizhni Novgorod (Russian Federation); Yangcheng Li, Vasily N. Astratov, The Univ. of North Carolina at Charlotte (USA) [8960-12]

2:40 pm: **Flexible microresonators: lasing and sensing**, Handong Sun, Van Duong Ta, Rui Chen, Nanyang Technological Univ. (Singapore) . . . [8960-13]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 4

Location: Room 124 (Exhibit Level) . . Mon 3:30 pm to 5:20 pm

Microcavity Sensors I: General

Session Chair: **Lan Yang**, Washington Univ. in St. Louis (USA)

3:30 pm: **Challenges in resonant cavity biosensor design: collection efficiency and specificity** (*Invited Paper*), Andrea M. Armani, Simin Mehrabani, Victoria Sun, Samantha McBirney, Rasheeda M. Hawk, Eda Gungor, Michele Lee, The Univ. of Southern California (USA) [8960-14]

3:55 pm: **Detection of single nanoparticles and lentiviruses using microcavity mode broadening** (*Invited Paper*), Yun-Feng Xiao, Linbo Shao, Xue-Feng Jiang, Qihuang Gong, Peking Univ. (China); Frank Vollmer, Max-Planck-Institut für die Physik des Lichts (Germany) [8960-15]

4:20 pm: **Spherical optical microresonator array as a multi-purpose measuring device**, Thomas Weigel, Henrik Dobbstein, Cemal Esen, Gustav Schweiger, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) . [8960-16]

4:40 pm: **Optimization of whispering gallery modes in microbubble resonators for sensing applications**, Jonathan M. Ward, Yong Yang, Sile G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan) [8960-17]

5:00 pm: **Multi-layered resonators for improved electric field detection**, Tindaro Ioppolo, M. Volkan Ötügen, Southern Methodist Univ. (USA) . . [8960-18]

Tuesday 4 February

SESSION 5

Location: Room 124 (Exhibit Level) . . Tue 8:00 am to 10:15 am

Microcavity Sensors II: Biosensing and Plasmons

Session Chair: **Andrea M. Armani**,
The Univ. of Southern California (USA)

- 8:00 am: **Simplified hollow-core microstructural optical fiber laser with intense output and polarized radial emission**, Zhi-Li Li, Wen-Yuan Zhou, Yan-Ge Liu, Qing Ye, Min Yan, Jian-Guo Tian, Nankai Univ. (China)[8960-19]
- 8:20 am: **Multiphoton excitation of organic chromophores in microbubble capillary resonators**, Gregory A. Cohoon, Khanh Q. Kieu, Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA)[8960-20]
- 8:40 am: **High-Q plasmonic bottle microresonators**, Mohd Narizee Bin Mohd Nasir, Ming Ding, Senthil Murugan Ganapathy, Michalis N. Zervas, Univ. of Southampton (United Kingdom)[8960-21]
- 9:00 am: **Level-repulsion in hybrid photonic plasmonic resonators: enhancing WGM biosensing** (*Invited Paper*), Frank Vollmer, Matthew R. Foreman, Martin Baaske, Max-Planck-Institut für die Physik des Lichts (Germany)[8960-22]
- 9:25 am: **Interfacing whispering gallery mode microresonators for environmental biosensing** (*Invited Paper*), Heather K. Hunt, Jeremy L. Dahmen, Univ. of Missouri-Columbia (USA); Carol E. Soteropoulos, Univ. of Missouri (USA)[8960-23]
- 9:50 am: **Microcavity optics with high Q micro-bottle resonators** (*Invited Paper*), Lei Xu, Fudan Univ. (China)[8960-24]
- Coffee Break Tue 10:15 am to 10:45 am

SESSION 6

Location: Room 124 (Exhibit Level) . Tue 10:45 am to 12:10 pm

Microcavity Sensors III: Active Sensors

Session Chair: **Andrew Forbes**, CSIR National Laser Ctr. (South Africa)

- 10:45 am: **Recent explorations in whispering gallery microcavities for functional devices**, Sahin Kaya Ozdemir, Bo Peng, Jiangang Zhu, Faraz Monifi, Huzeyfe Yilmaz, Obi Kenchukwu, Steven H. Huang, Xu Yang, Lan Yang, Washington Univ. in St. Louis (USA)[8960-25]
- 11:05 am: **Real-time measurement of the dynamic response of a microresonator** (*Invited Paper*), Jong H. Chow, The Australian National Univ. (Australia); Malcolm B. Gray, National Measurement Institute of Australia (Australia)[8960-26]
- 11:30 am: **Low threshold gold nanorod plasmonic laser**, Ce Shi, Soheil Soltani, Andrea M. Armani, The Univ. of Southern California (USA)[8960-27]
- 11:50 am: **Heterodyning cavity-based microlasers to improve sensing performance**, Ashley J. Maker, Andrea M. Armani, The Univ. of Southern California (USA)[8960-28]
- Lunch/Exhibition Tue 12:10 pm to 1:40 pm

SESSION 7

Location: Room 124 (Exhibit Level) . . . Tue 1:40 pm to 3:20 pm

Beam Guiding, Shaping, and Analysis for High-Power Applications I

Joint Session with Conferences 8960 and 8963

Session Chair: **Friedhelm Dorsch**,
TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany)

- 1:40 pm: **Robust focusing optics for high-power laser welding**, Blake McAllister, Edison Welding Institute (USA)[8963-10]
- 2:00 pm: **Superior power handling in fiber optic cables for multi-kW lasers**, Mats Blomqvist, Ola I. Blomster, Optoskand AB (Sweden)[8963-11]
- 2:20 pm: **UV laser line for semiconductor surface processing**, Lisa Kleinschmidt, Vyacheslav Grimm, Mikhail M. Ivanenko, Alexei Krasnaberski, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikroskopik GmbH (Germany)[8960-29]
- 2:40 pm: **Beamshaping for high-power lasers using freeform refractive optics**, Roy McBride, Natalia Trela-McDonald, Matthew O. Currie, Duncan Walker, Howard J. Baker, PowerPhotonic, Ltd. (United Kingdom)[8963-12]
- 3:00 pm: **Industrial performance analysis of the fast axis collimator lens**, Martin Forrer, Hansruedi Moser, Dzelal Kura, Hans Forrer, FISBA OPTIK AG (Switzerland)[8963-13]
- Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 8

Location: Room 124 (Exhibit Level) . . . Tue 3:50 pm to 5:50 pm

Beam Guiding, Shaping, and Analysis for High-Power Applications II

Joint Session with Conferences 8960 and 8963

Session Chair: **Lutz Aschke**,
LIMO Lissotschenko Mikroskopik GmbH (Germany)

- 3:50 pm: **Monolithic aspherical beam expanding systems**, Stefan Klinzing, asphericon GmbH (Germany)[8963-14]
- 4:10 pm: **Efficient optical design and measurement technique to realize six sigma laser processing**, Michael J. Scaggs, Gilbert J. Haas, Haas Laser Technologies, Inc. (USA)[8960-30]
- 4:30 pm: **Manufacturing process to improve roughness on aspheric surfaces**, Stefan Klinzing, asphericon GmbH (Germany)[8963-15]
- 4:50 pm: **Active wavefront control in Hilase multislabs high-average-power laser system**, Jan Pilar, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Stefano Bonora, Univ. degli Studi di Padova (Italy) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Ondrej Slezák, Antonio Lucianetti, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic)[8960-31]
- 5:10 pm: **New metric for the measurement of the quality of complex beams**, Vadim Smirnov, OptiGrate Corp. (USA); Leonid B. Glebov, Christopher Lantigua, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Julien Lumeau, Aix-Marseille Univ. (France) and Institut Fresnel (France) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)[8963-16]
- 5:30 pm: **Intra-fiber mode combining schemes, demonstrating high power brightness preservation and coherent-coupling brightness enhancement**, Yariv Shamir, Roey Zuitlin, Yaakov Glick, Matitya Aviel, Asaf Dahan, Noam Shafir, Revital Feldman, Soreq Nuclear Research Ctr. (Israel); Benayahu Urbach, Daniel Levy, Eyal Shekel, Civan Advanced Technologies Ltd. (Israel); Yoav Sintov, Soreq Nuclear Research Ctr. (Israel)[8963-41]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

- Analysis of a right angle conical reflector resonator by the transfer matrix method**, Dongxiang Ling, Hongcheng Wang, Dongguan Univ. of Technology (China)[8960-65]
- Investigation of the low power stage of a 1178 nm Raman system**, Leanne J. Henry, Air Force Research Lab. (USA); Michael Klopfer, The Univ. of New Mexico (USA); Jacob Grosek, Air Force Research Lab. (USA); Ravinder K. Jain, The Univ. of New Mexico (USA)[8960-66]
- Highly sensitive temperature sensing in liquid core microbubble resonators**, Jonathan M. Ward, Yong Yang, Sile G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan)[8960-67]
- Digital control of laser modes with an intra-cavity spatial light modulator**, Sandile S. Ngcobo, Igor A. Litvin, Liesl Burger, Council for Scientific and Industrial Research (South Africa); Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa)[8960-68]
- Optimized Findlay-Clay Analysis for diode side-pumped Nd:YAG lasers**, Avid Farhoodfar, San Jose City College (USA) and International Technological Univ. (USA); Sydney Sukuta, San Jose City College (USA)[8960-69]
- Investigation of ring resonators with bidirectional regions**, Alan H. Paxton, Harold C. Miller, Air Force Research Lab. (USA)[8960-70]

Wednesday 5 February

SESSION 9

Location: Room 124 (Exhibit Level) . . Wed 8:00 am to 9:50 am

Microcavity Lasers and RF Photonics

Session Chair: **Yanne K. Chembo**, FEMTO-ST (France)

8:00 am: **On phase noise of self-injection locked semiconductor lasers**, Danny Elyahu, Elijah B. Dale, Wei Liang, Vladimir S. Ilchenko, Andrey B. Matsko, David J. Seidel, Lute Maleki, OEwaves, Inc. (USA) [8960-32]

8:20 am: **Whispering gallery mode resonator applications in mid-IR spectroscopy** (*Invited Paper*), Nan Yu, Kamjou Mansour, Aaron Rury, Jet Propulsion Lab. (USA) [8960-33]

8:45 am: **Investigation on high speed directly modulated microcircular and microring lasers** (*Invited Paper*), Yong-Zhen Huang, Xiao-Meng Lv, Ling-Xiu Zou, Heng Long, Jin-Long Xiao, Yue-De Yang, Yun Du, Institute of Semiconductors (China) [8960-34]

9:10 am: **Spectrally pure RF photonic source based on a resonant optical hyper-parametric oscillator**, Wei Liang, Danny Elyahu, Andrey B. Matsko, Vladimir S. Ilchenko, David J. Seidel, Lute Maleki, OEwaves, Inc. (USA) . [8960-35]

9:30 am: **Phase-matched coupling to whispering gallery mode resonator of large refractive index using metallic diffraction grating**, Yanyan Zhou, Nanyang Technological Univ. (Singapore) and A*STAR Singapore Institute of Manufacturing Technology (Singapore); Xia Yu, A*STAR Singapore Institute of Manufacturing Technology (Singapore); Feng Luan, Nanyang Technological Univ. (Singapore) [8960-36]

Coffee Break Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);
Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA);
Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best “Green” LASE Paper Award**,
Stephen J. Eglash, Energy and Environment Affiliates Program,
Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscale**,
Michel Meunier, Ecole Polytechnique de Montréal (Canada)

SESSION 10

Location: Room 124 (Exhibit Level) . . Wed 2:00 pm to 3:35 pm

Novel Microresonator Topologies and Devices I

Session Chair: **Gualtiero Nunzi Conti**,
Istituto di Fisica Applicata Nello Carrara (Italy)

2:00 pm: **New directions for high-Q micro cavities** (*Invited Paper*),
Kerry J. Vahala, California Institute of Technology (USA) [8960-37]

2:25 pm: **Crystalline whispering gallery mode resonators: in search of the optimal material**, Vladimir S. Ilchenko, Anatoliy A. Savchenkov, Andrey B. Matsko, Lute Maleki, OEwaves, Inc. (USA) [8960-38]

2:45 pm: **Micro-ring resonators for vertical optical emission** (*Invited Paper*),
Marc Sorel, Univ. of Glasgow (United Kingdom); Michael J. Strain, Univ. of Glasgow (United Kingdom) and Univ. of Strathclyde (United Kingdom); Vincenzo Pusino, Univ. of Glasgow (United Kingdom); Siyuan Yu, Huanlu Li, Xinlun Cai, Univ. of Bristol (United Kingdom) [8960-39]

3:10 pm: **Droplet resonator based optofluidic microlasers** (*Invited Paper*),
Alper Kiraz, Koç Univ. (Turkey) [8960-40]

Coffee Break Wed 3:35 pm to 4:05 pm

SESSION 11

Location: Room 124 (Exhibit Level) . . Wed 4:05 pm to 5:55 pm

Novel Microresonator Topologies and Devices II

Session Chair: **Vladimir S. Ilchenko**, OEwaves, Inc. (USA)

4:05 pm: **Self-assembled liquid crystal microlasers, microresonators, and microfibres** (*Invited Paper*), Igor Musevic, Jožef Stefan Institute (Slovenia) [8960-41]

4:30 pm: **Whispering-gallery modes excitation in microspheres integrated inside microstructured optical fibers** (*Invited Paper*), Kyriaki Kosma, Gianluigi Zito, Foundation for Research and Technology-Hellas (Greece); Kay Schuster, Institut für Photonische Technologien e.V. (Germany); Stavros Pissadakis, Foundation for Research and Technology-Hellas (Greece) [8960-42]

4:55 pm: **Optical microstub resonator lasers**, Ganapathy Senthil Murugan, Christophe A. Codemard, Mohd Narizee Bin Mohd Nasir, George Y. Chen, Univ. of Southampton (United Kingdom); Andreas Langner, Heraeus Quarzglas GmbH & Co. KG (Germany); Michalis N. Zervas, Univ. of Southampton (United Kingdom) [8960-43]

5:15 pm: **Optical bottle resonator slow light delay line**, Misha Sumetsky, Aston Institute for Photonics Technologies (United Kingdom) [8960-44]

5:35 pm: **Fabrication of microoptical cavities with femtosecond laser pulses**, Ya Cheng, Jintian Lin, Jiangxin Song, Shanghai Institute of Optics and Fine Mechanics (China); Wei Fang, Zhejiang Univ. (China); Koji Sugioka, RIKEN (Japan) [8960-45]

Thursday 6 February

SESSION 12

Location: Room 124 (Exhibit Level) . . . Thu 8:00 am to 9:05 am

Pulsed Lasers

Session Chair: **James R. Leger**, Univ. of Minnesota, Twin Cities (USA)

8:00 am: **Group and phase velocity coupling and decoupling in mode locked lasers** (*Invited Paper*), Ladan Arissian, The Univ. of New Mexico (USA) . [8960-46]

8:25 am: **A simplified design of resonators for Kerr-lens mode-locked Ti:sapphire lasers exploiting the Z-scan method**, Reza Akbari, Arkady Major, Univ. of Manitoba (Canada) [8960-47]

8:45 am: **26 ps pulses from a passively Q-switched microchip laser**, Benjamin Bernard, Georg-Simon-Ohm-Hochschule für angewandte Wissenschaften - Fachhochschule Nürnberg (Germany); Eva Mehner, Georg-Simon-Ohm-Hochschule für angewandte Wissenschaften - Fachhochschule Nürnberg (Germany) and Univ. Stuttgart (Germany); Daniel Kopf, MONTFORT Laser GmbH (Austria); Harald W. Giessen, Univ. Stuttgart (Germany); Bernd Braun, Georg-Simon-Ohm-Hochschule für angewandte Wissenschaften - Fachhochschule Nürnberg (Germany) [8960-48]

SESSION 13

Location: Room 124 (Exhibit Level) . . Thu 9:05 am to 10:10 am

Coupled Resonators, Beam Combining, and Adaptive Optics

Session Chair: **Alan H. Paxton**, Air Force Research Lab. (USA)

9:05 am: **Nonlinear effects in coherent coupled laser resonators** (*Invited Paper*), James R. Leger, Hung-Sheng Chiang, Univ. of Minnesota, Twin Cities (USA) [8960-49]

9:30 am: **Simultaneous laser beam combining and mode conversion using multiplexed volume phase elements**, Marc SeGall, Clémence Jollivet, Ivan B. Divliansky, Axel Schulzgen, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8960-50]

9:50 am: **Wide aperture (more than 500 mm) deformable mirrors for high power laser beam correction**, Alexis V. Kudryashov, Vadim Samarkin, Alexander Alexandrov, Julia Sheldakova, Moscow State Open Univ. (Russian Federation) and Moscow State Technical Univ. (Russian Federation) . . [8960-51]

Coffee Break Thu 10:10 am to 10:40 am

SESSION 14

Location: Room 124 (Exhibit Level) · Thu 10:40 am to 12:05 pm

Beam Shaping I

Session Chair: **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

10:40 am: **Intra-cavity metamorphosis of a Gaussian beam to flat-top distribution**, Darryl Naidoo, Igor A. Litvin, Council for Scientific and Industrial Research (South Africa); Alexander V. Laskin, AdlOptica Optical Systems GmbH (Germany); Andrew Forbes, Council for Scientific and Industrial Research (South Africa)[8960-52]

11:00 am: **Improving beam parameters of edge emitting diode laser arrays using optical phase conjugation**, Christof Zink, Andreas Jechow, Axel Heuer, Ralf Menzel, Univ. Potsdam (Germany).[8960-53]

11:45 am: **Homogenization of the semiconductor laser array by diffractive microlens array**, Zhi H. Liu, Huan Yang, Zhen D. Shi, Guo J. Li, Chuan K. Qiu, Chong X. Zhou, Institute of Optics and Electronics (China)[8960-54]

Lunch/Exhibition Break Thu 12:05 pm to 1:35 pm

SESSION 15

Location: Room 124 (Exhibit Level) . . . Thu 1:35 pm to 3:20 pm

Beam Shaping II

Session Chair: **Jean-Claude M. Diels**, The Univ. of New Mexico (USA)

1:35 pm: **The digital laser: on-demand laser modes with the click of a button** (*Invited Paper*), Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Stellenbosch Univ. (South Africa) and Univ. of KwaZulu-Natal (South Africa); Sandile S. Ngcobo, Council for Scientific and Industrial Research (South Africa) and Univ. of KwaZulu-Natal (South Africa); Liesl Burger, Council for Scientific and Industrial Research (South Africa) and Stellenbosch Univ. (South Africa); Igor A. Litvin, Council for Scientific and Industrial Research (South Africa)[8960-55]

2:00 pm: **Tuneable Gaussian to flat-top resonator by amplitude beam shaping**, Sandile S. Ngcobo, Igor A. Litvin, Council for Scientific and Industrial Research (South Africa); Kamel Ait-Ameur, ENSICAEN (France); Andrew Forbes, Council for Scientific and Industrial Research (South Africa) and Univ. of KwaZulu-Natal (South Africa)[8960-56]

2:20 pm: **Application of spatial light modulators for the synthesis of spiral laser beams**, Alexander A. Zinchik, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation)[8960-57]

2:40 pm: **Beam shaping with a laser amplifier**, Igor A. Litvin, Oliver J. Collett, Council for Scientific and Industrial Research (South Africa)[8960-58]

3:00 pm: **Engineering of automated assembly of beam-shaping optics**, Sebastian Haag, Fraunhofer-Institut für Produktionstechnologie (Germany); Volker R. Sinnhoff, INGENERIC GmbH (Germany); Tobias Mueller, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany)[8960-59]

Coffee Break Thu 3:20 pm to 3:50 pm

SESSION 16

Location: Room 124 (Exhibit Level) . . . Thu 3:50 pm to 5:30 pm

Beam Shaping III

Session Chair: **Alexis V. Kudryashov**,
Moscow State Open Univ. (Russian Federation)

3:50 pm: **Freeform beam shaping for high-power multimode lasers**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany)[8960-60]

4:10 pm: **Laser beams with conical refraction patterns**, Yurii V. Loiko, Univ. of Dundee (United Kingdom); Grigorii S. Sokolovskii, Univ. of Dundee (United Kingdom) and Ioffe Physico-Technical Institute (Russian Federation); David J. Carnegie, Univ. of Dundee (United Kingdom); Alex Turpin, Jordi Mompert, Univ. Autònoma de Barcelona (Spain); Edik U. Rafailov, Univ. of Dundee (United Kingdom)[8960-61]

4:30 pm: **Diffraction limited focal spot in the interaction chamber using phase retrieval adaptive optics**, Nicolas A. Lefaudeux, Xavier Levecq, Emeric Lavergne, Imagine Optic SA (France)[8960-62]

4:50 pm: **Reduction of speckle contrast in multimode fibers using piezoelectric vibrator**, Yosuke Fujimaki, Hirokazu Taniguchi, Mitsubishi Cable Industries, Ltd. (Japan)[8960-63]

5:10 pm: **Stability of a laser cavity with non-parabolic phase transformation elements and applications**, Igor A. Litvin, Council for Scientific and Industrial Research (South Africa)[8960-64]

Fiber Lasers XI: Technology, Systems, and Applications

Conference Chair: **Siddharth Ramachandran**, Boston Univ. (USA)

Conference Co-Chair: **Brandon Shaw**, U.S. Naval Research Lab. (USA)

Program Committee: **Thomas T. Alkeskjold**, NKT Photonics A/S (Denmark); **Paulo Almeida**, Fianium Ltd. (United Kingdom); **John Ballato**, Clemson Univ. (USA); **Adrian L. Carter**, Nufem (USA); **Fabio Di Teodoro**, The Aerospace Corp. (USA); **Ingmar Hartl**, Deutsches Elektronen-Synchrotron (Germany); **Clifford Headley III**, OFS Labs. (USA); **Sami T. Hendow**, Adaptive Laser Processing (USA); **Eric C. Honea**, Lockheed Martin Aculight (USA); **Jens Limpert**, Friedrich-Schiller-Univ. Jena (Germany); **Jian Liu**, PolarOnyx (USA); **John D. Minelly**, Coherent, Inc. (USA); **Peter F. Moulton**, Q-Peak, Inc. (USA); **Martin H. Muendel**, JDSU (USA); **Hans-Jürgen Otto**, Friedrich-Schiller-Univ. Jena (Germany); **Craig Robin**, Air Force Research Lab. (USA); **Akira Shirakawa**, The Univ. of Electro-Communications (Japan); **Daniel B. Soh**, Sandia National Labs., California (USA); **Ji Wang**, Corning Incorporated (USA); **Michalis N. Zervas**, Univ. of Southampton (United Kingdom)

Conference Cosponsors:



Monday 3 February

WELCOME AND INTRODUCTION

Location: Room 131 (Exhibit Level) .. Mon 8:30 am to 8:40 am

Siddharth Ramachandran, Boston Univ. (USA)

SESSION 1

Location: Room 131 (Exhibit Level) . Mon 8:40 am to 10:10 am

Narrow Linewidth

Session Chair: **Akira Shirakawa**,
The Univ. of Electro-Communications (Japan)

8:40 am: **Using a linearly chirped seed suppresses SBS in high-power fiber amplifiers, allows for coherent combination, and enables long delivery fibers** (*Invited Paper*), Jeffrey O. White, Eliot B. Petersen, Zhi Y. Yang, U.S. Army Research Lab. (USA); Carl E. Mungan, U.S. Naval Academy (USA); George A. Rakuljic, Telaris, Inc. (USA); Arseny Vasilyev, Naresh Satyan, Amnon Yariv, California Institute of Technology (USA) [8961-1]

9:10 am: **Single-frequency Yb-doped photonic crystal fiber amplifier with 800 W output power**, Craig A. Robin, Iyad Dajani, Air Force Research Lab. (USA) [8961-2]

9:30 am: **Characterization of photonic bandgap fiber for high-power, narrow-linewidth optical transport**, Charlotte R. Bennett, David C. Jones, Mark A. Smith, Andrew M. Scott, QinetiQ Ltd. (United Kingdom); Jens K. Lyngsø, Christian Jakobsen, NKT Photonics A/S (Denmark) [8961-3]

9:50 am: **Single-frequency 1178 nm SDL/Yb-PBGF MOPA with an output power of 31 W**, Tomi Leinonen, Tampere Univ. of Technology (Finland); Mingchen Chen, Xinyan Fan, The Univ. of Electro-Communications (Japan); Emmi L. Kantola, Tampere Univ. of Technology (Finland); Akira Shirakawa, The Univ. of Electro-Communications (Japan); Mircea D. Guina, Tampere Univ. of Technology (Finland) [8961-4]

Coffee Break Mon 10:10 am to 10:40 am

SESSION 2

Location: Room 131 (Exhibit Level) Mon 10:40 am to 12:00 pm

Beam Combination

Session Chair: **Craig A. Robin**, Air Force Research Lab. (USA)

10:40 am: **Approaching TW-peak powers at >10 kHz repetition rate by multi-dimensional coherent combining of femtosecond fiber lasers**, Sven Breitkopf, Friedrich-Schiller-Univ. Jena (Germany); Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Lorenz von Grafenstein, Friedrich-Schiller-Univ. Jena (Germany); Arno Klenke, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Henning Carstens, Simon Holzberger, Joachim Pupeza, Ernst E. Fill, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Thomas Schreiber, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Ferenc Krausz, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) [8961-5]

11:00 am: **Coherent-beam-combining performance in harsh environment**, Laurent Lombard, Guillaume Canat, Pierre Bourdon, ONERA (France) . . . [8961-6]

11:20 am: **Spectral beam combination of kilowatt class fiber lasers with reflective volume Bragg gratings**, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Thomas Ehrenreich, Nufem (USA); George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Roger H. Holten, Nufem (USA); Brian Anderson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp. (USA); Martin Seifert, Imtiaz Majid, Nufem (USA) [8961-7]

11:40 am: **Phase-locked, Q-switched multicore fiber laser by saturable absorber**, Akira Shirakawa, Keigo Sato, Hidenori Yamada, The Univ. of Electro-Communications (Japan) [8961-8]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 3

Location: Room 131 (Exhibit Level) .. Mon 1:30 pm to 3:10 pm

Applications

Session Chair: **Clifford Headley III**, OFS Labs. (USA)

1:30 pm: **Tunable fiber-based sources and their applications to biomedical imaging** (*Invited Paper*), Chris Xu, Cornell Univ. (USA) [8961-9]

2:00 pm: **1.5- μ m pulsed coherent fiber-optic lidar system for aircraft-based hazard detection**, Shantanu Gupta, Wei Lu, Frank Kimpel, Jacob Hwang, Youming Chen, Xung Dang, Horacio Verdun, Fibertek, Inc. (USA) [8961-10]

2:20 pm: **High-power, narrowline, 1.5- μ m fiber-amplifier lidar transmitter for atmospheric CO₂ detection**, Wei Lu, Doruk Engin, Mark E. Storm, Shantanu Gupta, Fibertek, Inc. (USA) [8961-11]

2:40 pm: **High-power fiber lasers in geothermal, oil and gas** (*Invited Paper*), Mark S. Zediger, Foro Energy, Inc. (USA) [8961-12]

Coffee Break Mon 3:10 pm to 3:40 pm

SESSION 4

Location: Room 131 (Exhibit Level) .. Mon 3:40 pm to 5:40 pm

Bandgap and Microstructured Fibers

Session Chair: **Thomas T. Alkeskjold**, NKT Photonics A/S (Denmark)

3:40 pm: **Advanced hollow-core fibers: overcoming the challenges of polarization and modal control** (*Invited Paper*), John M. Fini, OFS Labs. (USA) [8961-13]

4:10 pm: **Design of double-cladding large mode area all-solid photonic bandgap fibers**, Enrico Coscelli, Univ. degli Studi di Parma (Italy); Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Annamaria Cucinotta, Stefano Selli, Univ. degli Studi di Parma (Italy) [8961-14]

4:30 pm: **Novel multifocus tomography for measurement of microstructured and multicore optical fibers**, Andrew D. Yablon, Interfiber Analysis (USA) [8961-15]

4:50 pm: **Kagome fiber beam delivery of high-energy ultrafast laser and application to microprocessing**, Benoit Debord, Madhoussouhana Dontactouny, Meshaal Alharbi, Coralie Fourcade-Dutin, XLIM Institut de Recherche (France); Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France); Frederic Gérôme, XLIM Institut de Recherche (France); Fetah A. Benabid, GLOphotonics SAS (France) and XLIM Institut de Recherche (France) [8961-16]

5:10 pm: **Negative curvature hollow core fibers: design, fabrication, and applications** (*Invited Paper*), Andrey D. Pryamikov, Fiber Optics Research Ctr. (Russian Federation) [8961-17]

Tuesday 4 February

SESSION 5

Location: Room 131 (Exhibit Level) . . Tue 8:10 am to 10:00 am

Ultrashort Pulse Lasers I

Session Chair: **Ingar Hartl**,
Deutsches Elektronen-Synchrotron (Germany)

8:10 am: **Scaling peak power in ultrafast fiber lasers** (*Invited Paper*),
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) [8961-18]

8:40 am: **Towards high-power and high-energy femtosecond fiber lasers**,
Peng Wan, Lih-Mei Yang, Jian Liu, PolarOnyx, Inc. (USA) [8961-19]

9:00 am: **Divided-pulse nonlinear compression**, Florent Guichard,
Yoann Zaouter, Amplitude Systèmes (France); Marc Hanna, Frédéric Druon, Lab.
Charles Fabry (France); Eric P. Mottay, Amplitude Systèmes (France);
Patrick Georges, Lab. Charles Fabry (France) [8961-20]

9:20 am: **Analysis of divided-pulse amplification for high-energy extraction**,
Marco Kienel, Arno Klenke, Steffen Hädrich, Tino Eidam, Friedrich-Schiller-Univ.
Jena (Germany) and Helmholtz Institute Jena (Germany); Jens Limpert, Andreas
Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute
Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik
(Germany) [8961-21]

9:40 am: **215 μJ, 16 W femtosecond fiber laser for precision industrial micro-
machining**, Kyungbum Kim, Xiang Peng, Wangkuen Lee, Raydiance, Inc. (USA);
Xinhua Gu, JDSU (USA); Michael M. Mielke, Raydiance, Inc. (USA) [8961-22]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 6

Location: Room 131 (Exhibit Level) . Tue 10:30 am to 12:00 pm

Pioneers of Fiber Optics

Session Chair: **Siddharth Ramachandran**, Boston Univ. (USA)

10:30 am: **Realizing the first low-loss optical fibers** (*Invited Paper*),
Donald B. Keck, Corning Incorporated (USA) [8961-23]

11:00 am: **The first fiber Raman amplifiers and lasers** (*Invited Paper*),
Rogers H. Stolen, Clemson Univ. Research Foundation (USA) [8961-25]

11:30 am: **Fibre lasers: Past, present, and what next?** (*Invited Paper*),
David N. Payne, Univ. of Southampton (United Kingdom) [8961-24]

Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 7

Location: Room 131 (Exhibit Level) . . . Tue 1:30 pm to 3:00 pm

Novel Fibers and Designs

Session Chairs: **John Ballato**, Clemson Univ. (USA);
E. Joseph Friebele, U.S. Naval Research Lab. (USA)

1:30 pm: **Nanowires in photonic crystal fibers: from plasmonics towards
nonlinear optics** (*Invited Paper*), Markus A. Schmidt, Institut für Photonische
Technologien e.V. (Germany); Patrick Uebel, Nicolai Granzow, Philip St. John
Russell, Max-Planck-Institut für die Physik des Lichts (Germany) [8961-26]

2:00 pm: **Fibers design with a bend-compensated cladding for distributed
wavelength filtering**, John M. Fini, Jeffrey W. Nicholson, OFS Labs.
(USA) [8961-27]

2:20 pm: **Yb³⁺ doped ribbon fiber for high-average power lasers and
amplifiers**, Derrek R. Drachenberg, Michael J. Messerly, Paul H. Pax, Arun K.
Sridharan, John B. Tassano, Jay W. Dawson, Lawrence Livermore National Lab.
(USA) [8961-28]

2:40 pm: **Low-loss hybrid fiber with zero dispersion wavelength shifted to 1
μm**, Svetlana S. Aleshkina, Mikhail E. Likhachev, Andrei K. Senatorov, Mikhail M.
Bubnov, Fiber Optics Research Ctr. (Russian Federation); Mikhail Y. Salganskii,
Alexei N. Guryanov, Institute of Chemistry of High-Purity Substances of the
Russian Academy of Sciences (Russian Federation) [8961-29]

Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 8

Location: Room 131 (Exhibit Level) . . . Tue 3:30 pm to 5:10 pm

High Power I

Session Chair: **Sami T. Hendow**, Adaptive Laser Processing (USA)

3:30 pm: **3kW single-mode direct diode-pumped fiber laser**, Victor Khitrov,
John D. Minelly, Coherent, Inc. (USA); Richard P. Tumminelli, Vincent Petit,
Coherent, Inc., Salem (USA); Eric S. Pooler, Coherent, Inc. (USA) [8961-30]

3:50 pm: **146 W continuous wave Ytterbium-doped fiber amplifier at 1009
nm**, Franz Beier, Fraunhofer-Institut für Angewandte Optik und Feinmechanik
(Germany) and Friedrich-Schiller-Univ. Jena (Germany); Hans-Jürgen Otto,
Friedrich-Schiller-Univ. Jena (Germany); Bettina Sattler, Marco Plötner, Nicoletta
Haarlammert, Johannes Nold, Fraunhofer-Institut für Angewandte Optik und
Feinmechanik (Germany); Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena
(Germany); Thomas Schreiber, Fraunhofer-Institut für Angewandte Optik und
Feinmechanik (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany)
and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany);
Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik
(Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und
Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) . . [8961-31]

4:10 pm: **Yb-free Er-doped all-fiber amplifier cladding-pumped at 976 nm
with output power in excess of 100 W**, Leonid V. Kotov, Fiber Optics Research
Ctr. (Russian Federation) and Moscow Institute of Physics and Technology
(Russian Federation); Mikhail E. Likhachev, Mikhail M. Bubnov, Oleg I.
Medvedkov, Fiber Optics Research Ctr. (Russian Federation); Mikhail V. Yashkov,
Institute of Chemistry of High-Purity Substances of the Russian Academy of
Sciences (Russian Federation); Alexei N. Guryanov, Institute of Chemistry
of High-Purity Substances of the Russian Academy of Sciences (Russian
Federation); Sébastien Février, XLIM Institut de Recherche (France); Jérôme
Lhermite, Eric Cormier, Univ. Bordeaux 1 (France) [8961-32]

4:30 pm: **>450W gain-switched-diode-seeded, single-polarization,
picosecond fiber MOPA**, Shaif-ul Alam, Peh Siong Teh, Richard J. Lewis,
David J. Richardson, Univ. of Southampton (United Kingdom) [8961-33]

4:50 pm: **Investigation of a large core 976 nm Yb fiber laser for high
brightness fiber-based pump sources**, Martin Leich, Stephan Grimm,
Denny Hoh, Sylvia Jetschke, Matthias Jäger, Hartmut Bartel, Institut für
Photonische Technologien e.V. (Germany) [8961-34]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

High-brightness, fiber-coupled pump modules in fiber laser applications,
Marty D. Hemenway, Kirk Price, Wolfram Urbanek, Kylan Hoener, Ling Bao,
Keith W. Kennedy, David Dawson, Emily S. Cragerud, Mitch Reynolds,
Jim Haden, Dahv A. Kliner, nLIGHT Corp. (USA) [8961-66]

Experimental study of SBS suppression via white noise phase modulation,
Brian Anderson, CREOL, The College of Optics and Photonics, Univ. of Central
Florida (USA); Craig A. Robin, Angel Flores, Iyad Dajani, Air Force Research Lab.
(USA) [8961-67]

**High-energy, high-average and peak-power phosphate-glass fiber
amplifiers for 1micron band**, Mehmetcan Akbulut, Andy Miller, Kort Wiersma,
Jie Zong, Dan L. Rhonehouse, Dan T. Nguyen, Arturo Chavez-Pirson, NP
Photonics, Inc. (USA) [8961-68]

**Coherent combining of SHG converters through active phase control of the
fundamental waves**, Anne Durécu, Cassandra Aubert, Guillaume Canat,
Julien Le Gouët, Laurent Lombard, Pierre Bourdon, ONERA (France) . . [8961-69]

**Actively Q-switched single-frequency fiber laser at 978nm using highly
ytterbium-doped silica fiber**, Wei Shi, Tianjin Univ. (China); Qiang Fang,
Xueping Tian, Bo Wang, Shandong HFB Photonics Co. Ltd. (China);
Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona
(USA) [8961-70]

Ho-doped fiber for high-energy laser applications, E. Joseph Friebele, Charles
G. Askins, John R. Peele, Barbara M. Wright, Steven R. Bowman, Nicholas J.
Condon, U.S. Naval Research Lab. (USA); Shawn P. O'Connor, Naval Air Warfare
Ctr. Aircraft Div. (USA); Christopher G. Brown, Sotera Defense Solutions
(USA) [8961-71]



Mitigation of photodarkening in Yb-doped lasers based on Al-silicate fibers, Stefano Taccheo, Riccardo Piccoli, Hrvoje Gebavi, Swansea Univ. (United Kingdom); Thierry Robin, iXFiber SAS (France); David Méchin, Photonics Bretagne (France); Daniel Milanese, Politecnico di Torino (Italy); Thomas Brand, DILAS Diodenlaser GmbH (Germany); Tim Durrant, Gooch & Housego PLC (United Kingdom) [8961-72]

All-fiber Raman oscillator for radially and azimuthally polarized beam generation, Christoph Jocher, Cesar Jauregui-Misas, Friedrich-Schiller-Universität Jena (Germany); Martin Becker, Manfred Rothhardt, Institut für Photonische Technologien e.V. (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Universität Jena (Germany) [8961-73]

Optimization of laser fibers for high pump light absorption, Jörg Bierlich, Jens Kobelke, David Brand, Sylvia Jetschke, Stephan Grimm, Sonja Unger, Kay Schuster, Institut für Photonische Technologien e.V. (Germany) [8961-74]

Completely monolithic linearly polarized high-power fiber laser oscillator, Steffen Belke, Frank Becker, Benjamin Neumann, Stefan Ruppik, Ulrich Hefter, ROFIN-SINAR Laser GmbH (Germany) [8961-75]

Vector modulation instabilities in high-energy narrow-bandwidth nanosecond pulsed polarization-maintaining ytterbium-doped single-mode fiber amplifier, Emmanuel Hugonnot, Commissariat à l'Énergie Atomique (France); Pierre Calvet, Commissariat à l'Énergie Atomique (France) and Univ. des Sciences et Technologies de Lille (France); Arnaud Musso, Univ. des Sciences et Technologies de Lille (France); Guillaume Tison, Agnes Mahe, Eric Freysz, Univ. Bordeaux 1 (France) [8961-76]

Single-crystal, rare-earth doped YAG fiber lasers grown by the laser-heated pedestal growth technique, James A. Harrington, Craig D. Nie, Rutgers, The State Univ. of New Jersey (USA); Yuan Li, Eric G. Johnson, Clemson Univ. (USA); Elizabeth F. Cloos, Stephen C. Rand, Pedro Machado, Univ. of Michigan (USA); Ramesh K. Shori, Naval Air Warfare Ctr. Weapons Div. (USA) [8961-77]

Design and characterization of a polarizing microstructured optical fiber with large mode area for single-mode operation at 1064 nm, Laurent Provino, Achille Monteville, Olivier Le Goffic, David Landais, PERFOS (France); Cédric Romano, Jérôme Moraine, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Alain Mugnier, Quantel Group (France); Christelle Pareige, Adil Haboucha, Thierry Chartier, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); David Méchin, PERFOS (France); David Pureur, Quantel Group (France) [8961-78]

Passive mitigation of mode instabilities, Cesar Jauregui-Misas, Hans-Jürgen Otto, Fabian Stutzki, Florian Jansen, Jens Limpert, Friedrich-Schiller-Universität Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-79]

Fabrication of microstructured fibers from preforms with sealed top-end holes, Sergey L. Semjonov, Alexander N. Denisov, Andrei K. Senatorov, Fiber Optics Research Ctr. (Russian Federation) [8961-80]

Dual-wavelength fiber mode-locked laser based on graphene-saturable absorber, Jaroslaw Z. Sotor, Grzegorz J. Sobon, Wrocław Univ. of Technology (Poland); Iwona Pasternak, Institute of Electronic Materials Technology (Poland); Karol Krzemepek, Grzegorz Dudzik, Wrocław Univ. of Technology (Poland); Aleksandra Krajewska, Włodzimierz Strupinski, Institute of Electronic Materials Technology (Poland); Krzysztof M. Abramski, Wrocław Univ. of Technology (Poland) [8961-81]

The effect of polarization in passive coherent beam combining of fiber lasers, Hung-Sheng Chiang, James R. Leger, Univ. of Minnesota, Twin Cities (USA); Emese Huszar, Bethlen Gábor Református Gimnázium (Hungary); Johan Nilsson, Jayanta K. Sahu, Univ. of Southampton (United Kingdom) [8961-82]

Novel technique for suppression of self-pulsing in Yb fiber lasers, Ji Won Kim, Jeongseop Lee, Hanyang Univ. (Korea, Republic of) [8961-83]

kW average power from a Yb-doped rod-type large-pitch fiber, Hans-Jürgen Otto, Cesar Jauregui-Misas, Fabian Stutzki, Florian Jansen, Friedrich-Schiller-Universität Jena (Germany); Jens Limpert, Friedrich-Schiller-Universität Jena (Germany) and Helmholtz Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Universität Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-84]

Fiber laser seeded by 1030 nm gain-switched laser diode for supercontinuum generation, Anthony Bertrand, Multitel A.S.B.L. (Belgium); Rok Petkovsek, Univ. of Ljubljana (Slovenia); Yves Hernandez, Multitel A.S.B.L. (Belgium) [8961-85]

980-nm random fiber laser directly pumped by a high-power 938-nm laser diode, Sergey A. Babin, Ekaterina I. Dontsova, Sergey I. Kablukov, Institute of Automation and Electrometry (Russian Federation) [8961-86]

Gain-switched all-fiber sources at 2 μm, Mateusz Wyszomolek, Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [8961-87]

16 W pulsed green laser based on efficient frequency conversion of an Yb-doped fibre laser externally modulated by a semiconductor optical amplifier, Adil Haboucha, CNRS-Fonctions Optiques pour les Technologistes de l'information (France); Alain Mugnier, Quantel Group (France); Christelle Pareige, Arnaud Fernandez, Thierry Chartier, CNRS-Fonctions Optiques pour les Technologistes de l'information (France); David Pureur, Quantel Group (France) [8961-88]

Spatially resolved 3D-measurements of long-period gratings written by fs-laser inscription in large mode area fibers, Andrea Kliner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Universität Jena (Germany); Ria G. Krämer, Christian Voigtländer, Friedrich-Schiller-Universität Jena (Germany); Frauke Theuer, Thomas Schreiber, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Universität Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Universität Jena (Germany) [8961-89]

Ultra-low noise optical phase-locked loop, Simon Ayotte, André Babin, François Costin, TeraXion Inc. (Canada) [8961-90]

Performance of kW class fiber amplifiers spanning a broad range of wavelengths: 1028-1100nm, Ye Huang, Thomas Ehrenreich, Jianwu Ding, John Edgecombe, Cyril Guinrand, Peyman Ahmadi, Kanxian Wei, Scott Christensen, Chiachi Wang, Imtiaz Majid, Nufem (USA) [8961-91]

Power scaling through narrowband ASE seeding in pulsed MOPA fiber systems, Miguel Melo, MWTechnologies, Lda (Portugal) and Univ. do Porto (Portugal); João M. Sousa, Consultant (Portugal) [8961-92]

Development of narrow-linewidth Yb- and Er- fiber lasers and frequency mixing for ArF excimer laser seeding, Hongwen Xuan, Zhigang Zhao, The Univ. of Tokyo (Japan); Hironori Igarashi, Shinji Ito, Kouji Kakizaki, Gigaphoton Inc. (Japan); Yohei Kobayashi, The Univ. of Tokyo (Japan) [8961-93]

Polarization maintaining, high-power and high-efficiency (6+1)x1 pump/signal combiner, Victor I. Kopp, Jongchul Park, Mitchell S. Wlodawski, Jonathan Singer, Daniel Neugroschl, Chiral Photonics, Inc. (USA) [8961-94]

Effect of resonant and Kerr nonlinearities on passive phase-locking of a multi-stable regenerative fiber amplifier array, Erik J. Bochove, Air Force Research Lab. (USA); Mohammad R. Zunoubi, State Univ. of New York at New Paltz (USA); Christopher J. Corcoran, Corcoran Engineering Inc. (USA) . [8961-95]

Rod fiber amplifiers under high thermal load leading to transverse mode instability, Mette M. Johansen, Kristian R. Hansen, Technical Univ. of Denmark (Denmark); Marko Laurila, Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Technical Univ. of Denmark (Denmark) [8961-96]

Thermo-optical effects in Tm-doped large mode area photonic crystal fibers, Carlo Molardi, Enrico Coscelli, Annamaria Cucinotta, Stefano Selli, Univ. degli Studi di Parma (Italy) [8961-97]

Effect of gain saturation on the mode instability threshold of high-power fiber amplifiers, Kristian R. Hansen, Mette M. Johansen, Jesper Lægsgaard, Technical Univ. of Denmark (Denmark) [8961-98]

Intense supercontinuum generation in a nanosecond nonlinear all-PM-fiber power amplifier, Chun-Lin L. Chang, National Taiwan Univ. (Taiwan); Yen-Yin Lin, National Tsing Hua Univ. (Taiwan); Po-Yen Lai, National Central Univ. (Taiwan); Yen-Yin Li, Dong-Yo Jheng, National Taiwan Univ. (Taiwan); Shih-Hung Chen, National Central Univ. (Taiwan); Sheng-Lung L. Huang, National Taiwan Univ. (Taiwan) [8961-99]

Effective suppression of stimulated Raman scattering in high power fiber amplifiers using double-pass scheme, Po-Yen Lai, National Central Univ. (Taiwan); Chun-Lin L. Chang, Sheng-Lung L. Huang, National Taiwan Univ. (Taiwan); Shih-Hung Chen, National Central Univ. (Taiwan) [8961-100]

New optical fiber designs for beam shaping applications, Kevin F. Farley, Michael Conroy, Chih-Hao Wang, Kanxian Wei, Imtiaz Majid, Nufem (USA) [8961-101]

Adjustment of double resonance in short cavity Brillouin fiber lasers, Cesar A. López-Mercado, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); Vasily V. Spirin, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Sergey I. Kablukov, Ekaterina A. Zlobina, Institute of Automation and Electrometry (Russian Federation); Igor O. Zolotovskiy, Ulyanovsk State Univ. (Russian Federation); Patrice Mégret, Univ. de Mons (Belgium); Andrei A. Fotiadi, Univ. de Mons (Belgium) and Ulyanovsk State Univ. (Russian Federation) and Ioffe Physico-Technical Institute of the RAS (Russian Federation) [8961-102]

Mode coupling in few-mode large-mode-area fibers, Changgeng Ye, Joona J. Koponen, Ville Aallos, Ossi Kimmelma, Teemu Kokki, nLIGHT Corp., Lohja (Finland) [8961-103]

Frequency conversion through spontaneous degenerate four wave mixing in large mode area hybrid photonic crystal fibers, Sidsel R. Petersen, Technical Univ. of Denmark (Denmark); Thomas T. Alkeskjold, NKT Photonics A/S (Denmark); Jesper Lægsgaard, Technical Univ. of Denmark (Denmark) [8961-104]

Brillouin-gain spectra of a monolithic counter-pumped single-frequency fiber amplifier, Thomas Theeg, Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (Germany) [8961-105]

Time-frequency-domain dispersion measurement in rare earth doped large effective mode area multicore fibers, Tobias Baselt, Christopher Taudt, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany). [8961-106]

All Yb-based CPA high-repetition rate femtosecond fibre laser with CEP stabilisation for strong field physics, Steffen Driever, Konstantin B. Holzner, Martin Arnold, Amelle Zair, Imperial College London (United Kingdom). [8961-108]

Effective NIR gain-switched fiber laser, Rok Petkovsek, Vid Agrez, Univ. of Ljubljana (Slovenia) [8961-109]

Switchable dual-wavelength erbium-doped fiber laser covered in C-and L-bands with wide tunability and fast response time, Hyun-Joo Kim, Seung Bin K. Ahn, Young-Geun Han, Hanyang Univ. (Korea, Republic of) [8961-110]

Optical characterization, luminescence properties of Er³⁺ and Er³⁺/Yb³⁺ co-doped tellurite glasses for broadband amplification, Seshadri Meruva, Luiz C. Barbosa, Julio A. P. Ferencz, Univ. Estadual de Campinas (Brazil) . [8961-111]

Photonic crystal fiber pump combiner for high-peak power all-fiber thulium lasers, Alex M. Sincore, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Jason Tafoya, Donald Sipes Jr., Optical Engines, Inc. (USA); Lasse Leick, NKT Photonics A/S (Denmark); Lawrence Shah, Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8961-112]

Measurement of temporal and spectral phase of photonic devices by optical frequency-domain reflectometry, Bruno Robillart, Télécom SudParis (France) [8961-114]

Effect of linewidth enhancement factor in actively mode-locked ring laser, Akira Takada, Makoto Saika, Toshiaki Sato, Shigenori Nagano, Topcon Corp. (Japan) [8961-115]

Fiber modes in non-confocal cavities, Henrik Tünnermann, Malte Karow, Thomas Theeg, Jörg Neumann, Dietmar Kracht, Peter Wessels, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (Germany) [8961-116]

Influence of zero dispersion wavelength on supercontinuum generation in near infrared, visible, and UV range for a series of microstructured fibres, Zbigniew Holdynski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Marek Napierala, InPhoTech Ltd. (Poland) and Military Univ. of Technology (Poland); Michal Szymanski, Michal Murawski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Pawel Mergo, Univ. Marii Curie-Sklodowskiej (Poland); Pawel Marc, Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Tomasz Nasilowski, InPhoTech Ltd. (Poland) . [8961-117]

Analysis of supercontinuum generated with endlessly single-mode new type of microstructured fibre series with near-visible zero-dispersion wavelength, Zbigniew Holdynski, Military Univ. of Technology (Poland); Marek Napierala, Michal Szymanski, Michal Murawski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Pawel Marc, Military Univ. of Technology (Poland); Pawel Mergo, Univ. Marii Curie-Sklodowskiej (Poland); Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Urszula A. Laudyn, Mirosław A. Karpierz, Warsaw Univ. of Technology (Poland) [8961-118]

Spectroscopic properties of Ho³⁺, Tm³⁺, and Ho³⁺/Tm³⁺ doped tellurite glasses for fiber laser applications, Meruva Seshadria, Julio A. P. Ferencz, Y. Ratnakaran, Luiz C. Barbosa, Univ. Estadual de Campinas (Brazil) . [8961-119]

Effect of mode locking technique on the filtering bandwidth limitation in all normal dispersion femtosecond fiber laser, Hussein E. Kotb, Univ. of Ottawa (Canada); Mohamed A. Abdelalim, Univ. of Ottawa (Canada) and Electronics Research Institute (Egypt); Hanan Anis, Univ. of Ottawa (Canada). [8961-120]

Highly stable carbon nanotubes mode locked fiber laser, Zhenhua Yu, Yanrong Song, Beijing Univ. of Technology (China); Yonggang Wang, Xi'an Institute of Optics and Precision Mechanics (China) [8961-121]

Automated image magnification for CO₂ laser glass processing system, Michael E. Harju, Hiroshi Sugawara, Toshiro Mizushima, AFL (USA) . [8961-122]

Gauss modulated of burst gauss-pulses by a pulse shaper from an erbium q-switched fiber laser, Luis Escalante Zarate, Yuri O. Barmenkov, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Stanislav A. Kolpakov, José Luis Cruz Muñoz, Miguel V. Andrés, Univ. de València (Spain) [8961-123]

Effects of the gain property on the efficiency of the strongly pumped fiber laser, Jianqiu Cao, Shaofeng Guo, Jinyong Leng, Xiaojun Xu, Jinbao Chen, National Univ. of Defense Technology (China) [8961-124]

High-power fiber amplifier with adjustable repetition rate for use in all-fiber supercontinuum light sources, Tobias Baselt, Christopher Taudt, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) . . . [8961-125]

Numerical aperture measurement system for microstructured and tapers analysis in a broad wavelength range, Lukasz Ostrowski, Michal Murawski, Michal Szymanski, Zbigniew Holdynski, Tadeusz Tenderenda, Paulina Pura, Military Univ. of Technology (Poland); Pawel Mergo, Univ. Marii Curie-Sklodowskiej (Poland); Pawel Marc, Leszek R. Jaroszewicz, Tomasz Nasilowski, Military Univ. of Technology (Poland) [8961-126]

Stimulated Brillouin scattering suppression with a chirped laser seed: comparison of dynamical model to experimental data, Eliot B. Petersen, Zhi Y. Yang, U.S. Army Research Lab. (USA); Naresh Satyan, Arseny Vasilyev, Amnon Yariv, California Institute of Technology (USA); George A. Rakuljic, Telaris, Inc. (USA); Jeffrey O. White, U.S. Army Research Lab. (USA) [8961-127]

Wednesday 5 February

SESSION 9

Location: Room 131 (Exhibit Level) . . Wed 8:00 am to 9:50 am

High Power II

Session Chair: **Eric C. Honea**, Lockheed Martin Aculight (USA)

8:00 am: **Bursting for enhanced ablation of materials using a multi-pulsed nanosecond UV fiber laser** (*Invited Paper*), Sami T. Hendow, Adaptive Laser Processing (USA); Edward C. Rea Jr., Coherent, Inc. (USA); Nadhir Kosa, Adaptive Laser Processing (USA); Magnus Bengtsson, Coherent, Inc. (USA) [8961-35]

8:30 am: **High peak- and average-power, pulse shaped fibre laser in the ns-regime applying step-index XLMA gain fibres**, Reinhold Dinger, Frank-Peter Grundmann, Christian Hapke, Stefan Ruppik, ROFIN-SINAR Laser GmbH (Germany) [8961-36]

8:50 am: **High-peak power, flexible-pulse parameter, chirally coupled core (3C[®]) fiber-based picosecond MOPA systems**, Timothy S. McComb, Dennis McCal, Roger L. Farrow, Tyson L. Lowder, David Logan, Jared Green, nLIGHT Corp. (USA); Changgeng Ye, Ville Aallos, Joonas J. Koponen, nLIGHT Corp., Lohja (USA); Geoff Fanning, nLIGHT Corp. (USA) [8961-37]

9:10 am: **An all-fiber high-energy cladding-pumped 93 nanosecond Q-switched fiber laser using a fiber saturable absorber**, Sean W. Moore, Daniel B. Soh, Scott E. Bisson, Brian D. Patterson, Sandia National Labs., California (USA) [8961-38]

9:30 am: **High-power monolithic fiber amplifiers based on advanced photonic crystal fiber designs**, Donald Sipes Jr., Jason Tafoya, Daniel S. Schulz, Optical Engines, Inc. (USA); Thomas T. Alkeskjold, Christina B. Olausson, Johannes Weirich, NKT Photonics A/S (Denmark) [8961-39]

Coffee Break Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best "Green" LASE Paper Award**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscale**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 2:00 pm

LASE

Conference 8961 · Location: Room 131 (Exhibit Level)

SESSION 10

Location: Room 131 (Exhibit Level) . . Wed 2:00 pm to 3:30 pm

Materials and Fabrication

Session Chair: **Adrian L. Carter**, Nufern (USA)

2:00 pm: **Plasma outside deposition (POD) of fluorine doped silica for high-power laser applications** (*Invited Paper*), Andreas Langner, Gerhard Schötz, Heraeus Quarzglas GmbH & Co. KG (Germany) [8961-40]

2:30 pm: **The Yb-doped aluminosilicate fibers photodarkening mechanism based on the charge-transfer state excitation**, Andrey A. Rybaltofsky, Konstantin K. Bobkov, Vladimir V. Velmskin, Fiber Optics Research Ctr. (Russian Federation); Andrey A. Umnikov, Alexei N. Guryanov, Institute of Chemistry of High-Purity Substances of the Russian Academy of Sciences (Russian Federation); Irina A. Shestakova, POLYUS Research and Development Institute (Russian Federation); Mikhail E. Likhachev, Mikhail M. Bubnov, Eugeny M. Dianov, Fiber Optics Research Ctr. (Russian Federation) [8961-41]

2:50 pm: **Intrinsically low Brillouin- and Raman-scattering optical fibers**, John Ballato, Clemson Univ. (USA); Peter D. Dragic, Univ. of Illinois at Urbana-Champaign (USA); Thomas Hawkins, Clemson Univ. Research Foundation (USA) [8961-42]

3:10 pm: **Fabrication and characterization of a phosphosilicate YDF with high Yb absorbance and low background loss**, Seong-Jin Kim, Yosuke Fujimaki, Hirokazu Taniguchi, Hiroaki Kinoshita, Kenji Sato, Mitsubishi Cable Industries, Ltd. (Japan) [8961-43]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 11

Location: Room 131 (Exhibit Level) . . Wed 4:00 pm to 5:30 pm

Mid-IR Sources

Session Chair: **Brandon Shaw**, U.S. Naval Research Lab. (USA)

4:00 pm: **Fiber lasers at 3 microns and beyond: status and perspectives** (*Invited Paper*), Real Vallee, Ctr. d'optique, photonique et laser (Canada) and Univ. Laval (Canada) [8961-44]

4:30 pm: **Development of high-power holmium-doped fibre amplifiers**, Alexander V. Hemming, Nikita Simakov, Alan Davidson, Michael Oermann, Len Corena, Dmitrii Stepanov, Neil Carmody, John Haub, Defence Science and Technology Organisation (Australia); Robert Swain, Sub-Micron Engineering Corp. (USA); Adrian L. Carter, Nufern (USA) [8961-45]

4:50 pm: **Efficiency improvement in Thulium-doped fibers via excited state pumping**, Cesar Jauregui-Misas, Fabian Stutzki, Florian Jansen, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-46]

5:10 pm: **3.8 W supercontinuum all-fiber source at 1.9-3.1 μ m**, Vladislav V. Dvoyrin, Irina T. Sorokina, Norwegian Univ. of Science and Technology (Norway) [8961-47]

Thursday 6 February

SESSION 12

Location: Room 131 (Exhibit Level) . . Thu 8:00 am to 10:00 am

Ultrashort Pulse Laser II

Session Chair: **Jian Liu**, PolarOnyx, Inc. (USA)

8:00 am: **2.1mJ, 210W femtosecond fiber CPA system**, Arno Klenke, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Armin Hoffmann, Friedrich-Schiller-Univ. Jena (Germany); Steffen Hädrich, Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Thomas Gottschall, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-48]

8:20 am: **High-pulse energy and average-power ultrashort laser pulses via nonlinear compression of coherently combined fiber CPA system**, Steffen Hädrich, Arno Klenke, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Armin Hoffmann, Tino Eidam, Thomas Gottschall, Friedrich-Schiller-Univ. Jena (Germany); Jan Rothhardt, Helmholtz Institute Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-49]

8:40 am: **High average power and energetic femtosecond fiber laser using chirped- and divided-pulse amplification**, Yoann Zaouter, Florent Guichard, Amplitude Systèmes (France); Marc Hanna, Lab. Charles Fabry (France); Franck Morin, Clemens Hönninger, Amplitude Systèmes (France); Frédéric Druon, Lab. Charles Fabry (France); Eric P. Mottay, Amplitude Systèmes (France); Patrick Georges, Lab. Charles Fabry (France) [8961-50]

9:00 am: **Spectral synthesis to overcome gain-narrowing in femtosecond fiber amplifiers**, Florent Guichard, Amplitude Systèmes (France); Marc Hanna, Lab. Charles Fabry (France); Laurent Lombard, ONERA (France); Yoann Zaouter, Amplitude Systèmes (France); Frédéric Druon, Lab. Charles Fabry (France); Eric P. Mottay, Amplitude Systèmes (France); Patrick Georges, Lab. Charles Fabry (France) [8961-51]

9:20 am: **High-energy booster using a core-pumped Yb-doped fiber chirped-pulse amplifier**, Franck Morin, Yoann Zaouter, Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France) [8961-52]

9:40 am: **Normal dispersion femtosecond fiber optical parametric oscillator**, Khanh Q. Kieu, Nam Nguyen, College of Optical Sciences, The Univ. of Arizona (USA); Alexey V. Maslov, Mamoru Miyawaki, Canon USA, Inc. (USA); Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [8961-53]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 13

Location: Room 131 (Exhibit Level) . Thu 10:30 am to 12:20 pm

Novel Fibers and Designs II

Session Chair: **Ji Wang**, Corning Incorporated (USA)

10:30 am: **Nonlinear optics in gas-filled hollow core fibers** (*Invited Paper*), Fetah A. Benabid, XLIM Institut de Recherche (France) [8961-54]

11:00 am: **High-gain, Ytterbium-doped, Ge-pedestal, large-pitch fiber**, Christian Gaida, Florian Jansen, Hans-Jürgen Otto, Fabian Stutzki, Jens Limpert, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8961-55]

11:20 am: **Double-clad large mode area Er-doped fiber for high-energy and high-peak power amplifiers**, Leonid V. Kotov, Fiber Optics Research Ctr. (Russian Federation) and Moscow Institute of Physics and Technology (Russian Federation); Mikhail M. Bubnov, Fiber Optics Research Ctr. (Russian Federation); Denis S. Lipatov, Alexei N. Guryanov, Institute of Chemistry of High-Purity Substances of the Russian Academy of Sciences (Russian Federation); Sébastien Février, XLIM Institut de Recherche (France); Jérôme Lhermite, Eric Cormier, Univ. Bordeaux 1 (France); Maxim Y. Koptev, Elena A. Anashkina, Sergey V. Muraviov, Alexey V. Andrianov, Arkady V. Kim, Institute of Applied Physics (Russian Federation); Mikhail E. Likhachev, Fiber Optics Research Ctr. (Russian Federation) [8961-56]

11:40 am: **Single-mode fibers with antireflective surface structures for high-power laser applications**, Lynda E. Busse, U.S. Naval Research Lab. (USA); Catalin M. Florea, Sotera Defense Solutions, Inc. (USA); Leslie B. Shaw, U.S. Naval Research Lab. (USA); Ishwar D. Aggarwal, Sotera Defense Solutions, Inc. (USA); Jasbinder S. Sanghera, U.S. Naval Research Lab. (USA) [8961-57]

12:00 pm: **Breaking the symmetry for enhanced higher-order mode delocalization**, Fabian Stutzki, Florian Jansen, Cesar Jauregui-Misas, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . [8961-58]

Lunch/Exhibition Break Thu 12:20 pm to 2:00 pm

SESSION 14

Location: Room 131 (Exhibit Level) . . . Thu 2:00 pm to 3:10 pm

Fiber Pumped Frequency Conversion

Session Chair: **Peter F. Moulton**, Q-Peak, Inc. (USA)

2:00 pm: **Mid-IR combs pumped by fiber lasers** (*Invited Paper*), Konstantin L. Vodopyanov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8961-59]

2:30 pm: **A scalable high-power yellow laser source based on frequency doubling of a combined Yb-Raman fiber amplifier**, Eitan E. Rowen, Guy Vashdi, Jacob Lasri, Eran Inbar, V-Gen Ltd. (Israel) [8961-60]

2:50 pm: **500mW, nanosecond, single-frequency fiber laser at 325.3nm**, Romain Dubrasquet, Azur Light Systems (France) [8961-61]

Coffee Break Thu 3:10 pm to 3:40 pm

SESSION 15

Location: Room 131 (Exhibit Level) . . . Thu 3:40 pm to 5:00 pm

Characterization

Session Chair: **John D. Minelly**, Coherent, Inc. (USA)

3:40 pm: **Threshold power and fiber-degradation-induced modal instabilities in high-power fiber amplifiers based on large-mode-area fibers**, Khushvinder Brar, Lockheed Martin Aculight (USA); Jason Henrie, Sean M. Courtney, Matthias P. Savage-Leuchs, Robert S. Afzal, Eric C. Honea, Lockheed Martin Laser and Sensor Systems (USA) [8961-62]

4:00 pm: **Raising the mode instability thresholds of fiber amplifiers**, Arlee V. Smith, Jesse J. Smith, AS-Photonics, LLC (USA). [8961-63]

4:20 pm: **Analysis of stimulated Raman scattering in cw kW fiber oscillators**, Thomas Schreiber, Andreas Liem, Erik Freier, Christian Matzdorf, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Jens Limpert, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [8961-64]

4:40 pm: **Numerical analysis of modal instability onset in fiber amplifiers**, Benjamin G. Ward, U.S. Air Force Academy (USA). [8961-65]

BEST STUDENT PRESENTATION AWARDS AND CONCLUDING REMARKS

Location: Room 131 (Exhibit Level) . . . 5:00 pm to 5:20 pm

Siddharth Ramachandran , Boston Univ. (USA) and **Brandon Shaw** , U.S. Naval Research Lab. (USA)

Student Presentation Competition

We are pleased to announce that a **cash prize** will be awarded to the best student oral presentation in the conference.

Throughout the conference, qualifying student oral presentations will be evaluated by the conference committee, and the results will be announced in this session. Student presentations will be judged based on scientific merit of the work, and clarity of the presentation. While the award is not judged by the manuscript, **a manuscript must be submitted**.

To be eligible for consideration, the student must be the first author on an accepted paper, and must make the oral presentation.

Award Sponsors: **NKT Photonics A/S**
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High Energy/Average Power Lasers and Intense Beam Applications VIII

Conference Chairs: **Steven J. Davis**, Physical Sciences Inc. (USA); **Michael C. Heaven**, Emory Univ. (USA); **J. Thomas Schriempf**, Naval Sea Systems Command (USA)

Program Committee: **David L. Carroll**, CU Aerospace LLC (USA); **Jarmila Kodymová**, Institute of Physics of the ASCR, v.v.i. (Czech Republic); **Timothy Madden**, Air Force Research Lab. (USA); **William E. McDermott**, Univ. of Denver (USA); **Wilson T. Rawlins**, Physical Sciences Inc. (USA)

Sunday 2 February

INTRODUCTORY REMARKS

Location: Room 276 (Mezzanine) 8:30 am to 8:50 am

Session Chair: **Steven J. Davis**, Physical Sciences Inc. (USA)

SESSION 1

Location: Room 276 (Mezzanine) Sun 8:50 am to 10:00 am

Optically Pumped Rare Gas Lasers

Session Chair: **Steven J. Davis**, Physical Sciences Inc. (USA)

8:50 am: **Kinetics of an optically pumped metastable Ar laser** (*Invited Paper*), Jiande Han, Michael C. Heaven, Gordon D. Hager, Emory Univ. (USA); George B. Venus, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8962-1]

9:20 am: **Laser excitation dynamics of argon metastables generated in atmospheric pressure flows by microwave frequency microplasma arrays**, Wilson T. Rawlins, Kristin L. Galbally-Kinney, Steven J. Davis, Physical Sciences Inc. (USA); Alan R. Hoskinson, Jeffrey A. Hopwood, Tufts Univ. (USA) . . . [8962-2]

9:40 am: **Optical pumping of Ar metastables in a high pressure CW discharge**, Michael C. Heaven, Michael N. Sullivan, Emory Univ. (USA); Greg A. Pitz, Air Force Research Lab. (USA) [8962-3]

Coffee Break Sun 10:00 am to 10:30 am

SESSION 2

Location: Room 276 (Mezzanine) . . . Sun 10:30 am to 12:00 pm

DPAL I

Session Chair: **Michael C. Heaven**, Emory Univ. (USA)

10:30 am: **Experimental study of the diode pumped alkali laser (DPAL)** (*Invited Paper*), Masamori Endo, Tokai Univ. (Japan); Ryuji Nagaoka, Hiroki Nagaoka, Toru Nagai, Fumio Wani, Kawasaki Heavy Industries, Ltd. (Japan) [8962-4]

11:00 am: **Optical gain and multi-quantum excitation in optically pumped alkali atom: rare gas mixtures**, Kristin L. Galbally-Kinney, Wilson T. Rawlins, Steven J. Davis, Physical Sciences Inc. (USA) [8962-5]

11:20 am: **The role of adiabaticity in alkali atom fine structure mixing**, Glen P. Perram, Air Force Institute of Technology (USA) [8962-6]

11:40 am: **An experimental high pressure line-shape study of the rubidium D1 and D2 transition with helium**, Greg A. Pitz, Air Force Research Lab. (USA); Gordon D. Hager, Air Force Institute of Technology (USA); Tiffany B. Tafoya, Joseph W. Young, Air Force Research Lab. (USA); Glen P. Perram, Air Force Institute of Technology (USA); David A. Hostutler, Air Force Research Lab. (USA) [8962-7]

Lunch/Exhibition Sun 12:00 pm to 1:30 pm

SESSION 3

Location: Room 276 (Mezzanine) Sun 1:30 pm to 3:20 pm

DPAL II

Session Chair: **Wilson Terry Rawlins**, Physical Sciences Inc. (USA)

1:30 pm: **Semi-analytical and 3D CFD DPAL modeling: Feasibility of superperson operation** (*Invited Paper*), Salman Rosenwaks, Boris D. Barmashenko, Karol Waichman, Ben-Gurion Univ. of the Negev (Israel) . . [8962-8]

2:00 pm: **Multi-dimensional modeling of classic DPAL**, David L. Carroll, Andrew D. Palla, CU Aerospace LLC (USA) [8962-9]

2:20 pm: **Simulation of deleterious processes in a static-cell diode pumped alkali laser**, Benjamin Q. Oliker, Ball Aerospace & Technologies Corp. (USA) [8962-10]

2:40 pm: **Kinetic and fluid dynamic processes in diode pumped alkali lasers: semi-analytical and 3D CFD modeling**, Boris D. Barmashenko, Salman Rosenwaks, Karol Waichman, Ben-Gurion Univ. of the Negev (Israel) . . [8962-11]

3:00 pm: **Mechanisms for plasma formation during high power pumping of XPAL**, Natalia Y. Babaeva, Univ. of Michigan (USA); Oleg Zatsarinny, Klaus Bartschat, Drake Univ. (USA); Mark J. Kushner, Univ. of Michigan (USA) [8962-12]

Coffee Break Sun 3:20 pm to 3:50 pm

SESSION 4

Location: Room 276 (Mezzanine) Sun 3:50 pm to 4:50 pm

DPAL III

Session Chair: **David L. Carroll**, CU Aerospace LLC (USA)

3:50 pm: **Scalable pump source for diode pumped alkali lasers**, F. W. Hersman, The Univ. of New Hampshire (USA) and Xemed LLC (USA); R. Carrier, The Univ. of New Hampshire (USA); J. H. Distelbrink, Jeff Ketel, D. Sargent, David W. Watt, Xemed LLC (USA) [8962-13]

4:10 pm: **Narrow line diode laser stacks for DPAL pumping**, Tobias P. Koening, David A. Irwin, Rajiv Pandey, Dean Stapleton, Steven G. Patterson, DILAS Diode Laser, Inc. (USA) [8962-14]

4:30 pm: **Oxygen atom density and thermal energy control in an electric-oxygen iodine laser**, Gabriel F. Benavides, CU Aerospace LLC (USA) and Univ. of Illinois at Urbana-Champaign (USA); Andrew D. Palla, CU Aerospace LLC (USA); Joseph W. Zimmerman, CU Aerospace LLC (USA) and Univ. of Illinois at Urbana-Champaign (USA); Brian S. Woodard, Univ. of Illinois at Urbana-Champaign (USA); David L. Carroll, CU Aerospace LLC (USA); Wayne C. Solomon, Univ. of Illinois at Urbana-Champaign (USA) [8962-15]

SESSION 5

Location: Room 276 (Mezzanine) Sun 4:50 pm to 5:50 pm

Other High Power Lasers and Applications

Session Chair: **Steven J. Davis**, Physical Sciences Inc. (USA)

4:50 pm: **Active phase locking demonstration of low repetition rate, 100mJ class laser beams for medium size space debris removal application under cleanspace project**, David Sabourdy, Jean-Eucher Montagne, Louis Cabaret, Alexandre Martins-Santana, Daniel Petitgas, Christophe Jacqueland, CILAS (France) [8962-16]

5:10 pm: **ELI-beamlines: extreme light infrastructure science and technology with ultra-intense lasers**, Bruno J. Le Garrec, Georg Korn, Bedrich Rus, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8962-17]

5:30 pm: **Focal zooming improvements to make fusion Ignition achievable**, Seth Pace, Steven B. Coulbourne Jr., Central Carolina Community College (USA) [8962-18]

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Recent advances for temporal and spectral diagnostics of the LMJ front-end laser facility, Jean-François Gleyze, Vanessa Moreau, Jerome Duberland, Jacque Luce, Commissariat à l'Énergie Atomique (France) [8962-19]

Near field angular filtering with volume Bragg gratings in photothermorefractive glass, Xiao Yuan, Xiang Zhang, Kuaisheng Zou, Shang Wu, Jiansheng Feng, Soochow Univ. (China) [8962-20]

High contrast research in the Nd:glass laser system based on optical parametric amplification temporal cleaning device, Xiaoming Lu, Yuxin Leng, Shanghai Institute of Optics and Fine Mechanics (China); Zhan Sui, China Academy of Engineering Physics (China); YanYan Li, Zongxin Zhang, Yi Xu, Xiaoyang Guo, Ruxin Li, Zhizhan Xu, Shanghai Institute of Optics and Fine Mechanics (China) [8962-21]

Flowing characteristic measurements in the pulsed gas Laser, Yongyue Xu, Duluo Zuo, Xinbing Wang, Bin Li, Anlan Yu, Huazhong Institute of Electro-Optics-Wuhan National Lab. for Optoelectronics (China) [8962-22]

4kW coherent beam combination laser using self-controlled stimulated Brillouin scattering-phase conjugation mirrors for high-speed laser cutting, Hong Jin Kong, Sangwoo Park, Seongwoo Cha, KAIST (Korea, Republic of); Jomsool Kim, Laser Spectronix Co., Ltd. (Korea, Republic of) [8962-23]

Layer formation of a target in laser ion acceleration, Toshimasa Morita, Japan Atomic Energy Agency (Japan) [8962-24]



High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III

Conference Chair: **Friedhelm Dorsch**, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany)

Program Committee: **Ingomar Kelbassa**, RWTH Aachen (Germany); **Wolfgang Knapp**, Cooperation Laser Franco-Allemande (France); **Lin Li**, The Univ. of Manchester (United Kingdom); **Silke Pflueger**, Direct Photonics Inc. (USA); **Stanley L. Ream**, Edison Welding Institute (USA); **Stephan Roth**, BLZ Bayerisches Laserzentrum GmbH (Germany); **Leonardo Daniele Scintilla**, Politecnico di Bari (Italy); **Anja Techel**, Fraunhofer IWS Dresden (Germany); **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

Tuesday 4 February

SESSION 1

Location: Room 120 (Exhibit Level) . . Tue 8:20 am to 10:10 am

Laser Beam Welding

Session Chair: **Friedhelm Dorsch**,
TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany)

8:20 am: **Laser welding of XXL structures** (*Keynote Presentation*), Stefan Kaierle, André Springer, Oliver Seffer, Rabi Lahdo, Alexander Barroi, Jörg Hermsdorf, Laser Zentrum Hannover e.V. (Germany) [8963-1]

8:50 am: **Dynamical behavior of laser-induced nanoparticles during remote processing**, Tobias Scholz, Klaus Dickmann, Fachhochschule Münster (Germany); Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8963-2]

9:10 am: **Development of a double beam process for joining aluminum and steel**, Sascha Frank, Fraunhofer-Institut für Produktionstechnologie (Germany) [8963-3]

9:30 am: **Autogenous laser welding of Ti6Al4V in L-joint and T-joint configuration with Yb:YAG disk laser**, Fabrizia Caiazza, Univ. degli Studi di Salerno (Italy) [8963-4]

9:50 am: **Laser-assisted friction stir welding of aluminum alloy lap joints: microstructural and microhardness characterizations**, Sabina Luisa Campanelli, Giuseppe Casalino, Nicola Contuzzi, Andrea Angelastro, Antonio D. Ludovico, Politecnico di Bari (Italy) [8963-5]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 2

Location: Room 120 (Exhibit Level) . Tue 10:40 am to 12:10 pm

Laser Surface Treatment

Session Chair: **Wolfgang Knapp**,
Cooperation Laser Franco-Allemande (France)

10:40 am: **Trends and basic investigations in high power laser materials processing** (*Keynote Presentation*), Marco Holzer, Patrick Haug, Volker Rominger, Thomas Harrer, TRUMPF Laser- und Systemtechnik GmbH (Germany); David L. Havrilla, TRUMPF Inc. (USA) [8963-6]

11:10 am: **Characteristics of the heat resistant FBG sensor under laser cladding condition**, Akihiko Nishimura, Takaya Terada, Japan Atomic Energy Agency (Japan) [8963-7]

11:30 am: **Laser hardening of AISI 52100 bearing steel with a discrete fiber laser spot**, Donato Sorgente, Ottavio Corizzo, Politecnico di Bari (Italy); Antonio Ancona, CNR-IFN UOS Bari (Italy); Leonardo Daniele Scintilla, Gianfranco Palumbo, Luigi Tricarico, Politecnico di Bari (Italy) [8963-8]

11:50 am: **Non-conventional laser surface hardening for big components**, Erica Liverani, Alessandro Fortunato, Alessandro Ascari, Univ. degli Studi di Bologna (Italy); Leonardo Orazi, Univ. degli Studi di Modena e Reggio Emilia (Italy) [8963-9]

Lunch/Exhibition Break Tue 12:10 pm to 1:40 pm

SESSION 3

Location: Room 124 (Exhibit Level) . . . Tue 1:40 pm to 3:20 pm

Beam Guiding, Shaping, and Analysis for High-Power Applications I

Joint Session with Conferences 8960 and 8963

Session Chair: **Friedhelm Dorsch**,
TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany)

1:40 pm: **Robust focusing optics for high-power laser welding**, Blake McAllister, Edison Welding Institute (USA) [8963-10]

2:00 pm: **Superior power handling in fiber optic cables for multi-kW lasers**, Mats Blomqvist, Ola I. Blomster, Optoskand AB (Sweden) [8963-11]

2:20 pm: **UV laser line for semiconductor surface processing**, Lisa Kleinschmidt, Vyacheslav Grimm, Mikhail M. Ivanenko, Alexei Krasnaberski, Vitalij N. Lissotschenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8960-29]

2:40 pm: **Beamshaping for high-power lasers using freeform refractive optics**, Roy McBride, Natalia Trela-McDonald, Matthew O. Currie, Duncan Walker, Howard J. Baker, PowerPhotonic, Ltd. (United Kingdom) [8963-12]

3:00 pm: **Industrial performance analysis of the fast axis collimator lens**, Martin Forrer, Hansruedi Moser, Dzelal Kura, Hans Forrer, FISBA OPTIK AG (Switzerland) [8963-13]

Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 4

Location: Room 124 (Exhibit Level) . . . Tue 3:50 pm to 5:50 pm

Beam Guiding, Shaping, and Analysis for High-Power Applications II

Joint Session with Conferences 8960 and 8963

Session Chair: **Lutz Aschke**,
LIMO Lissotschenko Mikrooptik GmbH (Germany)

3:50 pm: **Monolithic aspherical beam expanding systems**, Stefan Klinzing, asphericon GmbH (Germany) [8963-14]

4:10 pm: **Efficient optical design and measurement technique to realize six sigma laser processing**, Michael J. Scaggs, Gilbert J. Haas, Haas Laser Technologies, Inc. (USA) [8960-30]

4:30 pm: **Manufacturing process to improve roughness on aspheric surfaces**, Stefan Klinzing, asphericon GmbH (Germany) [8963-15]

4:50 pm: **Active wavefront control in Hilase multislabs high-average-power laser system**, Jan Pilar, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Stefano Bonora, Univ. degli Studi di Padova (Italy) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Ondrej Slezák, Antonio Lucianetti, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8960-31]

5:10 pm: **New metric for the measurement of the quality of complex beams**, Vadim Smirnov, OptiGrate Corp. (USA); Leonid B. Glebov, Christopher Lantigua, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Julien Lumeau, Aix-Marseille Univ. (France) and Institut Fresnel (France) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8963-16]

5:30 pm: **Intra-fiber mode combining schemes, demonstrating high power brightness preservation and coherent-coupling brightness enhancement**, Yariv Shamir, Roey Zuitlin, Yaakov Glick, Matitya Aviel, Asaf Dahan, Noam Shafir, Revital Feldman, Soreq Nuclear Research Ctr. (Israel); Benayahu Urbach, Daniel Levy, Eyal Shekel, Civan Advanced Technologies Ltd. (Israel); Yoav Sintov, Soreq Nuclear Research Ctr. (Israel) [8963-41]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

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Analysis and design of supersonic deposition via a RE-doped fiber laser, Jesus Ivan Reyes Sanchez, José A. Alvarez-Chávez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Udo Klotzbach, Fraunhofer IWS Dresden (Germany); Grethell G. Perez-Sanchez, David I. Ortiz-Neria, Ctr. de Investigación e Innovación Tecnológica (Mexico) [8963-37]

Detection of nanoscale defects in optical thin films by photothermal reflectance microscopy, Ki Soo Chang, Woo June Choi, Dong-Uk Kim, Jun-Ki Kim, Korea Basic Science Institute (Korea, Republic of) [8963-38]

In-line process control for laser welding of titan by high dynamic range ratio pyrometry and plasma spectroscopy, Benjamin Lempe, Tobias Baselt, Christopher Taudt, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) [8963-39]

New method of measurement laser beam on focal plane, Minshi Liu, Xiaoman Wang, Changchun Univ. of Science and Technology (China); Bin Wang, Yupeng Jiang, Changchun Institute of Optics, Fine Mechanics and Physics (China) [8963-40]

Wednesday 5 February

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks,** Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best “Green” LASE Paper Award,** Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry,** Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication,** Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel,** Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 2:00 pm

SESSION 5

Location: Room 120 (Exhibit Level) . . Wed 2:00 pm to 3:30 pm

Special Laser Processes

Session Chair: **Silke Pflueger**, Directed Photonics, Inc. (USA)

2:00 pm: **Lasers for welding and their potential in production at GE (Keynote Presentation),** Marshall G. Jones, GE Global Research (USA) [8963-17]

2:30 pm: **Laser beam drilling of metal-based composites,** Harald Riegel, Markus Merkel, Hochschule Aalen (Germany); Andreas Oechsner, Univ. Teknologi Malaysia (Malaysia) [8963-18]

2:50 pm: **CO₂ laser heating for high reliability fiber component fabrication,** Douglas M. Duke, Wenxin Zheng, Michael Harju, AFL (USA) [8963-19]

3:10 pm: **Laser-dispersing of forging tools using AlN-ceramics,** Christian Noelke, Laser Zentrum Hannover e.V. (Germany); Michael Luecke, Institut für Integrierte Produktion Hannover Gemeinnützige GmbH (Germany); Stefan Kaieler, Volker Wesling, Laser Zentrum Hannover e.V. (Germany) [8963-20]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 6

Location: Room 120 (Exhibit Level) . . Wed 4:00 pm to 6:00 pm

Process Sensors and Diagnostics

Session Chair: **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

4:00 pm: **High power beam analysis,** Oren Aharon, Judith Aharon, Duma Optronics Ltd. (Israel) [8963-21]

4:20 pm: **Cognition for robot scanner based remote welding,** Ulrich Thombansen, Fraunhofer-Institut für Lasertechnik (Germany) [8963-22]

4:40 pm: **Tracking the course of the manufacturing process in selective laser melting,** Ulrich Thombansen, Fraunhofer-Institut für Lasertechnik (Germany); Alexander Gatej, RWTH Aachen (Germany); Milton Pereira, Fraunhofer-Institut für Lasertechnik (Germany) [8963-23]

5:00 pm: **Simultaneous laser and seam tracking with texture based image processing for laser materials processing,** Peter Abels, Alexander J. Drenker, Wolfgang Fiedler, Fraunhofer-Institut für Lasertechnik (Germany); Sebastian G. M. Kraemer, Technische Univ. München (Germany) [8963-24]

5:20 pm: **Fully automatic 3D laser processing,** Logan G. Wright, Cornell Univ. (USA); Paul J. Webster, Cole Van Vlack, Laser Depth Dynamics, Inc. (Canada); Alison W. Kinross, Yang Ji, Christopher M. Galbraith, Queen’s Univ. (Canada); Kevin D. Mortimer, Queen’s Univ. (Canada) and McMaster Univ. (Canada); James M. Fraser, Queen’s Univ. (Canada) [8963-25]

5:40 pm: **Online NIR diagnostic of laser welding processes and its potential for quality assuring sensor systems,** Friedhelm Dorsch, Holger Braun, Steffen Kessler, Dieter Pfitzner, TRUMPF Werkzeugmaschinen GmbH + Co. KG (Germany); Volker Rominger, TRUMPF Laser- und Systemtechnik GmbH (Germany) [8963-26]



Thursday 6 February

SESSION 7

Location: Room 120 (Exhibit Level) . . Thu 8:40 am to 10:00 am

Laser Cutting I

Session Chair: **Leonardo Daniele Scintilla**, Politecnico di Bari (Italy)

8:40 am: **Cutting and drilling of carbon fiber reinforced plastics (CFRP) by 70W short pulse nanosecond laser,** Peter Jaeschke, Laser Zentrum Hannover e.V. (Germany); Klaus P. Stolberg, JENOPTIK Optical Systems GmbH (Germany); Stefan Bastick, Laser Zentrum Hannover e.V. (Germany); Ewa Ziolkowski, Markus Roehner, JENOPTIK Laser GmbH (Germany) [8963-27]

9:00 am: **Remote laser cutting of CFRP: influence of the edge quality on fatigue strength,** Johannes W. Stock, Michael F. Zaeh, Technische Univ. München (Germany) [8963-28]

9:20 am: **Modelling and simulation of a laser fusion cutting process,** Sirko Pamin, Laser Zentrum Hannover e.V. (Germany); Jan Hesse, CFX Berlin Software GmbH (Germany); Stefan Kaieler, Ludger Overmeyer, Laser Zentrum Hannover e.V. (Germany) [8963-29]

9:40 am: **Highest performance in 3D metal cutting at smallest footprint: benchmark of a robot based system vs. parameters of gantry systems,** Torsten Scheller, André Bastick, Robert Michel-Triller, JENOPTIK Automatisierungstechnik GmbH (Germany); Christon Manzella, Jenoptik Laser Technology Corp. (USA) [8963-30]

Coffee Break Thu 10:00 am to 10:30 am

Conference 8963 · Location: Room 120 (Exhibit Level)

SESSION 8

Location: Room 120 (Exhibit Level) · Thu 10:30 am to 11:50 am

Laser Cutting II

Session Chair: **Stephan Roth**,
BLZ Bayerisches Laserzentrum GmbH (Germany)

10:30 am: **High power single-mode fiber laser and its application to metal and non-metal materials**, Taizo Miyato, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Takashi Kayahara, Furukawa Electric Co., Ltd. (Japan); Akira Fujisaki, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Koichi Furukawa, Masafumi Matsushita, Shin Nippon Koki Co. Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Mayu Muramatsu, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan); Yoshihisa Harada, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan); Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan) [8963-31]

10:50 am: **Experimental investigation on fiber laser cutting of aluminium thin sheets**, Leonardo Daniele Scintilla, Politecnico di Bari (Italy) [8963-32]

11:10 am: **Aberration beam shaping in laser cutting with large aspect ratios**, Vladimir Yurevich, Sergey G. Gorny, Igor V. Polyakov, Andrey Afonyushkin, Laser Center (Russian Federation) [8963-33]

11:30 am: **Experimental comparison of the oxygen-assisted laser cutting of low-carbon steel with fiber and CO₂-lasers under the condition of minimal roughness**, Victor B. Shulyatyev, Anatoly M. Orishich, Alexander G. Malikov, A. Golyshhev, Khristianovich Institute of Theoretical and Applied Mechanics (Russian Federation) [8963-34]

Lunch/Exhibition Break Thu 11:50 am to 1:30 pm

SESSION 9

Location: Room 120 (Exhibit Level) . . . Thu 1:30 pm to 3:20 pm

Laser Additive Manufacturing of Metal Structures

Joint Session with Conferences 8963 and 8970

Session Chair: **Stan Ream**, Edison Welding Institute (USA)

1:30 pm: **High performance laser additive manufacturing of metal components** (*Invited Paper*), Weidong Huang, Xin Lin, Northwestern Polytechnical Univ. (China) [8970-22]

2:00 pm: **Real-time laser cladding control with variable spot size**, Jorge L. Arias, M. Angeles Montealegre, Felix Vidal, Jorge Rodríguez, Asociación de Investigación Metalúrgica del Noroeste (Spain); Stefan Mann, Peter Abels, Fraunhofer-Institut für Lasertechnik (Germany); Filip Motmans, VITO NV (Belgium) [8970-23]

2:20 pm: **Development of laser cladding system with process monitoring by x-ray imaging**, Takaya Terada, Tomonori Yamada, Akihiko Nishimura, Japan Atomic Energy Agency (Japan) [8963-35]

2:40 pm: **Analysis of the molten/solidified zone in selective laser melted parts**, Sabina Luisa Campanelli, Giuseppe Casalino, Nicola Contuzzi, Andrea Angelastro, Antonio D. Ludovico, Politecnico di Bari (Italy) [8963-36]

3:00 pm: **Post-processing of 3D-printed parts using femtosecond and picosecond laser radiation**, Ilya Mingareev, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Nils Gehlich, Tobias Bonhoff, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Fraunhofer-Institut für Lasertechnik (Germany); Wilhelm Meiners, Ingomar Kelbassa, Fraunhofer-Institut für Lasertechnik (Germany); Tim Biermann, Joining Technologies, Inc. (USA); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8970-24]

Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIII

Conference Chair: **Konstantin L. Vodopyanov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

Conference Co-Chair: **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel)

Program Committee: **Darrell J. Armstrong**, Sandia National Labs. (USA); **Majid Ebrahim-Zadeh**, ICFO - Institut de Ciències Fotòniques (Spain); **Peter Günter**, ETH Zurich (Switzerland); **Baldemar Ibarra-Escamilla**, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); **Moti Katz**, Soreq Nuclear Research Ctr. (Israel); **Yun-Shik Lee**, Oregon State Univ. (USA); **Rita D. Peterson**, Air Force Research Lab. (USA); **Peter E. Powers**, Univ. of Dayton (USA); **Peter G. Schunemann**, BAE Systems (USA); **Kenneth L. Schepler**, Air Force Research Lab. (USA); **Andrei V. Shchegrov**, KLA-Tencor Corp. (USA); **Wei Shi**, Tianjin Univ. (China); **Michael Vasilyev**, The Univ. of Texas at Arlington (USA)

Tuesday 4 February

SESSION 1

Location: Room 133 (Exhibit Level) . . Tue 8:00 am to 10:00 am

Visible and UV Sources Based on Nonlinear Conversion

Session Chairs: **Andrei V. Shchegrov**, KLA-Tencor Corp. (USA); **Yehoshua Y. Kalisky**, Nuclear Research Ctr. Negev (Israel)

8:00 am: **CW emission at 193 nm using an all solid-state laser source** (*Invited Paper*), Matthias Scholz, Dmitrijs Opalevs, Jürgen Stuhler, Patrick Leisching, Wilhelm G. Kaenders, TOPTICA Photonics AG (Germany); Guiling Wang, Xiaoyang Wang, Rukang Li, Chuangtian Chen, Beijing Ctr. for Crystal Research and Development (China) [8964-1]

8:30 am: **High power green, yellow, and UV fiber lasers** (*Invited Paper*), Eran Tal, Eitan E. Rowen, Jacob Lasri, Dorron Barness, Eran Inbar, V-Gen Ltd. (Israel) [8964-2]

9:00 am: **A new approach to sum frequency generation of single-frequency blue light in a coupled ring cavity**, Ole B. Jensen, Paul M. Petersen, DTU Fotonik (Denmark) and Technical Univ. of Denmark (Denmark) [8964-3]

9:20 am: **Efficient generation of orange light by frequency-doubling of a quantum-dot laser radiation in a PPKTP waveguide**, Ksenia A. Fedorova, Univ. of Dundee (United Kingdom); Grigorii S. Sokolovskii, Univ. of Dundee (United Kingdom) and Ioffe Physico-Technical Institute (Russian Federation); Philip R. Battle, AdvR, Inc. (USA); Daniil A. Livshits, Innolume GmbH (Germany); Edik U. Rafailov, Univ. of Dundee (United Kingdom) [8964-4]

9:40 am: **Generation of 3.5 W of diffraction-limited green light from SHG of a single tapered diode laser in a cascade of nonlinear crystals**, Anders K. Hansen, Technical Univ. of Denmark (Denmark); Ole B. Jensen, DTU Fotonik (Denmark) and Technical Univ. of Denmark (Denmark); Peter E. Andersen, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark); Paul M. Petersen, DTU Fotonik (Denmark) and Technical Univ. of Denmark (Denmark); Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut (Germany); Angelika Unterhuber, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8964-5]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 2

Location: Room 133 (Exhibit Level) . Tue 10:30 am to 12:20 pm

Photonic Terahertz Generation

Session Chairs: **Peter Günter**, ETH Zurich (Switzerland); **Yun-Shik Lee**, Oregon State Univ. (USA)

10:30 am: **Continuous-wave optical parametric source for terahertz waves tunable from 1 to 4.5 THz frequency** (*Invited Paper*), Ingo Breunig, Albert-Ludwigs-Univ. Freiburg (Germany); Jens Kiessling, Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Konstantin L. Vodopyanov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8964-6]

11:00 am: **Ultra-broadband IR and THz generation and detection with ultrashort pulses** (*Invited Paper*), Masaaki Ashida, Eiichi Matsubara, Osaka Univ. (Japan); Ikufumi Katayama, Yokohama National Univ. (Japan) [8964-7]

11:30 am: **Synthesis of few-cycle multi-THz transients for sub-cycle nonlinear optics** (*Invited Paper*), Denis V. Seletskiy, Bernhard Mayer, Christian Schmidt, Johannes Bühler, Jonathan Fischer, Daniele Brida, Alexej Pashkin, Alfred Leitenstorfer, Univ. Konstanz (Germany) [8964-8]

12:00 pm: **Room temperature terahertz wave imaging in video-rate by frequency up-conversion in DAST crystal**, Shuzhen Fan, Feng Qi, Takashi Notake, Koji Nawata, Takeshi Matsukawa, Yuma Takida, Hiroaki Minamide, RIKEN (Japan) [8964-9]

Lunch/Exhibition Break Tue 12:20 pm to 1:50 pm

SESSION 3

Location: Room 133 (Exhibit Level) . . . Tue 1:50 pm to 3:40 pm

Optical Parametric and Ultrafast Nonlinear Devices

Session Chairs: **Kenneth L. Schepler**, Air Force Research Lab. (USA); **Moti Katz**, Soreq Nuclear Research Ctr. (Israel)

1:50 pm: **Intracavity optical parametric oscillators based upon OP-GaAs** (*Invited Paper*), David M. Stothard, Univ. of St. Andrews (United Kingdom) and Fraunhofer Ctr. for Applied Photonics (United Kingdom); Daniel J. Kane, Univ. of Strathclyde (United Kingdom); Malcolm H. Dunn, Univ. of St. Andrews (United Kingdom) [8964-10]

2:20 pm: **Efficient femtosecond 50 MHz repetition rate mid-IR source up to 17 μ m by difference-frequency generation in AgGaSe₂**, Marcus Beutler, Ingo Rimke, Edlef Büttner, APE GmbH (Germany); Valery V. Badikov, Dmitri V. Badikov, Kuban State Technological Univ. (Russian Federation); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8964-11]

2:40 pm: **Mid IR light source generated by OPO using PPMgSLT for laser ultrasound testing of carbon-fiber-reinforced plastic (CFRP)**, Kenji Kitamura, Hideki Hatano, National Institute for Materials Science (Japan) and SWING Ltd. (Japan); Shunji Takekawa, Hisashi Yamawaki, National Institute for Materials Science (Japan); Junji Hirohashi, Yasunori Furukawa, Oxide Corp. (Japan) [8964-12]

3:00 pm: **Non-collinear upconversion of incoherent light: designing infrared spectrometers and imaging systems**, Jeppe S. Dam, Qi Hu, Lasse Høgstedt, Christian Pedersen, Peter Tidemand-Lichtenberg, Technical Univ. of Denmark (Denmark) [8964-13]

3:20 pm: **Broadly tunable Watt-level femtosecond soliton-seeded optical parametric amplifier in the near- and mid-infrared**, Tobias R. J. Steinle, Joachim Krauth, Andy Steinmann, Harald W. Giessen, Univ. Stuttgart (Germany) [8964-14]

Coffee Break Tue 3:40 pm to 4:10 pm



SESSION 4

Location: Room 133 (Exhibit Level) . . . Tue 4:10 pm to 5:50 pm

High-order and Stimulated Nonlinear Phenomena

Session Chair: **Konstantin L. Vodopyanov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

4:10 pm: **Visualization of light filamentation in air and liquids** (*Invited Paper*), Andreas Veltén, Morgridge Institute for Research (USA) and Univ. of Wisconsin-Madison (USA); Andreas Schmitt-Sody, Air Force Research Lab. (USA); Adrian Lucero, U.S. Air Force (USA) and The Univ. of New Mexico (USA); Shermineh Rostami, Amin Rasoulof, Xiaozhen Xu, Chengyong Feng, Brian Kamer, The Univ. of New Mexico (USA); Thomas R. Mackie, Univ. of Wisconsin-Madison (USA); Kevin W. Eliceiri, Morgridge Institute for Research (USA) and Univ. of Wisconsin-Madison (USA); Ladan Arissian, Jean-Claude M. Diels, The Univ. of New Mexico (USA) [8964-15]

4:40 pm: **Four wave mixing and coupled solitons**, Amin Rasoulof, The Univ. of New Mexico (USA); Danhua Wang, Southern Methodist Univ. (USA); Ladan Arissian, The Univ. of New Mexico (USA); Alejandro B. Aceves, Southern Methodist Univ. (USA); Jean-Claude M. Diels, The Univ. of New Mexico (USA) [8964-16]

5:00 pm: **Power scaling of diamond Raman lasers beyond 100 W using quasi-cw pumping**, Robert J. Williams, Ondrej Kitzler, Aaron M. McKay, Richard P. Mildren, Macquarie Univ. (Australia) [8964-17]

5:20 pm: **Applications of stimulated Brillouin scattering in silicon photonics** (*Invited Paper*), Peter T. Rakich, Yale Univ. (USA) [8964-18]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Multicolor frequency upconversion luminescence in europium/terbium co-doped ytterbium-sensitized fluorogermanate glass excited at 980 nm, James R. Silva, Artur S. Gouveia-Neto, Luciano A. Bueno, Univ. Federal Rural de Pernambuco (Brazil) [8964-44]

Optical frequency comb generated by means of enhanced multiple four-wave mixing, Suzanne A. S. Melo, INATEL (Brazil); Adriano R. Nascimento Jr., Univ. Estadual de Campinas (Brazil); Arismar Cerqueira Sodré Jr., INATEL (Brazil); Luis H. H. Carvalho, Daniel M. Pataca, Júlio C.R. F. Oliveira, CpqD Foundation (Brazil) [8964-45]

New simple method for measuring nonlinear polarization ellipse rotation with high precision using a dual-phase lock-in, Lino Misoguti, Maria L. Miguez, Emerson C. Barbano, Sérgio C. Zilio, Univ. de São Paulo (Brazil) [8964-46]

Reflectance difference spectroscopy and second harmonic generation from strained silicon, Ramon Carriles, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Raúl E. Balderas-Navarro, Antonio N. Ulloa-Castillo, Univ. Autónoma de San Luis Potosí (Mexico); Keisuke Arimoto, Univ. of Yamanashi (Japan); Luis F. Lastras-Martínez, Univ. Autónoma de San Luis Potosí (Mexico); Hiroshi Furukawa, Junji Yamanaka, Ctr. for Crystal Science and Technology (Japan); Alfonso Lastras-Martínez, Univ. Autónoma de San Luis Potosí (Mexico); Norikata Usami, Tohoku Univ. (Japan); David Stifter, Kurt Hingerl, Johannes Kepler Univ. Linz (Austria); Rafael Herrera-Jasso, Univ. Autónoma de San Luis Potosí (Mexico); Angie C. Lin, James S. Harris Jr., Martin M. Fejer, Stanford Univ. (USA) [8964-47]

Mutual coherence measurement of THz beat notes generated by dual injection in a Fabry-Perot laser by using linear optical sampling, Christophe Gosset, Télécom ParisTech (France); Cheng Wang, Télécom ParisTech (France) and Univ. Européenne de Bretagne (France); Xin You, Frédéric Grillot, Philippe Gallion, Télécom ParisTech (France) [8964-48]

Nonlinear index of refraction of borate glass doped with transition metals, Ruben D. Fonseca, Juliana M. P. Almeida, Leonardo De Boni, Antonio C. Hernandez, Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8964-50]

Sum frequency generation process for new astronomical instrument, Romain Baudoin, Leukos (France) and XLIM Institut de Recherche (France); Jean-Thomas Gomes, Laurent Delage, Ludovic Grossard, François Reynaud, XLIM Institut de Recherche (France); Theo A. ten Brummelaar, Nicholas J. Scott, Judit Sturmman, CHARA (USA) [8964-51]

Upconversion enhanced degenerate four-wave mixing in the mid-infrared for sensitive detection of acetylene in gas flows, Lasse Høgstvedt, Jeppe Seidelin Dam, Technical Univ. of Denmark (Denmark); Anna-Lena Sahlberg, Zhongshan S. Li, Marcus Aldén, Lund Univ. (Sweden); Christian Pedersen, Peter Tidemand-Lichtenberg, Technical Univ. of Denmark (Denmark) . . . [8964-52]

Compact, room temperature 9.3 THz source, Aleksej Majkic, Andrej Petelin, Jožef Stefan Institute (Slovenia); Marko Zgonik, Jožef Stefan Institute (Slovenia) and Univ. of Ljubljana (Slovenia); Mojca Jazbinsek, Blanca Ruiz, Carolina C. Medrano, Peter Günter, Rainbow Photonics AG (Switzerland) [8964-53]

Mid-IR peak power scaling in a ZGP OPO, pumped by a Tm: fiber MOPA system, Martin Gebhardt, Christian Gaida, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Friedrich-Schiller-Univ. Jena (Germany); Pankaj Kadwani, Lawrence Shah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8964-54]

Mid-infrared upconversion spectroscopy using diffuse reflectance, Nicolai H. Sanders, DTU Fotonik (Denmark); Louis M. Kehlet, Jeppe S. Dam, Peter Tidemand-Lichtenberg, Technical Univ. of Denmark (Denmark); Pablo Beato, Haldor Topsøe A/S (Denmark); Christian Pedersen, Technical Univ. of Denmark (Denmark) [8964-55]

Near diffraction limited mid-IR spectromicroscopy using frequency upconversion, Nicolai H. Sanders, Jeppe S. Dam, Peter Tidemand-Lichtenberg, Christian Pedersen, Technical Univ. of Denmark (Denmark) [8964-56]

Saturable absorption properties of multi-core nonlinear fiber arrays, Elham Nazemosadat, Arash Mafi, Univ. of Wisconsin-Milwaukee (USA) [8964-57]

500µJ femtosecond UV laser and top-hat pulse shaping, Antoine Courjaud, Vincent Clet, Ludovic Quintard, Eric P. Mottay, Amplitude Systèmes (France) [8964-58]

High energy Yb:CaF₂ femtosecond laser for efficient terahertz generation in lithium niobate, Balazs Monoszlai, Carlo Vicario, Paul Scherrer Institut (Switzerland); Csaba Lombosi, Univ. of Pécs (Hungary); Alizée A. Mareczko, Amplitude Systèmes (France); Antoine Courjaud, Amplitude Systèmes (France); József A. Fülöp, Univ. of Pécs (Hungary); Christoph P. Hauri, Paul Scherrer Institut (Switzerland) [8964-59]

Continuously-tunable, broadband 40 ps pulse train generation source, from MHz to GHz applications, Xin You, Télécom ParisTech (France); Grethell G. Perez-Sanchez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Christophe Gosset, Télécom ParisTech (France) [8964-60]

Enhanced second harmonic generation in lithium niobate hexagonal micro-resonator via total internal reflection quasi-phase-matching, Christos Riziotis, National Hellenic Research Foundation (Greece); Tleyane J. Sono, Element Six (Pty) Ltd. (South Africa); Sakellaris Mailis, Robert W. Eason, Univ. of Southampton (United Kingdom) [8964-61]

Polarization evolution of laser filaments in air and the contribution of pre-filamentation propagation, Shermineh Rostami, Brian Kamer, Ladan Arissian, Jean-Claude M. Diels, The Univ. of New Mexico (USA); Tamar Seideman, Northwestern Univ. (USA) [8964-62]

Multi-watt frequency divide-by-three optical parametric oscillator, Yen-Yin Lin, National Tsing Hua Univ. (Taiwan) [8964-63]

Supercontinuum pulse train fluorescence technique: triplet state dynamics determination, Leonardo De Boni, Tiago G. B. de Souza, Marcelo G. Vivas, Sérgio C. Zilio, Cleber R. Mendonça, Lino Misoguti, Univ. de São Paulo (Brazil) [8964-64]

Difference frequency generation of Mid-IR radiation in PPLN crystals using a dual-wavelength all-fiber amplifier, Karol Krzempek, Grzegorz J. Sobon, Jaroslaw Z. Sotor, Grzegorz Dudzik, Krzysztof M. Abramski, Wrocław Univ. of Technology (Poland) [8964-65]

Nonlinear refraction in rutile TiO₂, Sarah Griesse-Nascimento, Harvard School of Engineering and Applied Sciences (USA); Christopher C. Evans, SeungYeon Kang, Orad Reshef, Michael G. Moebius, Eric Mazur, Harvard Univ. (USA) [8964-66]

Theoretical analysis of effect of pump and signal wavelengths on modal instabilities in Yb-doped fiber amplifiers, Shadi A. Naderi, Iyad Dajani, Timothy Madden, Air Force Research Lab. (USA); Thien-Nam Dinh, Univ. of Delaware (USA) [8964-67]

Pump suppressed four-wave mixing in optical fibers for correlated photon generation using feedback technique, Ankita Jain, Suchita Yadav, Pradeep K. Krishnamurthy, Ramarao Vijaya, Indian Institute of Technology Kanpur (India) [8964-68]

Wednesday 5 February

SESSION 5

Location: Room 133 (Exhibit Level) .. Wed 8:30 am to 9:50 am

Nonlinear Optical Phenomena and Signal Processing

Session Chairs: **Michael Vasilyev**, The Univ. of Texas at Arlington (USA);
Darrell J. Armstrong, Sandia National Labs. (USA)

8:30 am: **All-optical signal regeneration of advanced modulation formats** (*Invited Paper*), Tobias Roethlingshoefer, Max-Planck-Institut für die Physik des Lichts (Germany) and Friedrich-Alexander Univ. Erlangen-Nürnberg (Germany); Thomas Richter, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); Birgit Stiller, Georgy Onishchukov, Max-Planck-Institut für die Physik des Lichts (Germany) and Friedrich-Alexander Univ. Erlangen-Nürnberg (Germany); Colja Schubert, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); Bernhard Schmauss, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Gerd Leuchs, Max-Planck-Institut für die Physik des Lichts (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany)[8964-19]

9:00 am: **Generation of low-noise frequency replicas in parametric frequency combs via phase-sensitive process** (*Invited Paper*), Zhi Tong, Lan Liu, Stojan Radic, Univ. of California, San Diego (USA).....[8964-20]

9:30 am: **Mode-selective frequency up-conversion in a chi(2) waveguide**, Young B. Kwon, Michael Vasilyev, The Univ. of Texas at Arlington (USA)[8964-21]

Coffee Break Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA);
Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best "Green" LASE Paper Award**,
Stephen J. Eglash, Energy and Environment Affiliates Program,
Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 2:00 pm

SESSION 6

Location: Room 133 (Exhibit Level) .. Wed 2:00 pm to 3:40 pm

Nonlinear Fiber Devices and Applications

Session Chairs: **Darrell J. Armstrong**, Sandia National Labs. (USA);
Michael Vasilyev, The Univ. of Texas at Arlington (USA)

2:00 pm: **Effect of pump coherence on third-order nonlinear processes**,
Stephane Virally, Nicolas Godbout, Ecole Polytechnique de Montréal
(Canada)[8964-22]

2:20 pm: **Influence of fiber laser pump conditions at 1550 nm on broadband infrared supercontinuum generation in all-solid all-normal dispersion photonic crystal fibers**, Mariusz Klimczak, Bartłomiej Siwicki, Institute of Electronic Materials Technology (Poland); Grzegorz J. Sobon, Jaroslaw Z. Sotor, Wroclaw Univ. of Technology (Poland); Dariusz Pysz, Ryszard Stepien, Institute of Electronic Materials Technology (Poland); Tadeusz Martynkien, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland); Ryszard R. Buczynski, Univ. of Warsaw (Poland) and Institute of Electronic Materials Technology (Poland)[8964-23]

2:40 pm: **Fiber laser driven broadly tunable femtosecond mid-infrared source**, Yuhong Yao, Wayne H. Knox, Univ. of Rochester (USA)[8964-24]

3:00 pm: **Investigations of SBS and laser gain competition in high-power phase modulated fiber amplifiers**, Angel Flores, Iyad Dajani, Air Force Research Lab. (USA); Dane W. Hult, Trex Enterprises Corp. (USA)[8964-25]

3:20 pm: **Second-order coherence measurement of supercontinuum**, Mikko Närhi, Tampere Univ. of Technology (Finland); Minna M. Korhonen, Jari Turunen, Ari T. Friberg, Univ. of Eastern Finland (Finland); Goëry Genty, Tampere Univ. of Technology (Finland).....[8964-26]

Coffee Break Wed 3:40 pm to 4:10 pm

SESSION 7

Location: Room 133 (Exhibit Level) .. Wed 4:10 pm to 6:30 pm

Frequency Combs and Supercontinuum Generation

Session Chair: **Konstantin L. Vodopyanov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

4:10 pm: **SWIR and MIR super-continuum lasers and field trial results** (*Invited Paper*), Mohammed N. Islam, Univ. of Michigan (USA)[8964-27]

4:40 pm: **Mid-IR supercontinuum generation using nanospike chalcogenide-silica fibers** (*Invited Paper*), Markus A. Schmidt, Institut für Photonische Technologien e.V. (Germany); Nicolai Granzow, Philip Russell, Max-Planck-Institut für die Physik des Lichts (Germany)[8964-28]

5:10 pm: **Broadband IR supercontinuum generation in hexagonal lattice tellurite photonic crystal fiber with dispersion optimized for pumping over 1500 nm**, Mariusz Klimczak, Grzegorz Stepniowski, Institute of Electronic Materials Technology (Poland); Henry T. Bookey, Heriot-Watt Univ. (United Kingdom); Dariusz Pysz, Institute of Electronic Materials Technology (Poland); Andrew J. Waddie, Heriot-Watt Univ. (United Kingdom); Ryszard Stepien, Institute of Electronic Materials Technology (Poland); Ajoy K. Kar, Mohammed R. Taghizadeh, Heriot-Watt Univ. (United Kingdom); Ryszard R. Buczynski, Univ. of Warsaw (Poland) and Institute of Electronic Materials Technology (Poland)[8964-29]

5:30 pm: **500-MHz-rep-rate mid-IR frequency comb produced in a fractional sync-pumped optical parametric oscillator**, Kirk A. Ingold, Alireza Marandi, Charles W. Rudy, Stanford Univ. (USA); Robert L. Byer, Stanford Univ. (USA); Konstantin L. Vodopyanov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA).....[8964-30]

5:50 pm: **Mid-infrared supercontinuum generation using lead-bismuth-gallium-oxide glass-based photonic crystal fibers pumped at 1560 nm**, Grzegorz J. Sobon, Wroclaw Univ. of Technology (Poland); Mariusz Klimczak, Institute of Electronic Materials Technology (Poland); Jaroslaw Z. Sotor, Karol Krzempek, Wroclaw Univ. of Technology (Poland); Dariusz Pysz, Ryszard Stepien, Institute of Electronic Materials Technology (Poland); Tadeusz Martynkien, Grzegorz Dudzik, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland); Ryszard R. Buczynski, Institute of Electronic Materials Technology (Poland) and Univ. of Warsaw (Poland)[8964-31]

6:10 pm: **Mid-infrared frequency comb generation using a continuous-wave pumped optical parametric oscillator**, Markku M. Vainio, Univ. of Helsinki (Finland) and Ctr. for Metrology and Accreditation (Finland); Ville Ulvila, Univ. of Helsinki (Finland); Christopher R. Phillips, ETH Zurich (Switzerland); Lauri Halonen, Univ. of Helsinki (Finland).....[8964-69]

Thursday 6 February

SESSION 8

Location: Room 133 (Exhibit Level) ... Thu 8:00 am to 9:50 am

Nonlinear Materials and Characterization I

Session Chairs: **Rita D. Peterson**, Air Force Research Lab. (USA);
Kenneth L. Schepler, Air Force Research Lab. (USA);
Peter G. Schunemann, BAE Systems (USA)

8:00 am: **Directly laser written chalcogenide photonics devices** (*Invited Paper*), Ajoy K. Kar, Heriot-Watt Univ. (United Kingdom).....[8964-32]

8:30 am: **Sensitive absorption measurements in bulk material and coatings using a photothermal and a photoacoustic spectrometer**, Stephan Fieberg, Niklas Waasem, Frank Kühnemann, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany) and Univ. of Freiburg (Germany)[8964-33]

8:50 am: **Dielectric breakdown in periodically poled LiTaO₃ crystal during second harmonic generation**, Kenji Kitamura, National Institute for Materials Science (Japan) and SWING Ltd. (Japan); Oleg A. Louchev, RIKEN (Japan); Hideki Hatano, Shunji Takekawa, National Institute for Materials Science (Japan) and SWING Ltd. (Japan); Junji Hirohashi, Oxide Corp. (Japan); Satoshi Wada, RIKEN (Japan)[8964-34]



Conference 8964 · Location: Room 133 (Exhibit Level)

9:10 am: **Simultaneous three band CW laser by utilizing PPMgSLT devices**, Yasuhiro Tomihari, Satoshi Makio, Masami Hatori, Masayuki Hoshi, Junji Hirohashi, Koichi Imai, Hiroshi Motegi, Yasunori Furukawa, Oxide Corp. (Japan). [8964-35]

9:30 am: **An analysis of thermal effects in high power (8 W) KGW Raman lasers**, Aaron M. McKay, Ondrej Kitzler, Richard P. Mildren, Macquarie Univ. (Australia). [8964-36]

Coffee Break Thu 9:50 am to 10:20 am

SESSION 9

Location: Room 133 (Exhibit Level) · Thu 10:20 am to 12:20 pm

Nonlinear Materials and Characterization II

Session Chairs: **Rita D. Peterson**, Air Force Research Lab. (USA);
Kenneth L. Schepler, Air Force Research Lab. (USA)

10:20 am: **All-epitaxial growth of orientation-patterned GaAs and GaP waveguides**, Peter G. Schunemann, Peter A. Ketteridge, Paul R. Moffitt, BAE Systems (USA). [8964-38]

10:40 am: **HVPE growth of bulk orientation-patterned gallium phosphide (OP-GaP) on MBE templates**, Peter G. Schunemann, Alice Vera, Lee Mohnkern, Xiaoping S. Yang, BAE Systems (USA). [8964-39]

11:00 am: **GaP refractive index measurements between 0.7 and 5.2 μm** , David E. Zelmon, Air Force Research Lab. (USA); Peter G. Schunemann, BAE Systems (USA). [8964-40]

11:20 am: **Laser damage studies of CdSiP₂ and ZnGeP₂ nonlinear crystals with nanosecond pulses at 1064 and 2090 nm**, Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Anne Hildenbrand, Christelle Kieleck, Institut Franco-Allemand de Recherches de Saint-Louis (France); Aleksey Tyazhev, Georgi Marchev, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Georg Stöppler, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France); Peter G. Schunemann, BAE Systems (USA). [8964-41]

11:40 am: **Estimation of random duty-cycle error in periodically-poled lithium niobate by simple diffraction experiment**, Prashant P. Dwivedi, Hee Joo Choi, Byoung Joo Kim, Myoungsik Cha, Pusan National Univ. (Korea, Republic of). [8964-42]

12:00 pm: **Direct measurement of thermal lensing in GaAs induced by 100 W Tm: fiber laser**, Joshua D. Bradford, Konstantin L. Vodopyanov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Peter G. Schunemann, BAE Systems (USA); Lawrence Shah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). [8964-43]

High-Power Diode Laser Technology and Applications XII

Conference Chair: **Mark S. Zediker**, Foro Energy, Inc. (USA)

Program Committee: **Friedrich G. Bachmann**, FriBa LaserNet (Germany); **Stefan W. Heinemann**, TRUMPF Photonics (USA); **Volker Krause**, Laserline GmbH (Germany); **Robert J. Martinsen**, nLIGHT Corp. (USA); **Kurt J. Linden**, Spire Corp. (USA); **Erik P. Zucker**, JDSU (USA)

Sunday 2 February

SESSION 1

Location: Room 133 (Exhibit Level) . . Sun 8:30 am to 10:10 am

High Power Diode Laser Reliability I

Session Chair: **Erik P. Zucker**, JDSU (USA)

8:30 am: **Reliability study on high power 638 nm broad stripe LD with a window-mirror structure**, Tetsuya Yagi, Hiroshi Mitsuyama, Takehiro Nishida, Mitsubishi Electric Corp. (Japan); Kaoru Kadoiwa, Mitsubishi Electric Corp (Japan); Kyosuke Kuramoto, Mitsubishi Electric Corp. (Japan) [8965-1]

8:50 am: **Internal degradation of 980 nm emitting single-spatial-mode lasers during ultrahigh power operation**, Jens W. Tomm, Martin Hempel, Thomas Elsässer, Forschungsverbund Berlin e.V. (Germany); Juan Jimenez, Vanesa Hortelano, Univ. de Valladolid (Spain); Mauro A. Bettiati, 3S PHOTONICS S.A.S. (France) [8965-2]

9:10 am: **Catastrophic degradation in high power multi-mode InGaAs-AlGaAs strained quantum well lasers with intrinsic and irradiation-induced defects**, Yongkun Sin, Stephen LaLumondiere, Erica Delonno, Brendan Foran, Nathan Presser, William Lotshaw, Steven C. Moss, The Aerospace Corp. (USA) [8965-3]

9:30 am: **Nanoscale coatings for erosion and corrosion protection of copper microchannel coolers for high powered laser diodes**, Matt Flannery, Angie Fan, Tapan Desai, Advanced Cooling Technologies, Inc. (USA) . . . [8965-4]

9:50 am: **Feedback-induced catastrophic optical mirror damage (COMD) on 976nm broad area single emitters with different AR reflectivity**, Britta Leonhäuser, Heiko Kissel, Andreas Unger, Bernd Köhler, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8965-5]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 2

Location: Room 133 (Exhibit Level) . Sun 10:40 am to 12:00 pm

High Power Diode Laser Reliability II

Session Chair: **Erik P. Zucker**, JDSU (USA)

10:40 am: **Advancements in laser diode chip and packaging technologies for application in kW-class fiber laser pumping**, Erik P. Zucker, Daniel Zou, Laura Zavala, Prasad Yalamanchili, Lei Xu, JDSU (USA); Hui Xu, JDSU Ltd. (China); Jay Skidmore, Victor Rossin, Reddy Raju, Matthew Peters, Rupa Gurram, Kong-Weng Lee, Allen Hsieh, James Guo, Nicolas Guerin, Richard Duesterberg, Jihua Du, Abdullah Demir, Peter Cheng, Jane Cheng, JDSU (USA) [8965-6]

11:00 am: **High reliability of high power and high brightness diode lasers**, Manoj Kanskar, Ling Bao, John Bai, Keith Kennedy, Mike Grimshaw, Mark DeVito, Jeff Tibbals, Marty Hemenway, Weimin Dong, Xing Guang, Shiguo Zhang, Kirk Price, Rob Martinsen, Jim Haden, nLIGHT Corp. (USA) [8965-46]

11:20 am: **Watt-level continuous-wave diode lasers at 1180 nm with InGaAs quantum wells**, Katrin Paschke, Frank Bugge, Gunnar Blume, Christian Fiebig, Steffen Knigge, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8965-8]

11:40 am: **Inverse thermal lens for far-field angle reduction of high-power lasers**, Joachim Piprek, NUSOD Institute LLC (USA) [8965-44]

Lunch Break Sun 12:00 pm to 1:30 pm

SESSION 3

Location: Room 133 (Exhibit Level) . . . Sun 1:30 pm to 3:10 pm

High Power Beam Combining I

Session Chair: **Stefan W. Heinemann**, TRUMPF Photonics (USA)

1:30 pm: **A 25kW fiber-coupled diode laser for pumping applications**, Joerg Malchus, Volker Krause, Arnd Koesters, Laserline GmbH (Germany); Dave Matthews, Laserline Inc. (USA) [8965-10]

1:50 pm: **High-power dense wavelength division multiplexing (HP-DWDM) of frequency stabilized 9xx diode laser bars with a channel spacing of 1.5 nm**, Stefan Hengesbach, Fraunhofer-Institut für Lasertechnik (Germany) and RWTH Aachen (Germany); Niels Krauch, Carlo Holly, RWTH Aachen (Germany); Ulrich Witte, Martin Traub, Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8965-11]

2:10 pm: **high-power fiber-coupled diode lasers with superior brightness, efficiency, and reliability**, Keith Kennedy, Marty Hemenway, Wolfram Urbanek, Kylan Hoener, Kirk Price, Ling Bao, David Dawson, Manoj Kanskar, Jim Haden, nLIGHT Corp. (USA) [8965-12]

2:30 pm: **Near diffraction limit coherent addition of array of 10 broad-area laser diodes**, Bo Liu, Yehuda Braiman, Oak Ridge National Lab. (USA) . [8965-13]

2:50 pm: **Integrated coherent beam combining of a laser diode mini-bar**, Yunsong Zhao, Lin Zhu, Clemson Univ. (USA) [8965-14]

Coffee Break Sun 3:10 pm to 3:40 pm

SESSION 4

Location: Room 133 (Exhibit Level) . . . Sun 3:40 pm to 5:20 pm

High Power Beam Combining II

Session Chair: **Volker Krause**, Laserline GmbH (Germany)

3:40 pm: **High brightness, direct diode laser with kW output power**, Bastian Kruschke, Stefan W. Heinemann, Fabio Ferrario, Haro Fritsche, Wolfgang Gries, Uli Pahl, DirectPhotonics Industries GmbH (Germany) . [8965-15]

4:00 pm: **High density volume Bragg grating spectral beam combiner for pumping application using commercial fiber coupled laser diode modules**, George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Olexy Mokhun, Vadim Smirnov, OptiGrate Corp. (USA); Daniel Ott, Ivan B. Divliansky, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8965-16]

4:20 pm: **Narrow-stripe broad-area lasers with distributed-feedback surface gratings as brilliant sources for high power spectral beam combining systems**, Jonathan Decker, Paul Crump, Jörg Fricke, Hans Wenzel, Andre Maassdorf, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) [8965-17]

4:40 pm: **Scalable and modular diode laser architecture for fiber coupling that combines high-power, high-brightness, and low weight**, Andreas Bayer, Bernd Köhler, Axel Noeke, Matthias Küster, DILAS Diodenlaser GmbH (Germany); David A. Irwin, Steven G. Patterson, DILAS Diode Laser, Inc. (USA); Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8965-18]

5:00 pm: **Numerical analysis of external feedback concepts for spectral stabilization of high-power diode lasers**, Carlo Holly, RWTH Aachen (Germany); Stefan Hengesbach, RWTH Aachen (Germany) and Fraunhofer-Institut für Lasertechnik (Germany); Martin Traub, Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8965-19]

Conference 8965 · Location: Room 133 (Exhibit Level)

Monday 3 February

SESSION 5

Location: Room 133 (Exhibit Level) · Mon 8:00 am to 10:00 am

High Power Devices I

Session Chair: **Rob Martinsen**, nLIGHT Corp. (USA)

8:00 am: **Dense array slab-coupled optical waveguide laser capable of 500W/bar**, Mehmet Dogan, Science Research Lab., Inc. (USA); Gary M. Smith, Leo J. Missaggia, Michael K. Connors, Joseph P. Donnelly, George W. Turner, MIT Lincoln Lab. (USA); Jonah H. Jacob, Science Research Lab., Inc. (USA) [8965-20]

8:20 am: **High-brightness 800nm fiber-coupled laser diodes**, Moshe Levi, Noam Rappaport, Renana Tessler, Yuri Berk, Ophir Peleg, Moshe Shamay, Dan Yanson, Genadi Klumel, SCD Semiconductor Devices (Israel) [8965-21]

8:40 am: **High-volume manufacturing of 8XXnm-10XXnm single emitter pumps by MBE growth technique**, Alexander Ovtchinnikov, IPG Photonics Corp. (USA) [8965-22]

9:00 am: **Study of waveguide designs for high-power 9xx nm diode lasers operating at 200K**, Carlo F. Frevert, Paul Crump, Frank Bugge, Steffen Knigge, Götz Erbert, Ferdinand-Braun-Institut (Germany) [8965-23]

9:20 am: **Two photon absorption in high power broad area laser diodes**, Mehmet Dogan, Science Research Lab., Inc. (USA); Christopher P. Michael, Yan Zheng, Booz Allen Hamilton Inc. (USA); Lin Zhu, Clemson Univ. (USA); Jonah H. Jacob, Science Research Lab., Inc. (USA) [8965-24]

9:40 am: **High differential efficiency tilted wave laser**, Nikolay N. Ledentsov, Vitaly A. Shchukin, VI Systems GmbH (Germany); Nikita Y. Gordeev, Yuri M. Shernyakov, Alexey S. Payusov, Mikhail V. Maximov, Nikolay A. Kaluzhnyi, Sergey A. Mintairov, Vladimir M. Lantratov, Ksenia A. Vashanova, Marina M. Kulagina, Ioffe Physico-Technical Institute (Russian Federation) [8965-25]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 133 (Exhibit Level) Mon 10:30 am to 11:50 am

High Power Devices II

Session Chair: **Rob Martinsen**, nLIGHT Corp. (USA)

10:30 am: **High power pump laser diodes for 2 µm fibre laser**, Susanne Pawlik, René Todt, Michael Moser, II-VI Laser Enterprise GmbH (Switzerland); Christopher Button, Nick Gilbert, Mark Kearley, Steve Marchant, Ian Davies, Oclaro, Inc. (United Kingdom); Oscar Romero, II-VI Laser Enterprise (United States); Norbert Lichtenstein, II-VI Laser Enterprise GmbH (Switzerland) [8965-26]

10:50 am: **Wavelength stabilization of high power and high brightness laser systems using volume holographic gratings**, Viorel Negoita, Yufeng Li, Tobias Barnowski, Ching-Long Jiang, Haiyan An, Robert Roff, Ming Shih, Thilo Vethake, TRUMPF Photonics (USA); Tina Gottwald, Sven Schad, TRUMPF Laser GmbH & Co. KG (Germany); Georg Treusch, TRUMPF Photonics (USA) [8965-27]

11:10 am: **New highly-efficient laser bars and single emitters for 8xx-10xx nm pumping applications**, Agnieszka Pietrzak, Ralf Hülsewede, Martin Zorn, Olaf Hirsekorn, JENOPTIK Diode Lab GmbH (Germany); Jens Meusel, Matthias Schroeder, Joerg Diettrich, JENOPTIK Laser GmbH (Germany); Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany) [8965-28]

11:30 am: **Methods for slow axis beam quality improvement of high power broad area diode lasers**, Haiyan An, Yihan Xiong, TRUMPF Photonics (USA); Ching-Long Jiang, TRUMPF Photonics (USA); Berthold Schmidt, TRUMPF Photonics (Switzerland); Aloysius Inyang, Alexander Lewin, Qiang Zhang, Robert Roff, Georg Treusch, TRUMPF Photonics (USA) [8965-29]

Lunch Break Mon 11:50 am to 1:20 pm

SESSION 7

Location: Room 133 (Exhibit Level) .. Mon 1:20 pm to 3:00 pm

High Power Diode Laser Optics

Session Chair: **Stefan W. Heinemann**, TRUMPF Photonics (USA)

1:20 pm: **Automated alignment of fast-axis collimator lenses for high-power diode laser bars**, Thomas Westphalen, Martin Traub, Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [8965-30]

1:40 pm: **Aplanatic beam shaping for diffraction limited beam circularization of tapered laser diodes**, Arne Heinrich, Pantec Biosolutions AG (Liechtenstein); Clemens Hagen, Maximilian Harlander, Bernhard Nussbaumer, Pantec Engineering AG (Liechtenstein) [8965-31]

2:00 pm: **Micro optics for laser diode beam shaping**, Manfred Jarczyński, Jana Fründt, Ingo Steiner, Melanie Brodner, Udo Fornahl, Thomas Mitra, Jens Meinschien, LIMO Lissotschenko Mikrooptik GmbH (Germany) ... [8965-32]

2:20 pm: **Robust precision adhesive bonding of diode laser optics**, Tobias Mueller, Sebastian Haag, Fraunhofer-Institut für Produktionstechnologie (Germany); Thomas Gisler, Hansruedi Moser, FISBA OPTIK AG (Switzerland); Petteri Uusimaa, Modulight, Inc. (Finland); Christoph Axt, Rohwedder Micro Assembly GmbH (Germany); Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany) [8965-33]

2:40 pm: **Highly efficient and compact free beam kW-diode laser modules**, Jens Meinschien, Stephan Schneider, Dennis Bonsendorf, Melanie Brodner, Udo Fornahl, Dirk Hauschild, Ulrich Jentsch, Sebastian Liebl, Thomas Mitra, Detlef Stöhr, Michael Voss, LIMO Lissotschenko Mikrooptik GmbH (Germany) [8965-34]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 8

Location: Room 133 (Exhibit Level) .. Mon 3:30 pm to 5:30 pm

High Power Devices III

Session Chair: **Kurt J. Linden**, Spire Corp. (USA)

3:30 pm: **High power laser diodes at 14xx nm wavelength range for industrial and medical applications**, Jarkko Telkkälä, Julien Boucart, Martin Krejci, II-VI Laser Enterprise GmbH (Switzerland); Mark Kearley, Brian de Lary, James Waddup, Oclaro, Inc. (United Kingdom); Trevor Crum, II-VI Laser Enterprise (USA); Norbert Lichtenstein, II-VI Laser Enterprise GmbH (Switzerland) . [8965-35]

3:50 pm: **High power and high efficiency 14xx nm wavelength Fabry-Perrot lasers**, Tawee Tanbunek, Rajiv Pathak, Zhiji Wang, Heiko Winhold, Serguei Kim, Coherent, Inc. (USA) [8965-36]

4:10 pm: **High power diode lasers emitting from 639 nm to 690 nm**, Ling Bao, Mike Grimshaw, Mark Devito, Manoj Kanskar, Weimin Dong, Xingguo Guan, Shiguo Zhang, Keith Kennedy, Rob Martinsen, Jim Haden, nLIGHT Corp. (USA) [8965-37]

4:30 pm: **High-power visible spectrum diode lasers for display and medical applications: beam sources with tailored beam quality and spectral characteristics**, Andreas Unger, Bernd Köhler, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8965-38]

4:50 pm: **High power and high efficiency kW 88x-nm multi-junction pulsed diode laser bars and arrays**, Zhigang Chen, John Bai, Weimin Dong, Xingguo Guan, Shiguo Zhang, Sandrio Elim, Ling Bao, Mike Grimshaw, Mark Devito, Manoj Kanskar, nLIGHT Corp. (USA) [8965-39]

5:10 pm: **Simple design for fiber coupled 9xx nm kW-QCW pump module with high duty cycle based on customized chips and lateral heat removal**, Wolfgang Pittroff, Ferdinand-Braun-Institut (Germany) [8965-40]

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

- Performance assessment of high power QCW stacks for the HILASE system**, Pawel Sikocinski, Antonio Lucianetti, Jan Pilar, Martin Divoky, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Paul Crump, R. Staske, Ferdinand-Braun-Institut (Germany); Tomáš Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) [8965-7]
- Coupled function based stepped-tilted windows algorithm of Dammann grating optimization**, Ning Zhang, Yu Zhou, Jianfeng Sun, Liren Liu, Shanghai Institute of Optics and Fine Mechanics (China). [8965-42]
- Laser technology in automotive lighting**, Ceren Altingoz, Magneti Marelli Mako Elektrik Sanayi Ticaret A.S (Turkey). [8965-43]
- High-resolution spectral mapping of a lensed high power laser bar**, Caleb D. Gannon, Rose-Hulman Institute of Technology (USA); Tobias Koenning, Steven G. Patterson, DILAS Diode Laser, Inc. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA) [8965-45]
- Coupling of DBR tapered diode laser radiation into a single-mode-fiber at high powers**, Daniel Jedrzejczyk, Ferdinand-Braun-Institut (Germany); Patrick Asbahr, Ferdinand-Braun-Institut (Germany) and FCC FiberCableConnect GmbH (Germany); Markus Pulka, FCC FibreCableConnect GmbH (Germany); Bernd Eppich, Katrin Paschke, Ferdinand-Braun-Institut (Germany) [8965-47]
- Design and fabrication of high power single mode double-trench ridge waveguide laser**, Shaoyang Tan, Teng Zhai, Wei Wang, Ruikang Zhang, Dan Lu, Chen Ji, Institute of Semiconductors (China) [8965-48]
- Improved macro cooler for reduced thermal resistance**, David A. Irwin, DILAS Diode Laser, Inc. (USA); Wilhelm Fassbender, DILAS Diodenlaser GmbH (Germany); Steven G. Patterson, DILAS Diode Laser, Inc. (USA); Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) [8965-49]





Vertical External Cavity Surface Emitting Lasers (VECSELs) IV

Conference Chair: **Jerome V. Moloney**, College of Optical Sciences, The Univ. of Arizona (USA)

Program Committee: **Juan L. Chilla**, Coherent, Inc. (USA); **Arnaud Garnache**, Univ. Montpellier 2 (France); **Mircea Guina**, Tampere Univ. of Technology (Finland); **Jennifer E. Hastie**, Univ. of Strathclyde (United Kingdom); **Elyahou Kapon**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Ursula Keller**, ETH Zurich (Switzerland); **Anne C. Tropper**, Univ. of Southampton (United Kingdom)

Sunday 2 February

SESSION 1

Location: Room 123 (Exhibit Level) . . Sun 8:30 am to 10:10 am

Fundamental Physics

Session Chair: **Jerome V. Moloney**,
College of Optical Sciences, The Univ. of Arizona (USA)

8:30 am: **Nonequilibrium effects in the VECSEL gain medium** (*Keynote Presentation*), Stephan W. Koch, Philipps-Univ. Marburg (Germany) [8966-1]

9:20 am: **Exploring ultrafast negative Kerr Effect for self-modelocking vertical external-cavity surface-emitting lasers** (*Invited Paper*), Alexander R. Albrecht, The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Yi Wang, The Univ. of New Mexico (USA); Jeffrey G. Cederberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8966-2]

9:50 am: **Influence of Coulomb screening on lateral lasing in optically-pumped semiconductor disc lasers**, Chengao Wang, Kevin Malloy, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8966-3]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 2

Location: Room 123 (Exhibit Level) . Sun 10:40 am to 12:30 pm

Ultrafast VECSELs I

Session Chair: **Stephan W. Koch**, Philipps-Univ. Marburg (Germany)

10:40 am: **Carbon nanotube mode-locked vertical external-cavity surface-emitting laser** (*Invited Paper*), Kai Seger, Niels Meiser, KTH Royal Institute of Technology (Sweden); Sun Y. Choi, Bo H. Jung, Dong-Il Yeom, Fabian Rotermund, Ajou Univ. (Korea, Republic of); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland); Fredrik Laurell, Valdas Pasiskevicius, KTH Royal Institute of Technology (Sweden) [8966-4]

11:10 am: **Graphene modelocked VECSELs** (*Invited Paper*), Christian A. Zaugg, ETH Zurich (Switzerland); Valentin J. Wittwer, Zhipei Sun, Daniel Popa, Silvia Milana, Tero Kulmala, Ravi S. Sundaram, Univ. of Cambridge (United Kingdom); Mario Mangold, Matthias Golling, ETH Zurich (Switzerland); Young Lee, Jong-Hyun Ahn, Sungkyunkwan Univ. (Korea, Republic of); Andrea C. Ferrari, Univ. of Cambridge (United Kingdom); Ursula Keller, ETH Zurich (Switzerland) . . . [8966-5]

11:40 am: **Graphene-based saturable absorbers in semiconductor lasers**, Saima Husaini, Robert G. Bedford, Air Force Research Lab. (USA) [8966-6]

12:00 pm: **Femtosecond MIXSEL** (*Invited Paper*), Mario Mangold, Valentin J. Wittwer, Christian A. Zaugg, Sandro M. Link, Matthias Golling, Bauke W. Tilma, Ursula Keller, ETH Zurich (Switzerland) [8966-7]

Lunch Break Sun 12:30 pm to 2:00 pm

SESSION 3

Location: Room 123 (Exhibit Level) . . . Sun 2:00 pm to 3:20 pm

Single Frequency/Low Noise

Session Chair: **Mircea D. Guina**, Tampere Univ. of Technology (Finland)

2:00 pm: **Intensity and frequency noise properties of multi-Watt single frequency VECSEL with and without active stabilization** (*Invited Paper*), Alexandre Laurain, Jorg Hader, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [8966-8]

2:30 pm: **Frequency-stabilized ultraviolet semiconductor disk laser** (*Invited Paper*), David Pabœuf, Peter J. Schlosser, Jennifer E. Hastie, Univ. of Strathclyde (United Kingdom) [8966-9]

3:00 pm: **Record-low noise performance of high-power picosecond MIXSEL**, Sandro M. Link, Mario Mangold, Valentin J. Wittwer, Alexander Klenner, Matthias Golling, Bauke W. Tilma, Ursula Keller, ETH Zurich (Switzerland) [8966-10]

Coffee Break Sun 3:20 pm to 3:50 pm

SESSION 4

Location: Room 123 (Exhibit Level) . . . Sun 3:50 pm to 5:30 pm

Novel Sources/Applications

Session Chair: **Juan L. Chilla**, Coherent, Inc. (USA)

3:50 pm: **High-efficiency tunable yellow-orange VECSEL with an output power of 20 W**, Emmi L. Kantola, Tomi Leinonen, Sanna Ranta, Miki Tavast, Mircea Guina, Tampere Univ. of Technology (Finland) [8966-28]

4:10 pm: **Terahertz generation by difference frequency conversion of two single-frequency VECSELs in an external resonance cavity** (*Invited Paper*), Maik Scheller, Desert Beam Technologies LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Justin R. Paul, Desert Beam Technologies LLC (USA) and The Univ. of Arizona (USA); Alexandre Laurain, College of Optical Sciences, The Univ. of Arizona (USA); Abram Young, The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany) and Desert Beam Technologies LLC (USA); Jerome V. Moloney, Desert Beam Technologies LLC (USA) and College of Optical Sciences, The Univ. of Arizona (USA) . . . [8966-12]

4:40 pm: **Novel architecture of highly-compact diffraction limited single frequency vertical external cavity surface-emitting organic laser (VECSOL) with volume Bragg grating (VBG) output coupler**, Oussama Mhibik, Sébastien Forget, Sébastien Chenais, Univ. Paris 13 (France); Daniel Ott, Ivan Divliansky, George Venus, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8966-13]

5:00 pm: **Wafer-fused VECSELs emitting in the 1310 nm waveband** (*Invited Paper*), Alexei Sirbu, Kamil Pierscinski, Alexandru Mereuta, Andrei Caliman, Vladimir Iakovlev, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Jari Lyytikäinen, Jussi Rautiainen, Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland); Elyahou Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8966-14]

Monday 3 February

SESSION 5

Location: Room 123 (Exhibit Level) . Mon 8:30 am to 10:00 am

Electrical Pumping

Session Chair: **Anne C. Tropper**,
Univ. of Southampton (United Kingdom)

8:30 am: **High power electrically pumped VECSELs and arrays** (*Invited Paper*), Holger Moench, Philips Technologie GmbH (Germany); Anastasia Andreadaki, Philips Research (Netherlands); Stephan Gronenborn, Philips Technologie GmbH (Germany); Johanna S. Kolb, Philips Research (Germany); Peter Loosen, RWTH Aachen Univ. (Germany); Michael Miller, Philips Technologie GmbH U-L-M Photonics (Germany); Thomas Schwarz, RWTH Aachen (Germany); Alexander M. Van Der Lee, Philips Research (Netherlands); Ulrich Weichmann, Philips Research (Germany) [8966-15]

9:00 am: **Coaxial tunnel junctions: a novel approach to reduce the current crowding effect in electrically-pumped VECSELs**, Jaroslaw Walczak, Michal Wasiak, Robert P. Sarzala, Technical Univ. of Lodz (Poland); Alexei Sirbu, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Tomasz Czystanowski, Technical Univ. of Lodz (Poland) [8966-16]

9:20 am: **SESAM-modelocked electrically pumped VECSELs emitting 6.3-ps pulses**, Christian A. Zaugg, Wolfgang P. Pallmann, Mario Mangold, ETH Zurich (Switzerland); Imad Dahhan, Univ. Kassel (Germany); Matthias Golling, Bauke W. Tilma, ETH Zurich (Switzerland); Bernd Witzigmann, Univ. Kassel (Germany); Ursula Keller, ETH Zurich (Switzerland) [8966-17]

9:40 am: **216 MHz repetition rate passively mode-locked electrically-pumped VECSEL**, Ali Alhazime, Mantas Butkus, Univ. of Dundee (United Kingdom); Craig J. Hamilton, M Squared Lasers (United Kingdom); Edik U. Rafailov, Univ. of Dundee (United Kingdom) [8966-18]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 123 (Exhibit Level) Mon 10:30 am to 12:00 pm

Multi-Frequency/Applications

Session Chair: **Elyahou Kapon,**

Ecole Polytechnique Fédérale de Lausanne (Switzerland)

10:30 am: **Generation of high-purity microwave signals from a dual-frequency OP-VECSEL** (*Invited Paper*), Fabiola Almeida Camargo, Gaëlle Lucas-Leclin, Paul Dumont, Iryna Gozhyk, Sylvie Janicot, Patrick Georges, Institut d'Optique Graduate School (France); Ghaya Baili, Gregoire Pillet, Loic Morvan, Daniel Dolfi, Thales Research & Technology (France); David Holleville, Stéphane Guerandel, Jean-Marie Danet, Observatoire de Paris (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France)[8966-19]

11:00 am: **Experimental and theoretical study of noise in a dual-frequency VECSEL**, Syamsundar D. E., Lab. Aimé Cotton (France); Abdelkrim El Amili, Univ. de Rennes 1 (France); Gregoire Pillet, Ghaya Baili, Thales Research & Technology (France); Fabienne Goldfarb, Lab. Aimé Cotton (France); Mehdi Alouini, Univ. de Rennes 1 (France); Fabien Bretenaker, Lab. Aimé Cotton (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France)[8966-20]

11:20 am: **Systematic investigation of single- and multi-mode operation in vertical-external-cavity surface-emitting lasers**, Matthias Wichmann, Mohammad K. Shakfa, Philipps-Univ. Marburg (Germany); Maik Scheller, College of Optical Sciences, The Univ. of Arizona (USA) and Desert Beam Technologies LLC (USA); Alexey Chernikov, Arash Rahimi-Iman, Bernd Heinen, Philipps-Univ. Marburg (Germany); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) and Desert Beam Technologies LLC (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany) and Desert Beam Technologies LLC (USA); Martin Koch, Philipps-Univ. Marburg (Germany)[8966-21]

11:40 am: **Picosecond MIXSEL for clocking applications**, Mario Mangold, Valentin J. Wittwer, Christian A. Zaugg, Sandro M. Link, Matthias Golling, Bauke W. Tilmä, Ursula Keller, ETH Zurich (Switzerland)[8966-22]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 7

Location: Room 123 (Exhibit Level) .. Mon 1:30 pm to 3:00 pm

Ultrafast VECSELS II

Session Chair: **Jennifer E. Hastie,** Univ. of Strathclyde (United Kingdom)

1:30 pm: **Femtosecond mode-locked red AlGaInP-VECSEL** (*Invited Paper*), Roman Bek, Hermann Kahle, Thomas Schwarzbäck, Michael Jetter, Peter Michler, Univ. Stuttgart (Germany)[8966-23]

2:00 pm: **Passively mode-locked VECSELS at 675 nm and 2 µm** (*Invited Paper*), Antti Härkönen, Tomi Leinonen, Soile Suomalainen, Sanna Ranta, Jonna Paajaste, Tampere Univ. of Technology (Finland); Uwe Griebner, Günter Steinmeyer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Mircea Guina, Tampere Univ. of Technology (Finland)[8966-24]

2:30 pm: **Femtosecond pulse mode-locked VECSELS** (*Invited Paper*), Keith G. Wilcox, Univ. of Dundee (United Kingdom) and Univ. of Southampton (United Kingdom)[8966-25]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 8

Location: Room 123 (Exhibit Level) .. Mon 3:30 pm to 5:40 pm

Power Scaling

Session Chair: **Ursula Keller,** ETH Zurich (Switzerland)

3:30 pm: **Recent advances in the development of high power optically pumped semiconductor lasers** (*Invited Paper*), Jill D. Berger, Andrea Caprara, Juan L. Chilla, Sergei V. Govorkov, Arnaud Y. Lepert, Wayne Mefferd, Qi-Ze Shu, Luis Spinelli, Coherent, Inc. (USA)[8966-26]

4:00 pm: **2-µm high-brilliance micro-cavity VECSEL with >2W output power** (*Invited Paper*), Sebastian Kaspar, Marcel Rattunde, Christian Schilling, Peter Holl, Steffen Adler, Andreas Bächle, Christian Manz, Rolf Aidam, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[8966-27]

4:30 pm: **Generation of new spatial and temporal coherent states using VECSEL technology: VORTEX, high order Laguerre-Gauss mode, continuum source** (*Invited Paper*), Mohamed Sellahi, Mohamed Seghilani, Univ. Montpellier 2 (France); Isabelle Sagnes, Grégoire Beaudoin, Xavier Lafosse, Luc Legratiet, Lab. de Photonique et de Nanostructures (France); Philippe Lalanne, Institut d'Optique (France); Mikhaël Myara, Arnaud Garnache, Univ. Montpellier 2 (France)[8966-11]

5:00 pm: **Industrial integration of high coherence tunable VECSEL in the NIR and MIR**, Laurence Ferrieres, Innoptics SAS (France); Attia Benselama, Institut d'Electronique du Sud (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France); Mikhaël Myara, Univ. Montpellier 2 (France); Vincent Lecocq, Innoptics SAS (France); Laurent Cerutti, Univ. Montpellier 2 (France); Stéphane Denet, Innoptics SAS (France); Arnaud Garnache, Univ. Montpellier 2 (France)[8966-29]

5:20 pm: **Demonstration of an in-phase, coherently-coupled 37-element VECSEL array**, Alec C. Sills, Gavin N. West, Rose-Hulman Institute of Technology (USA); Eryn A. Fennig, Univ. of Rochester (USA); Joseph W. Braker, DILAS Diode Laser, Inc. (USA); Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA); Manoj Kanskar, Mike Grimshaw, nLIGHT Corp. (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA)[8966-30]

CLOSING REMARKS AND STUDENT PRIZE

Location: Room 123 (Exhibit Level) Mon 5:40 pm to 6:00 pm

Closing Remarks and Student Prize

Award Sponsor: **Coherent**

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Graphene saturable absorbers for VECSELS, Valentin J. Wittwer, Univ. of Cambridge (United Kingdom); Christian A. Zaugg, ETH Zurich (Switzerland); Zhipei Sun, Daniel Popa, Silvia Milana, Tero Kulmala, Ravi S. Sundaram, Univ. of Cambridge (United Kingdom); Mario Mangold, Matthias Golling, ETH Zurich (Switzerland); Y. Lee, Jong-Hyun Ahn, Sungkyunkwan Univ. (Korea, Republic of); Ursula Keller, ETH Zurich (Switzerland); Andrea C. Ferrari, Univ. of Cambridge (United Kingdom)[8966-31]

Beam combination of multiple vertical external cavity surface emitting lasers (VECSELS) via volume Bragg gratings (VBGs), Chunte A. Lu, William P. Roach, Air Force Research Lab. (USA); Genesh Balakrishnan, The Univ. of New Mexico (USA); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Alexander R. Albrecht, The Univ. of New Mexico (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)[8966-32]

Injection-locked optically-pumped vertically external cavity surface emitting laser (VECSEL), Yi-Ying Lai, Kevin Winn, J. Michael Yarborough, Yevgeny A. Merzlyak, Yushi Kaneda, College of Optical Sciences, The Univ. of Arizona (USA)[8966-33]

Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX

Conference Chairs: **Yoshiki Nakata**, Osaka Univ. (Japan); **Xianfan Xu**, Purdue Univ. (USA); **Stephan Roth**, BLZ Bayerisches Laserzentrum GmbH (Germany); **Beat Neuenschwander**, Berner Fachhochschule Technik und Informatik (Switzerland)

Program Committee: **Craig B. Arnold**, Princeton Univ. (USA); **J. Thomas Dickinson**, Washington State Univ. (USA); **Jan J. Dubowski**, Univ. de Sherbrooke (Canada); **Bo Gu**, Bos Photonics (USA); **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Henry Helvajian**, The Aerospace Corp. (USA); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA); **Michel Meunier**, Ecole Polytechnique de Montréal (Canada); **Hiroyuki Niino**, National Institute of Advanced Industrial Science and Technology (Japan); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA); **Gediminas Raciukaitis**, Ctr. for Physical Sciences and Technology (Lithuania); **Andrei V. Rode**, The Australian National Univ. (Australia); **Pere Serra**, Univ. de Barcelona (Spain); **Klaus Sokolowski-Tinten**, Univ. Duisburg-Essen (Germany); **Razvan Stoian**, Lab. Hubert Curien (France); **Koji Sugioka**, RIKEN (Japan)

Monday 3 February

SESSION 1

Location: Room 310 (Esplanade) . . . Mon 8:00 am to 10:00 am

Laser-induced Modification and Patterning of Surfaces I

Joint Session with Conferences 8967 and 8969

Session Chair: **Yoshiki Nakata**, Osaka Univ. (Japan)

8:00 am: **Excimer laser-induced nanoablation of amorphous and nanocrystalline diamond films**, Maksim Sergeevich Komlenok, Viktor G. Ralchenko, Sergey M. Pimenov, Vitaly I. Konov, A. M. Prokhorov General Physics Institute (Russian Federation) [8969-28]

8:20 am: **Black and colored metals and applications** (*Invited Paper*), Chunlei Guo, Univ. of Rochester (USA) [8967-1]

8:50 am: **Processing of nano-porous film based on plasmonic excitation of Au nanoparticles** (*Invited Paper*), Yasuyuki Tsuboi, Osaka City Univ. (Japan) [8967-2]

9:20 am: **Fluorescence and second-harmonic generation correlative microscopy to probe space charge separation during femtosecond direct laser writing**, Lionel S. Canioni, Nicolas Marquestaut, Univ. Bordeaux 1 (France); Yannick G. Petit, Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France) [8969-12]

9:40 am: **Real-time adaptive optimization of laser-induced nano-ripples by laser pulse shaping**, Pornsak Srisungsitthisunti, King Mongkut's Univ. of Technology North Bangkok (Thailand); Marian Zamfirescu, Liviu P. Neagu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Razvan Stoian, Lab. Hubert Curien (France) [8967-3]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 310 (Esplanade) . . Mon 10:30 am to 12:10 pm

Laser-induced Modification and Patterning of Surfaces II

Joint Session with Conferences 8967 and 8969

Session Chair: **Xianfan Xu**, Purdue Univ. (USA)

10:30 am: **The liquid phase assembly of metallic nanoparticle arrays using nanolithography and pulsed laser melting** (*Invited Paper*), Jason D. Fowlkes, The Univ. of Tennessee (USA) [8969-13]

11:00 am: **Laser-induced patterns on metals and polymers for biomimetic surface engineering** (*Invited Paper*), Fang Liang, Jorge Lehr, Anne-Marie Kietzig, McGill Univ. (Canada) [8967-4]

11:30 am: **Laser-induced periodic nanoparticle patterns**, Nathalie N. Destouches, Univ. de Lyon (France) and Lab. Hubert Curien (France); Guy Vitrant, IMEP-LAHC (France) and CEA-LETI-Minatec (France); Nicolas N. Crespo-Monteiro, Lab. Hubert Curien (France) and Univ. de Lyon (France); Zeming Liu, Univ. de Lyon (France) and Lab. Hubert Curien (France); Yaya Lefkir, Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France); Francis Vocanson, Lab. Hubert Curien (France) and Univ. de Lyon (France) [8969-14]

11:50 am: **Growth evolution of high spatial frequency LIPSS on SiC crystal surfaces**, Go Obara, Hisashi Shimizu, Taira Enami, Keio Univ. (Japan); Meng-Ju Sher, Benjamin Franta, Harvard Univ. (USA); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA); Mitsuhiro Terakawa, Minoru Obara, Keio Univ. (Japan) [8967-5]

Lunch Break Mon 12:10 pm to 1:30 pm

SESSION 3

Location: Room 310 (Esplanade) Mon 1:30 pm to 3:20 pm

Nanomaterial Photonics and Plasmonics I

Joint Session with Conferences 8967 and 8969

Session Chair: **Richard F. Haglund Jr.**, Vanderbilt Univ. (USA)

1:30 pm: **Flying plasmonic nanofocusing lenses for scalable nanolithography** (*Invited Paper*), Liang Pan, Purdue Univ. (USA); Yuan Wang, Univ. of California, Berkeley (USA); Cheng Sun, Northwestern Univ. (USA); David B. Bogy, Xiang Zhang, Univ. of California, Berkeley (USA) [8967-6]

2:00 pm: **Optical and electronic properties of transition metal dichalogenides at monolayer thickness** (*Invited Paper*), Tony F. Heinz, Columbia Univ. (USA) [8969-15]

2:30 pm: **Near-infrared emission from freestanding single- and few-layer graphene**, Tu Hong, Yunhao Cao, Da Ying, Yaqiong Xu, Vanderbilt Univ. (USA) [8969-16]

2:50 pm: **Nanophotonics for light-management in thin-film photovoltaics and optical nanopatterning for their fabrication** (*Invited Paper*), Rajesh Menon, The Univ. of Utah (USA) [8969-17]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 4

Location: Room 310 (Esplanade) Mon 3:50 pm to 5:50 pm

Nanomaterial Photonics and Plasmonics II

Joint Session with Conferences 8967 and 8969

Session Chair: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

3:50 pm: **Multifunctional materials for electronics and photonics** (*Invited Paper*), Federico Rosei, INRS, Univ. du Québec (Canada) [8969-18]

4:20 pm: **Optical-only methods for measuring charge carrier diffusion in colloidal quantum dot films** (*Invited Paper*), Oleksandr Voznyy, Univ. of Toronto (Canada) [8969-19]

4:50 pm: **Polarization-dependent switching in gold-vanadium dioxide heterodimers**, Kannatassen Appavoo, Richard F. Haglund Jr., Vanderbilt Univ. (USA) [8969-20]

5:10 pm: **Resonant-cavity effects on plasmon-enhanced photoluminescence in zinc-oxide core-shell nanowires**, Daniel C. Mayo, Claire Marvinney, Ephraim Billig, Vanderbilt Univ. (USA); Richard Mu, Fisk Univ. (USA); Richard F. Haglund Jr., Vanderbilt Univ. (USA) [8969-21]

5:30 pm: **Femtosecond pump-probe spectroscopy of Au/TiO₂ nanocomposites: the evolution of localized plasmon resonance and its connection to charge transfer effects**, Arseny Aybushev, Andrey N. Kostrov, Fedor Gostev, Viktor A. Nadtchenko, N.N. Semenov Institute of Chemical Physics (Russian Federation) [8969-22]

Tuesday 4 February

SESSION 5

Location: Room 125 (Exhibit Level) . . Tue 8:00 am to 10:30 am

Ultrafast Laser-induced Modifications of Transparent Materials

Joint Session with Conferences 8967 and 8972

Session Chair: **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

8:00 am: **Femtosecond laser 3D nanofabrication in glass: enabling direct write of integrated micro/nanofluidic chips** (*Invited Paper*), Ya Cheng, Yang Liao, Shanghai Institute of Optics and Fine Mechanics (China); Koji Sugioka, RIKEN (Japan) [8967-7]

8:30 am: **Flexible metal patterning in three-dimensional glass microfluidic structures using femtosecond laser direct-write ablation followed by electroless plating**, Jian Xu, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan) [8967-8]

8:50 am: **Laser-induced back side wet etching: further steps to application**, Pierre Lorenz, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Sarah Zehnder, Berner Fachhochschule Technik und Informatik (Switzerland); Martin Ehrhardt, Frank Frost, Klaus-Peter Zimmer, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Patrick Schwaller, Berner Fachhochschule Technik und Informatik (Switzerland) [8967-9]

9:10 am: **Contrasting femtosecond laser-written Fabry-Perot resonators, Mach-Zehnder-type interferometers and micro-cavity arrays for lab-in-fiber (LIF) sensing**, Moez Haque, Yiwen Shen, Kenneth K. C. Lee, Peter R. Herman, Univ. of Toronto (Canada) [8972-43]

9:30 am: **Picosecond-laser bulk modification, luminescence and Raman lasing in single-crystal diamond**, Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland); Sergei M. Pimenov, A. M. Prokhorov General Physics Institute (Russian Federation); Beat Jaeggi, Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland) [8967-10]

9:50 am: **Dynamics of interference of femtosecond laser-induced stress waves and crack formation inside a LiF single crystal**, Masaaki Sakakura, Naoaki Fukuda, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. (Japan) [8967-11]

10:10 am: **Ultrafast laser-assisted local energy deposition in bulk silicon**, Alexandros Mouskeftaras, David Grojo, Raphael G. C. R. Clady, Stéphanie Leyder, Olivier Uteza, Marc L. Sentis, Lasers, Plasmas et Procédés Photoniques (France) [8972-44]

Coffee Break Tue 10:30 am to 11:00 am

SESSION 6

Location: Room 125 (Exhibit Level) . Tue 11:00 am to 12:30 pm

Beam Shaping

Joint Session with Conferences 8967 and 8972

Session Chair: **Peter R. Herman**, Univ. of Toronto (Canada)

11:00 am: **Spatial and temporally focused femtosecond laser pulses for material processing** (*Invited Paper*), Jeffrey A. Squier, Jens U. Thomas, Erica K. Block, Charles G. Durfee III, Colorado School of Mines (USA); Sterling J. Backus, Kapteyn-Murnane Labs., Inc. (USA) [8967-12]

11:30 am: **Simultaneously spatially and temporally focusing light for tailored ultrafast micro-machining**, Jens U. Thomas, Friedrich-Schiller-Univ. Jena (Germany); Erica K. Block, Amanda K. Meier, Michael J. Greco, Charles G. Durfee, Jeffrey A. Squier, Colorado School of Mines (USA); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) [8972-45]

11:50 am: **In situ spectral phase characterization of simultaneous spatially and temporally focused pulses**, Michael J. Greco Jr., Erica K. Block, Charles G. Durfee, Jeffrey A. Squier, Amanda K. Meier, Jens U. Thomas, Colorado School of Mines (USA) [8972-46]

12:10 pm: **A brief analysis on pulse front tilt in simultaneous spatial and temporal focusing**, Site Zhang, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [8972-47]

Lunch/Exhibition Break Tue 12:30 pm to 1:50 pm

SESSION 7

Location: Room 125 (Exhibit Level) . . . Tue 1:50 pm to 3:30 pm

Adaptive Optics and Beam Shaping

Joint Session with Conferences 8967 and 8972

Session Chair: **Stephan Roth**, BLZ Bayerisches Laserzentrum GmbH (Germany)

1:50 pm: **Dynamic optics for laser direct writing** (*Invited Paper*), Patrick S. Salter, Martin J. Booth, Univ. of Oxford (United Kingdom) [8967-13]

2:20 pm: **Femtosecond laser processing and spatial light modulator** (*Invited Paper*), Kimmo Päiväsäari, Univ. of Eastern Finland (Finland) [8967-14]

2:50 pm: **Monolithic hybrid optics for focusing ultrashort laser pulses**, Sabrina Matthias, asphericon GmbH (Germany) [8967-48]

3:10 pm: **Focal length stabilization of a tunable lens integrated focus shifting unit**, Gregory Eberle, Benjamin Boesser, Konrad Wegener, ETH Zurich (Switzerland) [8967-15]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 8

Location: Room 125 (Exhibit Level) . . . Tue 4:00 pm to 5:50 pm

Ultrashort Pulse Micromachining

Joint Session with Conferences 8967 and 8972

Session Chair: **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany)

4:00 pm: **Ultrashort pulse lasers for precise processing: overview on a current German research initiative** (*Invited Paper*), Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) [8972-49]

4:30 pm: **Influence of laser parameters on quality of microholes and process efficiency**, Anne Feuer, Christoph Kunza, Univ. Stuttgart (Germany); Martin Kraus, Robert Bosch GmbH (Germany); Volkher Onuseit, Rudolf Weber, Thomas Graf, Univ. Stuttgart (Germany); Denis Ingildeev, Institut fuer Textilchemie und Chemiefasern (Germany); Frank Hermanutz, ITV - Denkendorf (Germany) [8967-16]

4:50 pm: **Trepanning drilling of stainless steel using a high-power Ytterbium-doped fiber ultrafast laser: influence of pulse duration on hole geometry and processing quality**, John Lopez, Univ. Bordeaux 1 (France); Mathieu Dijoux, Marc Faucon, Rainer Kling, ALPhANOV (France) [8972-50]

5:10 pm: **High-precision micro-machining with ultraviolet wavelength picosecond lasers**, Colin J. Moorhouse, Mark Thompson, Coherent Scotland Ltd. (United Kingdom) [8972-51]

5:30 pm: **Determination of the AISI 1045 steel ablation threshold dependence on the pulse superposition using the Diagonal Scan (D-Scan) technique**, Ricardo E. Samad, Denilson C. Mirim, Wagner de Rossi, Nilson D. Dias Vieira Jr., Instituto de Pesquisas Energéticas e Nucleares (Brazil) [8972-52]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Spot size dependence of LIPSS formation threshold using femtosecond laser, Hisashi Shimizu, Go Obara, Mitsuhiro Terakawa, Keio Univ. (Japan) [8967-46]

Laser radiation attenuator on the basis of four Dove's prisms, Jan A. Owsik, Military Univ. of Technology (Poland); Anatoly A. Liberman, Alexander A. Kovalev, Alexey S. Mikryukov, Sergey A. Moskalyuk, Michail V. Ulanovsky, All-Russian Research Institute for Optical and Physical Measurement (Russian Federation); Janusz Noga, Military Univ. of Technology (Poland); Anna Z. Rembielinska, LOT Polish Airlines (Poland); Joanna Walczuk, Agencja Restrukturyzacji i Modernizacji Rolnictwa (Poland) [8967-47]

High-precision laser forming for micro-actuation, Ger K. G. P. Folkersma, Gert-Willem R. Römer, Univ. of Twente (Netherlands); Dannis M. Brouwer, Univ. Twente (Netherlands); Bert A. J. Huis in 't Veld, Univ. Twente (Netherlands) and TNO Technical Sciences (Netherlands) [8967-49]



Conference 8967 · Location: Room 125 (Exhibit Level)

Laser texturing glass substrates for light in-coupling in silicon thin-film solar cells, Kambalakwao Chakanga, Ortwin Siepmann, Oleg Sergeev, Karsten von Maydell, Carsten Agert, Next Energy (Germany) [8967-50]

Smart optical writing head design for laser-based manufacturing, Nabeel A. Riza, Muhammad Junaid J. Amin, Univ. College Cork (Ireland) [8967-51]

High quality ZnO film formation by CO₂ laser annealing of buried films in SiO₂ matrix, Kota Yamasaki, Hiroshi Ikenoue, Tetsuya Simogaki, Yousuke Watanabe, Daisuke Nakamura, Tatsuo Okada, Kyushu Univ. (Japan) . . . [8967-52]

Selective realignment of the exchange-biased magnetization direction in spintronic layer stacks using continuous and pulsed-laser radiation, Isabel Berthold, Hochschule Mittweida (Germany) [8967-53]

Shape-controlled ZnO nanocrystals using multi-beam interference irradiation, Daisuke Nakamura, Tetsuya Shimogaki, Yuki Muraoka, Shinomi Nakao, Kosuke Harada, Mitsuhiro Higashihata, Kyushu Univ. (Japan); Yoshiaki Nakata, Osaka Univ. (Japan); Tatsuo Okada, Kyushu Univ. (Japan) . . . [8967-54]

Performance optimization of electronics circuits laser repair, Ram Oron, Orbotech Ltd. (Israel) [8967-55]

Femtosecond laser production of mixed metal oxides for efficient water oxidation, Kasey C. Phillips, Jin Suntivich, Cynthia M. Friend, Harvard Univ. (USA); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) [8967-56]

Study of fast laser-induced cutting of silicon materials, Sebastian Weinhold, Hochschule Mittweida (Germany) [8967-57]

Wednesday 5 February

SESSION 9

Location: Room 125 (Exhibit Level) · Wed 8:10 am to 10:00 am

Materials for Energy Conservation

Session Chair: **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

8:10 am: **Development of high T_c superconducting coated conductors based on laser processing technologies** (*Invited Paper*), Takanobu Kiss, Kyushu Univ. (Japan); Teruo Izumi, International Superconductivity Technology Ctr. (Japan); Yasuhiro Iijima, Fujikura Ltd. (Japan); Yuh Shiohara, International Superconductivity Technology Ctr. (Japan) [8967-17]

8:40 am: **Laser cutting of carbon fiber reinforced plastics (CFRP) by single-mode fiber laser irradiation**, Hiroyuki Niino, Yoshizo Kawaguchi, Tadatake Sato, Aiko Narazaki, AIST (Japan) and Advanced Laser and Process Technology Research Association (Japan); Ryoza Kurosaki, AIST (Japan); Mayu Muramatsu, Yoshihisa Harada, AIST (Japan) and Advanced Laser and Process Technology Research Association (Japan); Kenji Anzai, Mitsuaki Aoyama, Miyachi Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Masafumi Matsushita, Koichi Furukawa, Shin Nippon Koki Co. Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Michiteru Nishino, Mitsubishi Chemical Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Akira Fujisaki, Taizo Miyato, Takashi Kayahara, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan) [8967-18]

9:00 am: **Laser trepanning of CFRP with a scanner head for IR and UV lasers**, Kenji Anzai, Mitsuaki Aoyama, Miyachi Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Akira Fujisaki, Taizo Miyato, Takashi Kayahara, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Yoshihisa Harada, Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan) [8967-19]

9:20 am: **Ablation dynamics and shock wave expansion at laser processing of CFRP with ultrashort laser pulses**, Margit Wiedenmann, Christian Freitag, Volkher Onuseit, Rudolf Weber, Thomas Graf, Univ. Stuttgart (Germany) [8967-20]

9:40 am: **Analysis on laser ablation dynamics of CFRP with IR and UV pulse lasers**, Yuji Sato, Masahiro Tsukamoto, Kazuki Nakai, Osaka Univ. (Japan); Tatsuya Nariyama, Kinki Univ. (Japan); Kenjiro Takahashi, Shinichiro Masuno, Osaka Univ. (Japan); Hitoshi Nakano, Kinki Univ. (Japan) [8967-21]

Coffee Break Wed 10:00 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best “Green” LASE Paper Award**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 2:00 pm

SESSION 10

Location: Room 125 (Exhibit Level) . . Wed 2:00 pm to 3:20 pm

Enhanced Processing by Multi-pulse

Session Chair: **Stephan Roth**,

BLZ Bayerisches Laserzentrum GmbH (Germany)

2:00 pm: **Application of a laser heterodyne technique to characterize surface acoustic waves generated via a pulsed laser excitation**, Anthony J. Manzo, Henry Helvajian, The Aerospace Corp. (USA) [8967-22]

2:20 pm: **Maximizing laser ablation efficiency of silicon through optimization of the temporal pulse shape**, Alain Courmoyer, David Gay, INO (Canada); Pascal Turbis, Univ. de Montréal (Canada); Emmanuel Lorin de la Grandmaison, Carleton Univ. (Canada); Claude Le Bris, École des Ponts ParisTech (France); Yves Taillon, INO (Canada) [8967-23]

2:40 pm: **Laser thin film ablation with multiple beams and tailored beam profiles**, Erwin E. Jäger, Christian Bischoff, Udo Umhofer, TOPAG Lasertechnik GmbH (Germany); Stefan Rung, Ralf Hellmann, Univ. of Applied Sciences Aschaffenburg (Germany) [8967-24]

3:00 pm: **High-throughput and high-precision laser micromachining with ps-pulses in synchronized mode with a fast polygon line scanner**, Beat Neuenschwander, Beat Jaeggi, Markus Zimmermann, Berner Fachhochschule Technik und Informatik (Switzerland); Lars Penning, Ronny DeLoor, Next Scan Technology B.V. (Netherlands) [8967-25]

Coffee Break Wed 3:20 pm to 3:50 pm

SESSION 11

Location: Room 125 (Exhibit Level) . . Wed 3:50 pm to 5:30 pm

Annealing and Forming of Microstructures

Session Chair: **Masaaki Sakakura**, Kyoto Univ. (Japan)

3:50 pm: **Formation of corrosion-resistant iron thin films by F2 laser-induced surface modification**, Masayuki Okoshi, National Defense Academy (Japan); Yuta Awaiharu, Tsugito Yamashita, Kanto Gakuin Univ. (Japan); Narumi Inoue, National Defense Academy (Japan) [8967-26]

4:10 pm: **Precision laser annealing of silicon devices for enhanced electro-optic performance**, Daniel A. Bender, Sandia National Labs. (USA); Christopher T. DeRose, Sandia National Labs (USA); Andrew Starbuck, Jason C. Verley, Mark W. Jenkins, Sandia National Labs. (USA) [8967-27]

4:30 pm: **Laser annealing and simulation of amorphous silicon thin films for solar cell applications**, John Theodorakos, Yiannis S. Raptis, Dimitris Tsoukalas, National Technical Univ. of Athens (Greece); Vasilis Vamvakas, HelioSphere (Greece); Ioanna Zergioti, National Technical Univ. of Athens (Greece) . . [8967-28]

4:50 pm: **Novel industrial laser etching technics for sensors miniaturization applied to biomedical: a comparison of simulation and experimental approach**, Julien Zelgowski, Icube (France) and IREPA LASER (France) and Lab. Hubert Curien (France); Frédéric Mermet II, IREPA LASER (France); Frédéric Antoni, Icube (France); Cyril Mauclair, Eric Audouard, Lab. Hubert Curien (France); Eric Fogarassy, Icube (France) [8967-29]

5:10 pm: **Surface structuring of zirconium-based bulk metallic glasses using ultrashort laser pulses**, Claus A. Dold, Institut für Werkzeugmaschinen und Fertigung (Switzerland); Martin Kachel, Dirk Wortmann, RWTH Aachen (Germany); Victor Wessels, ETH Zurich (Switzerland); Andreas Dohrn, Fraunhofer-Institut für Lasertechnik (Germany); Arie Bruinink, EMPA (Switzerland); Frank Pude, Inspire AG (Switzerland); Jörg F. Löffler, ETH Zurich (Switzerland); Reinhart Poprawe, Fraunhofer-Institut für Lasertechnik (Germany); Konrad Wegener, ETH Zurich (Switzerland) [8967-30]

Thursday 6 February

SESSION 12

Location: Room 125 (Exhibit Level) . . Thu 8:00 am to 10:00 am

Applications and Diagnostics of Laser Transfer Techniques

Joint Session with Conferences 8967 and 8970

Session Chairs: **Masayuki Okoshi**, National Defense Academy (Japan); **Daisuke Nakamura**, Kyushu Univ. (Japan)

8:00 am: **Simple technique for high rate and highly conductive metal (Al) deposition on silicon by laser selective metallization**, Armel Bahouka, Frédéric Mermet, IREPA LASER (France); Pablo M. Romero, Nerea Otero, Ivette Coto, Cristina Leira, Alejandro González, Asociación de Investigación Metalúrgica del Noroeste (Spain); Thomas Schutz-Kuchly, Karim Derbouz Draoua, Abdelilah Slaoui, ICube (France) [8970-15]

8:20 am: **The shape of nanospheres propelled by femtosecond laser-excited enhanced near field**, Takuya Shinohara, Mitsuhiro Terakawa, Keio Univ. (Japan) [8970-16]

8:40 am: **Laser-induced forward transfer as an immobilization tool for biosensor applications**, Marianneza Chatzipetrou, National Technical Univ. of Athens (Greece); Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada); Athanasios Papathanassiou, National Technical Univ. of Athens (Greece); Eleftherios Touloupakis, Univ. of Crete (Greece); Ioanna Zergioti, National Technical Univ. of Athens (Greece) [8970-17]

9:00 am: **Study of direct writing of heavily doped Al and Bi heterojunctions on Si by laser transfer doping**, Pablo M. Romero, Nerea Otero, Asociación de Investigación Metalúrgica del Noroeste (Spain) [8967-31]

9:20 am: **High-resolution imaging of ejection dynamics in laser-induced forward transfer**, Ralph Pohl, C. W. Visser, Gert-Willem R. Römer, C. Sun, Bert A. J. Huis in't Veld, Detlef Lohse, Univ. Twente (Netherlands) [8967-32]

9:40 am: **Pump-probe investigations and numerical simulation of the confined laser ablation of thin molybdenum films**, Juergen Sotop, Alfred Kersch, Matthias Domke, Heinz P. Huber, Munich Univ. of Applied Sciences (Germany) [8967-33]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 13

Location: Room 125 (Exhibit Level) . Thu 10:30 am to 11:30 am

Time-resolved Diagnostic Techniques

Session Chair: **Klaus Sokolowski-Tinten**, Univ. Duisburg-Essen (Germany)

10:30 am: **Short pulse laser-induced switching of phase change materials studied by time-resolved X-ray scattering**, Klaus Sokolowski-Tinten, Univ. Duisburg-Essen (Germany) [8967-34]

10:50 am: **Synchronized videography of plasma plume expansion during femtosecond laser ablation**, Steven Paolasini, Anne-Marie Kietzig, McGill Univ. (Canada) [8967-36]

11:10 am: **Ultrafast imaging of highly efficient submicron fabrication using nondiffractive Bessel beams**, Velupa Praveen Kumar, Lab. Hubert Curien (France); Manoj Kumar Bhuyan, Lab. Hubert Curien (France) and Univ. Jean Monnet (France) and Univ. de Lyon (France); Cyril Mauclair, Lab. Hubert Curien (France) and Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France); Jean-Philippe Colombier, Razvan Stoian, Lab. Hubert Curien (France) and Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France) [8967-37]

Lunch/Exhibition Break Thu 11:30 am to 1:40 pm

SESSION 14

Location: Room 125 (Exhibit Level) . . . Thu 1:40 pm to 3:20 pm

Processing and Diagnostics of Photovoltaics

Session Chair: **Beat Neuenschwander**, Berner Fachhochschule Technik und Informatik (Switzerland)

1:40 pm: **Time-resolved microscopy studies at fs laser-irradiated surfaces**, Klaus Sokolowski-Tinten, Matthieu Nicoul, Azize Koc, Florian Quirin, Univ. Duisburg-Essen (Germany) [8967-38]

2:00 pm: **Rapid composition analysis of compound semiconductor thin film solar cell by laser-induced breakdown spectroscopy**, Sung Ho Jeong, Suk-Hee Lee, C. K. Kim, J. H. In, Gwangju Institute of Science and Technology (Korea, Republic of) [8967-39]

2:20 pm: **Modeling of laser patterning of thin-film solar cells**, Thomas Peschel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8967-40]

2:40 pm: **Optimizing process time of laser drilling processes in solar cell manufacturing by coaxial camera control**, Volker Jetter, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Simon Gutscher, Fraunhofer-Institut für Solare Energiesysteme (Germany); Andreas Blug, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Christopher Ahrbeck, Annerose Knorz, Jan Nekarda, Fraunhofer-Institut für Solare Energiesysteme (Germany); Daniel Carl, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8967-41]

3:00 pm: **Silver-free solar cell interconnection by laser spot welding of thin aluminum layers: analysis of process limits for ns- and μ s-lasers**, Henning Schulte-Huxel, Susanne Blankemeyer, Verena Steckenreiter, Sarah Kajari-Schröder, The Institut für Solarenergieforschung Hameln (Germany); Rolf Brendel, The Institut für Solarenergieforschung Hameln (Germany) and Leibniz Univ. Hannover (Germany) [8967-48]

Coffee Break Thu 3:20 pm to 3:50 pm

SESSION 15

Location: Room 132 (Exhibit Level) . . . Thu 3:50 pm to 6:00 pm

Photovoltaics and Energy Devices

Joint Session with Conferences 8967 and 8968

Session Chairs: **Yoshiki Nakata**, Osaka Univ. (Japan); **Udo Klotzbach**, Fraunhofer IWS Dresden (Germany)

3:50 pm: **New strategies in laser processing of TCOs for light management in thin-film silicon solar cells (Invited Paper)**, Carlos Molpeceres, Sara Lauzurica, Isabel Sanchez, Miguel Morales, Univ. Politécnica de Madrid (Spain); David Canteli, Ignacio Torres, Susana Fernández, José-Pablo Gonzalez, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Marta LLuscà, Joan Bertomeu, Univ. de Barcelona (Spain) [8968-30]

4:20 pm: **Optimized laser patterning for high performance Cu(In,Ga)Se₂ thin-film solar modules**, Andreas Burn, Martin Murait, Berner Fachhochschule Technik und Informatik (Switzerland); Reiner M. Witte, Solneva SA (Switzerland); Shiro Nishiwaki, Stephan Bücheler, EMPA (Switzerland); Lukas Krainer, Onefive GmbH (Switzerland); Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland) [8967-43]

4:40 pm: **Quasi-simultaneous laser soldering for the interconnection of back-contact solar cells with composite foils**, Simon W. Britten, Alexander Olowinsky, Arnold Gillner, Rumitha Seva Bala Sundaram, Fraunhofer-Institut für Lasertechnik (Germany) [8968-31]

5:00 pm: **Investigations of laser ablation processes in thin-films for photovoltaic applications**, Paulius Gecys, Gediminas Raciukaitis, Edgaras Markauskas, Juozas Dudutis, Ctr. for Physical Sciences and Technology (Lithuania) [8967-44]

5:20 pm: **Utilizing the transparency of semiconductors via backside machining with a nanosecond 2 μ m Tm: fiber laser**, Nils Gehlich, Fraunhofer-Institut für Lasertechnik (Germany) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Tobias Bonhoff, Fraunhofer Institute for Laser Technology (Germany) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Laura Sisken, Mark Ramme, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Christian Gaida, Martin Gebhardt, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Friedrich-Schiller-Univ. Jena (Germany); Ilya Mingareev, Lawrence Shah, Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8968-32]

5:40 pm: **Study of a-Si crystallization dependence on power and irradiation time using a cw green laser**, Miguel Morales, David Munoz-Martin, Yu Chen, Oscar García, Juan J. García-Ballesteros, Univ. Politécnica de Madrid (Spain); Julio Cárabe, Javier Gandía, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Carlos Molpeceres, Univ. Politécnica de Madrid (Spain) [8968-33]

Laser-based Micro- and Nano-Processing VIII

Conference Chair: **Udo Klotzbach**, Fraunhofer IWS Dresden (Germany)

Conference Co-Chairs: **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan); **Craig B. Arnold**, Princeton Univ. (USA)

Program Committee: **José A. Alvarez-Chávez**, Ctr. de Investigación e Innovación Tecnológica (Mexico); **Roberto Osellame**, Politecnico di Milano (Italy); **Friedrich G. Bachmann**, FriBa LaserNet (Germany); **Francois Courvoisier**, Univ. de Franche-Comté (France); **Bo Gu**, Bos Photonics (USA); **Haiyan Zhao**, Tsinghua Univ. (China); **Duncan P. Hand**, Heriot-Watt Univ. (United Kingdom); **Miguel Holgado Bolaños**, Univ. Politécnica de Madrid (Spain); **Minghui Hong**, National Univ. of Singapore (Singapore); **Nam Seong Kim**, EO Technics Co., Ltd. (Korea, Republic of); **Sonja M. Kittel**, Robert Bosch GmbH (Germany); **Rainer Kling**, ALPhANOV (France); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA); **Yasu Osako**, Electro Scientific Industries, Inc. (USA); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Wilhelm Pfleging**, Karlsruher Institut für Technologie (Germany); **Alberto Piqué**, U.S. Naval Research Lab. (USA); **Razvan Stoian**, Lab. Hubert Curien (France); **Koji Sugioka**, RIKEN (Japan); **Akira Watanabe**, Tohoku Univ. (Japan); **Michael J. Withford**, Macquarie Univ. (Australia); **Xianfan Xu**, Purdue Univ. (USA); **Haibin Zhang**, Electro Scientific Industries, Inc. (USA)

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Influence of Sn impurities as enhancement mechanism of the laser ablation process of commercial soda-lime glass, Daniel Nieto Garcia, María Teresa Flores-Arias, Univ. de Santiago de Compostela (Spain) . . . [8968-2]

CO₂-laser based fiber coating process for high-power fiber applications, Steffen Böhme, Christian Hupel, Simone Fabian, Thomas Schreiber, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Kathleen Hirte, Technische Univ. Ilmenau (Germany) . . . [8968-34]

Surface transmission enhancement of ZnS via continuous-wave laser microstructuring, Kevin J. Major, Menelaos K. Poutous, Rajendra Joshi, The Univ. of North Carolina at Charlotte (USA); Catalin M. Florea, Sotera Defense Solutions, Inc. (USA); Lynda E. Busse, Leslie B. Shaw, Jasbinder S. Sanghera, U.S. Naval Research Lab. (USA); Ishwar D. Aggarwal, The Univ. of North Carolina at Charlotte (USA) . . . [8968-35]

Compact probing system using LIBS and remote imaging for industrial plant maintenance, Fuyumi Ito, Akihiko Nishimura, Japan Atomic Energy Agency (Japan) . . . [8968-36]

Laser-induced processes on the back side of dielectric surfaces using a CuSO₄-based absorber liquid, Pierre Lorenz, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Sarah Zehnder, Berner Fachhochschule Technik und Informatik (Switzerland); Martin Ehrhardt, Frank Frost, Klaus-Peter Zimmer, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Patrick Schwaller, Berner Fachhochschule Technik und Informatik (Switzerland) . . . [8968-37]

Synthesis of graphene pattern using laser-induced chemical vapor deposition, Jongbok Park, Swook Hann, Korea Photonics Technology Institute (Korea, Republic of); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) . . . [8968-38]

Direct selective metallization of AlN ceramics induced by laser radiation, Arkadiusz J. Antonczak, Pawel E. Kozioł, Bogusz D. Stepak, Patrycja Szymczyk, Krzysztof M. Abramski, Wrocław Univ. of Technology (Poland) . . . [8968-39]

Investigations on laser transmission welding of absorber-free thermoplastics, Viktor Mamuschkin, Alexander Olowinsky, Simon W. Britten, Fraunhofer-Institut für Lasertechnik (Germany) . . . [8968-40]

Wednesday 5 February

SESSION 1

Location: Room 132 (Exhibit Level) . . . Wed 8:20 am to 9:50 am

Direct-write Processing and Surface Modification I

Session Chair: **Udo Klotzbach**, Fraunhofer IWS Dresden (Germany)

8:20 am: **Quantized structuring of transparent films with femtosecond laser interference** (*Invited Paper*), Peter R. Herman, Kitty Kumar, Kenneth K. C. Lee, Jianzhao Li, Jun Nogami, Nazir Kherani, Univ. of Toronto (Canada) . . . [8968-1]

8:50 am: **In situ structural analysis of direct laser written waveguides**, Patrick Salter, Univ. of Oxford (United Kingdom); Alexander Jesacher, Innsbruck Medical Univ. (Austria); Xiang Liu, Martin Booth, Univ. of Oxford (United Kingdom) . . . [8968-3]

9:10 am: **High resolution multiphoton ablation with negligible thermal effects in transparent materials using Q-switched microchip lasers with 300 picosecond pulses at 532nm**, Patrice L. Baldeck, Taghrid Mhalla, Univ. Joseph Fourier (France) . . . [8968-4]

9:30 am: **Fs-laser microstructuring of laser-printed LiMn₂O₄ electrodes for manufacturing of 3D microbatteries**, Johannes Pröll, Karlsruher Institut für Technologie (Germany); Heungsoo Kim, U.S. Naval Research Lab. (USA); Melanie Mangang, Hans J. Seifert, Karlsruher Institut für Technologie (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA); Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany) . . . [8968-5]

Coffee Break Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 12:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA); **Andreas Tünnermann**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best "Green" LASE Paper Award**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 2:00 pm

SESSION 2

Location: Room 132 (Exhibit Level) . . Wed 2:00 pm to 3:30 pm

Direct-write Processing and Surface Modification II

Session Chair: **Kunihiko Washio**, Paradigm Laser Research Ltd. (Japan)

2:00 pm: **Laser surface micro-texturing to enhance the frictional behavior of lubricated steel** (*Invited Paper*), Antonio Ancona, CNR-IFN UOS Bari (Italy); Giuseppe Carbone, Politecnico di Bari (Italy); Michele Scaraggi, Univ. del Salento (Italy); Francesco P. Mezzapesa, CNR-IFN UOS Bari (Italy) and Univ. degli Studi di Bari (Italy); Donato Sorgente, Politecnico di Bari (Italy); Pietro M. Lugarà, CNR-IFN UOS Bari (Italy) and Univ. degli Studi di Bari (Italy) [8968-6]

2:30 pm: **Non-digitized diffractive beam splitters for high-throughput laser materials processing**, Jun Amako, Toyo Univ. (Japan); Eiichi Fujii, Seiko Epson Corp. (Japan) [8968-7]

2:50 pm: **Fabricating fiber Bragg gratings using phase modulated direct UV writing**, Christopher Holmes, Chaotian Sima, Paolo L. Mennea, Lewis G. Carpenter, James C. Gates, Peter G. R. Smith, Univ. of Southampton (United Kingdom) [8968-8]

3:10 pm: **Laser micromachining and modification of bioabsorbable polymers**, Bogusz D. Stepak, Arkadiusz J. Antonczak, Pawel E. Koziol, Krzysztof M. Abramski, Konrad Szustakiewicz, Wroclaw Univ. of Technology (Poland) [8968-9]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 3

Location: Room 132 (Exhibit Level) . . Wed 4:00 pm to 5:50 pm

Laser Nano-structuring and Processing I

Session Chair: **Michael Withford**, Macquarie Univ. (Australia)

4:00 pm: **High speed surface functionalization using direct laser interference patterning, breaking the 1 m²/min barrier with sub-µm resolution** (*Invited Paper*), Andrés F. Lasagni, Teja Roch, Fraunhofer IWS Dresden (Germany), Technische Univ. Dresden (Germany); Matthias Bieda, Fraunhofer IWS Dresden (Germany); Dimitri Benke, Eckhard Beyer, Fraunhofer IWS Dresden (Germany), Technische Univ. Dresden (Germany) [8968-10]

4:30 pm: **Laser generated microstructures in tape cast electrodes for rapid electrolyte wetting: new technical approach for cost efficient battery manufacturing**, Wilhelm Pflöging, Robert Kohler, Johannes Pröll, Karlsruhe Institute of Technology (Germany) [8968-11]

4:50 pm: **Understanding the formation of self-organized micro/nanostructures on metal surfaces from femtosecond laser ablation using stop-motion SEM imaging**, Craig A. Zuhlke, Troy Anderson, Univ of Nebraska-Lincoln (USA); Dennis Alexander, Univ. of Nebraska-Lincoln (USA) [8968-12]

5:10 pm: **Laser-induced periodic surface structures: modelling, experiments, and applications**, Gert-Willem R. Römer, Johann Z. Skolski, Jozef V. Oboňa, Univ. Twente (Netherlands); Vaclav Ocelik, Jeff T. De Hosson, Univ. of Groningen (Netherlands); Bert A. J. Huis in 't Veld, Univ. Twente (Netherlands), TNO Technical Sciences (Netherlands) [8968-13]

5:30 pm: **IR and green femtosecond laser machining of heat sensitive materials for medical devices at micrometer scale**, Markus Roehner, JENOPTIK Laser GmbH (Germany); Klaus Stolberg, JENOPTIK Optical Systems GmbH (Germany); Susanna Friedel, JENOPTIK AG (Germany); Bert Kremser, JENOPTIK Optical Systems GmbH (Germany); Nikolas von Freyhold, JENOPTIK Laser GmbH (Germany) [8968-14]

Thursday 6 February

SESSION 4

Location: Room 132 (Exhibit Level) . . Thu 8:00 am to 10:10 am

Laser Micro-structuring and Processing II

Session Chair: **Craig B. Arnold**, Princeton Univ. (USA)

8:00 am: **Black silicon and the quest for intermediate band semiconductors** (*Invited Paper*), Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) [8968-15]

8:30 am: **Control of multiphoton and avalanche ionization using an ultraviolet-infrared pulse train in femtosecond laser micro/nano-machining of fused silica**, Xiaoming Yu, Qiumei Bian, Kansas State Univ. (USA); Zenghu Chang, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Paul B. Corkum, National Research Council Canada (Canada) and Univ. of Ottawa (Canada); Shuting Lei, Kansas State Univ. (USA) [8968-16]

8:50 am: **Femto-second laser micro-machined structures for light harvesting applications in optofluidics**, Surya Sameer Kumar Guduru, Istituto Italiano di Tecnologia (Italy); Petra Paiè, Serena Bolis, Politecnico di Milano (Italy); Tersilla Virgili, Istituto di Fotonica e Nanotecnologie (Italy); Francesco Scotognella, Politecnico di Milano (Italy); Rebeca M. Vázquez, Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy); Luigino Criante, Krishna C. Vishnubhatla, Istituto Italiano di Tecnologia (Italy); Roberta Ramponi, Politecnico di Milano (Italy) [8968-17]

9:10 am: **A new method for tempered glass cutting**, Yore Jiang, Jakie Di, Yuxing Zhao, Suzhou Delphi Laser Co., Ltd. (China) [8968-18]

9:30 am: **How to capitalize the laser direct writing and holographic lithography match: looking for a high quality tunable microfluidic dye laser driven by liquid crystals orientation properties**, Sara Lo Turco, Istituto Italiano di Tecnologia (Italy) and Politecnico di Milano (Italy); Krishna C. Vishnubhatla, Istituto Italiano di Tecnologia (Italy); Roberta Ramponi, Politecnico di Milano (Italy) and Istituto Italiano di Tecnologia (Italy); Francesco Simoni, Daniele E. Lucchetta, Univ. Politecnica delle Marche (Italy); Luigino Criante, Istituto Italiano di Tecnologia (Italy) and Univ. Politecnica delle Marche (Italy) [8968-19]

9:50 am: **3D hydrodynamic focusing fabricated by femtosecond laser micromachining**, Petra Paiè, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Francesca Bragheri, Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8968-20]

Coffee Break Thu 10:10 am to 10:40 am

SESSION 5

Location: Room 132 (Exhibit Level) . Thu 10:40 am to 12:10 pm

Batteries and Thin Film Structuring

Session Chair: **Wilhelm Pflöging**,

Karlsruher Institut für Technologie (Germany)

10:40 am: **Laser-printed/structured thick-film electrodes for Li-ion microbatteries** (*Invited Paper*), Heungsoo Kim, U.S. Naval Research Lab. (USA); Johannes Pröll, Robert Kohler, Wilhelm Pflöging, Karlsruher Institut für Technologie (Germany); Alberto Piqué, U.S. Naval Research Lab. (USA) . [8968-21]

11:10 am: **Ultrafast laser microstructuring of LiFePO₄ cathode material**, Melanie Mangang, Johannes Pröll, Christian Tarde, Wilhelm Pflöging, Hans J. Seifert, Karlsruher Institut für Technologie (Germany) [8968-22]

11:30 am: **Polarization selectable nano-pattern formation on diamond surfaces by 2-photon ultraviolet desorption**, Andrew Lehmann, Christopher Baldwin, James E. Downes, Richard P. Mildren, Macquarie Univ. (Australia) [8968-23]

11:50 am: **Microstructuring of resist double layers by a femtosecond laser ablation and UV lithography hybrid process**, Tamara Pacher, Fachhochschule Vorarlberg (Austria); Adrian Prinz, Sony DADC Austria AG (Austria); Stefan Partel, Johann Zehetner, Fachhochschule Vorarlberg (Austria); Victor V. Matylytsky, High Q Laser, a Newport Corp. Brand (Austria); Sandra Stroj, Fachhochschule Vorarlberg (Austria) [8968-24]

Lunch/Exhibition Break Thu 12:10 pm to 1:30 pm

Conference 8968 · Location: Room 132 (Exhibit Level)

SESSION 6

Location: Room 132 (Exhibit Level) . . . Thu 1:30 pm to 3:20 pm

Additive Manufacturing and Advanced Deposition Processes

Session Chair: **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

- 1:30 pm: **Formation and properties of nanostructured amorphous polymer films by MAPLE** (*Invited Paper*), Rodney D. Priestley, Princeton Univ. (USA) [8968-25]
- 2:00 pm: **Transparent conductive films based on the laser sintering of metal and metal oxide nanoparticles**, Akira Watanabe, Gang Qin, Tohoku Univ. (Japan) [8968-26]
- 2:20 pm: **Tailoring liquid/solid interfacial energy transfer: fabrication and application of multiscale metallic surfaces with engineered heat transfer and electrolysis properties via femtosecond laser surface processing techniques**, Troy Anderson, Craig A. Zuhlke, Corey Kruse, Chris Wilson, Univ. of Nebraska-Lincoln (USA); Anton Hassebrook, Isra Somanas, Univ. of Nebraska-Lincoln (USA); Sidy Ndao, George Gogos, Univ. of Nebraska-Lincoln (USA); Dennis Alexander, Univ. of Nebraska-Lincoln (USA) [8968-27]
- 2:40 pm: **Femtosecond laser sintering of nanoparticle based metallic inks on flexible substrates for organic electronics applications**, Krishna C. Vishnubhatla, Andrea Perinot, Sadir Bucella, Mario Caironi, Istituto Italiano di Tecnologia (Italy) [8968-28]
- 3:00 pm: **Joining of ultra thin sheets using a beam shaping optic**, Kerstin Kowalick, Manuel Joop, Ralf Nett, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8968-29]
- Coffee Break Thu 3:20 pm to 3:50 pm

SESSION 7

Location: Room 132 (Exhibit Level) . . . Thu 3:50 pm to 6:00 pm

Photovoltaics and Energy Devices

Joint Session with Conferences 8967 and 8968

Session Chairs: **Yoshiki Nakata**, Osaka Univ. (Japan);
Udo Klotzbach, Fraunhofer IWS Dresden (Germany)

- 3:50 pm: **New strategies in laser processing of TCOs for light management in thin-film silicon solar cells** (*Invited Paper*), Carlos Molpeceres, Sara Lauzurica, Isabel Sanchez, Miguel Morales, Univ. Politécnic de Madrid (Spain); David Canteli, Ignacio Torres, Susana Fernández, José-Pablo Gonzalez, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Marta Llusçà, Joan Bertomeu, Univ. de Barcelona (Spain) [8968-30]
- 4:20 pm: **Optimized laser patterning for high performance Cu(In,Ga)Se₂ thin-film solar modules**, Andreas Burn, Martin Muralit, Berner Fachhochschule Technik und Informatik (Switzerland); Reiner M. Witte, Solneva SA (Switzerland); Shiro Nishiwaki, Stephan Bücheler, EMPA (Switzerland); Lukas Krainer, Onefive GmbH (Switzerland); Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland) [8967-43]
- 4:40 pm: **Quasi-simultaneous laser soldering for the interconnection of back-contact solar cells with composite foils**, Simon W. Britten, Alexander Olowinsky, Arnold Gillner, Rumitha Seva Bala Sundaram, Fraunhofer-Institut für Lasertechnik (Germany) [8968-31]
- 5:00 pm: **Investigations of laser ablation processes in thin-films for photovoltaic applications**, Paulius Gecys, Gediminas Raciukaitis, Edgaras Markauskas, Jozas Dudutis, Ctr. for Physical Sciences and Technology (Lithuania) [8967-44]
- 5:20 pm: **Utilizing the transparency of semiconductors via backside machining with a nanosecond 2 μm Tm: fiber laser**, Nils Gehlich, Fraunhofer-Institut für Lasertechnik (Germany) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Tobias Bonhoff, Fraunhofer Institute for Laser Technology (Germany) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Laura Sisken, Mark Ramme, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Christian Gaida, Martin Gebhardt, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Friedrich-Schiller-Univ. Jena (Germany); Ilya Mingareev, Lawrence Shah, Martin Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8968-32]
- 5:40 pm: **Study of a-Si crystallization dependence on power and irradiation time using a cw green laser**, Miguel Morales, David Munoz-Martin, Yu Chen, Oscar García, Juan J. García-Ballesteros, Univ. Politécnic de Madrid (Spain); Julio Cárabe, Javier Gandía, Ctr. de Investigaciones Energéticas, Medioambientales y Tecnológicas (Spain); Carlos Molpeceres, Univ. Politécnic de Madrid (Spain) [8968-33]

Synthesis and Photonics of Nanoscale Materials XI

Conference Chairs: **David B. Geohegan**, Oak Ridge National Lab. (USA); **Frank Träger**, Univ. Kassel (Germany); **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

Sunday 2 February

SESSION 1

Location: Room 310 (Esplanade) Sun 1:00 pm to 3:10 pm

Laser-based Nanomaterials Synthesis and Real-Time Diagnostics

Session Chair: **David B. Geohegan**, Oak Ridge National Lab. (USA)

1:00 pm: **In situ Raman spectroscopy studies of single-walled carbon nanotube growth** (*Invited Paper*), Rahul Rao, Honda Research Institute USA, Inc. (USA) [8969-1]

1:30 pm: **Laser-assisted growth of carbon nanotubes inside sealed fluidic microchannels**, Yoeri van de Burgt, Audrey Champion, Yves Bellouard, Technische Univ. Eindhoven (Netherlands) [8969-2]

1:50 pm: **Revealing growth mechanism of graphene induced by CVD and PLD using real-time optical diagnostics**, Alex A. Puretzky, David B. Geohegan, Sreekanth Pannala, Christopher M. Rouleau, Gyula Eres, Masoud Mahjouri-Samani, Gerd Duscher, Oak Ridge National Lab. (USA) [8969-3]

2:10 pm: **Laser-based synthesis of nanoparticles: role of laser parameters and background conditions**, Tatiana E. Itina, Mikhail Povarnitsyn, Andrey Voloshko, Lab. Hubert Curien (France) [8969-4]

2:30 pm: **Understanding the formation of nanostructures and thin films using nanoparticles as 'building blocks' in pulsed laser deposition**, Masoud Mahjouri-Samani, David B. Geohegan, Alex A. Puretzky, Christopher M. Rouleau, Gyula Eres, Karren L. More, Miaofang Chi, Oak Ridge National Lab. (USA); Mengkun Tian, Gerd Duscher, The Univ. of Tennessee (USA) [8969-5]

2:50 pm: **Catalytic nanoparticles for carbon nanotube growth synthesized by through thin film femtosecond laser ablation**, Christopher M. Rouleau, Alex A. Puretzky, David B. Geohegan, Mina Yoon, Karren L. More, Oak Ridge National Lab. (USA); Gerd Duscher, The Univ. of Tennessee (USA); Cheng-Yu Shih, Chengping Wu, Leonid V. Zhigilei, Univ. of Virginia (USA) [8969-6]

Coffee Break Sun 3:10 pm to 3:40 pm

SESSION 2

Location: Room 310 (Esplanade) Sun 3:40 pm to 5:20 pm

Laser-induced Chemistry and Assembly

Session Chair: **Frank Träger**, Univ. Kassel (Germany)

3:40 pm: **Demonstration of enhanced surface mobility of adsorbate cluster species by surface acoustic wave excitation-induced by a pulsed laser**, Anthony J. Manzo, Henry Helvajian, The Aerospace Corp. (USA) [8969-7]

4:00 pm: **Characterization of two-photon polymerization process using Raman spectroscopy**, L. J. Jiang, Wei Xiong, Yunshen Zhou, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) [8969-8]

4:20 pm: **Stability of Rh-Pd-Pt alloy nanoparticles produced by femtosecond laser irradiation of aqueous solution with surfactant**, Md. Samiul Islam Sarker, Takahiro Nakamura, Shunichi Sato, Tohoku Univ. (Japan) [8969-9]

4:40 pm: **Preparation of submicron-sized gold particles using laser-induced agglomeration-fusion process**, Takeshi Tsuji, Yuuma Higashi, Masaharu Tsuji, Kyushu Univ. (Japan); Yoshie Ishikawa, National Institute of Advanced Industrial Science and Technology (Korea, Republic of); Naoto Koshizaki, Hokkaido Univ. (Japan) [8969-10]

5:00 pm: **Compositional analysis of silicon fibrous nanostructures synthesized using femtosecond laser pulses under ambient condition**, Manickam Sivakumar, Amrita Visshwa Vidyapeetham Univ. (India); Krishnan Venkatakrishnan, Bo Tan, Ryerson Univ. (Canada) [8969-11]

Monday 3 February

SESSION 3

Location: Room 310 (Esplanade) . . . Mon 8:00 am to 10:00 am

Laser-induced Modification and Patterning of Surfaces I

Joint Session with Conferences 8967 and 8969

Session Chair: **Yoshiki Nakata**, Osaka Univ. (Japan)

8:00 am: **Excimer laser-induced nanoablation of amorphous and nanocrystalline diamond films**, Maksim Sergeevich Komlenok, Viktor G. Ralchenko, Sergey M. Pimenov, Vitaly I. Konov, A. M. Prokhorov General Physics Institute (Russian Federation) [8969-28]

8:20 am: **Black and colored metals and applications** (*Invited Paper*), Chunlei Guo, Univ. of Rochester (USA) [8967-1]

8:50 am: **Processing of nano-porous film based on plasmonic excitation of Au nanoparticles** (*Invited Paper*), Yasuyuki Tsuboi, Osaka City Univ. (Japan) [8967-2]

9:20 am: **Fluorescence and second-harmonic generation correlative microscopy to probe space charge separation during femtosecond direct laser writing**, Lionel S. Canioni, Nicolas Marquestaut, Univ. Bordeaux 1 (France); Yannick G. Petit, Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France) [8969-12]

9:40 am: **Real-time adaptive optimization of laser-induced nano-ripples by laser pulse shaping**, Pornsak Srisungsitthisunti, King Mongkut's Univ. of Technology North Bangkok (Thailand); Marian Zamfirescu, Liviu P. Neagu, National Institute for Lasers, Plasma and Radiation Physics (Romania); Razvan Stoian, Lab. Hubert Curien (France) [8967-3]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 4

Location: Room 310 (Esplanade) . . Mon 10:30 am to 12:10 pm

Laser-induced Modification and Patterning of Surfaces II

Joint Session with Conferences 8967 and 8969

Session Chair: **Xianfan Xu**, Purdue Univ. (USA)

10:30 am: **The liquid phase assembly of metallic nanoparticle arrays using nanolithography and pulsed laser melting** (*Invited Paper*), Jason D. Fowlkes, The Univ. of Tennessee (USA) [8969-13]

11:00 am: **Laser-induced patterns on metals and polymers for biomimetic surface engineering** (*Invited Paper*), Fang Liang, Jorge Lehr, Anne-Marie Kietzig, McGill Univ. (Canada) [8967-4]

11:30 am: **Laser-induced periodic nanoparticle patterns**, Nathalie N. Destouches, Univ. de Lyon (France) and Lab. Hubert Curien (France); Guy Vitrant, IMEP-LAHC (France) and CEA-LETI-Minatec (France); Nicolas N. Crespo-Monteiro, Lab. Hubert Curien (France) and Univ. de Lyon (France); Zeming Liu, Univ. de Lyon (France) and Lab. Hubert Curien (France); Yaya Lefkir, Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France); Francis Vocanson, Lab. Hubert Curien (France) and Univ. de Lyon (France) [8969-14]

11:50 am: **Growth evolution of high spatial frequency LIPSS on SiC crystal surfaces**, Go Obara, Hisashi Shimizu, Taira Enami, Keio Univ. (Japan); Meng-Ju Sher, Benjamin Franta, Harvard Univ. (USA); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA); Mitsuhiro Terakawa, Minoru Obara, Keio Univ. (Japan) [8967-5]

Lunch Break Mon 12:10 pm to 1:30 pm

LASE

Conference 8969 · Location: Room 310 (Esplanade)

SESSION 5

Location: Room 310 (Esplanade) Mon 1:30 pm to 3:20 pm

Nanomaterial Photonics and Plasmonics I

Joint Session with Conferences 8967 and 8969

Session Chair: **Richard F. Haglund Jr.**, Vanderbilt Univ. (USA)

1:30 pm: **Flying plasmonic nanofocusing lenses for scalable nanolithography** (*Invited Paper*), Liang Pan, Purdue Univ. (USA); Yuan Wang, Univ. of California, Berkeley (USA); Cheng Sun, Northwestern Univ. (USA); David B. Bogy, Xiang Zhang, Univ. of California, Berkeley (USA) [8967-6]

2:00 pm: **Optical and electronic properties of transition metal dichalcogenides at monolayer thickness** (*Invited Paper*), Tony F. Heinz, Columbia Univ. (USA) [8969-15]

2:30 pm: **Near-infrared emission from freestanding single- and few-layer graphene**, Tu Hong, Yunhao Cao, Da Ying, Yaqiong Xu, Vanderbilt Univ. (USA) [8969-16]

2:50 pm: **Nanophotonics for light-management in thin-film photovoltaics and optical nanopatterning for their fabrication** (*Invited Paper*), Rajesh Menon, The Univ. of Utah (USA) [8969-17]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 6

Location: Room 310 (Esplanade) Mon 3:50 pm to 5:50 pm

Nanomaterial Photonics and Plasmonics II

Joint Session with Conferences 8967 and 8969

Session Chair: **Jan J. Dubowski**, Univ. de Sherbrooke (Canada)

3:50 pm: **Multifunctional materials for electronics and photonics** (*Invited Paper*), Riad Nechache, Federico Rosei, INRS, Univ. du Québec (Canada) [8969-18]

4:20 pm: **Optical-only methods for measuring charge carrier diffusion in colloidal quantum dot films** (*Invited Paper*), Oleksandr Voznyy, Univ. of Toronto (Canada) [8969-19]

4:50 pm: **Polarization-dependent switching in gold-vanadium dioxide heterodimers**, Kannatassen Appavoo, Richard F. Haglund Jr., Vanderbilt Univ. (USA) [8969-20]

5:10 pm: **Resonant-cavity effects on plasmon-enhanced photoluminescence in zinc-oxide core-shell nanowires**, Daniel C. Mayo, Claire Marvinney, Ephraim Billign, Vanderbilt Univ. (USA); Richard Mu, Fisk Univ. (USA); Richard F. Haglund Jr., Vanderbilt Univ. (USA) [8969-21]

5:30 pm: **Femtosecond pump-probe spectroscopy of Au/TiO₂ nanocomposites: the evolution of localized plasmon resonance and its connection to charge transfer effects**, Arseny Aybushev, Andrey N. Kostrov, Fedor Gostev, Viktor A. Nadochenko, N.N. Semenov Institute of Chemical Physics (Russian Federation) [8969-22]

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Interpreting strong two-photon absorption of PE3 platinum acetylride complex: double resonance and excited state absorption, Marcelo G. Vivas, Leonardo De Boni, Univ. de São Paulo (Brazil); Thomas M. Cooper, Air Force Research Lab. (USA); Cleber R. Mendonça, Univ. de São Paulo (Brazil) . [8969-23]

Structure-property relationships for two-photon absorbing triarylamine chromophores containing trifluoromethyl, Marcelo G. Vivas, Daniel L. Silva, Leonardo De Boni, Univ. de São Paulo (Brazil); Robert Zale?ny, Wroclaw Univ. of Technology (Poland); Sylvio Canuto, Univ. de São Paulo (Brazil); Eléna Ishow, Ecole Normale Supérieure de Cachan (France); Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8969-24]

Correlation between the morphology of the DEA-Mn compounds and the photoinduced absorption, Katarzyna Ozga, Artur Wojciechowski, Politechnika Czestochowska (Poland); Volodymyr Kapustianyk, Victor P. Rudyk, Ivan Franko National Univ. of L'viv (Ukraine); Stanislaw W. Tkaczyk, J. Dlugosz Univ. de Czestochowa (Poland) [8969-25]

Raman gas sensing of modified Ag nanoparticle SERS, NoSung Myoung, Hyung Keun Yoo, Advanced Photonics Research Institute (Korea, Republic of); OkMi Mun, Chosun Univ. (Korea, Republic of) and Advanced Photonics Research Institute (Korea, Republic of); In-Wook Hwang, Gwangju Institute of Science and Technology (Korea, Republic of) [8969-26]

Variation of cell spreading on TiO₂ film modified by 775 nm and 388 nm femtosecond laser irradiation, Masahiro Tsukamoto, Togo Shinonaga, Yuji Sato, Osaka Univ. (Japan); Peng Chen, Akiko Nagai, Takao Hanawa, Institute of Biomaterials and Bioengineering (Japan) [8969-27]

Laser 3D Manufacturing

Conference Chairs: **Henry Helvajian**, The Aerospace Corp. (USA); **Alberto Piqué**, U.S. Naval Research Lab. (USA); **Martin Wegener**, Karlsruhe Institute of Technology (Germany); **Bo Gu**, Bos Photonics (USA)

Wednesday 5 February

OPENING STATEMENT

Location: Room 120 (Exhibit Level) . . Wed 8:00 am to 8:10 am

SESSION 1

Location: Room 120 (Exhibit Level) . Wed 8:10 am to 10:00 am

Opportunities and Challenges in Laser 3D Manufacturing

Session Chair: **Henry Helvajian**, The Aerospace Corp. (USA)

8:10 am: **A synopsis of DARPA investment in additive manufacture and what challenges remain** (*Invited Paper*), Michael C. Maher, Defense Advanced Research Projects Agency (USA) [8970-1]

8:40 am: **Laser additive manufacturing: where it has been, where it needs to go** (*Invited Paper*), Khershed P. Cooper, National Science Foundation (USA) and U.S. Naval Research Lab. (USA) [8970-2]

9:10 am: **Laser embedding electronics on 3D printed objects**, Matthew A. Kirleis, Nicholas A. Charipar, Heungsoo Kim, Kristin M. Charipar, Raymond C. Y. Auyeung, Scott A. Mathews, Alberto Piqué, U.S. Naval Research Lab. (USA) [8970-3]

9:30 am: **Fabricating specialised orthopaedic implants using additive manufacturing** (*Invited Paper*), Paul Unwin, Stanmore Implants Worldwide Ltd. (United Kingdom) [8970-4]

Coffee Break Wed 10:00 am to 10:20 am

LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA); **Andreas Tünnermann**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best "Green" LASE Paper Award**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscapel**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

Lunch/Exhibition Break Wed 12:30 pm to 1:30 pm

SESSION 2

Location: Room 113 (Exhibit Level) . . Wed 1:30 pm to 3:40 pm

Multi-photon Polymerization of 3D Micro- and Nanostructures I

Session Chair: **Martin Wegener**,
Karlsruher Institut für Technologie (Germany)

1:30 pm: **3D two-photon lithography: an enabling technology for photonic wire bonding and multi-chip integration** (*Invited Paper*), Christian Koos, Karlsruher Institut für Technologie (Germany) [8970-5]

2:00 pm: **Nano-confined polymer structures for protein adhesion** (*Invited Paper*), Moritz Wiesbauer, Johannes Kepler Univ. Linz (Austria) and Upper Austria Univ. of Applied Physics (Austria); Richard Wollhofen, Johannes Kepler Univ. Linz (Austria); Kurt Schilcher, Upper Austria Univ. of Applied Physics (Austria); Jaroslav Jacak, Thomas A. Klar, Johannes Kepler Univ. Linz (Austria) . . . [8970-6]

2:30 pm: **3D porous structures fabricated by 2PP induce liquid crystal bistability**, Shane M. Eaton, Istituto di Fotonica e Nanotecnologie (Italy); Francesca Serra, Univ. degli Studi di Milano (Italy); Arianna M. Bernasconi, Istituto di Fotonica e Nanotecnologie (Italy); Roberto Cerbino, Marco Buscaglia, Univ. degli Studi di Milano (Italy); Giulio Cerullo, Istituto di Fotonica e Nanotecnologie (Italy); Tommaso Bellini, Univ. degli Studi di Milano (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8970-7]

2:50 pm: **Three-dimensional dilational mechanical metamaterials: a 3D printing challenge** (*Invited Paper*), Tiemo K. Bückmann, Robert Schittny, Karlsruher Institut für Technologie (Germany); Michael Thiel, Nanoscribe GmbH (Germany); Muamer Kadic, Karlsruher Institut für Technologie (Germany); Graeme W. Milton, The Univ. of Utah (USA); Martin Wegener, Karlsruher Institut für Technologie (Germany) [8970-8]

3:20 pm: **Creation of high efficiency light extractors of LED structures by means of laser nanolithography**, Albertas Zukauskas, Vilnius Univ. (Lithuania); Gediminas Gervinskis, Swinburne Univ. of Technology (Australia); Mangirdas Malinauskas, Arunas Kadys, Vilnius Univ. (Lithuania); Zigmantas Balevicius, Ctr. for Physical Sciences and Technology (Lithuania); Roland Tomasiunas, Vilnius Univ. (Lithuania); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) [8970-9]

Coffee Break Wed 3:40 pm to 4:10 pm

SESSION 3

Location: Room 113 (Exhibit Level) . . Wed 4:10 pm to 6:00 pm

Multi-photon Polymerization of 3D Micro- and Nanostructures II

Session Chair: **Henry Helvajian**, The Aerospace Corp. (USA)

4:10 pm: **3D micro-printing for photonics and biology** (*Invited Paper*), Georg von Freymann, Technische Univ. Kaiserslautern (Germany) and Fraunhofer-Institut für Physikalische Messtechnik (Germany); Erik H. Waller, Michael Renner, Judith Hohmann, Technische Univ. Kaiserslautern (Germany); André Radke, Michael Thiel, Nanoscribe GmbH (Germany) [8970-10]

4:40 pm: **Towards larger printing volumes in multi-photon polymerization**, Michael Thiel, Nanoscribe GmbH (Germany) and Karlsruher Institut für Technologie (Germany); Jörg Hoffmann, Jennifer Lindemeier, Fabian B. Niesler, André Radke, Roman Reiner, Nanoscribe GmbH (Germany) [8970-11]

5:00 pm: **Laser fabrication of polymeric microstructures with SWCNT**, Adriano J. Galvani Otuka, Vinicius Tribuzi, Univ. de São Paulo (Brazil); Daniel S. Correa, Embrapa Instrumentação Agropecuária (Brazil); Antonio R. Zanatta, Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8970-12]

5:20 pm: **Direct writing of shape-controlled nanodot array by two-photon nanolithography using an elliptical beam**, Hong-Zhong Cao, Technical Institute of Physics and Chemistry (China) and Chongqing Institutes of Green and Intelligent Technology (China); Mei-Ling Zheng, Xian-Zi Dong, Zhen-Sheng Zhao, Technical Institute of Physics and Chemistry (China); Xuan-Ming Duan, Technical Institute of Physics and Chemistry (China) and Chongqing Institutes of Green and Intelligent Technology (China) [8970-13]

5:40 pm: **Three-dimensional ceramic molding process based on microstereolithography for the production of piezoelectric energy harvesters**, Shoji Maruo, Kenji Sugiyama, Yokohama National Univ. (Japan); Yuya Daicho, Yokohama National Univ. (Japan) and CMET Inc. (Japan) [8970-14]



Thursday 6 February

SESSION 4

Location: Room 125 (Exhibit Level) . . Thu 8:00 am to 10:00 am

Applications and Diagnostics of Laser Transfer Techniques

Joint Session with Conferences 8967 and 8970

Session Chairs: **Masayuki Okoshi**, National Defense Academy (Japan);
Daisuke Nakamura, Kyushu Univ. (Japan)

8:00 am: **Simple technique for high rate and highly conductive metal (Al) deposition on silicon by laser selective metallization**, Armel Bahouka, Frédéric Mermet, IREPA LASER (France); Pablo M. Romero, Nerea Otero, Ivette Coto, Cristina Leira, Alejandro González, Asociación de Investigación Metalúrgica del Noroeste (Spain); Thomas Schutz-Kuchly, Karim Derbouz Draoua, Abdelilah Slaoui, ICube (France) [8970-15]

8:20 am: **The shape of nanospheres propelled by femtosecond laser-excited enhanced near field**, Takuya Shinohara, Mitsuhiro Terakawa, Keio Univ. (Japan) [8970-16]

8:40 am: **Laser-induced forward transfer as an immobilization tool for biosensor applications**, Marianneza Chatzipetrou, National Technical Univ. of Athens (Greece); Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada); Athanasios Papathanassiou, National Technical Univ. of Athens (Greece); Eleftherios Touloupakis, Univ. of Crete (Greece); Ioanna Zergioti, National Technical Univ. of Athens (Greece) [8970-17]

9:00 am: **Study of direct writing of heavily doped Al and Bi heterojunctions on Si by laser transfer doping**, Pablo M. Romero, Nerea Otero, Asociación de Investigación Metalúrgica del Noroeste (Spain) [8967-31]

9:20 am: **High-resolution imaging of ejection dynamics in laser-induced forward transfer**, Ralph Pohl, C. W. Visser, Gert-Willem R. Römer, C. Sun, Bert A. J. Huis in't Veld, Detlef Lohse, Univ. Twente (Netherlands) [8967-32]

9:40 am: **Pump-probe investigations and numerical simulation of the confined laser ablation of thin molybdenum films**, Juergen Sotrop, Alfred Kersch, Matthias Domke, Heinz P. Huber, Munich Univ. of Applied Sciences (Germany) [8967-33]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 5

Location: Room 113 (Exhibit Level) . Thu 10:30 am to 12:30 pm

Multifunctional and Multimaterial 3D Fabrication

Session Chair: **Alberto Piqué**, U.S. Naval Research Lab. (USA)

10:30 am: **Multifunctional 3D printing (Invited Paper)**, Ricky Wildman, The Univ. of Nottingham (United Kingdom) [8970-18]

11:00 am: **Creation of multimaterial micro- and nanostructures through aqueous-based fabrication, manipulation, and immobilization (Invited Paper)**, John T. Fourkas, Univ. of Maryland, College Park (USA) [8970-19]

11:30 am: **The design and production of 3D structures using bitstreams of light (Invited Paper)**, Suman Das, Georgia Institute of Technology (USA) [8970-20]

12:00 pm: **Gas-mediated charged particle beam processing of nanostructured materials (Invited Paper)**, Milos Toth, Aiden Martin, Charlene J. Lobo, Igor Aharonovich, Univ. of Technology, Sydney (Australia) [8970-21]

Lunch/Exhibition Break Thu 12:30 pm to 1:30 pm

SESSION 6

Location: Room 120 (Exhibit Level) . . . Thu 1:30 pm to 3:20 pm

Laser Additive Manufacturing of Metal Structures

Joint Session with Conferences 8963 and 8970

Session Chair: **Stan Ream**, Edison Welding Institute (USA)

1:30 pm: **High performance laser additive manufacturing of metal components (Invited Paper)**, Weidong Huang, Xin Lin, Northwestern Polytechnical Univ. (China) [8970-22]

2:00 pm: **Real-time laser cladding control with variable spot size**, Jorge L. Arias, M. Angeles Montealegre, Felix Vidal, Jorge Rodríguez, Asociación de Investigación Metalúrgica del Noroeste (Spain); Stefan Mann, Peter Abels, Fraunhofer-Institut für Lasertechnik (Germany); Filip Motmans, VITO NV (Belgium) [8970-23]

2:20 pm: **Development of laser cladding system with process monitoring by x-ray imaging**, Takaya Terada, Tomonori Yamada, Akihiko Nishimura, Japan Atomic Energy Agency (Japan) [8963-35]

2:40 pm: **Analysis of the molten/solidified zone in selective laser melted parts**, Sabina Luisa Campanelli, Giuseppe Casalino, Nicola Contuzzi, Andrea Angelastro, Antonio D. Ludovico, Politecnico di Bari (Italy) [8963-36]

3:00 pm: **Post-processing of 3D-printed parts using femtosecond and picosecond laser radiation**, Ilya Mingareev, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Nils Gehlich, Tobias Bonhoff, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Fraunhofer-Institut für Lasertechnik (Germany); Wilhelm Meiners, Ingomar Kelbassa, Fraunhofer-Institut für Lasertechnik (Germany); Tim Biermann, Joining Technologies, Inc. (USA); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8970-24]

Coffee Break Thu 3:20 pm to 3:50 pm

SESSION 7

Location: Room 113 (Exhibit Level) . . . Thu 3:50 pm to 5:20 pm

Laser Processing of Novel Structures and Complex Shapes

Session Chair: **Bo Gu**, Bos Photonics (USA)

3:50 pm: **Femtosecond laser micromachining for 3D optofluidic devices (Invited Paper)**, Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8970-25]

4:20 pm: **Rapid manufacture of freeform micro-optics for high power applications**, Matthew O. Currie, Roy McBride, PowerPhotonic, Ltd. (United Kingdom) [8970-26]

4:40 pm: **Flexible and robust beam shaping concepts with aspheres**, Sabrina Matthias, asphericon GmbH (Germany) [8970-27]

5:00 pm: **Forming of 3D complex shapes of AISI 304 stainless steel by high power diode laser**, Massimiliano Barletta, Univ. degli Studi di Roma Tor Vergata (Italy); Annamaria Gisario, Simone Venettacci, Francesco Veniali, Univ. degli Studi di Roma La Sapienza (Italy) [8970-28]

Free-Space Laser Communication and Atmospheric Propagation XXVI

Conference Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA); **Don M. Boroson**, MIT Lincoln Lab. (USA)

Program Committee: **Vincent W. S. Chan**, Massachusetts Institute of Technology (USA); **Renny A. Fields**, The Aerospace Corp. (USA); **G. Charmaine Gilbreath**, U.S. Naval Research Lab. (USA); **Frank F. Heine**, Tesat-Spacecom GmbH & Co. KG (Germany); **Olga Korotkova**, Univ. of Miami (USA); **Michael A. Krainak**, NASA Goddard Space Flight Ctr. (USA); **Ronald L. Phillips**, Florida Space Institute (USA); **Zoran Sodnik**, European Space Research and Technology Ctr. (Netherlands); **Morio Toyoshima**, National Institute of Information and Communications Technology (Japan); **Alan E. Willner**, The Univ. of Southern California (USA); **Shiro Yamakawa**, Japan Aerospace Exploration Agency (Japan)

Sunday 2 February

SESSION 1

Location: Room 120 (Exhibit Level) . . Sun 8:30 am to 12:10 pm

Atmospheric Propagation

Session Chair: **Don M. Boroson**, MIT Lincoln Lab. (USA)

8:30 am: **Investigation of chaotic profiled beam propagation through a turbulent layer and evaluation of the temporal statistics of the output using a modified von Karman phase screen**, Monish R. Chatterjee, Fathi H. A. Mohamed, Univ. of Dayton (USA) [8971-1]

8:50 am: **Optical beam spreading in the presence of both atmospheric turbulence and quartic aberration**, Nelofar Mosavi, Johns Hopkins Univ. Applied Physics Lab. (USA) and Univ. of Maryland, Baltimore County (USA); Brian S. Marks, Johns Hopkins Univ. Applied Physics Lab. (USA); Curtis R. Menyuk, Univ. of Maryland, Baltimore County (USA) [8971-2]

9:10 am: **Transmitter diversity verification on Artemis geostationary satellite**, Ramon Mata-Calvo, Peter Becker, Dirk Giggenbach, Florian Moll, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany); Malte Schwarzer, Martin Hinz, Cassidian Optronics GmbH (Germany); Zoran Sodnik, European Space Research and Technology Ctr. (Netherlands) [8971-3]

9:30 am: **Simultaneous scintillation measurements of coherent and partially coherent beams in an open atmosphere experiment (Invited Paper)**, Anatoly Efimov, Kirill Velizhanin, Los Alamos National Lab. (USA); Grigory Gelikonov, Institute of Applied Physics (Russian Federation) [8971-4]

Coffee Break Sun 10:00 am to 10:30 am

10:30 am: **Evaluation of the performance of the ground to satellite free space optical link under turbulence conditions for different intensity modulation schemes**, Anjitha Viswanath, Indian Institute of Technology Delhi (India); Hemani Kausal, Institute of Technology and Management (India); Virander K. Jain, Subrat Kar, Indian Institute of Technology Delhi (India) [8971-5]

10:50 am: **Clouds impacts on the design of optical feeder link and associated optical ground station network for future broadband fixed satellite services**, Sylvain Poulenard, Mathieu Ruellan, Infoterra France (France); Jérôme Riedi, Frederic Parol, Univ. des Sciences et Technologies de Lille (France); Bernard Roy, Infoterra France (France); Angélique Rissons, Institut Supérieur de l'Aéronautique et de l'Espace (France) [8971-6]

11:10 am: **Channel characterization for air-to-ground free-space optical communication links**, Kevin Shortt, Dirk Giggenbach, Ramon Mata Calvo, Florian Moll, Christian Fuchs, Christopher Schmidt, Joachim Horwath, Jack Yeh, Vevek Selvaraj, Ranjoy Banerjee, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [8971-7]

11:30 am: **Performance analysis of coherent tiled fiber-array beam director with near-field phase-locking and programmable control of tip/tilt and piston phases**, Grigory A. Filimonov, V.E. Zuev Institute of Atmospheric Optics (Russian Federation) and Univ. of Dayton (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA) and Optonicus (USA); Svetlana L. Lachinova, Optonicus (USA) [8971-8]

11:50 am: **Scintillation resistant multi-aperture phase-contrast wavefront sensor**, Jeffrey R. Kraccek, Univ. of Dayton (USA); Mathieu Aubailly, Univ. of Maryland, College Park (USA) and Optonicus (USA); Mikhail A. Vorontsov, Univ. of Dayton (USA) and Optonicus (USA) and Univ. of Maryland, College Park (USA) [8971-9]

Lunch Break Sun 12:10 pm to 1:40 pm

SESSION 2

Location: Room 120 (Exhibit Level) . . . Sun 1:40 pm to 3:00 pm

Laser Transmitters

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab. (USA)

1:40 pm: **Ongoing testing of pulsed fiber amplifiers in simulated space environment**, Malcolm W. Wright, Hamid Hemmati, Jet Propulsion Lab. (USA) [8971-10]

2:00 pm: **High power photonic crystal fiber amplifiers for deep space uplink applications**, Donald Sipes Jr., Jason Tafoya, Optical Engines, Inc. (USA) [8971-11]

2:20 pm: **1030nm Yb-fiber-MOPA based, multi-aperture high-power, high energy uplink laser beacon for deep space communication**, Doruk Engin, Frank Kimple, John Burton, Ibraheem Darab, Brian Mathason, Shantanu Gupta, Fibertek, Inc. (USA) [8971-12]

2:40 pm: **Radiation-hardened Erbium-doped optical fibers and amplifiers for future high-dose space missions**, Sylvain Girard, Univ. Jean Monnet Saint-Etienne (France); Arnaud Laurent, Emmanuel Pinsard, Thierry Robin, Benoit Cadier, iXFiber SAS (France); Claude Marcandella, Commissariat à l'Énergie Atomique (France); Aziz Boukenter, Youcef Ouerdane, Univ. Jean Monnet Saint-Etienne (France) [8971-13]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 3

Location: Room 120 (Exhibit Level) . . . Sun 3:30 pm to 5:00 pm

Modeling and Analysis

Session Chair: **Don M. Boroson**, MIT Lincoln Lab. (USA)

3:30 pm: **A reconsideration of the current best wavelengths for FSO (Invited Paper)**, Colin Reinhardt, SPAWAR Systems Ctr. (USA); Stephen Hammel, Space and Naval Warfare Systems Command (USA); John deGrassie, SPAWARSYSCEN Pacific: San Diego (USA) [8971-14]

4:00 pm: **Orthogonal multi phase shift keying (OMPSK) modulation for free-space laser communications**, Saleh Faruque, The Univ. of North Dakota (USA) [8971-16]

4:20 pm: **Pointing, acquisition, and tracking architecture tools for deep-space optical communications**, Swati Mohan, Jet Propulsion Lab. (USA) [8971-17]

4:40 pm: **Improving the efficiency of undersea laser communications**, Hamid Hemmati, Abhijit Biswas, Jet Propulsion Lab. (USA) [8971-18]

LASE

Monday 3 February

SESSION 4

Location: Room 120 (Exhibit Level) . Mon 8:30 am to 11:40 am

Receiver/Optics/Beam-Steering

Session Chair: **Hamid Hemmati**, Jet Propulsion Lab. (USA)

8:30 am: **A multi-rate DPSK modem for free-space laser communications**, Neal W. Spellmeyer, C. A. Browne, David O. Caplan, John J. Carney, M. L. Chavez, Andrew S. Fletcher, J. J. Fitzgerald, R. D. Kaminsky, G. Lund, Scott A. Hamilton, Richard J. Magliocco, O. V. Mikulina, Robert J. Murphy, Hemonth G. Rao, M. S. Scheinbart, M. M. Seaver, Jade P. Wang, MIT Lincoln Lab. (USA)[8971-36]

8:50 am: **Multi-rate DPSK optical transceivers for free-space applications**, David O. Caplan, John J. Carney, J. Fitzgerald, I. Gaschits, D. Geisler, R. Kaminsky, G. Lund, Scott A. Hamilton, Richard J. Magliocco, Robert J. Murphy, Hemonth G. Rao, Neal W. Spellmeyer, Jade P. Wang, MIT Lincoln Lab. (USA)[8971-37]

9:10 am: **The Lunar Laser OCTL Terminal (LLOT) receiver assembly**, Kevin Birnbaum, Matthew D. Shaw, Michael K. Cheng, Meera Srinivasan, Kevin J. Quirk, Abhijit Biswas, Jet Propulsion Lab. (USA)[8971-20]

9:30 am: **Ground receiver unit for optical communication between LADEE spacecraft and ESA ground station**, Felix Arnold, Martin Mosberger, Johannes Widmer, Fabio Gambarara, RUAG Space AG (Switzerland)[8971-21]

9:50 am: **Monolithic telescopes for free-space optical communications**, William T. Roberts, Jet Propulsion Lab. (USA)[8971-22]

Coffee BreakMon 10:10 am to 10:40 am

10:40 am: **Recent developments in the production of spin-cast epoxy mirrors**, Lisa Brodhacker, Lander Univ. (USA); Joe Ritter, Univ. of Hawai'i (USA)[8971-23]

11:00 am: **Infrared Risley prism beam pointer**, Steve Harford, Homero Gutierrez, Michael Newman, Robert Pierce, Tim Quakenbush, John Wallace, Ball Aerospace & Technologies Corp. (USA)[8971-24]

11:20 am: **Liquid crystal optical phased array multiple-beam steering methods**, Feng Xiao, Lingjiang Kong, Univ. of Electronic Science and Technology of China (China)[8971-26]

Lunch Break Mon 11:40 am to 1:30 pm

SESSION 5

Location: Room 120 (Exhibit Level) . . Mon 1:30 pm to 5:30 pm

Field Demonstrations

Session Chair: **Don M. Boroson**, MIT Lincoln Lab. (USA)

1:30 pm: **Introduction of terrestrial free-space optical communications network facility: in-orbit and networked optical ground stations experimental verification advanced testbed (INNOVA)** (*Invited Paper*), Morio Toyoshima, Yasushi Munemasa, Hideki Takenaka, Yoshihisa Takayama, Yoshisada Koyama, Hiroo Kunimori, Toshihiro Kubooka, Kenji Suzuki, Shinichi Yamamoto, Shinichi Taira, Hiroyuki Tsuji, Isao Nakazawa, Maki Akioka, National Institute of Information and Communications Technology (Japan)[8971-28]

2:00 pm: **Overview and results of the Lunar Laser Communication Demonstration** (*Invited Paper*), Don M. Boroson, Bryan S. Robinson, Daniel V. Murphy, Dennis A. Burianek, Farzana Khatri, MIT Lincoln Lab. (USA); Joseph M. Kovalik, Jet Propulsion Lab. (USA); Zoran Sodnik, European Space Research and Technology Ctr. (Netherlands)[8971-29]

2:30 pm: **Inter-island optical link demonstration using high data-rate pulse-position modulation**, Michael Bacher, Felix Arnold, Björn Thieme, RUAG Space AG (Switzerland)[8971-30]

2:50 pm: **Link demonstration from the International Space Station (ISS) to ground with the Optical Payload for Lasercom Science (OPALS) system**, Bogdan V. Oaida, Abhijit Biswas, Jet Propulsion Lab. (USA) and California Institute of Technology (USA)[8971-31]

Coffee Break Mon 3:10 pm to 3:40 pm

3:40 pm: **LLCD operations using the Lunar Lasercom Ground Terminal**, Daniel V. Murphy, Robert E. Lafon, Jan E. Kinsky, Matthew E. Grein, Robert T. Schulein, Matthew M. Willis, MIT Lincoln Lab. (USA)[8971-32]

4:00 pm: **LLCD operations using the Lunar Lasercom OGS Terminal** (*Invited Paper*), Zoran Sodnik, European Space Research and Technology Ctr. (Netherlands); Igor Zayer, European Space Operations Ctr. (Germany)[8971-33]

4:30 pm: **The Lunar Laser OCTL Terminal (LLOT)**, Abhijit Biswas, Joseph M. Kovalik, Malcolm W. Wright, William T. Roberts, Kevin Birnbaum, Matthew D. Shaw, Michael K. Cheng, Meera Srinivasan, Kevin J. Quirk, Jet Propulsion Lab. (USA)[8971-34]

4:50 pm: **Electronics design of a multi-rate DPSK modem for free-space optical communications**, Hemonth G. Rao, C. A. Browne, David O. Caplan, John J. Carney, M. L. Chavez, Andrew S. Fletcher, J. J. Fitzgerald, R. D. Kaminsky, G. Lund, Scott A. Hamilton, Richard J. Magliocco, O. V. Mikulina, Robert J. Murphy, M. M. Seaver, M. S. Scheinbart, Neal W. Spellmeyer, Jade P. Wang, MIT Lincoln Lab. (USA)[8971-38]

5:10 pm: **Performance and qualification of a multi-rate DPSK modem**, Jade P. Wang, C. Browne, David O. Caplan, John J. Carney, M. L. Chavez, J. Fitzgerald, I. Gaschits, D. Geisler, Scott A. Hamilton, Scott R. Henion, G. Lund, Richard J. Magliocco, O. V. Mikulina, Robert J. Murphy, Hemonth G. Rao, M. M. Seaver, Neal W. Spellmeyer, MIT Lincoln Lab. (USA)[8971-39]

Tuesday 4 February

TECHNICAL EVENT

Location: InterContinental Hotel, Fremont. . . . 7:30 to 9:00 pm

Laser Communications

Session Chairs: **Hamid Hemmati**, Jet Propulsion Lab. (USA) and **Don Boroson**, MIT Lincoln Lab. (USA)

This technical event on Laser Communications will hold its informal annual meeting in conjunction with the Free-Space Laser Communication and Atmospheric Propagation conference. All professionals involved in theory and applications of free-space laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XIV

Conference Chairs: Alexander Heisterkamp, Friedrich-Schiller-Univ. Jena (Germany); Peter R. Herman, Univ. of Toronto (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)

Program Committee: Craig B. Arnold, Princeton Univ. (USA); James E. Carey III, SiOnyx Inc. (USA); Xun Gu, ABB Corporate Research (Switzerland); Denise M. Krol, Univ. of California, Davis (USA); Eric Mazur, Harvard Univ. (USA); Michael M. Mielke, Raydiance, Inc. (USA); Eric P. Mottay, Amplitude Systèmes (France); Christopher B. Schaffer, Cornell Univ. (USA); Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany); Alfred Vogel, Univ. zu Lübeck (Germany); Wataru Watanabe, Ritsumeikan Univ. (Japan)

Conference Cosponsors :



LASE

Sunday 2 February

OPENING REMARKS

Location: Room 125 (Exhibit Level) 8:30 am to 8:50 am

Alexander Heisterkamp, Friedrich-Schiller-Univ. Jena (Germany) and **Michel Meunier**, Ecole Polytechnique de Montréal (Canada)

SESSION 1

Location: Room 125 (Exhibit Level) . . Sun 8:50 am to 10:10 am

New Methods for Optical Perforation of Cells

Session Chair: **Alexander Heisterkamp**, Friedrich-Schiller-Univ. Jena (Germany)

8:50 am: **Plasmonic cell transfection using micropylamids**, Nabiha Saklayen, Harvard Univ. (USA); Sébastien Courvoisier, Univ. of Geneva (Switzerland); Jun Chen, Nanjing Univ. of Science and Technology (China); Jean-Pierre Wolf, Univ. of Geneva (Switzerland); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) [8972-1]

9:10 am: **Single cell transfection by laser-induced breakdown of an optically trapped gold nanoparticle**, Yoshihiko Arita, Martin Ploschner, Maciej K. Antkowiak, Frank J. Gunn-Moore, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8972-2]

9:30 am: **Enhanced cell transfection using subwavelength focused optical eigenmode beams**, Michael Mazilu, Xanthi Tsampoula, Tom Vettenburg, Frank J. Gunn-Moore, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8972-3]

9:50 am: **Biodegradable microsphere-mediated perforation using low-intensity femtosecond laser pulses for microfluidic perforation system**, Tatsuki Mitsuhashi, Mitsuhiro Terakawa, Keio Univ. (Japan) [8972-4]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 2

Location: Room 125 (Exhibit Level) . Sun 10:40 am to 12:30 pm

Mechanisms of Plasmon-mediated Manipulation of Cells

Session Chair: **Dvir Yelin**, Technion-Israel Institute of Technology (Israel)

10:40 am: **Plasmonic nanobubbles for target cell-specific gene and drug delivery and multifunctional processing of heterogeneous cell systems** (*Invited Paper*), Ekaterina Y. Lukianova-Hleb, Rice Univ. (USA); Leslie E. Huye, Malcolm K. Brenner M.D., Baylor College of Medicine (USA); Dmitri Lapotko, Rice Univ. (USA) [8972-11]

11:10 am: **Mechanistic investigations and molecular medicine applications of gold nanoparticle mediated (GNOME) laser transfection**, Markus Schomaker, Dag Heinemann, Stefan Kalies, Laser Zentrum Hannover e.V. (Germany); Saskia Willenbrock, StiftungTierärztliche Hochschule Hannover (Germany); Hugo Murua Escobar, StiftungTierärztliche Hochschule Hannover (Germany) and Univ. Rostock (Germany); Tammo Ripken, Laser Zentrum Hannover e.V. (Germany); Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) and Hannover Medical School (Germany) [8972-6]

11:30 am: **Dynamic imaging of transient bubbles generated by femtosecond irradiation of plasmonic nanoparticles in cell environment**, Christos Boutopoulos, Matthieu Fortin-Deschenes, Eric Bergeron, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [8972-7]

11:50 am: **New methods to study fluence threshold in nanoparticle mediated laser-induced bubble formation**, Kaushik G. Subramanian, Sigfried Haering, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) [8972-8]

12:10 pm: **Nanoplasma formation around plasmonic nanostructures in ultrafast laser-induced nanocavitation**, Rémi Lachaine, Étienne Boulais, Michel Meunier, Ecole Polytechnique de Montréal (Canada) [8972-9]

Lunch/BIOS Exhibition Break Sun 12:30 pm to 1:50 pm

SESSION 3

Location: Room 125 (Exhibit Level) . . . Sun 1:50 pm to 3:00 pm

Applications of Optical Perforation of Cells

Session Chair: **Michel Meunier**, Ecole Polytechnique de Montréal (Canada)

1:50 pm: **Specific manipulations of cancer cells using gold nanoparticles and femtosecond pulses** (*Invited Paper*), Dvir Yelin, Daniella Yeheskely-Hayon, Limor Minal, Technion-Israel Institute of Technology (Israel) [8972-10]

2:20 pm: **Femtosecond optical injection of intact plant cells using a reconfigurable photoporation platform**, Claire A. Mitchell, Univ. of St. Andrews (United Kingdom); Stefan Kalies, Laser Zentrum Hannover e.V. (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Tomás Cizmár, Univ. of Dundee (United Kingdom); Nicola Bellini, Anisha Kubasik-Thayil, Univ. of St. Andrews (United Kingdom); Lesley Torrance, The James Hutton Institute (United Kingdom) and Univ. of St. Andrews (United Kingdom); Alison Roberts, The James Hutton Institute (United Kingdom); Frank J. Gunn-Moore, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8972-12]

2:40 pm: **Evaluation of pulsed laser ablation in liquids generated gold nanoparticles as novel transfection tools: efficiency and cytotoxicity**, Saskia Willenbrock, María C. Durán, StiftungTierärztliche Hochschule Hannover (Germany); Annette Barchanski, Stephan Barcikowski, Univ. Duisburg-Essen (Germany); Karsten Feige, Ingo Nolte, StiftungTierärztliche Hochschule Hannover (Germany); Hugo Murua Escobar, Univ. Rostock (Germany) and StiftungTierärztliche Hochschule Hannover (Germany) [8972-13]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 4

Location: Room 125 (Exhibit Level) . . . Sun 3:30 pm to 4:30 pm

New Technologies

Session Chair: **Christopher B. Schaffer**, Cornell Univ. (USA)

3:30 pm: **Extreme ultra violet optical coherence tomography with high harmonic generation sources**, Silvio Fuchs, Christian Rödel, Julius Biedermann, Martin Wünsche, Ulf Zastra, Vinzenz Hilbert, Alexander Blinne, Max Möller, Eckhart Förster, Gerhard G. Paulus, Friedrich-Schiller-Univ. Jena (Germany) [8972-14]

3:50 pm: **Label-free high-throughput imaging flow cytometry**, Ata Mahjoubfar, Claire Chen, Univ. of California, Los Angeles (USA) and California NanoSystems Institute (USA); Kayvan R. Niazi, Shahrooz Rabizadeh, NantWorks, LLC (USA) and California NanoSystems Institute (USA) and Univ. of California, Los Angeles (USA); Bahram Jalali, Univ. of California, Los Angeles (USA) and California NanoSystems Institute (USA) and Univ. of California, Los Angeles (USA) [8972-15]

4:10 pm: **Smart surgical tool**, Huan Huang, Shuang Bai, Lih-Mei Yang, Jian Liu, PolarOnyx, Inc. (USA) [8972-16]

Conference 8972 · Location: Room 125 (Exhibit Level)

SESSION 5

Location: Room 125 (Exhibit Level) . . . Sun 4:30 pm to 5:50 pm

Laser Sources for Biomedical Applications

Session Chair: **Eric P. Mottay**, Amplitude Systèmes (France)

4:30 pm: **Femtosecond-laser induced nanostructuring for surface enhanced Raman spectroscopy**, Hamza Messaoudi, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) and Technische Fachhochschule Wildau (Germany); Janine Lange, Friedhelm Heinrich, Technische Fachhochschule Wildau (Germany); Susanta K. Das, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Sigurd K. Schrader, Marcus Frohme, Technische Fachhochschule Wildau (Germany); Rüdiger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [8972-17]

4:50 pm: **High fidelity fiber-based optical parametric oscillator for coherent anti-stokes Raman (CARS) microscopy**, Thomas Gottschall, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Tobias Meyer, Benjamin Dietzek, Jürgen Popp, Institut für Photonische Technologien e.V. (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8972-18]

5:10 pm: **A novel compact femtosecond Ti:sapphire laser with inherently synchronized high-power fiber amplifier for nonlinear microscopy**, Angelika Unterhuber, Medizinische Univ. Wien (Austria); Alma del Carmen Fernandez, Technische Univ. Wien (Austria); Tschackad Kamali, Medizinische Univ. Wien (Austria); Anders K. Hansen, Technical Univ. of Denmark (Denmark); Ole B. Jensen, DTU Fotonik (Denmark); Bernd Sumpf, Götz Erbert, Ferdinand-Braun-Institut (Germany); Paul M. Petersen, Peter E. Andersen, Technical Univ. of Denmark (Denmark); Wolfgang Drexler, Medizinische Univ. Wien (Austria) [8972-19]

5:30 pm: **Synchronization of fiber laser with Ti:sapphire laser for multimodal nonlinear imaging**, Mathieu Laliberté, Institut National de la Recherche Scientifique (Canada); Youngjae Kim, André Archambault, Alain Villeneuve, Genia Photonics Inc. (Canada); Charles Doillon, Univ. Laval (Canada); François Légaré, Institut National de la Recherche Scientifique (Canada) [8972-20]

Monday 3 February

SESSION 6

Location: Room 125 (Exhibit Level) . Mon 8:00 am to 10:00 am

Laser Development

Session Chair: **Michael M. Mielke**, Raydiance, Inc. (USA)

8:00 am: **Compact, high-repetition rate OPCPA system for high harmonic generation**, Jan Matyschok, Leibniz Univ. Hannover (Germany); Thomas Binhammer, VENTON Laser Technologies GmbH (Germany); Tino Lang, Laser Zentrum Hannover e.V. (Germany); Oliver Prochnow, Stefan Rausch, VENTON Laser Technologies GmbH (Germany); Piotr Rudawski, Miguel Miranda, Cord L. Arnold, Anne L'Huillier, Lund Univ. (Sweden); Uwe Morgner, Leibniz Univ. Hannover (Germany) [8972-21]

8:20 am: **UV-VIS enhanced supercontinuum source based on higher-order mode excitation for hyperspectral (fluorescence lifetime) imaging**, Stefano Taccheo, Swansea Univ. (United Kingdom); Cosimo D'Andrea, Politecnico di Milano (Italy); Silvia Soria, Istituto di Fisica Applicata Nello Carrara (Italy); Raffaella Mercatelli, Istituto Nazionale di Ottica (Italy); Kay Schuster, Institut für Photonische Technologien e.V. (Germany); Andrea Bassi, Rinaldo Cubeddu, Politecnico di Milano (Italy); Jens Kobelke, Klaus W. Moerl, Institut für Photonische Technologien e.V. (Germany); Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy); Franco Quercioli, Istituto Nazionale di Ottica (Italy) [8972-22]

8:40 am: **Powerful 67 fs Kerr-lens mode-locked Yb: KGW oscillator**, Haitao Zhao, Arkady Major, Univ. of Manitoba (Canada) [8972-23]

9:00 am: **Industrial 300-fs, 300-µJ thin disk amplifier with >30W average power and efficient frequency conversion to green and UV**, Martin Delaigue, Julien Pouysegur, Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France) [8972-24]

9:20 am: **Industry-grade high average power femtosecond light source**, Oliver H. Heckl, TRUMPF Laser- und Systemtechnik GmbH (Germany); Sascha Weiler, TRUMPF Inc. (USA); Robert Fleischhaker, Raphael Gebbs, Aleksander Budnicki, Martin Wolf, Jochen D. Kleinbauer, Simone Russ, TRUMPF Laser GmbH & Co. KG (Germany); Malte Kumkar, TRUMPF Laser- und Systemtechnik GmbH (Germany); Dirk H. Sutter, TRUMPF Laser GmbH & Co. KG (Germany) [8972-25]

9:40 am: **Femtosecond burst laser based on 100mJ Yb: CaF₂ regenerative amplifier**, Antoine Courjaud, Alizée A. Mareczko, Vincent Clet, Amplitude Systèmes (France); Richard Moncorgé, ENSICAEN (France); Eric P. Mottay, Amplitude Systèmes (France) [8972-26]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 7

Location: Room 125 (Exhibit Level) Mon 10:30 am to 12:00 pm

Simulation and Measurement

Session Chair: **Peter R. Herman**, Univ. of Toronto (Canada)

10:30 am: **The coherent artifact in modern pulse measurements (Invited Paper)**, Michelle Rhodes, Georgia Institute of Technology (USA); Günter Steinmeyer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Rick Trebino, Georgia Institute of Technology (USA) [8972-27]

11:00 am: **Spatio-temporal characterization of high-power femtosecond laser chains**, Valentin Gallet, Subhendu Kahaly, Olivier Gobert, Fabien Quéré, Commissariat à l'Énergie Atomique (France) [8972-28]

11:20 am: **Plasma generation by ultrashort multi-chromatic pulses during nonlinear propagation**, Jeremy R. Gulley, Jiexi Liao, Thomas E. Lanier, Kennesaw State Univ. (USA) [8972-29]

11:40 am: **Nonlinear shaping of ultrashort pulses in optical fibers under steady-state propagation conditions: triangular waveforms**, Oleksiy V. Shulika, Univ. de Guanajuato (Mexico) and Kharkov National Univ. of Radio Electronics (Ukraine); Sergii O. Iakushev, Kharkov National Univ. of Radio Electronics (Ukraine); Igor A. Sukhoivanov, Univ. de Guanajuato (Mexico) and Kharkov National Univ. of Radio Electronics (Ukraine) [8972-30]

Lunch Break Mon 12:00 pm to 1:10 pm

SESSION 8

Location: Room 125 (Exhibit Level) . . Mon 1:10 pm to 3:30 pm

Internal Structuring

Session Chair: **Koji Sugioka**, RIKEN (Japan)

1:10 pm: **Arbitrary integrated multimode interferometers for the elaboration of photonic qubits**, Andrea Crespi, Consiglio Nazionale delle Ricerche (Italy) and Politecnico di Milano (Italy); Roberta Ramponi, Politecnico di Milano (Italy) and Consiglio Nazionale delle Ricerche (Italy); Daniel J. Brod, Ernesto Galvao, Univ. Federal Fluminense (Brazil); Nicolò Spagnolo, Chiara Vitelli, Linda Sansoni, Fabio Sciarrino, Paolo Mataloni, Univ. degli Studi di Roma La Sapienza (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) and Politecnico di Milano (Italy) [8972-31]

1:30 pm: **Writing polarization dependent and independent directional couplers in optical fiber with femtosecond lasers**, Jason R. Grenier, Luis A. Fernandes, Peter R. Herman, Univ. of Toronto (Canada) [8972-32]

1:50 pm: **Integrated optical waveplates fabricated by femtosecond laser micromachining**, Giacomo Corrielli, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Andrea Crespi, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Riccardo Geremia, Politecnico di Milano (Italy); Roberta Ramponi, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Linda Sansoni, Andrea Santinelli, Paolo Mataloni, Fabio Sciarrino, Univ. degli Studi di Roma La Sapienza (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8972-33]

2:10 pm: **Morphological evolution of nanopores and cracks as fundamental components of ultrashort pulse laser-induced nanogratings**, Felix Zimmermann, Friedrich-Schiller-Univ. Jena (Germany); Anton Plech, Karlsruher Institut für Technologie (Germany); Sören Richter, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8972-34]

2:30 pm: **Direct-write diffracting tubular optical components using femtosecond lasers**, Ben W. McMillen, Yves Bellouard, Technische Univ. Eindhoven (Netherlands) [8972-35]

2:50 pm: **Temperature-compensated fiber-optic 3D shape sensor based on femtosecond laser direct-written Bragg grating waveguides**, Kenneth K. C. Lee, Univ. of Toronto (Canada); Adrian Mariampillai, 7D Surgical Inc. (Canada); Moez Haque, Univ. of Toronto (Canada); Beau A. Standish, Victor X. D. Yang, Ryerson Univ. (Canada); Peter R. Herman, Univ. of Toronto (Canada) [8972-36]

3:10 pm: **On the use femtosecond laser for ultra-high accuracy alignment and positioning of optical elements: toward new concepts for optical device integration and packaging**, Yves Bellouard, Technische Univ. Eindhoven (Netherlands) [8972-37]

Coffee Break Mon 3:30 pm to 4:00 pm

Conference 8972 · Location: Room 125 (Exhibit Level)

SESSION 9

Location: Room 125 (Exhibit Level) .. Mon 4:00 pm to 5:50 pm

Glass and Thin Film Processing

Session Chair: **Craig B. Arnold**, Princeton Univ. (USA)

- 4:00 pm: **Towards a more complete understanding of laser ablation** (*Invited Paper*), Heinz P. Huber, Matthias Domke, Regina Moser, Stephan Rapp, Juergen Sotrop, Munich Univ. of Applied Science (Germany)[8972-38]
- 4:30 pm: **Micro-patterning of self-assembled organic monolayers by using tunable ultrafast laser pulses**, Stella Maragkaki, Andreas Aumann, Ruhr-Univ. Bochum (Germany); Florian Schulz, Anja Schröter, Univ. Duisburg-Essen (Germany); Benjamin Schöps, Ruhr-Univ. Bochum (Germany); Steffen Franzka, Nils O. Hartmann, Univ. Duisburg-Essen (Germany); Andreas Ostendorf, Ruhr-Univ. Bochum (Germany)[8972-39]
- 4:50 pm: **Comparison of different processes for separation of glass and crystals using ultra short pulsed lasers**, Malte Kumkar, TRUMPF Laser- und Systemtechnik GmbH (Germany); Lara Bauer, Simone Russ, TRUMPF Laser GmbH & Co. KG (Germany); Myriam Wendel, Jonas Kleiner, TRUMPF GmbH & Co. KG (Germany); Klaus Bergner, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)[8972-40]
- 5:10 pm: **Microscopic investigation on the ultrafast laser cutting of chemically strengthened glass**, Jiyeon Choi, Dong-Sig Shin, Jeong Suh, Kyung-Han Kim, Korea Institute of Machinery & Materials (Korea, Republic of); Seung Hwan Paek, Chang-Ho Kim, L2K Korea Co., Ltd (Korea, Republic of)[8972-41]
- 5:30 pm: **Rapid microfabrication of transparent materials using a filamented beam of the IR femtosecond laser**, Simas Butkus, Domas Paipulas, Aleksandr Alesenkov, Zydrunas Viburyus, Eugenijus Gaizauskas, Dalia Kaskelyte, Martynas Barkauskas, Valdas Sirutkaitis, Vilnius Univ. (Lithuania)[8972-42]

Tuesday 4 February

SESSION 10

Location: Room 125 (Exhibit Level) .. Tue 8:00 am to 10:30 am

Ultrafast Laser-induced Modifications of Transparent Materials

Joint Session with Conferences 8967 and 8972

Session Chair: **Stefan Nolte**, Friedrich-Schiller-Univ. Jena (Germany)

- 8:00 am: **Femtosecond laser 3D nanofabrication in glass: enabling direct write of integrated micro/nanofluidic chips** (*Invited Paper*), Ya Cheng, Yang Liao, Shanghai Institute of Optics and Fine Mechanics (China); Koji Sugioka, RIKEN (Japan)[8967-7]
- 8:30 am: **Flexible metal patterning in three-dimensional glass microfluidic structures using femtosecond laser direct-write ablation followed by electroless plating**, Jian Xu, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan)[8967-8]
- 8:50 am: **Laser-induced back side wet etching: further steps to application**, Pierre Lorenz, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Sarah Zehnder, Berner Fachhochschule Technik und Informatik (Switzerland); Martin Ehrhardt, Frank Frost, Klaus-Peter Zimmer, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Patrick Schwaller, Berner Fachhochschule Technik und Informatik (Switzerland)[8967-9]
- 9:10 am: **Contrasting femtosecond laser-written Fabry-Perot resonators, Mach-Zehnder-type interferometers and micro-cavity arrays for lab-in-fiber (LIF) sensing**, Moez Haque, Yiwen Shen, Kenneth K. C. Lee, Peter R. Herman, Univ. of Toronto (Canada)[8972-43]
- 9:30 am: **Picosecond-laser bulk modification, luminescence and Raman lasing in single-crystal diamond**, Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland); Sergei M. Pimenov, A. M. Prokhorov General Physics Institute (Russian Federation); Beat Jaeggi, Valerio Romano, Berner Fachhochschule Technik und Informatik (Switzerland)[8967-10]
- 9:50 am: **Dynamics of interference of femtosecond laser-induced stress waves and crack formation inside a LiF single crystal**, Masaaki Sakakura, Naoaki Fukuda, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. (Japan)[8967-11]
- 10:10 am: **Ultrafast laser-assisted local energy deposition in bulk silicon**, Alexandros Mouskeftaras, David Grojo, Raphael G. C. R. Clady, Stéphanie Leyder, Olivier Uteza, Marc L. Sentis, Lasers, Plasmas et Procédés Photoniques (France)[8972-44]
- Coffee Break Tue 10:30 am to 11:00 am

SESSION 11

Location: Room 125 (Exhibit Level) . Tue 11:00 am to 12:30 pm

Beam Shaping

Joint Session with Conferences 8967 and 8972

Session Chair: **Peter R. Herman**, Univ. of Toronto (Canada)

- 11:00 am: **Spatial and temporally focused femtosecond laser pulses for tailored ultrafast micro-machining** (*Invited Paper*), Jeffrey A. Squier, Jens U. Thomas, Erica K. Block, Charles G. Durfee III, Colorado School of Mines (USA); Sterling J. Backus, Kapteyn-Murnane Labs., Inc. (USA)[8967-12]
- 11:30 am: **Simultaneously spatially and temporally focusing light for tailored ultrafast micro-machining**, Jens U. Thomas, Friedrich-Schiller-Univ. Jena (Germany); Erica K. Block, Amanda K. Meier, Michael J. Greco, Charles G. Durfee, Jeffrey A. Squier, Colorado School of Mines (USA); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)[8972-45]
- 11:50 am: **In situ spectral phase characterization of simultaneous spatially and temporally focused pulses**, Michael J. Greco Jr., Erica K. Block, Charles G. Durfee, Jeffrey A. Squier, Amanda K. Meier, Jens U. Thomas, Colorado School of Mines (USA)[8972-46]
- 12:10 pm: **A brief analysis on pulse front tilt in simultaneous spatial and temporal focusing**, Site Zhang, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany)[8972-47]
- Lunch/Exhibition Break Tue 12:30 pm to 1:50 pm

SESSION 12

Location: Room 125 (Exhibit Level) ... Tue 1:50 pm to 3:30 pm

Adaptive Optics and Beam Shaping

Joint Session with Conferences 8967 and 8972

Session Chair: **Stephan Roth**, BLZ Bayerisches Laserzentrum GmbH (Germany)

- 1:50 pm: **Dynamic optics for laser direct writing** (*Invited Paper*), Patrick S. Salter, Martin J. Booth, Univ. of Oxford (United Kingdom) ... [8967-13]
- 2:20 pm: **Femtosecond laser processing and spatial light modulator** (*Invited Paper*), Kimmo Päiväsäari, Univ. of Eastern Finland (Finland) ... [8967-14]
- 2:50 pm: **Monolithic hybrid optics for focusing ultrashort laser pulses**, Sabrina Matthias, asphericon GmbH (Germany)[8967-48]
- 3:10 pm: **Focal length stabilization of a tunable lens integrated focus shifting unit**, Gregory Eberle, Benjamin Boesser, Konrad Wegener, ETH Zurich (Switzerland)[8967-15]
- Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 13

Location: Room 125 (Exhibit Level) ... Tue 4:00 pm to 5:50 pm

Ultrashort Pulse Micromachining

Joint Session with Conferences 8967 and 8972

Session Chair: **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany)

- 4:00 pm: **Ultrashort pulse lasers for precise processing: overview on a current German research initiative** (*Invited Paper*), Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany)[8972-49]
- 4:30 pm: **Influence of laser parameters on quality of microholes and process efficiency**, Anne Feuer, Christoph Kunza, Univ. Stuttgart (Germany); Martin Kraus, Robert Bosch GmbH (Germany); Volkher Onuseit, Rudolf Weber, Thomas Graf, Univ. Stuttgart (Germany); Denis Ingildeev, Institut fuer Textilchemie und Chemiefasern (Germany); Frank Hermanutz, ITV - Denckendorf (Germany)[8967-16]
- 4:50 pm: **Trepanning drilling of stainless steel using a high-power Ytterbium-doped fiber ultrafast laser: influence of pulse duration on hole geometry and processing quality**, John Lopez, Univ. Bordeaux 1 (France); Mathieu Dijoux, Marc Faucon, Rainer Kling, ALPhANOV (France)[8972-50]
- 5:10 pm: **High-precision micro-machining with ultraviolet wavelength picosecond lasers**, Colin J. Moorhouse, Mark Thompson, Coherent Scotland Ltd. (United Kingdom)[8972-51]
- 5:30 pm: **Determination of the AISI 1045 steel ablation threshold dependence on the pulse superposition using the Diagonal Scan (D-Scan) technique**, Ricardo E. Samad, Denilson C. Mirim, Wagner de Rossi, Nilson D. Dias Vieira Jr., Instituto de Pesquisas Energéticas e Nucleares (Brazil)[8972-52]

Conference 8972 · Location: Room 130 (Exhibit Level)

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are requested to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Optimizing plasmonic transfection using nanostructured substrates, Jun Chen, Harvard Univ. (USA) and Nanjing Univ. of Science and Technology (China); Sebastien D. Courvoisier, Harvard School of Engineering and Applied Sciences (USA) and Univ. of Geneva (Switzerland); Nabih Saklayen, Eric Mazur, Harvard Univ. (USA) [8972-53]

Surface nanostructure formation on biodegradable polymer film by femtosecond laser irradiation, Shuhei Yada, Hisashi Shimizu, Go Obara, Mitsuhiro Terakawa, Keio Univ. (Japan) [8972-54]

Laser drilling of carbon fiber reinforced plastics (CFRP) by picosecond laser pulses: comparative study of different drilling tools, Thomas Herrmann, Mareike Stolze, Johannes L'huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany) [8972-55]

Ultrafast laser micromachining of fine structures for mobile display panels, Jiyeon Choi, Sung-Hak Cho, Korea Institute of Machinery & Materials (Korea, Republic of); Chang-Hyun Cho, HPK Inc. (Korea, Republic of); Eric P. Mottay, Amplitude Systèmes (France); Arnaud Zoubir, Rainer Kling, ALPhANOV (France) [8972-56]

Surface blackening by laser texturing with high repetition rate femtosecond laser up to 1MHz, Marc Faucon, Audrey Laffitte, ALPhANOV (France); John Lopez, Univ. Bordeaux 1 (France); Rainer Kling, ALPhANOV (France) [8972-57]

Ultrafast laser manufacturing of composite material 3D microstructured scaffolds, Sima Rekstyte, Evaldas Balciunas, Mangirdas Malinauskas, Vilnius Univ. (Lithuania) [8972-60]

Three-dimensional nano-structuring of polymer materials by controlled avalanche using femtosecond laser pulses, Mangirdas Malinauskas, Albertas Zukauskas, Sima Rekstyte, Vilnius Univ. (Lithuania); Ricardas Buividas, Saulius Juodkakis, Swinburne Univ. of Technology (Australia) and Australian National Fabrication Facility (Australia) [8972-61]

Femtosecond laser-induced breakdown spectroscopy for understanding high-energy materials, Venugopal Rao Soma, Sreedhar Sunku, Univ. of Hyderabad (India) [8972-62]

Thermoelectric assessment of laser peening induced effects on a metallic biomaterial Ti6Al4V, Hector G. Carreon, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Sandra Barriuso, Ctr. Nacional de Investigaciones Metalúrgicas (Spain); J. L. González-Carrasco, Ctr. Nacional de Investigaciones Metalúrgicas (Spain) and CIBER-BBN (Spain); Juan Antonio Porro, Univ. Politécnica de Madrid (Spain); J. L. Ocaño, Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain) [8972-63]

Wednesday 5 February

BEST STUDENT PAPER COMPETITION

Location: Room 130 (Exhibit Level) . Wed 8:00 am to 10:00 am

Competition · 8:00 to 9:00 am

Award Ceremony · 9:40 to 10:00 am

We are pleased to announce that a cash prize will be awarded to the best student presentation in this conference (both poster and oral papers considered).

Papers submitted by **graduate and undergraduate** students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief **5-minute summary** of their original talk or poster presented at the conference.

Following the student competition, the judges will meet and decide on the winner. The winner and runner-up will be announced during the award ceremony and awarded a cash prize.

Award Sponsor: **APE GmbH**

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LASE PLENARY SESSION

Location: Room 134 (Exhibit Level) Wed 10:20 am to 12:30 pm

Session Chairs: **Bo Gu**, Bos Photonics (USA);

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:20 am: **Welcome and Opening Remarks**, Bo Gu, Bos Photonics (USA); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

10:25 am: **Announcement of the Best "Green" LASE Paper Award**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

10:30 am: **Photonics21 and the Perspectives from the European Photonics Industry**, Michael Mertin, JENOPTIK AG (Germany)

11:10 am: **Femtosecond Laser 3D Micromachining and its Applications to Biochip Fabrication**, Koji Sugioka, RIKEN (Japan)

11:50 am: **A New Plasmonics Enhanced Ultrafast Laser Multi-Nanoscale**, Michel Meunier, Ecole Polytechnique de Montréal (Canada)

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David L. Dickensheets
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(Germany)

Steering Committee Chair



Rajeshuni Ramesham
Jet Propulsion Lab. (USA)

Founding Chair



M. Edward Motamedi
Revoltech Microsystems (USA)

Micro/Nanofabrication

- 8973 **Micromachining and Microfabrication Process Technology XIX** (Maher, Resnick) 241
- 8974 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII** (von Freymann, Schoenfeld, Rumpf) 243
- 8967 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX** (Nakata, Xu, Roth, Neuenschwander) 222
- 8968 **Laser-based Micro- and Nano-Processing VIII** (Klotzbach, Washio, Arnold) 226

Devices/Applications/Reliability

- 8975 **Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII** (Shea, Ramesham) 246
- 8976 **Microfluidics, BioMEMS, and Medical Microsystems XII** (Gray, Becker) 248
- 8977 **MOEMS and Miniaturized Systems XIII** (Piyawattanametha, Park) 251
- 8978 **MEMS Adaptive Optics VIII** (Bifano, Kubby, Gigan) 253
- 8979 **Emerging Digital Micromirror Device Based Systems and Applications VI** (Douglass, King, Lee) 254

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SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, session chairs, and authors who have so generously given their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

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Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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MOEMS-MEMS Plenary Session
9:00 am to 12:00 pm

Poster Session
6:00 to 8:00 pm

LASE Plenary Session
10:20 am to 12:30 pm

Micro/Nanofabrication

8973 **Micromachining and Microfabrication Process Technology XIX** (Maher, Resnick)

8974 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII** (von Freymann, Schoenfeld, Rumpf)

8967 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX** (Nakata, Xu, Roth, Neuenschwander)

8968 **Laser-based Micro- and Nano-Processing VIII** (Klotzbach, Washio, Arnold)

Devices/Applications/Reliability

8975 **Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII** (Shea, Ramesham)

8976 **Microfluidics, BioMEMS, and Medical Microsystems XII** (Gray, Becker)

8978 **MEMS Adaptive Optics VIII** (Bifano, Kubby, Gigan)

8977 **MOEMS and Miniaturized Systems XIII** (Piyawattanametha, Park)

8979 **Emerging Digital Micromirror Device Based Systems and Applications VI** (Douglass, King, Lee)

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Tuesday 4 February · 10:00 am to 5:00 pm
Wednesday 5 February · 10:00 am to 5:00 pm
Thursday 6 February · 10:00 am to 4:00 pm

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Micromachining and Microfabrication Process Technology XIX

Conference Chairs: **Mary Ann Maher**, SoftMEMS (USA); **Paul J. Resnick**, Sandia National Labs. (USA)

Program Committee: **Ronald A. Coutu Jr.**, Air Force Institute of Technology (USA); **David G. Lishan**, Plasma-Therm LLC (USA); **Sanjay Krishna**, The Univ. of New Mexico (USA); **Tamal Mukherjee**, Carnegie Mellon Univ. (USA); **Metin Ozen**, Ozen Engineering, Inc. (USA); **Yu-Chuan Su**, National Tsing Hua Univ. (Taiwan); **T. C. Yih**, California State Univ., Long Beach (USA)

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Design of active temperature compensated composite free-free beam MEMS resonators in a standard process, George Xereas, Vamsy P. Chodavarapu, McGill Univ. (Canada) [8973-23]

Design and fabrication of 3-axis accelerometer for harsh environment applications using semi-custom process, Adel Merdasi, Vamsy P. Chodavarapu, George Xereas, McGill Univ. (Canada) [8973-24]

Facile fabrication of nanogap electrodes for suspended graphene characterization using direct ion beam patterning, Zhengqing John Qi, A. T. Charlie Johnson, Univ. of Pennsylvania (USA) [8973-25]

Resonator structures on AlN ceramics surface treated by laser radiation, Pawel E. Koziol, Arkadiusz J. Antonczak, Bogusz D. Stepak, Przemyslaw A. Gorski, Wroclaw Univ. of Technology (Poland); Michal Walczakowski, Norbert Palka, Military Univ. of Technology (Poland); Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) [8973-26]

Annular heating of optical fiber by CO₂ laser with reflective axicon elements, William Klimowich, AFL (USA) [8973-27]

Complaint MEMS mechanism to extend resolution in Fourier transform spectroscopy, Angel Saucedo-Carvajal, Univ. Autónoma de Ciudad Juárez (Mexico); Héctor D. Kennedy-Cabrera Sr., Julian Hernández-Torres, Agustín L. Herrera-May, Univ. Veracruzana (Mexico); José Mireles Jr., Univ. Autónoma de Ciudad Juárez (Mexico) [8973-28]

Wednesday 5 February

SESSION 1

Location: Room 234 (Mezzanine) Wed 1:30 pm to 3:10 pm

Device Fabrication

Session Chair: **Mary Ann Maher**, SoftMEMS (USA)

1:30 pm: **Fabrication of microelectromechanical systems (MEMS) cantilevers for photoacoustic (PA) detection of terahertz (THz) radiation**, Richard Newberry, Nathan E. Glauvitz, Ronald A. Coutu Jr., Air Force Institute of Technology (USA); Ivan Medvedev, Douglas T. Petkie, Wright State Univ. (USA) [8973-1]

1:50 pm: **Using microelectromechanical systems (MEMS) parallel-plate capacitive sensors to determine thrust of a Hall Effect thruster**, Rajan Pal, Ronald A. Coutu Jr., David Liu, Air Force Institute of Technology (USA) . . [8973-2]

2:10 pm: **Isolating the negative stiffness region of a buckled Si/SiO₂ membrane**, Kyle Ziegler, Robert Lake, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) [8973-3]

2:30 pm: **Thin film fabrication and system integration test run for a microactuator for a tuneable lens**, Dominik Hoheisel, Lutz Rissing, Leibniz Univ. Hannover (Germany) [8973-4]

2:50 pm: **Fabrication of waveguides containing Ag₀ nanoparticles using femtosecond laser micromachining**, Juliana M. P. Almeida, Paulo Henrique D. Ferreira, Univ. de São Paulo (Brazil); Danilo Manzani, Mariana F. Napoli, Univ. Estadual de São Paulo (Brazil); Sidney J. Ribeiro, Univ. Estadual Paulista (Brazil); Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8973-5]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 2

Location: Room 234 (Mezzanine) Wed 3:40 pm to 4:20 pm

Device Design

Session Chair: **Paul J. Resnick**, Sandia National Labs. (USA)

3:40 pm: **Calibrating bimetallic grayscale photomasks to photoresist response for precise micro-optics fabrication**, Glenn H. Chapman, Reza Qarehbaghi, Santiago Roche, Simon Fraser Univ. (Canada) [8973-6]

4:00 pm: **Numerical analysis of laser-assisted micro-hole drilling process**, Maziar Ramezani, Thomas Neitzert, Timotius Pasang, Auckland Univ. of Technology (New Zealand) [8973-8]

Thursday 6 February

SESSION 3

Location: Room 234 (Mezzanine) Thu 9:00 am to 12:00 pm

Microfabrication Techniques

Session Chair: **Mary Ann Maher**, SoftMEMS (USA)

9:00 am: **Deep silicon etching: current capabilities and future directions (Invited Paper)**, Russell J. Westerman, Linnell Martinez, David Pays-Volard, Ken Mackenzie, Thierry Lazerand, Plasma-Therm LLC (USA) [8973-9]

9:30 am: **Study of the high rate chemical mechanical polishing (CMP) of boron-doped polysilicon for 3D applications**, Hamidreza Pirayesh, Kenneth C. Cadien, Univ. of Alberta (Canada) [8973-10]

9:50 am: **A unique method for fabricating structures half the size of the listed minimum feature size of a direct-write laser photolithography system**, Robert Lake, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) [8973-11]

Coffee Break Thu 10:10 am to 10:40 am

10:40 am: **Off-normal patterned etching through suspended membranes**, D. Bruce Burckel, M. David Henry, Robert L. Jarecki, Paul J. Resnick, Sandia National Labs. (USA) [8973-12]

11:00 am: **Periodic nano structures fabricated by Talbot extreme ultraviolet lithography**, Mario C. Marconi, Wei Li, Dinesh Patel, Lukasz Urbanski, Carmen S. Menoni, Colorado State Univ. (USA); Aaron G. Stein, Brookhaven National Lab. (USA) [8973-13]

11:20 am: **Fabrication of 3D surface structures using grayscale lithography**, Christopher Stilson, Rajan Pal, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) [8973-14]

11:40 am: **Residual stress control during the release process in gold suspended microstructures**, Akshdeep Sharma, Kamaljit Rangra, Dinesh Kumar, Central Electronics Engineering Research Institute (India) [8973-15]

Lunch/Exhibition Break Thu 12:00 pm to 1:40 pm

SESSION 4

Location: Room 234 (Mezzanine) Thu 1:40 pm to 3:00 pm

New Materials for Microfabrication

Session Chair: **Paul J. Resnick**, Sandia National Labs. (USA)

1:40 pm: **Phase change materials (PCM) fabricated in vertical structures for reconfigurable and tunable circuits**, Eduardo Barajas, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) [8973-16]

2:00 pm: **Microfabrication of passive electronic components with printed graphene-oxide deposition**, Dogan Sinar, George K. Knopf, The Univ. of Western Ontario (Canada); Suwas Nikumb, National Research Council Canada (Canada) [8973-17]

MOEMS-
MEMS

Conference 8973 · Location: Room 234 (Mezzanine)

2:20 pm: **Optimal microelectromechanical systems (MEMS) device for achieving high pyroelectric response of AlN**, Bemnet Kebede, Ronald A. Coutu Jr., LaVern A. Starman, Air Force Institute of Technology (USA) . . . [8973-18]

2:40 pm: **Fabrication technology to increase surface area of ionomer membrane material and its application towards high surface area electric double-layer capacitors**, Alberto A. Chang, Jasbir N. Patel, Cristina Cordoba, Jeydmer Aristizabal, Badr Omrane, Bozena Kaminska, Karen L. Kavanagh, Simon Fraser Univ. (Canada) [8973-19]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 5

Location: Room 234 (Mezzanine) Thu 3:30 pm to 4:30 pm

Laser Micromachining

Session Chair: **David G. Lishan**, Plasma-Therm LLC (USA)

3:30 pm: **Laser micromachining of oxygen-reduced graphene-oxide films**, Dogan Sinar, George K. Knopf, The Univ. of Western Ontario (Canada); Suwas Nikumb, National Research Council Canada (Canada); Anatoly Andrushchenko, The Univ. of Western Ontario (Canada) [8973-20]

3:50 pm: **Laser-assisted and hermetic room-temperature bonding, based on direct-bonding technology**, Jeroen Haneveld, Peter Tjijssen, Johannes Oonk, Mark B. Olde Riekerink, Hendrik J. H. Tigelaar, Marko T. Blom, Ronny van't Oever, Micronit Microfluidics BV (Netherlands) [8973-21]

4:10 pm: **Design and fabrication of sub-wavelength annular apertures on fiber tip for femtosecond laser machining**, Yen Chun Tung, Ming-Han Chung, I Hui Sung, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8973-22]



Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII

Conference Chairs: Georg von Freymann, Technische Univ. Kaiserslautern (Germany); **Winston V. Schoenfeld**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Raymond C. Rumpf**, The Univ. of Texas at El Paso (USA)

Program Committee: **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatforschung (Germany); **Saulius Juodkazis**, Swinburne Univ. of Technology (Australia); **Shanalyn A. Kemme**, Sandia National Labs. (USA); **Ernst-Bernhard Kley**, Friedrich-Schiller-Univ. Jena (Germany); **Akhlesh Lakhtakia**, The Pennsylvania State Univ. (USA); **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel); **Marko Loncar**, Harvard Univ. (USA); **Robert R. McLeod**, Univ. of Colorado at Boulder (USA); **Menelaos K. Poutous**, Clemson Univ. (USA); **Dennis W. Prather**, Univ. of Delaware (USA); **John A. Rogers**, Univ. of Illinois at Urbana-Champaign (USA); **Pradeep Srinivasan**, Intel Corp. (USA); **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte (USA); **Michael Thiel**, Nanoscribe GmbH (Germany); **Mike P. C. Watts**, Impattern Solutions (USA)

Monday 3 February

MOEMS-MEMS PLENARY SESSION

Location: Room 130 (Exhibit Level) . Mon 9:00 am to 12:00 pm

Session Chairs: **David L. Dickensheets**, Montana State Univ. (USA); **Holger Becker**, microfluidic ChipShop GmbH (Germany)

9:15 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**

David L. Dickensheets, Montana State Univ. (USA) and **Holger Becker**, microfluidic ChipShop GmbH (Germany)

9:15 am: **Electrostatic nano electromechanical switches (NEMS) for energy-efficient digital systems (Plenary)**, Roger T. Howe, Stanford Univ. (USA)

Coffee Break Mon 10:00 am to 10:30 am

10:30 am: **Tailoring light for optically-guided nano- and microassembly: from bio-hybrid robots to droplet cages (Plenary)**, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)

11:15 am: **Bio-integrated and bio-inspired optical microsystems (Plenary)**, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA)

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 1

Location: Room 234 (Mezzanine) Mon 1:30 pm to 3:00 pm

3D Printing: Novel Materials

Session Chair: **Georg von Freymann**, Technische Univ. Kaiserslautern (Germany)

1:30 pm: **Liquid deposition photolithography for the fabrication of three dimensional gradient index micro-optics (Invited Paper)**, Robert R. McLeod, Adam C. Urness, Michael C. Cole, Univ. of Colorado at Boulder (USA) . . . [8974-1]

2:00 pm: **Raman micro-spectroscopy on cross-linked polymer nanowires formed by 2-photon fabrication**, Natsuo Taguchi, Satoru Shoji, Shota Ushiba, Kyoko Masui, Satoshi Kawata, Osaka Univ. (Japan) [8974-2]

2:20 pm: **Mechanisms of nanoparticles formation using DLW and thermal annealing in a phosphate glass**, Nicolas Marquestaut, Arnaud Royon, Univ. Bordeaux 1 (France); Marc Dussauze, Vincent Rodriguez, Institut des Sciences Moléculaires (France); Yannick G. Petit, Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Lionel S. Canioni, Univ. Bordeaux 1 (France) [8974-3]

2:40 pm: **Femtosecond laser processing of silver-containing glass with optical vortex beams**, Konstantin Mishchik, Univ. Bordeaux 1 (France); Yannick G. Petit, Institut de Chimie de la Matière Condensée de Bordeaux (France); Etienne Brasselet, Inka B. Manek-Hönninger, Nicolas Marquestaut, Arnaud Royon, Univ. Bordeaux 1 (France); Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Lionel S. Canioni, Univ. Bordeaux 1 (France) [8974-4]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 2

Location: Room 234 (Mezzanine) Mon 3:30 pm to 5:00 pm

Lithography Materials

Session Chair: **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatforschung (Germany)

3:30 pm: **UV-curable hybrid polymers for optical applications: technical challenges, industrial solutions and future developments (Invited Paper)**, Gabi Grütznher, Jan Klein, Marko Vogler, Arne Schleunitz, micro resist technology GmbH (Germany) [8974-5]

4:00 pm: **A novel route for fabricating printable photonic devices with a high refractive index**, Carlos A. Pina-Hernandez, abeam Technologies, Inc. (USA); Alexander Koshelev, Nano-Optic Devices (USA); Alexander Polyakov, Lucas Digianantonio, The Molecular Foundry (USA); Alexander Bugrov, Nano-Optic Devices (USA); Giuseppe Calafiore, abeam Technologies, Inc. (United Kingdom); Scott Dhuey, The Molecular Foundry (USA); Alexander Goltsov, Nano-Optic Devices (USA); Stefano Cabrini, The Molecular Foundry (USA); Christophe Peroz, abeam Technologies, Inc. (USA) [8974-6]

4:20 pm: **Silk fibroin: a new resist for eco-friendly photolithography**, Sunghwan Kim, Ajou Univ. (Korea, Republic of); Sung-Gyu Lee, Hye-Keun Oh, Hanyang Univ. (Korea, Republic of); Myungjae Lee, Heonsu Jeon, Seoul National Univ. (Korea, Republic of); David L. Kaplan, Fiorenzo G. Omenetto, Tufts Univ. (USA) [8974-7]

4:40 pm: **Fabrication of SU-8 based nanopatterns and their use as a nanoimprint mold**, Junwei Su, Fan Gao, Hongwei Sun, Zhiyong Gu, Univ. of Massachusetts Lowell (USA); Wen Dai, George Cernigliaro, MicroChem Corp. (USA) [8974-8]

SESSION 3

Location: Room 234 (Mezzanine) Mon 5:00 pm to 6:00 pm

Lensarrays and Subwavelength Imaging

Session Chair: **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatforschung (Germany)

5:00 pm: **Self-assembly via condensation of polymer liquid nanolenses for wide-field nanoparticle and virus imaging**, Euan R. McLeod, Patrick Huang, Muhammed Veli, Shiv Acharya, Wei Luo, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [8974-9]

5:20 pm: **Array of nano/micro polymer lenses for subwavelength optical lithography**, Jae-Won Jang, Pukyong National Univ. (Korea, Republic of) [8974-10]

5:40 pm: **Micro-optics fabrication by mask-based and mask-less mixed lithography process towards 3D optical circuits**, Chris Summitt, Sunglin Wang, Lee Johnson, The Univ. of Arizona (USA); Melissa A. Zaveron, Thomas D. Milster, Yuzuru Takashima, College of Optical Sciences, The Univ. of Arizona (USA) [8974-11]

MOEMS-MEMS

Conference 8974 · Location: Room 234 (Mezzanine)

Tuesday 4 February

SESSION 4

Location: Room 234 (Mezzanine) Tue 8:00 am to 10:00 am

Photonic Crystals and Cavities

Session Chair: **Robert R. McLeod**, Univ. of Colorado at Boulder (USA)

8:00 am: **Planar chalcogenide glass mid-infrared photonics** (*Invited Paper*), Hongtao Lin, Lan Li, Yi Zou, Fei Deng, Chaoying Ni, Juejun Hu, Univ. of Delaware (USA); Sylvain Danto, Kathleen A. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Stephen T. Kozacic, Maciej Murakowski, Dennis W. Prather, Univ. of Delaware (USA); J. David Musgraves, IRadiance Glass, Inc. (USA)[8974-12]

8:30 am: **Photonic crystal resonant surfaces** (*Invited Paper*), Thomas F. Krauss, Annett B. Klemm, Daan Stellinga, Graham Triggs, The Univ. of York (United Kingdom); Emiliano Rezend-Martins, Univ. of St. Andrews (United Kingdom)[8974-13]

9:00 am: **Talbot lithography an alternative for contact lithography for sub-micron features**, L. Andrea Dunbar, Branislav D. Timotijevic, Silvia Angeloni, Giovanni Bergonzi, Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Uwe Vogler, Arianna Bramati, Skender Veseli, Reinhard Voelkel, SUSS MicroOptics SA (Switzerland)[8974-14]

9:20 am: **Efficient fabrication of complex nano-optical structures by E-beam lithography based on character projection**, Uwe D. Zeitner, Torsten Harzendorf, Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Michael Banasch, Vistec Electron Beam GmbH (Germany); Holger Schmidt, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany)[8974-15]

9:40 am: **Rapid prototyping of coupled photonic cavities by focused ion beam/photolithography hybrid technique**, Jaime Viegas, Peng Xing, Masdar Institute of Science & Technology (United Arab Emirates)[8974-16]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 234 (Mezzanine) . . . Tue 10:30 am to 12:00 pm

Sensors and Devices

Session Chair: **Winston V. Schoenfeld**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **On-chip polarizer on image sensor using advanced CMOS technology** (*Invited Paper*), Kiyotaka Sasagawa, Norimitsu Wakama, Toshihiko Noda, Takashi Tokuda, Kiyomi Kakiuchi, Jun Ohta, Nara Institute of Science and Technology (Japan)[8974-17]

11:00 am: **Dual-modes sensing platforms with silicon and metal nanonet structures fabricated using nanosphere lithography**, Han Li, Chang-Han Wang, Min-Huan Wang, Yi-Kai Huang, Yun-Chong Chang, National Cheng Kung Univ. (Taiwan)[8974-18]

11:20 am: **A compact snapshot multispectral imager with a monolithically integrated, per-pixel filter mosaic**, Bert Geelen, Klaas Tack, Andy Lambrechts, IMEC (Belgium)[8974-21]

11:40 am: **High-precision transfer printing of ultra-thin AlInGaN micro-light-emitting diodes onto polymeric substrates**, Antonio Jose Trindade, Martin D. Dawson, Univ. of Strathclyde (United Kingdom)[8974-20]

Lunch/Exhibition Break Tue 12:00 pm to 1:50 pm

SESSION 6

Location: Room 234 (Mezzanine) Tue 1:50 pm to 3:20 pm

3D Printing: Novel Approaches

Session Chair: **Michael Thiel**, Nanoscribe GmbH (Germany)

1:50 pm: **Titanium woodpiles with complete three-dimensional photonic bandgaps in the visible** (*Invited Paper*), Andreas M. Frölich, Joachim Fischer, Thomas Zebrowski, Karlsruhe Institut für Technologie (Germany); Kurt Busch, Humboldt-Univ. zu Berlin (Germany) and Karlsruher Institut für Technologie (Germany) and Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martin Wegener, Karlsruher Institut für Technologie (Germany)[8974-26]

2:20 pm: **Structural colour of porous dielectrics processed by direct laser write technique**, Vyngantas Mizeikis, Shizuoka Univ. (Japan); Vytautas Puryls, Vilnius Univ. (Lithuania); Ricardas Buividas, Saulius Juodkazis, Swinburne Univ. of Technology (Australia)[8974-23]

2:40 pm: **Uniaxial alignment of single-wall carbon nanotubes induced in two-photon lithographically fabricated polymer micro/nano-structures**, Shota Ushiba, Satoru Shoji, Kyoko Masui, Osaka Univ. (Japan); Junichiro Kono, Rice Univ. (USA); Satoshi Kawata, Osaka Univ. (Japan)[8974-24]

3:00 pm: **Processing and properties of arsenic trisulfide chalcogenide glasses for direct laser writing of 3D micro-structures**, Casey M. Schwarz, Univ. of Central Florida (USA); Henry E. Williams, Chris N. Grabill, Stephen M. Kuebler, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Benn H. Gleason, Univ. of Central Florida (USA); Kathleen A. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Alexej V. Pogrebnjakov, Theresa S. Mayer, The Pennsylvania State Univ. (USA); Christina Drake, Clara A. Rivero-Baleine, Lockheed Martin Missiles and Fire Control (USA)[8974-25]

Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 7

Location: Room 234 (Mezzanine) Tue 3:50 pm to 5:20 pm

3D Printing: STED and SLM

Session Chair: **Thomas J. Suleski**, The Univ. of North Carolina at Charlotte (USA)

3:50 pm: **Direct laser writing with a spatial light modulator** (*Invited Paper*), Min Gu, Swinburne Univ. of Technology (Australia)[8974-22]

4:20 pm: **STED-inspired dip-in optical lithography of 3D chiral polarizers for visible and telecom wavelengths**, Michael Thiel, Nanoscribe GmbH (Germany) and Karlsruher Institut für Technologie (Germany); Julian Ott, André Radke, Nanoscribe GmbH (Germany); Johannes Kaschke, Martin Wegener, Karlsruher Institut für Technologie (Germany)[8974-27]

4:40 pm: **Quantifying the proximity effect by active point-spread-function engineering**, Erik H. Waller, Georg von Freymann, Technische Univ. Kaiserslautern (Germany)[8974-28]

5:00 pm: **Three-dimensional ultrafast laser processing of diamond**, Patrick Salter, Martin Booth, Univ. of Oxford (United Kingdom)[8974-29]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

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Random micro-lens array illumination device manufactured by ultra-precision machining, Yukinobu Nishio, Kayoko Fujimura, Sho Ogihara, Masato Okano, Seiichiro Kitagawa, Nalux Co., Ltd. (Japan)[8974-30]

Fabrication of defects in periodic photonic crystals using a phase-only spatial light modulator, David George, Jeffrey R. Lutkenhaus, Bayaner Arigong, Yuankun Lin, Usha Philipose, Univ. of North Texas (USA)[8974-31]

Cascaded fiber-optic intrinsic Fabry-Perot interferometers fabricated by femtosecond laser irradiation, Lei Yuan, Jie Huang, Hanzheng Wang, Baokai Cheng, Clemson Univ. (USA); Xinwei Lan, Missouri Univ. of Science and Technology (USA) and Clemson Univ. (USA); Hai Xiao, Missouri Univ. of Science and Technology (USA) and Clemson Univ. (USA)[8974-32]

Fiber inline quarter-wave plate fabricated by femtosecond laser irradiation: modeling and experiment, Lei Yuan, Jie Liu, Jie Huang, Clemson Univ. (USA); Zhen Huo, Missouri Univ. of Science and Technology (USA); Hanzheng Wang, Clemson Univ. (USA); Xinwei Lan, Hai Xiao, Missouri Univ. of Science and Technology (USA) and Clemson Univ. (USA)[8974-33]

Computational modeling and experimental study on fiber inline Michelson interferometer fabricated by femtosecond laser ablation, Lei Yuan, Beijing Institute of Technology (China) and Clemson Univ. (USA); Hongbin Wu, Zhitao Cao, Cong Wang, Yanping Yuan, Kaihu Zhang, Sumei Wang, Beijing Institute of Technology (China)[8974-34]

Manufacturing techniques of large-area optical elements with micro/nano structures on both surfaces, Toshimitsu Takaoka, Hidetoshi Fukui, Tomoya Yamashita, Takeshi Matsuo, Kazuya Yamamoto, Hiroshi Owari, Nalux Co., Ltd. (Japan)[8974-36]

Holographic fabrication of photonic crystal templates using spatial-light-modulator-based phase mask method, Jeffrey R. Lutkenhaus, David George, Mojtaba Moazzezi, Usha Phillipose, YuanKun Lin, Univ. of North Texas (USA) [8974-37]

Miniaturized optical fiber Fabry-Perot interferometer fabricated by femtosecond laser irradiation and selective chemical etching for refractive index sensing, Lei Yuan, Hongbin Wu, Cong Wang, Yanping Yuan, Kaihu Zhang, Zhitao Cao, Sumei Wang, Beijing Institute of Technology (China) [8974-38]

High-temperature sensor-based on microcavity Michelson interferometer fabricated by femtosecond laser, Hongbin Wu, Lei Yuan, Sumei Wang, Zhitao Cao, Beijing Institute of Technology (China) [8974-40]

Fabrication of the nanoimprint template with periodic structures, Quan Liu, Jianhong Wu, Yu Cheng, Soochow Univ. (China) [8974-41]

Fiber inline taper-based Michelson interferometer fabricated by CO₂ laser irradiations, Hongbin Wu, Lei Yuan, Sumei Wang, Zhitao Cao, Beijing Institute of Technology (China) [8974-42]

Co-molding of nanoscale photonic crystals and microfluidic channel, Chloe E. Snyder, Maurya Srungarapu, Anand Kadiyala, West Virginia Univ. (USA); Gary Eurice, Univ. of Maryland, Baltimore County (USA); Yuxin Liu, Jeremy M. Dawson, West Virginia Univ. (USA) [8974-43]

Refractive index insensitive asymmetrical optical fiber Mach-Zehnder interferometer for temperature sensing, Hongbin Wu, Lei Yuan, Sumei Wang, Zhitao Cao, Beijing Institute of Technology (China) [8974-44]

Temporal growth of gold nanorod aggregates through local surface plasmon-assisted two-photon polymerization, Kyoko Masui, Satoru Shoji, Shota Ushiba, Satoshi Kawata, Osaka Univ. (Japan) [8974-45]

Two-photon lithography for single-wall carbon nanotube/polymer composite nanofabrication, Shota Ushiba, Satoru Shoji, Kyoko Masui, Osaka Univ. (Japan); Junichiro Kono, Rice Univ. (USA); Satoshi Kawata, Osaka Univ. (Japan) [8974-46]

Size-gradient two-dimensional photonic crystal fabricated using laser holographic lithography, Hyunho Jung, Hanbit Kim, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [8974-47]

Wednesday 5 February

SESSION 8

Location: Room 234 (Mezzanine) . . . Wed 8:30 am to 10:10 am

Large Area Fabrication

Session Chair: **Akhlesh Lakhtakia**, The Pennsylvania State Univ. (USA)

8:30 am: **One step lithography-less silicon nanomanufacturing for low cost, high-efficiency solar cell production**, Yi Chen, Univ. of Illinois at Urbana-Champaign (USA) and Effimax Solar, Inc. (USA) [8974-49]

8:50 am: **Antireflective glass surface patterned by rolling mask lithography**, Boris Kobrin, Joseph Geddes III, Joseph Perez, Oliver Seitz, Jonathan Wassei, Ian McMackin, Rolith, Inc. (USA) [8974-50]

9:10 am: **Emission-enhanced plasmonic substrates fabricated by nano-imprint lithography**, Bongseok Choi, Masanobu Iwanaga, Hideki Miyazaki, Kazuaki Sakoda, Yoshimasa Sugimoto, National Institute for Materials Science (Japan) [8974-51]

9:30 am: **Thermal emitter performance as a function of lithographic quality**, Adam M. Jones, College of Optical Sciences, The Univ. of Arizona (USA) and Sandia National Labs. (USA); Shanalyn A. Kemme, A. Robert Ellis, Sandia National Labs. (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) [8974-52]

9:50 am: **Surface micro-structuring of glassy carbon**, Loïc E. Hans, Hans Peter Herzig, Toralf Scharf, Cédric Kilchoer, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andreas Hermerschmidt, HOLOEYE Photonics AG (Germany) [8974-53]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 9

Location: Room 234 (Mezzanine) . . Wed 10:40 am to 12:10 pm

Diffraction Elements

Session Chair: **Georg von Freymann**, Technische Univ. Kaiserslautern (Germany)

10:40 am: **Integrated design and nanofabrication of genetically engineered subwavelength optical nanostructures and metamaterials** (*Invited Paper*), Theresa S. Mayer, Lan Lin, Seokho Yun, Zhihao Zhang, Jeremy A. Bossard, Douglas H. Werner, The Pennsylvania State Univ. (USA) [8974-54]

11:10 am: **Optomechanical cantilever device for displacement sensing and variable attenuator**, Peter A. Cooper, Chris Holmes, Lewis G. Carpenter, Paolo L. Mennea, James C. Gates, Peter G. R. Smith, Univ. of Southampton (United Kingdom) [8974-56]

11:30 am: **Application of rigorously optimized phase masks for the fabrication of binary and blazed gratings with diffractive proximity lithography**, Lorenz Stürzebecher, Friedrich-Schiller-Univ. Jena (Germany); Frank Fuchs, Torsten Harzendorf, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Meyer, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Uwe D. Zeitner, Friedrich-Schiller-Univ. Jena (Germany) [8974-57]

11:50 am: **Mode-splitting of a non-polarizing guided mode resonance filter on substrate overetching effect**, Muhammad Rizwan Saleem, Univ. of Eastern Finland (Finland) and National Univ. of Sciences and Technology (Pakistan); Seppo Honkanen, Jari Turunen, Univ. of Eastern Finland (Finland) [8974-58]

Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII

Conference Chairs: **Herbert R. Shea**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA)

Program Committee: **Cheryl G. Asbury**, Jet Propulsion Lab. (USA); **Paul A. Bierden**, Boston Micromachines Corp. (USA); **Sonia M. Garcia-Blanco**, Univ. Twente (Netherlands); **Christopher K. Harrison**, Schlumberger-Doll Research Ctr. (USA); **Allyson Hartzell**, Qualcomm Inc. (USA), Pixtronix, Inc. (USA); **Albert K. Henning**, Aquarian Microsystems (USA); **Maurice S. Karpman**, Draper Lab. (USA); **Richard C. Kullberg**, Vacuum Energy, Inc. (USA); **Kee-Keun Lee**, Ajou Univ. (Korea, Republic of); **Jose M. Pozo**, TNO (Netherlands); **Tolga Tekin**, Technische Univ. Berlin (Germany); **Joyce H. Wu**, Qualcomm Inc. (USA), Pixtronix, Inc. (USA); **Yanzhu Zhao**, Medtronic, Inc. (USA)

Monday 3 February

MOEMS-MEMS PLENARY SESSION

Location: Room 130 (Exhibit Level) . Mon 9:00 am to 12:00 pm

Session Chairs: **David L. Dickensheets**, Montana State Univ. (USA);
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**
David L. Dickensheets, Montana State Univ. (USA) and
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Electrostatic nano electromechanical switches (NEMS) for energy-efficient digital systems (Plenary)**, Roger T. Howe, Stanford Univ. (USA)

Coffee Break Mon 10:00 am to 10:30 am

10:30 am: **Tailoring light for optically-guided nano- and microassembly: from bio-hybrid robots to droplet cages (Plenary)**, Cornelia Denz, Westfälische Wilhelms-Universität Münster (Germany)

11:15 am: **Bio-integrated and bio-inspired optical microsystems (Plenary)**, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA)

Lunch Break Mon 12:00 pm to 1:20 pm

SESSION 1

Location: Room 110 (Exhibit Level) . . Mon 1:20 pm to 3:10 pm

Session Chair: **Joyce H. Wu**, Pixtronix, Inc. (USA)

1:20 pm: **Development of wireless, battery-free microgroscope based on one-port SAW delay lines and double resonant antenna (Invited Paper)**, Kee-Keun Lee, Ajou Univ. (Korea, Republic of) [8975-1]

1:50 pm: **Design and fabrication of net flux radiometers for Mars exploration**, Linh Ngo Phong, Canadian Space Agency (Canada); Christian Proulx, François Châteauneuf, INO (Canada) [8975-2]

2:10 pm: **Low spring index, large displacement shape memory alloy (SMA) coil actuators for use in macro- and micro-systems (Invited Paper)**, Brad Holschuh, Dava Newman, Massachusetts Institute of Technology (USA) [8975-3]

2:40 pm: **MEMS tactile display: from fabrication to characterization (Invited Paper)**, Norihisa Miki, Keio Univ. (Japan) and Japan Science and Technology Agency (Japan); Yumi Kosemura, Hiroaki Ishikawa, Junpei Watanabe, Keio Univ. (Japan) [8975-4]

Coffee Break Mon 3:10 pm to 3:40 pm

SESSION 2

Location: Room 110 (Exhibit Level) . . Mon 3:40 pm to 6:10 pm

Session Chair: **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA)

3:40 pm: **Characterization of gallium nitride microsystems within radiation and high-temperature environments**, Heather Chiamori, Minmin Hou, Caitlin A. Chapin, Ashwin Shankar, Debbie G. Senesky, Stanford Univ. (USA) [8975-6]

4:10 pm: **Submicroradian deflection and stress metrology for fabrication of MEMS and optoelectronic structures**, Peter Walecki, Sunrise Optical LLC (USA) [8975-7]

4:30 pm: **Improved test setup for MEMS mechanical strength investigations and fabrication process qualification**, Tobias Bandi, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Xavier Maeder, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Alex Dommann, EMPA (Switzerland); Herbert R. Shea, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Antonia Neels, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [8975-8]

4:50 pm: **Investigation of a novel approach for the cross-linking characterization of SU-8 photoresist materials by means of optical dispersion measurements**, Christopher Taudt, Tobias Baselt, Westsächsische Hochschule Zwickau (Germany); Edmund Koch, Technische Univ. Dresden (Germany); Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) [8975-9]

5:10 pm: **Measuring Young's modulus using a self-mixing laser diode**, Ke Lin, Yanguang Yu, Jiangtao Xi, Yuanlong Fan, Huijun Li, Univ. of Wollongong (Australia) [8975-10]

5:30 pm: **Wafer-level radiometric performance testing of uncooled microbolometer arrays**, Denis G. Dufour, INO (Canada) [8975-11]

5:50 pm: **Measurements of thermal conductivity of thermoelectric oxide nanofibers using MEMS devices**, Weihe Xu, Brookhaven National Lab. (USA); Hamid Hadim, Stevens Institute of Technology (USA); Yong S. Chu, Brookhaven National Lab. (USA); Yong Shi, Stevens Institute of Technology (USA); Evgeny Nazaretski, Brookhaven National Lab. (USA) [8975-25]

Tuesday 4 February

SESSION 3

Location: Room 110 (Exhibit Level) . . Tue 8:00 am to 10:00 am

Session Chair: **Herbert R. Shea**, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

8:00 am: **Heterogeneous MEMS device assembly and integration**, Patrice Topart, INO (Canada) [8975-13]

8:20 am: **Contact resistance evolution of lightly loaded, highly cycled, micro-contacts**, Christopher Stilson, Ronald A. Couto, Air Force Institute of Technology (USA) [8975-14]

8:40 am: **Combined dielectric spectroscopy and laser-induced photocurrent approach to study the degradation of organic solar cells**, Olena Kozlova, Siegfried G. Bauer, Markus C. Sharber, Reinhard Schwödjaer, Matthew White, Thomas Stokinger, Johannes Kepler Univ. Linz (Austria) [8975-15]

9:00 am: **Studies on the dynamics of vacuum encapsulated 2D MEMS scanners by laser Doppler vibrometry**, Joachim Janes, Ulrich Hofmann, Fraunhofer-Institut für Siliziumtechnologie (Germany) [8975-16]

9:20 am: **Air damping in silicon tuning-fork resonators for MEMS hermeticity assessment**, Tobias Bandi, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Alex Dommann, EMPA (Switzerland); Herbert R. Shea, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Antonia Neels, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [8975-17]

9:40 am: **HALT to qualify electronic packages: a proof of concept**, Rajeshuni Ramesham, Jet Propulsion Lab. (USA) [8975-18]

Coffee Break Tue 10:00 am to 10:30 am

SESSION 4

Location: Room 110 (Exhibit Level) · Tue 10:30 am to 12:30 pm

Session Chairs: **Rajeshuni Ramesham**, Jet Propulsion Lab. (USA);
Cheryl G. Asbury, Jet Propulsion Lab. (USA)

10:30 am: **The mechanical properties and stabilities of pristine, and hydrogenated and fluorinated silicene under tension**, Chuanghua Yang, Zhongyuan Yu, Pengfei Lu, Yumin Liu, Saima Manzoor, Ming Li, Shuai Zhou, Beijing Univ. of Posts and Telecommunications (China). [8975-19]

10:50 am: **Effective data processing in the frequency-domain based self-mixing approach for measuring alpha factor**, Yan Gao, Yanguang Yu, Ke Lin, Jiangtao Xi, Univ. of Wollongong (Australia) [8975-20]

11:10 am: **Optical properties of plasmonic nanoantenna arrays based on H-shaped nanoparticles with extended arms**, Erdem Aslan, Mustafa Kemal Üniv. (Turkey); Mustafa Turkmen, Erciyes Üniv. (Turkey) [8975-21]

11:30 am: **A new release technique using methodologies for reliability in the fabrication process of MEMS devices**, Georgina G. Rosas, Roberto S. Murphy, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Wilfrido A. Moreno, Univ. of South Florida (USA) [8975-22]

11:50 am: **Acoustic and optoelectronic nature and interfacial durability of modified CNT and GnP-PVDF composites with nano-structural control**, Joung-Man Park, Dong-Jun Kwon, Zuo-Jia Wang, Gyeongsang National Univ. (Korea, Republic of); Lawrence K. DeVries, The Univ. of Utah (USA) [8975-23]

12:10 pm: **Electrothermally tunable MEMS filters**, A. V. S. S. Prasad, Venkatesh KP, Navakanta Bhat, Rudra Pratap, Indian Institute of Science (India). [8975-5]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Quantitative thermal characterization of microelectronic devices by using CCD-based thermoreflectance microscopy, Dong Uk Kim, SeonYoung Ryu, Junki Kim, Ki Soo Chang, Korea Basic Science Institute (Korea, Republic of) [8975-12]

Certain properties of multi-phase anisotropic systems, Vladimir V. Shchennikov, Institute of Metal Physics (Russian Federation); Sergey V. Ovsyannikov, Univ. Bayreuth (Germany); Natalia V. Morozova, Igor V. Korobeynikov, Vsevolod V. Shchennikov, Institute of Metal Physics (Russian Federation) [8975-24]

Microfluidics, BioMEMS, and Medical Microsystems XII

Conference Chairs: **Bonnie L. Gray**, Simon Fraser Univ. (Canada); **Holger Becker**, microfluidic ChipShop GmbH (Germany)

Program Committee: **Brian W. Anthony**, Massachusetts Institute of Technology (USA); **Yolanda Fintschenko**, LabSmith, Inc. (USA); **Bruce K. Gale**, The Univ. of Utah (USA); **Albert K. Henning**, Aquarian Microsystems (USA); **Yu-Cheng Lin**, National Cheng Kung Univ. (Taiwan); **Yuehe Lin**, Pacific Northwest National Lab. (USA); **Ciara K. O'Sullivan**, Univ. Rovira i Virgili (Spain); **Ian Papautsky**, Univ. of Cincinnati (USA); **Thomas Stieglitz**, Albert-Ludwigs-Univ. Freiburg (Germany); **Sindy Kam-Yan Tang**, Stanford Univ. (USA); **Albert van den Berg**, Univ. Twente (Netherlands); **Wanjun Wang**, Louisiana State Univ. (USA); **Bernhard H. Weigl**, PATH (USA)

Sunday 2 February

SESSION 1

Location: Room 232 (Mezzanine) Sun 8:30 am to 10:10 am

Manufacturing Technologies I

Session Chair: **Bonnie L. Gray**, Simon Fraser Univ. (Canada)

8:30 am: **Scalable production of sub μm functional structures made of non CMOS compatible materials on glass**, Winfried Arens, IMT Masken und Teilungen AG (Switzerland) [8976-1]

8:50 am: **Modeling particle flow and blockages in microfluidic channels supported by periodic posts**, Mahyar Mehran, Jorden A. L. Bryer, Bonnie L. Gray, Glenn H. Chapman, Simon Fraser Univ. (Canada) [8976-2]

9:10 am: **Selective structuring of thick SU-8 layers on fused silica by femtosecond laser ablation for medical applications**, Tamara Pacher, Fachhochschule Vorarlberg (Austria); Adrian Prinz, Sony DADC Austria AG (Austria); Stefan Partel, Johann Zehetner, Fachhochschule Vorarlberg (Austria); Victor V. Matyilitsky, High Q Laser, a Newport Corp. Brand (Austria); Sandra Stroj, Fachhochschule Vorarlberg (Austria) [8976-3]

9:30 am: **Micro-porous drilling in natural rubber latex using femtosecond laser for drug release application**, Marcos R. Cardoso, Gustavo F. Almeida, Univ. de São Paulo (Brazil); Leticia L. Bernardes, Rondinelli D. Herculano, Univ. Estadual Paulista (Brazil); Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8976-4]

9:50 am: **Design and analysis of a hot embossing machine and the effects of tool wear and accuracy of resin replication on high aspect ratio microfluidic features**, Khanh H. Nguyen, Brian W. Anthony, Massachusetts Institute of Technology (USA) [8976-5]

Coffee Break Sun 10:10 am to 10:40 am

SESSION 2

Location: Room 232 (Mezzanine) . . . Sun 10:40 am to 12:10 pm

Manufacturing Technologies II

Session Chair: **Marya Lieberman**, Univ. of Notre Dame (USA)

10:40 am: **OSTE: a new material system for labs-on-chip** (Invited Paper), Wouter van der Wijngaart, KTH Royal Institute of Technology (Sweden) . . [8976-6]

11:10 am: **Design, measurement analysis, and process optimization of hot embossing system for high aspect ratio microfluidics**, Nicholas Ragosta, Viren Kalsekar, Brian W. Anthony, Massachusetts Institute of Technology (USA) [8976-7]

11:30 am: **Rapid bonding of polydimethylsiloxane (PDMS) to various stereolithographically (STL) structurable epoxy resins using photochemically cross-linked intermediary siloxane layers**, Elisabeth Wilhelm, Christiane Neumann, Kai Sachsenheimer, Kerstin Länge, Bastian E. Rapp, Karlsruher Institut für Technologie (Germany) [8976-8]

11:50 am: **Rapid prototyping of multiphase microfluidics with robotic cutters**, Zidong Li, Zhengtuo Zhao, Fu-Jiou J. Lo, Univ. of Michigan-Dearborn (USA) [8976-9]

Lunch/BIOS Exhibition Sun 12:10 pm to 1:40 pm

SESSION 3

Location: Room 232 (Mezzanine) Sun 1:40 pm to 3:30 pm

Microfluidic Devices

Session Chair: **Albert van den Berg**, Univ. Twente (Netherlands)

1:40 pm: **Magnetic microbeads for sampling and mixing in a microchannel** (Invited Paper), Peter J. Hesketh, Drew Owen, Matt Ballard, Wenbin Mao, Alexander Alexeev, Georgia Institute of Technology (USA) [8976-10]

2:10 pm: **High aspect ratio magnetic nanocomposite polymer cilium**, Mona Rahbar, Hsiu-Yang Tseng, Bonnie L. Gray, Simon Fraser Univ. (Canada) [8976-11]

2:30 pm: **A chemically inert, multichannel chip-to-world interface to connect microfluidic chips**, Christiane Neumann, Elisabeth Wilhelm, Thomas Dutenhofer, Leonardo Pires, Bastian E Rapp, Karlsruher Institut für Technologie (Germany) [8976-12]

2:50 pm: **Confinement of single macromolecules in free solution using a hydrodynamic trap**, Melikhan M. Tanyeri, Istanbul Sehir Univ. (Turkey) . [8976-13]

3:10 pm: **Microfluidics on liquid handling stations (μF -on-LHS): a new industry-compatible microfluidic platform**, Jörg Kittelmann, Carsten P. Radtke, Ansgar Waldbaur, Karlsruher Institut für Technologie (Germany); Christiane Neumann, Karlsruhe Institute of Technology (Germany); Jürgen Hubbuch, Bastian E. Rapp, Karlsruher Institut für Technologie (Germany) [8976-14]

Coffee Break Sun 3:30 pm to 4:00 pm

SESSION 4

Location: Room 232 (Mezzanine) Sun 4:00 pm to 5:30 pm

Applications I

Session Chair: **Sam Kassegne**, San Diego State Univ. (USA)

4:00 pm: **Paper analytical devices for detection of low-quality pharmaceuticals** (Invited Paper), Marya Lieberman, Abigail Weaver, Univ. of Notre Dame (USA) [8976-15]

4:30 pm: **Laser patterning for paper-based fluidics**, Collin L. Sones, Ioannis Katis, Ben Mills, Matthias Feinaeugle, Robert W. Eason, Medya Fouad Namiq, Morten Ibsen, Univ. of Southampton (United Kingdom) [8976-16]

4:50 pm: **Electrical manipulation of biological samples in glass-based electrofluidics fabricated by three-dimensional femtosecond laser processing**, Jian Xu, Koji Sugioka, Katsumi Midorikawa, RIKEN (Japan) [8976-17]

5:10 pm: **Uniform algal growth in photo-bioreactors using surface scatterers**, Syed S. Ahsan, David Erickson, Cornell Univ. (USA) [8976-18]

Best Student Paper Award

We are pleased to announce that a cash prize will be awarded to the best student paper in this conference.

Nominations were collected during the call for papers. Qualifying papers and presentations will be evaluated by the awards committee.

Award Sponsors: **microfluidic ChipShop GmbH**
The Ohio Center for Microfluidic Innovation

Monday 3 February

MOEMS-MEMS PLENARY SESSION

Location: Room 130 (Exhibit Level) . Mon 9:00 am to 12:00 pm

Session Chairs: **David L. Dickensheets**, Montana State Univ. (USA);
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**
David L. Dickensheets, Montana State Univ. (USA) and
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Electrostatic nano electromechanical switches (NEMS) for energy-efficient digital systems (Plenary)**, Roger T. Howe, Stanford Univ. (USA)

Coffee Break Mon 10:00 am to 10:30 am

10:30 am: **Tailoring light for optically-guided nano- and microassembly: from bio-hybrid robots to droplet cages (Plenary)**, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)

11:15 am: **Bio-integrated and bio-inspired optical microsystems (Plenary)**, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA)

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 5

Location: Room 232 (Mezzanine) Mon 1:30 pm to 3:20 pm

Applications II

Session Chair: **Peter J. Hesketh**, Georgia Institute of Technology (USA)

1:30 pm: **Labs, cells, and organs on chip (Invited Paper)**, Albert van den Berg, Univ. Twente (Netherlands) [8976-20]

2:00 pm: **Femtosecond laser fabricated micro fluorescence-activated cell sorter for single cell recovery**, Francesca Bragheri, Istituto di Fotonica e Nanotecnologie (Italy); Petra Paiè, Istituto di Fotonica e Nanotecnologie (Italy); Giovanni Nava, Tiè Yang, Paolo Minzioni, Univ. degli Studi di Pavia (Italy); Rebeca Martinez Vazquez, Istituto di Fotonica e Nanotecnologie (Italy); Nicola Bellini, Univ. of St. Andrews (United Kingdom) and Univ. degli Studi di Pavia (Italy); Roberta Ramponi, Istituto di Fotonica e Nanotecnologie (Italy); Ilaria Cristiani, Univ. degli Studi di Pavia (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) and Politecnico di Milano (Italy) [8976-21]

2:20 pm: **Microfluidic devices for cell culture and handling in organ-on-a-chip applications**, Holger Becker, Ingo Schulz, microfluidic ChipShop GmbH (Germany); Alexander Mosig, Universitätsklinikum Jena (Germany); Tobias Jahn, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8976-22]

2:40 pm: **Separation of biological cells in a microfluidic device using surface acoustic waves (SAWs)**, Ye Ai, Singapore Univ. of Technology & Design (Singapore); Babetta L. Marrone, Los Alamos National Lab. (USA) [8976-23]

3:00 pm: **A newly designed optical biochip for a TDM-POCT device**, Francesco Baldini, Chiara Berrettoni, Cosimo Trono, Simone Berneschi, Ambra Giannetti, Sara Tombelli, Istituto di Fisica Applicata Nello Carrara (Italy); Romeo Bernini, Angelica Grimaldi, Gianluca Persichetti, Genni Testa, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Luca Bolzoni, Giampiero Porro, Datamed S.r.L. (Italy); Holger Becker, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8976-24]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 6

Location: Room 232 (Mezzanine) Mon 3:50 pm to 4:50 pm

Medical Microsystems

Session Chair: **Sindy K. Y. Tang**, Stanford Univ. (USA)

3:50 pm: **Design and fabrication of tri-axial capillary needles for microencapsulation of multiple drugs and imaging agents**, Hanxin Feng, Ting Si, Bin Xie, Univ. of Science and Technology of China (China); Ronald X. Xu, The Ohio State Univ. (USA) [8976-27]

4:10 pm: **Pathology in a tube, step 1: fixing, staining, and transporting pancreatic core biopsies in a microfluidic device for 3D imaging**, Ronnie Das, Univ. of Washington (USA); Greg M. Kramer, Nortis, Inc. (USA); Chris W. Burfeind, Eric J. Seibel, Univ. of Washington (USA) [8976-28]

4:30 pm: **Passive flow regulators for drug delivery and hydrocephalus treatment**, Eric Chappel, Dimitry Dumont-Fillon, Selma Mefti, Debiotech SA (Switzerland) [8976-29]

PANEL DISCUSSION

Location: Room 232 (Mezzanine) 5:30 pm to 7:00 pm

Prospects and Future of Microfluidics

Moderator: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

The commercialization of microfluidic devices and systems is rapidly progressing. However not all promising approaches have become an economic success and investor's payback often has not met initial expectations. The discussion will look upon experiences made in the product development and market introduction phase of microfluidics enabled devices and will present lessons learned from various perspectives, from device performance to commercial organization. It tries to identify trends and will present case studies from different applications.

Tuesday 4 February

SESSION 7

Location: Room 232 (Mezzanine) Tue 8:20 am to 10:10 am

Optofluidics I

Session Chair: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

8:20 am: **Actively transporting virus like analytes with optofluidic plasmonic sensors for rapid and ultrasensitive biodetection (Invited Paper)**, Haticé Altug, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Min A. Huang, Betty Galarreta, Boston Univ. (USA) [8976-30]

8:50 am: **Generalized phase contrast method for parallel optical sorting of biological cells**, Lars Rindorf, OptoRobotix ApS (Denmark); Jesper Glückstad, Technical Univ. of Denmark (Denmark) [8976-31]

9:10 am: **Combining dual wavelength optical trapping in a microfluidic channel with simultaneous micro-Raman spectroscopy and motion detection**, Penelope F. Lawton, John M. Girkin, Christopher D. Saunter, Durham Univ. (United Kingdom) [8976-32]

9:30 am: **Microfluidic optomechanics with viscous liquids**, Kyu Hyun Kim, Univ. of Michigan (USA); Gaurav Bahl, Univ. of Illinois at Urbana-Champaign (USA); Wonsuk Lee, Jing Liu, Matthew R. Tomes, Xudong Fan, Tal E. Carmon, Univ. of Michigan (USA) [8976-33]

9:50 am: **Monolithic optoelectronic chip for label-free multi-analyte sensing applications**, Ioannis Raptis, Eleni Makarona, Panagiota Petrou, Sotirios E. Kakabakos, Konstantinos Misiakos, National Ctr. for Scientific Research Demokritos (Greece) [8976-35]

Coffee Break Tue 10:10 am to 10:40 am

SESSION 8

Location: Room 232 (Mezzanine) . . . Tue 10:40 am to 12:10 pm

Applications III

Session Chair: **Joshua A. Hagen**, Air Force Research Lab. (USA)

10:40 am: **Capillary-driven microfluidic chips with evaporation-induced flow control and dielectrophoretic microbead trapping (Invited Paper)**, Yuksel Temiz, Jelena Skorucak, Emmanuel Delamarche, IBM Zürich Research Lab. (Switzerland) [8976-36]

11:10 am: **Real-time PCR in microfluidic devices**, Holger Becker, Nadine Hlawatsch, Richard Klemm, Christian Moche, Thomas E. Hansen-Hagge, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) [8976-37]

11:30 am: **Disposable pen-shaped capillary gel electrophoresis cartridge for fluorescence detection of bio-molecules**, Varoujan D. Amirkhanian, BiOptic Inc. (USA); Shou-Kuan Tsai, BiOptic Inc. (Taiwan) [8976-38]

11:50 am: **Rapid detection tuberculosis using droplet-based microfluidics**, Liat Rosenfeld, Minkyu Kim, Sindy K. Y. Tang, Stanford Univ. (USA) . . . [8976-39]

Lunch/Exhibition Break Tue 12:10 pm to 1:40 pm

MOEMS-MEMS

SESSION 9

Location: Room 232 (Mezzanine) Tue 1:40 pm to 3:20 pm

Optofluidics II

Session Chair: **Hatice Altug,**

Ecole Polytechnique Fédérale de Lausanne (Switzerland)

1:40 pm: **Optofluidic jet waveguide for Raman spectroscopy**, Romeo Bernini, Gianluca Persichetti, Genni Testa, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [8976-40]

2:00 pm: **Opto-mechanical manipulation of chemical reactions on the nanoscale with optofluidic nanotweezers**, Dakota O'Dell, Xavier Serey, David Erickson, Cornell Univ. (USA) [8976-41]

2:20 pm: **Development of a novel configuration for a MEMS transducer for low bias and high resolution imaging applications**, Tahereh Arezoo Emadi, Douglas A. Buchanan, Univ. of Manitoba (Canada) [8976-42]

2:40 pm: **Research and development on the construction of 2D light-driven droplet manipulation platform-based on light modulation of TIOPc impedance**, Yi-Chen Chen, Ho-Tsung Chen, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8976-43]

3:00 pm: **Real-time multi-analyte label-free detection of proteins by white light-reflectance spectroscopy**, Panagiota Petrou, Georgios Koukouvinos, National Ctr. for Scientific Research Demokritos (Greece); Dimitrios Drygiannakis, Dimitris Goustouridis, Ioannis Raptis, ThetaMetrisis S.A. (Greece); Konstantinos Misiakos, Sotirios E. Kakabakos, National Ctr. for Scientific Research Demokritos (Greece) [8976-44]

Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 10

Location: Room 232 (Mezzanine) Tue 3:50 pm to 5:40 pm

Applications IV

Session Chair: **Bonnie L. Gray,** Simon Fraser Univ. (Canada)

3:50 pm: **Integrated neurotransmitters and electrical signal sensing and stimulations using neurons-on-a-chip system (Invited Paper)**, Sam Kassegne, Pieter van Niekerk, Jaco van Niekerk, Zach Achen, San Diego State Univ. (USA) [8976-45]

4:20 pm: **Nanoscale electronic detection of endothelial growth factors**, Rahim Esfandyarpour, Stanford Univ. (USA); Mehdi Javanmard, Stanford Univ. School of Medicine (USA); James S. Harris Jr., Ronald W. Davis, Stanford Univ. (USA) [8976-46]

4:40 pm: **On the sensitivity improvement of a miniaturized label-free electrochemical impedance biosensor**, Yi-Ching Kuo, Shin-Ting Chou, Pei-I Tsai, Guan-Wei Li, Chih-Ting Lin, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8976-47]

5:00 pm: **Monolithic cell counter based on 3D hydrodynamic focusing in microfluidic channels**, Petra Paiè, Politecnico di Milano (Italy) and Istituto di Fotonica e Nanotecnologie (Italy); Francesca Bragheri, Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) [8976-48]

5:20 pm: **Nitric oxide (NO) release by vascular endothelial cells grown in microchannels of different sizes**, Shaghayegh Hosseinpour, Arthur C. Liu, Jonathan Choy, Simon Fraser Univ. (Canada); Abdul I. Barakat, Ecole Polytechnique (France); Bonnie L. Gray, Simon Fraser Univ. (Canada) . . [8976-49]

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

High precision innovative micropump for artificial pancreas, Eric Chappel, Christophe Conan, Gian-luca Lettieri, Stephan Proennecke, Selma Mefti, Debiotech SA (Switzerland) [8976-50]

Optofluidic prism refractometer, Sergio Calixto-Carrera, Ctr. de Investigaciones en Óptica, A.C. (Mexico) [8976-51]

Sensitivity of the resonance characteristics of Jerusalem cross-shaped nanoaperture antenna arrays to the changes in substrate parameters and metal thickness, Ekin Aslan, Mustafa Kemal Üniv. (Turkey); Mustafa Turkmen, Erciyes Üniv. (Turkey); Erdem Aslan, Mustafa Kemal Üniv. (Turkey) [8976-52]

Thermally induced light-driven microfluidics using a MOEMS-based laser scanner for particle manipulation, Matthias P. Kremer, Carinthian Tech Research AG (Austria) and Karlsruher Institut für Technologie (Germany); Andreas Tortschanoff, Carinthian Tech Research AG (Austria) [8976-53]

Conference 8977 · Location: Room 304 (Esplanade) and Room 222 (Mezzanine)

Monday - Thursday 3 - 6 February 2014 • Proceedings of SPIE Vol. 8977

Conference Cosponsor:



MOEMS and Miniaturized Systems XIII

Conference Chairs: **Wibool Piyawattanametha**, NECTEC (Thailand) and Chulalongkorn Univ. (Thailand); **Yong-Hwa Park**, Samsung Advanced Institute of Technology (Korea, Republic of)

Program Committee: **Wyatt O. Davis**, MicroVision, Inc. (USA); **David L. Dickensheets**, Montana State Univ. (USA); **Jean-Christophe Eloy**, Yole Développement (France); **Sonia M. García-Blanco**, Univ. Twente (Netherlands); **Jan Grahmann**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Jason C. Heikenfeld**, Univ. of Cincinnati (USA); **Il-Woong Jung**, Argonne National Lab. (USA); **Jonathan T. Liu**, Stony Brook Univ. (USA); **Veljko Milanovic**, Mirrorcle Technologies, Inc. (USA); **Harald Schenk**, Fraunhofer Institute for Photonic Microsystems (Germany); **Jason B. Stewart**, MIT Lincoln Lab. (USA); **Wanjun Wang**, Louisiana State Univ. (USA); **Guangya Zhou**, National Univ. of Singapore (Singapore)

Monday 3 February

MOEMS-MEMS PLENARY SESSION

Location: Room 130 (Exhibit Level) . Mon 9:00 am to 12:00 pm

Session Chairs: **David L. Dickensheets**, Montana State Univ. (USA);
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Welcome and Announcement of MOEMS-MEMS Best Paper Award and Best Student Paper Award**

David L. Dickensheets, Montana State Univ. (USA) and
Holger Becker, microfluidic ChipShop GmbH (Germany)

9:15 am: **Electrostatic nano electromechanical switches (NEMS) for energy-efficient digital systems (Plenary)**, Roger T. Howe, Stanford Univ. (USA)

Coffee Break Mon 10:00 am to 10:30 am

10:30 am: **Tailoring light for optically-guided nano- and microassembly: from bio-hybrid robots to droplet cages (Plenary)**, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany)

11:15 am: **Bio-integrated and bio-inspired optical microsystems (Plenary)**, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA)

SESSION 1

Location: Room 304 (Esplanade) Mon 3:30 pm to 4:40 pm

Miniature Instruments for Endoscopic Microscopy

Joint Session with Conferences 8927A and 8977

Session Chair: **Jonathan T. Liu**, Stony Brook Univ. (USA)

3:30 pm: **MEMS endoscopes for advanced biomedical imaging (Invited Paper)**, Ki-Hun Jeong, Hyeon-Cheol Park, Kyungwon Jang, KAIST (Korea, Republic of) [8977-1]

4:00 pm: **A high-resonance-frequency MEMS Fabry-Perot tunable filter with applications in high speed swept-source optical coherence tomography (OCT) imaging**, Vaibhav Mathur, Peter Whitney, Mark Kuznetsov, AXSUN Technologies Inc. (USA) [8977-2]

4:20 pm: **Vertical cross-sectional imaging by multi-spectral handheld dual axes confocal endomicroscope**, Zhen Qiu, Haijun Li, Xiyu Duan, Supang Khondee, Bishnu Joshi, Kenn R. Oldham, Katsuo Kurabayashi, Thomas D. Wang M.D., Univ. of Michigan (USA) [8927-31]

Best Student Paper Award

We are pleased to announce that a cash prize will be awarded to the best student paper in this conference and the winner will be notified.

Nominations were collected during the call for papers. Qualifying papers and presentations will be evaluated by the awards committee.

Award Sponsor: **Samsung Advanced Institute of Technology**

Tuesday 4 February

POSTERS-TUESDAY

Location: Room 103 (Exhibit Level) . . . Tue 6:00 pm to 8:00 pm

Conference attendees are invited to attend the MOEMS-MEMS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Efficient grating simulation for general incident beam, Site Zhang, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Jani Tervo, Univ. of Eastern Finland (Finland) [8977-33]

Study on parabal thin element approximation, Huiying Zhong, Frank Wyrowski, Muhammad Ahmad, Friedrich-Schiller-Univ. Jena (Germany); Hagen Schweitzer, LightTrans VirtualLab UG (Germany) [8977-34]

120° silicon double mirrors for the use in a micro optical gyroscope, Thalke Niesel, Andreas H. Dietzel, Technische Univ. Braunschweig (Germany) . [8977-35]

Wednesday 5 February

SESSION 2

Location: Room 222 (Mezzanine) Wed 1:00 pm to 3:30 pm

Microscanner

Session Chair: **Yong-Hwa Park**, Samsung Advanced Institute of Technology (Korea, Republic of)

1:00 pm: **Micro-scanning mirrors for high-power laser applications (Invited Paper)**, Thilo Sandner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Simon Kimme, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) and Fraunhofer-Institut für Werkzeugmaschinen und Umformtechnik (Germany); Thomas Grasshoff, Ulrich Todt, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8977-3]

1:30 pm: **Two-dimensional scanning using two single-axis, low-voltage, PZT-resonant micromirrors**, Shanshan Gu-Stoppel, Joachim Janes, Hans-Joachim Quenzer, Ulrich Hofmann, Wolfgang Benecke, Fraunhofer-Institut für Siliziumtechnologie (Germany) [8977-4]

1:50 pm: **Analysis of capacitive sensing for 2D-MEMS scanner laser projection**, Thomas von Wantoch, Christian Mallas, Ulrich Hofmann, Joachim Janes, Bernhard Wagner, Wolfgang Benecke, Fraunhofer-Institut für Siliziumtechnologie (Germany) [8977-5]

2:10 pm: **Tunable external cavity quantum cascade lasers (EC-QCL) an application field for MOEMS-based scanning gratings**, Jan Grahmann, Harald Schenk, André Merten, Michael Fontenot, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Ralf Ostendorf, Daniela Bleh, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8977-6]

2:30 pm: **High-speed focus control capability of electrostatic-pneumatic actuation of MEMS deformable mirrors**, Mohammad J. Moghimi, Krishna Chattergoon, David L. Dickensheets, Montana State Univ. (USA) [8977-7]

2:50 pm: **Wafer-level vacuum-packaged two-axis MEMS scanning mirror for pico-projector application**, Ulrich Hofmann, Joachim Janes, Frank Senger, Christian Mallas, Thomas von Wantoch, Fraunhofer-Institut für Siliziumtechnologie (Germany) [8977-8]

3:10 pm: **Rapidly analyzing parametric resonance and manufacturing yield of MEMS 2D scanning mirrors using hybrid finite-element/behavioral modeling**, Sandipan Maity, Susan Liu, Coventor, Inc. (USA); Stephane Rouvillois, Gunar Lorenz, Coventor, SARL (France); Mattan Kamon, Coventor, Inc. (USA) . [8977-36]

Coffee Break Wed 3:30 pm to 4:00 pm

MOEMS-MEMS

Conference 8977 · Location: Room 222 (Mezzanine)

SESSION 3

Location: Room 222 (Mezzanine) Wed 4:00 pm to 5:50 pm

MOEMS for Imaging Applications

Session Chair: **David L. Dickensheets**, Montana State Univ. (USA)

4:00 pm: **A robust design and fabrication of micro-machined electro-absorptive optical modulator for 3D imaging** (*Invited Paper*), Yong-Hwa Park, Yong-Chul Cho, Jang-Woo You, Chang-Young Park, Heesun Yoon, Sang-Hun Lee, Samsung Advanced Institute of Technology (Korea, Republic of); Byung Hoon Na, Gun Wu Ju, Hee Ju Choi, Yong Tak Lee, Gwangju Institute of Science and Technology (Korea, Republic of) [8977-9]

4:30 pm: **Next generation miniature simultaneous multi-hyperspectral imaging systems**, Michele Hinnrichs, Pacific Advanced Technology, Inc. (USA); Neelam Gupta, U.S. Army Research Lab. (USA) [8977-10]

4:50 pm: **MEMS-based miniature FT-IR engine with built-in photo-detector**, Yoshihisa Warashina, Tomofumi Suzuki, Kouhei Kasamori, Ryosuke Okumura, Yuki Matsuo, Mitsutaka Takemura, Hamamatsu Photonics K.K. (Japan) . [8977-11]

5:10 pm: **A new generation of MEMS middle-infrared spectrometers**, Thomas Otto, Ray Saupé, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Volker Stock, Technical Quartz Solutions GmbH (Germany); Thomas Gessner, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) [8977-12]

5:30 pm: **MEMS Fabry-Perot interferometer with Si-air mirrors for mid- and thermal infrared**, Mikko Tuohiniemi, Antti Näsilä, Altti Akujärvi, VTT Technical Research Ctr. of Finland (Finland) [8977-13]

Thursday 6 February

SESSION 4

Location: Room 222 (Mezzanine) Thu 8:00 am to 10:10 am

MOEMS Components and Systems

Session Chair: **Guangya Zhou**, National Univ. of Singapore (Singapore)

8:00 am: **High-speed 32x32 MEMS optical-phased array** (*Invited Paper*), Mischa Megens, Byung-Wook Yoo, Weijian Yang, Tianbo Sun, Univ. of California, Berkeley (USA); Trevor K. Chan, Univ. of California, Davis (USA); Connie J. Chang-Hasnain, Ming C. Wu, Univ. of California, Berkeley (USA); David A. Horsley, Univ. of California, Davis (USA) [8977-14]

8:30 am: **Newly developed broadband plasmonic absorber for uncooled infrared detectors**, Hae-Seok Park, Sung Hyun Nam, Hyun-Gue Hong, Sookyoung Cho, Seokho Yun, Jung Woo Kim, Samsung Advanced Institute of Technology (Korea, Republic of) [8977-15]

8:50 am: **Three-dimensional collimation of in-plane-propagating light using silicon micromachined mirror**, Yasser M. Sabry, Ecole Supérieure d'Ingénieurs en Electronique et Electrotechnique (France); Diaa Khalil, Ain Shams Univ. (Egypt); Bassam Saadany, Si-Ware Systems (Egypt); Tarik Bourouina, Ecole Supérieure d'Ingénieurs en Electronique et Electrotechnique (France) . . [8977-16]

9:10 am: **Analog of electromagnetically induced transparency in coupled one-dimensional photonic crystal cavities**, Feng Tian, Guangya Zhou, Yu Du, Fook Siong Chau, National Univ. of Singapore (Singapore); Jie Deng, A*STAR Institute of Materials Research and Engineering (Singapore) [8977-17]

9:30 am: **Nano-scale optical actuation based on coupled one-dimensional photonic crystal cavities**, Feng Tian, Guangya Zhou, Yu Du, Fook Siong Chau, National Univ. of Singapore (Singapore); Jie Deng, A*STAR Institute of Materials Research and Engineering (Singapore) [8977-18]

9:50 am: **A bi-material microbeam-based thermal actuator for out-of-plane rotation**, Ali Najafi Sohi, Patricia Nieva, Univ. of Waterloo (Canada) . . . [8977-19]
Coffee Break Thu 10:10 am to 10:40 am

SESSION 5

Location: Room 222 (Mezzanine) . . . Thu 10:40 am to 12:10 pm

Spatial Light Modulator

Session Chair: **Harald Schenk**,
Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

10:40 am: **Holographic display with a FPD-based complex spatial light modulator** (*Invited Paper*), Song Hoon, Gee-Young Sung, Kang-Hee Won, Jungkwon An, Young-Jun Yun, Jae-eun Jung, Jesada Ungnapatanin, Samsung Advanced Institute of Technology (Korea, Republic of); Da-jung Lim, Korea Univ. (Korea, Republic of); Hwi Kim, Korea Univ. Sejong Campus (Korea, Republic of); Hong-Seok Lee, U-In Chung, Samsung Advanced Institute of Technology (Korea, Republic of) [8977-20]

11:10 am: **Fast one-dimensional light modulator for mask-less lithography in the ultra-violet spectral range**, Jan-Uwe Schmidt, Ulrike A. Dauderstadt, Martin Friedrichs, Thomas Hughes, Thomas Ludewig, Dirk Rudloff, Tino Schwaten, Daniela Trenkler, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Ingo Wullinger, GLOBALFOUNDRIES Dresden Module One LLC & Co. KG (Germany); Michael Wagner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Per Askebjør, Climeon AB (Sweden); Andreas Bergstrom, Peter B. Bjoernangen II, Tord Karlin, Micronic Mydata AB (Sweden) [8977-21]

11:30 am: **Speckle reduction technique for embeddable MEMS-laser picoprojector**, Nicolas Abelé, Christophe Legros, Jonathan Masson, Lucio Kilcher, Lemoptix SA (Switzerland) [8977-22]

11:50 am: **Large array of 2048 tilting micromirrors for astronomical spectroscopy: optical and cryogenic characterization**, Frédéric Zamkotsian, Lab. d'Astrophysique de Marseille (France); Michael Canonica, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Patrick Lanzoni, Lab. d'Astrophysique de Marseille (France); Wilfried Noell, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Sebastien Lani, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [8977-23]

Lunch/Exhibition Break Thu 12:10 pm to 1:40 pm

SESSION 6

Location: Room 222 (Mezzanine) Thu 1:40 pm to 3:30 pm

Microspectrometer and Optical Filters

Session Chair: **Guangya Zhou**, National Univ. of Singapore (Singapore)

1:40 pm: **MMI-based MOEMS FT spectrometer for visible and IR spectral ranges**, Bassem M. Al-Demerdash, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt); Mostafa Medhat, Bassam Saadany, Si-Ware Systems (Egypt); Diaa Khalil, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt) [8977-24]

2:00 pm: **On-chip NIR optical spectrometer based on polymeric waveguide and metallic nano-structures**, Maurine Malak, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Konstantin Jefimovs, EMPA (Switzerland); Edoardo Alberti, Micos Engineering GmbH (Switzerland); Hans Peter Herzog, Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8977-25]

2:20 pm: **Resolution and speed improvements of mid-infrared Fabry-Perot microspectrometers for the analysis of hydrocarbon gases**, Martin Ebermann, Norbert Neumann, InfraTec GmbH (Germany); Karla Hiller, Mario Seifert, Technische Univ. Chemnitz (Germany); Marco Meinig, Steffen Kurth, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) . . [8977-26]

2:40 pm: **MEMS Fabry-Perot interferometer-based spectrometer demonstrator for 7.5 µm to 9.5 µm wavelength range** (*Invited Paper*), Jussi H. Mäkynen, Mikko Tuohiniemi, Antti Näsilä, Rami Mannila, Jarkko E. Antila, VTT Technical Research Ctr. of Finland (Finland) [8977-27]

3:10 pm: **MEMS optical tunable filter based on free-standing sub-wavelength silicon layers**, Haitham Omran, Ain Shams Univ. (Egypt); Yasser M. Sabry, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Mohamed Sadek, Khaled Hassan, Si-Ware Systems (Egypt); Mohamed Y. Shalaby, Ain Shams Univ. (Egypt); Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) [8977-28]

Coffee Break Thu 3:30 pm to 4:00 pm

SESSION 7

Location: Room 222 (Mezzanine) Thu 4:00 pm to 5:20 pm

MOEMS for Sensing Applications

Session Chair: **Wyatt O. Davis**, MicroVision, Inc. (USA)

4:00 pm: **MEMS infrared approaches to detector-based on nonlinear oscillation and wavelength selective emitter using surface plasmon polariton** (*Invited Paper*), Minoru Sasaki, Shinya Kumagai, Toyota Technological Institute (Japan) [8977-29]

4:20 pm: **Tunable MOEMS Fabry-Perot interferometer for miniaturized spectral sensing in near-infrared**, Anna Rissanen, Mikko Tuohiniemi, Rami Mannila, Jarkko E. Antila, VTT Technical Research Ctr. of Finland (Finland) [8977-30]

4:40 pm: **Planar integrated polymer-based optical strain sensor**, Christian Kelb, Eduard Reithmeier, Bernhard Roth, Leibniz Univ. Hannover (Germany) [8977-31]

5:00 pm: **Mechanically amplified MEMS optical accelerometer with FPI readout**, Edward Davies, Imperial College London (United Kingdom); David S. George, AWE plc (United Kingdom); Andrew S. Holmes, Imperial College London (United Kingdom) [8977-32]

MEMS Adaptive Optics VIII

Conference Chairs: **Thomas G. Bifano**, Boston Univ. (USA); **Joel Kubby**, Univ. of California, Santa Cruz (USA); **Sylvain Gigan**, Institut Langevin (France)

Program Committee: **Martin Booth**, Univ. of Oxford (United Kingdom); **William D. Cowan**, Sandia National Labs. (USA); **Chris Dainty**, National Univ. of Ireland, Galway (Ireland); **Don Gavel**, Univ. of California, Santa Cruz (USA); **Andreas Gehner**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Wenhan Jiang**, Institute of Optics and Electronics (China); **Peter A. Kner**, The Univ. of Georgia (USA); **Alexis V. Kudryashov**, Moscow State Open Univ. (Russian Federation); **Scot S. Olivier**, Lawrence Livermore National Lab. (USA); **Rafael Piestun**, Univ. of Colorado at Boulder (USA); **Sergio R. Restaino**, U.S. Naval Research Lab. (USA); **Ulrich Wittrock**, Fachhochschule Münster (Germany)

Sunday 2 February

SESSION 1

Location: Room 111 (Exhibit Level) . . . Sun 8:00 am to 9:20 am

AO Technology

Session Chair: **Thomas G. Bifano**, Boston Univ. (USA)

8:00 am: **FPGA-accelerated adaptive optics wavefront control**, Erik Beckert, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Steffen Mauch, Technische Univ. Ilmenau (Germany); Claudia Reinlein, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Johann Reger, Technische Univ. Ilmenau (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8978-1]

8:20 am: **Focus-tunable Moiré lenses from stacked diffractive optical elements**, Walter H. Harm, Stefan Bernet, Monika Ritsch-Marte, Innsbruck Medical Univ. (Austria) [8978-2]

8:40 am: **Laser testing of thermally-piezoelectric MEMS deformable mirror**, Claudia Reinlein, Michael Appelfelder, Matthias Goy, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Sylvia E. Gebhardt, Fraunhofer-Institut für Keramische Technologien und Systeme (Germany) [8978-3]

9:00 am: **First light with a carbon fiber reinforced polymer 0.4 meter telescope**, Christopher C. Wilcox, U.S. Naval Research Lab. (USA); Freddie Santiago, Matthew E. Jungwirth, Sandia National Labs. (USA); Ty Martinez, Sergio R. Restaino, U.S. Naval Research Lab. (USA); Brett E. Bagwell, Sandia National Labs. (USA); Robert C. Romeo, Composite Mirror Applications, Inc. (USA) [8978-4]

SESSION 2

Location: Room 111 (Exhibit Level) . . Sun 9:20 am to 10:40 am

AO in Astronomy

Session Chair: **Thomas G. Bifano**, Boston Univ. (USA)

9:20 am: **MEMS and the direct detection of exoplanets** (Invited Paper), Sandrine J. Thomas, NASA Ames Research Ctr. (USA) [8978-5]

9:50 am: **Wavefront compensation technique using acquired images for small satellite remote sensing**, Norihide Miyamura, Meisei Univ. (Japan) [8978-6]

10:10 am: **On-sky wavefront correction with a 2048 actuator MEMS** (Invited Paper), Olivier Guyon, Subaru Telescope, National Astronomical Observatory of Japan (USA) and The Univ. of Arizona (USA); Frantz Martinache, Nemanja Jovanovic, Christophe S. Clergeon, Garima Singh, Tomoyuki Kudo, Subaru Telescope, National Astronomical Observatory of Japan (USA) . . [8978-7]

Coffee break Sun 10:40 am to 11:10 am

SESSION 3

Location: Room 111 (Exhibit Level) . Sun 11:10 am to 12:10 pm

AO in Microscopy I

Session Chair: **Martin J. Booth**, Univ. of Oxford (United Kingdom)

11:10 am: **Comparison of closed loop and sensorless adaptive optics in widefield microscopy** (Invited Paper), John M. Girkin, Christopher D. Saunter, Cyril J. Bourgenot, Gordon D. Love, Durham Univ. (United Kingdom); Jonathan P. Taylor, Univ. of Glasgow (United Kingdom) [8978-8]

11:40 am: **Correction of optical aberrations for fluorescence fluctuation microscopy** (Invited Paper), Antoine Delon, Charles-Edouard Leroux, Dorian Champelovier, Irene Wang, Alexei Grichine, Univ. Joseph Fourier (France) [8978-9]

Lunch Break Sun 12:10 pm to 1:20 pm

SESSION 4

Location: Room 111 (Exhibit Level) . . . Sun 1:20 pm to 3:00 pm

AO in Microscopy II

Session Chair: **Martin J. Booth**, Univ. of Oxford (United Kingdom)

1:20 pm: **Imaging deep and clear in thick inhomogeneous samples** (Invited Paper), Jordi Andilla, Omar E. Olarte, Rodrigo Aviles-Espinosa, Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain) . . . [8978-10]

1:50 pm: **Adaptive optics for in vivo two-photon calcium imaging of neuronal networks**, Serge C. Meimon, Jean-Marc Conan, Vincent Michau, ONERA (France); Arnaud Malvache, Institut de Neurosciences Cognitives de la Méditerranée (France) [8978-11]

2:10 pm: **Adaptive optical two-photon microscopy with direct wavefront sensing using autofluorescent guide-stars**, Xiaodong Tao, Andrew P. Norton, Matthew Kissel, Oscar A. Azucena Jr., Joel Kubby, Univ. of California, Santa Cruz (USA) [8978-12]

2:30 pm: **Optical design of a broadband scanning adaptive optics ophthalmoscope for the mouse eye** (Invited Paper), Yusufu N. Sulai, Univ. of Rochester (USA); Alfredo Dubra, Medical College of Wisconsin (USA) and Marquette Univ. (USA) [8978-13]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 5

Location: Room 111 (Exhibit Level) . . . Sun 3:30 pm to 5:00 pm

AO in Microscopy III

Session Chair: **Joel Kubby**, Univ. of California, Santa Cruz (USA)

3:30 pm: **Adaptive optics for superresolution nanoscopy** (Invited Paper), Brian R. Patton, Daniel Burke, Fiona Kenny, Maria Frade Rodriguez, Martin Booth, Univ. of Oxford (United Kingdom) [8978-14]

4:00 pm: **Development and testing of an AO-structured illumination microscope**, Matthew Kissel, Oscar A. Azucena Jr., Juan J. Díaz León, Marc R. Reinig, Joel Kubby, Univ. of California, Santa Cruz (USA) [8978-15]

4:20 pm: **100nm resolution in thick samples with structured illumination and adaptive optics**, Benjamin Thomas, Megan Sloan, Adrian J. Wolstenholme, Peter A. Kner, The Univ. of Georgia (USA) [8978-16]

4:40 pm: **Point spread function optimization for STORM using adaptive optics**, Kayvan Forouhesh Tehrani, Peter A. Kner, The Univ. of Georgia (USA) [8978-17]

SESSION 6

Location: Room 111 (Exhibit Level) . . . Sun 5:00 pm to 6:30 pm

AO for Wavefront Shaping

Session Chair: **Joel Kubby**, Univ. of California, Santa Cruz (USA)

5:00 pm: **Non-invasive optical imaging through scattering layers** (Invited Paper), Allard P. Mosk, Elbert G. van Putten, Univ. Twente (Netherlands); Jacopo Bertolotti, Univ. Twente (Netherlands) and Univ degli Studi di Firenze (Italy); Christian Blum, Ad Lagendijk, Willem L. Vos, Univ. Twente (Netherlands) [8978-18]

5:30 pm: **Time-reversal optical focusing for biophotonics applications** (Invited Paper), Changhui Yang, California Institute of Technology (USA) [8978-19]

6:00 pm: **Real-time 3D endoscopic imaging through a single multimode optical fiber** (Invited Paper), Wonshik Choi, Donggyu Kim, Jungho Moon, Changhyeong Yoon, Korea Univ. (Korea, Republic of) [8978-20]

MOEMS-
MEMS



Emerging Digital Micromirror Device Based Systems and Applications VI

Conference Chairs: **Michael R. Douglass**, Texas Instruments Inc. (USA); **Philip S. King**, Texas Instruments Inc. (USA); **Benjamin L. Lee**, Texas Instruments Inc. (USA)

Program Committee: **Umit Batur**, Texas Instruments Inc. (USA); **Hal Bellis**, Keynote Technologies, LLC (USA); **Sara L. Best**, Univ. of Wisconsin School of Medicine and Public Health (USA); **Daniel N. Carothers**, Consultant (USA); **Goksel Dedeoglu**, Texas Instruments Inc. (USA); **Jason Geng**, Xigen, LLC (USA); **Roland Höfling**, VIALUX GmbH (Germany); **Alfred Jacobsen**, Visitech AS (Norway); **Yuval Kapellner Rabinovitz**, EKB Technologies Ltd. (Israel); **Yongzhi Charley Yang**, Wintech Digital Systems Technology Corp. (USA); **Karel J. Zuzak**, Digital Light Innovations (USA)

Tuesday 4 February

SESSION 1

Location: Room 300 (Esplanade) Tue 2:20 pm to 3:00 pm

Biomedical Imaging with Advanced Microscopy using a DMD or other MEMS Micromirror

Joint Session with Conferences 8947 and 8979

Session Chairs: **Sara L. Best**, Univ. of Wisconsin School of Medicine and Public Health (USA); **Robert C. Leif**, Newport Instruments (USA)

2:20 pm: **Massively parallel confocal scanning imaging of the retina**, Kari V. Vienola, Boy Braaf, Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands) [8979-19]

2:40 pm: **Miniaturized CARS microendoscope probe for label-free intraoperative imaging**, Xu Chen, Xi Wang, Zhengfan Liu, Xiaoyun Xu, Jie Cheng, Seng Weng, Michael J. Thrall, Kelvin Wong, Stephen Wong, The Methodist Hospital Research Institute (USA) [8947-33]

Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 2

Location: Room 300 (Esplanade) Tue 3:30 pm to 5:30 pm

Biomedical Imaging using a DMD or other MEMS Micromirror

Joint Session with Conferences 8947 and 8979

Session Chairs: **Karel J. Zuzak**, Digital Light Innovations (USA); **Fartash Vasefi**, SMI (USA)

3:30 pm: **The use of hyperspectral imaging (HSI) in wound healing (Invited Paper)**, Javier La Fontaine, Lawrence Lavery, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); **Karel J. Zuzak**, Digital Light Innovations (USA) [8979-21]

4:10 pm: **DLP technology application: 3D head tracking and motion correction in medical brain imaging**, Oline V. Olesen, Massachusetts General Hospital (USA) and Technical Univ. of Denmark (Denmark); Jakob Wilm, Rasmus R. Paulsen, Technical Univ. of Denmark (Denmark); Liselotte Højgaard, Rigshospitalet (Denmark); Rasmus Larsen, Technical Univ. of Denmark (Denmark) [8979-22]

4:30 pm: **Development of a spectrally-resolved fluorescence tomography system using a NIR swept laser and a digital micromirror array based detection system**, Jaedu Cho, Univ. of California, Irvine (USA); Seung Woan Jeon, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Orhan Nalcioğlu, Gultekin Gulsen, Univ. of California, Irvine (USA) [8947-23]

4:50 pm: **Using DMDs for focusing light through turbid media**, Sri Nivas Chandrasekaran, Hans Ligtenberg, Wiendelt Steenbergen, Ivo M. Vellekoop, Univ. Twente (Netherlands) [8979-23]

5:10 pm: **Fabrication of topographic patterns by DMD-controlled photopolymerization and characterization for cellular migration**, Nelson Cardenas, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) [8979-24]

Wednesday 5 February

SESSION 3

Location: Room 232 (Mezzanine) Wed 8:30 am to 9:30 am

Structured Light 3D Imaging Methodology

Session Chairs: **Benjamin L. Lee**, Texas Instruments Inc. (USA); **Jason Geng**, Xigen, LLC (USA)

8:30 am: **Towards superfast 3D optical metrology with digital micromirror device (DMD) platforms**, Tyler Bell, Song Zhang, Iowa State Univ. (USA) [8979-1]

8:50 am: **Comparison of fixed-pattern and multiple-pattern structured light imaging systems**, Vikram V. Appia, Pedro Gelabert, Texas Instruments Inc. (USA) [8979-2]

9:10 am: **Accurate calibration of DLP projection systems**, Jakob Wilm, Technical Univ. of Denmark (Denmark) and Rigshospitalet (Denmark); Oline V. Olesen, Technical Univ. of Denmark (Denmark) and Rigshospitalet (Denmark) and Massachusetts General Hospital (USA); Rasmus Larsen, Technical Univ. of Denmark (Denmark) [8979-3]

SESSION 4

Location: Room 232 (Mezzanine) Wed 9:30 am to 10:10 am

Structured Light 3D Imaging Applications

Session Chairs: **Benjamin L. Lee**, Texas Instruments Inc. (USA); **Roland Höfling**, VIALUX GmbH (Germany)

9:30 am: **Robust near-infrared structured light scanning for 3D human model reconstruction**, Bo Fu, Ruigang Yang, Univ. of Kentucky (USA) [8979-4]

9:50 am: **High-speed active head tracking system**, Stephen A. Kupiec, Vladimir B. Markov, Advanced Systems & Technologies, Inc. (USA); Arthur R. Hastings, U.S. Army Night Vision & Electronic Sensors Directorate (USA) [8979-5]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 5

Location: Room 232 (Mezzanine) Wed 10:40 am to 11:50 am

Holographic and Spectroscopic Applications

Session Chairs: **Daniel N. Carothers**, Consultant (USA); **Alfred Jacobsen**, Visitech AS (Norway)

10:40 am: **Microsecond reconfigurable NxN data-communication switch using DMD (Invited Paper)**, Pierre-Alexandre J. Blanche, College of Optical Sciences, The Univ. of Arizona (USA); Alexander A. Miles, The Univ. of Arizona (USA); Brittany Lynn, College of Optical Sciences, The Univ. of Arizona (USA); John Wissinger, The Univ. of Arizona (USA); Daniel N. Carothers, Texas Instruments Inc. (USA); Robert A. Norwood, Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) [8979-6]

11:10 am: **Precise holograms using complex light modulation**, Michael F. Becker, The Univ. of Texas at Austin (USA); Jinyang Liang, Washington Univ. in St. Louis (USA) [8979-7]

11:30 am: **Micro-mirror arrays for spectroscopic applications**, Walter M. Duncan, Charles J. Maxwell, The Univ. of Texas at Dallas (USA) [8979-8]

Lunch/Exhibition Break Wed 11:50 am to 1:00 pm

SESSION 6

Location: Room 232 (Mezzanine) Wed 1:00 pm to 3:00 pm

System Designs for Emerging DMD Applications

Session Chairs: **Yuval Kapellner Rabinovitz**, EKB Technologies Ltd. (Israel); **Goksel Dedeoglu**, Texas Instruments Inc. (USA)

1:00 pm: **DMD-based reactive visual system design for programmable headlights** (*Invited Paper*), Srinivasa Narasimhan, Carnegie Mellon Univ. (USA) [8979-25]

1:30 pm: **High-resolution and energetically efficient lensless imaging system based upon time-varied pinholes array** (*Invited Paper*), Ariel Schwarz, Amir Shemer, Zeev Zalevsky, Bar-Ilan Univ. (Israel) [8979-9]

2:00 pm: **Frequency division multiplexed imaging: a Texas Instruments DMD implementation**, Houman Habibkhani, Bahadır K. Gunturk, Martin Feldman, Louisiana State Univ. (USA); Aziz U. Batur, Texas Instruments Inc. (USA) [8979-10]

2:20 pm: **Use of high-radiant flux, high-resolution DMD light engines in industrial applications**, Alexandra Müller, IN-VISION Digital Imaging Optics GmbH (Austria); Surinder Ram, Lenzing Technik GmbH (Austria) [8979-11]

2:40 pm: **Dynamically reconfigurable framework for pixel-level visible light communication projector**, Leijie Zhou, Shogo Fukushima, Takeshi Naemura, The Univ. of Tokyo (Japan) [8979-12]

Coffee Break Wed 3:00 pm to 3:30 pm

SESSION 7

Location: Room 232 (Mezzanine) Wed 3:30 pm to 5:10 pm

Advanced 3D Display

Session Chairs: **Philip S. King**, Texas Instruments Inc. (USA); **Michael R. Douglass**, Texas Instruments Inc. (USA)

3:30 pm: **Design of a single projector multiview 3D display system**, Jason Geng, IEEE Intelligent Transportation Systems Society (USA) [8979-13]

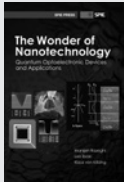
3:50 pm: **DMD technology enables an optical see-through head-mounted 3D display with true focus cues**, Xinda Hu, Hong Hua, College of Optical Sciences, The Univ. of Arizona (USA) [8979-14]

4:10 pm: **Control over the DMD for projection display applications**, Badia Koudsi, Optecks, LLC (USA) [8979-15]

4:30 pm: **A scalable multi-DLP-pico-projector system for augmented and virtual reality**, Fernando Teubl Ferreira Sr., Marcio C. Cabral Sr., Univ. de São Paulo (Brazil); Celso S. Kurashima, UFABC (Brazil); Marcelo K. Zuffo Sr., Univ. de São Paulo (Brazil) [8979-16]

4:50 pm: **Integration of real-time 3D image acquisition and multiview 3D display**, Zhaoxing Zhang, Zheng Geng, Institute of Automation (China) . [8979-17]

New Books from SPIE



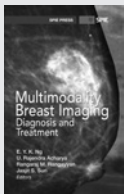
The Wonder of Nanotechnology: Quantum Optoelectronic Devices and Applications

Editors: Manijeh Razeghi, Leo Esaki, Klaus von Klitzing
Vol. PM238
SPIE Member \$123; Nonmember \$145



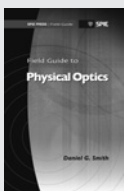
Computer-Aided Cancer Detection and Diagnosis: Recent Advances

Jinshan Tang
Vol. PM240
SPIE Member \$63; Nonmember \$74



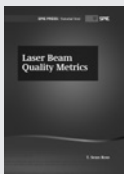
Multimodality Breast Imaging: Diagnosis and Treatment

Editors: E. Y. K. Ng, U. Rajendra Acharya, Rangaraj M. Rangayyan, Jasjit S. Suri
Vol. PM227
SPIE Member \$114; Nonmember \$134



Field Guide to Physical Optics

Daniel G. Smith
Vol. FG17
SPIE Member \$36
Nonmember \$42



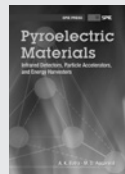
Laser Beam Quality Metrics

T. Sean Ross
Vol. TT96
SPIE Member \$47
Nonmember \$55



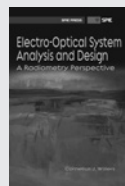
Stray Light Analysis and Control

Eric Fest
Vol. PM229
SPIE Member \$47
Nonmember \$55



Pyroelectric Materials: Infrared Detectors, Particle Accelerators, and Energy Harvesters

Ashok K. Batra and Mohan D. Aggarwal
Vol. PM231
SPIE Member \$56
Nonmember \$66



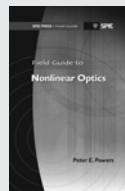
Electro-Optical System Analysis and Design: A Radiometry Perspective

Cornelius J. Willers
Vol. PM236
SPIE Member \$83
Nonmember \$98



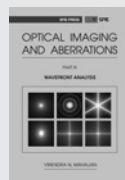
The Proper Care of Optics: Cleaning, Handling, Storage, and Shipping

Robert Schalck
Vol. PM233
SPIE Member \$46
Nonmember \$54



Field Guide to Nonlinear Optics

Peter E. Powers
Vol. FG29
SPIE Member \$36
Nonmember \$42



Optical Imaging and Aberrations, Part III: Wavefront Analysis

Virendra N. Mahajan
Vol. PM221
SPIE Member \$78
Nonmember \$92



Windowed Fringe Pattern Analysis

Qian Kemao
Vol. PM239
SPIE Member \$56
Nonmember \$66

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OPTO

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Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8981	Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III (Freundlich, Guillemoles)	264
8982	Optical Components and Materials XI (Digonnet, Jiang).	268
8983	Organic Photonic Materials and Devices XVI (Tabor, Kajzar, Kaino, Koike)	272
8984	Ultrafast Phenomena and Nanophotonics XVIII (Betz, Elezzabi, Song, Tsen)	275
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç).	281
8987	Oxide-based Materials and Devices V (Teherani, Look, Rogers)	286

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles & Brady LLP (USA)

8988	Integrated Optics: Devices, Materials, and Technologies XVIII (Broquin, Nunzi Conti)	290
8989	Smart Photonic and Optoelectronic Integrated Circuits XVI (Eidada, Lee, He).	294
8990	Silicon Photonics IX (Kubby, Reed).	296
8991	Optical Interconnects XIV (Schröder, Chen, Glebov)	299
8992	Photonic Instrumentation Engineering (Soskind, Olson)	302
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

8993	Quantum Sensing and Nanophotonic Devices XI (Razeghi)	304
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8994	Photonic and Phononic Properties of Engineered Nanostructures IV (Adibi, Lin, Scherer).	310
8995	High Contrast Metastructures III (Chang-Hasnain, Fattal, Koyama, Zhou)	314
8996	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI (Huffaker, Szmulowicz, Eisele)	316
8974	Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (von Freymann, Schoenfeld, Rumpf)	243

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

8997	Advances in Photonics of Quantum Computing, Memory, and Communication VII (Hasan, Hemmer, Lee, Santori)	318
8998	Advances in Slow and Fast Light VII (Shahriar, Narducci)	321
8999	Complex Light and Optical Forces VIII (Andrews, Galvez, Glückstad)	324
9000	Laser Refrigeration of Solids VII (Epstein, Seletskiy, Sheik-Bahae)	327
8993	Quantum Sensing and Nanophotonic Devices XI (Razeghi)	304
8996	Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI (Huffaker, Szmulowicz, Eisele).	316

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

9001	Vertical-Cavity Surface-Emitting Lasers XVIII (Gunter, Lei)	329
9002	Novel In-Plane Semiconductor Lasers XIII (Belyanin, Smowton)	330
9003	Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII (Streubel, Jeon, Tu)	333
8965	High-Power Diode Laser Technology and Applications XII (Zediker)	217
8966	Vertical External Cavity Surface Emitting Lasers (VECSELs) IV (Moloney)	220
8980	Physics and Simulation of Optoelectronic Devices XXII (Witzigmann, Osinski, Henneberger, Arakawa)	260
8986	Gallium Nitride Materials and Devices IX (Chyi, Nanishi, Morkoç)	281

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

9004	Emerging Liquid Crystal Technologies IX (Chien)	337
9005	Advances in Display Technologies IV (Chien, Lee, Wu)	339
9006	Practical Holography XXVIII: Materials and Applications (Bjelkhagen, Bove)	340

Optical Communications: Devices to Systems

Program Chair: **Benjamin Dingel**, Nasfine Photonics, Inc. (USA)

9007	Broadband Access Communication Technologies VIII (Dingel, Tsukamoto)	343
9008	Optical Metro Networks and Short-Haul Systems VI (Weiershausen, Dingel, Dutta, Srivastava).	346
9009	Next-Generation Optical Communication: Components, Sub-Systems, and Systems III (Li)	349
9010	Next-Generation Optical Networks for Data Centers and Short-Reach Links (Srivastava)	352
8971	Free-Space Laser Communication and Atmospheric Propagation XXVI (Hemmati, Boroson)	233
8985	Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII (Sadwick, O'Sullivan)	278
8990	Silicon Photonics IX (Kubby, Reed).	296
8991	Optical Interconnects XIV (Schröder, Chen, Glebov)	299

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
			OPTO Plenary Session, 8:30 to 10:00 am	OPTO Interactive Poster Session, 6:00 to 8:00 pm	

Optoelectronic Materials and Devices

Program Chair: **James G. Grote**, Air Force Research Lab. (USA)

8987 **Oxide-based Materials and Devices V** (*Teherani, Look, Rogers*)

8984 **Ultrafast Phenomena and Nanophotonics XVIII** (*Betz, Elezzabi, Song, Tsen*)

8981 **Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III** (*Freundlich, Guillemoles*)

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8983 **Organic Photonic Materials and Devices XVI** (*Tabor, Kajzar, Kaino, Koike*)

8980 **Physics and Simulation of Optoelectronic Devices XXII** (*Witzigmann, Osirski, Henneberger, Arakawa*)

8986 **Gallium Nitride Materials and Devices IX** (*Chyi, Nanishi, Morkoç*)

8985 **Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII** (*Sadwick, O'Sullivan*)

Photonic Integration

Program Chair: **Yakov Sidorin**, Quarles & Brady LLP (USA)

8992 **Photonic Instrumentation Engineering** (*Soskind, Olson*)

8988 **Integrated Optics: Devices, Materials, and Technologies XVIII** (*Broquin, Nunzi Conti*)

8990 **Silicon Photonics IX** (*Kubby, Reed*)

8991 **Optical Interconnects XIV** (*Schröder, Chen, Glebov*)

8985 **Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII** (*Sadwick, O'Sullivan*)

8989 **Smart Photonic and Optoelectronic Integrated Circuits XVI** (*Eldada, Lee, He*)

Nanotechnologies in Photonics

Program Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

8993 **Quantum Sensing and Nanophotonic Devices XI** (*Razeghi*)

8994 **Photonic and Phononic Properties of Engineered Nanostructures IV** (*Adibi, Lin, Scherer*)

8996 **Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI** (*Huffaker, Szmulowicz, Eisele*)

8974 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII** (*von Freymann, Schoenfeld, Rumpf*)

8995 **High Contrast Metasstructures III** (*Chang-Hasnain, Fattal, Koyama, Zhou*)

SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, session chairs, and authors who have so generously given their time and advice to make this symposium possible.

The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members. This program is based on commitments received up to the time of publication and is subject to change without notice.

Opto Conference Daily Schedule

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
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OPTO Plenary Session,
8:30 to 10:00 am

OPTO Interactive Poster Session,
6:00 to 8:00 pm

Advanced Quantum and Optoelectronic Applications

Program Chair: **Zameer U. Hasan**, Temple Univ. (USA)

8993 **Quantum Sensing and Nanophotonic Devices XI** (*Razeghi*)

8998 **Advances in Slow and Fast Light VII** (*Shahriar, Narducci*)

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9000 **Laser Refrigeration of Solids VII** (*Epstein, Seletskiy, Sheik-Bahae*)

Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel**, OSRAM GmbH (Germany)

8965 **High-Power Diode Laser Technology and Applications XII** (*Zediker*)

9001 **Vertical-Cavity Surface-Emitting Lasers XVIII** (*Guenter, Lei*)

8966 **Vertical External Cavity Surface Emitting Lasers (VECSELs) IV** (*Moloney*)

8986 **Gallium Nitride Materials and Devices IX** (*Chyi, Nanishi, Morkoç*)

9002 **Novel In-Plane Semiconductor Lasers XIII** (*Belyanin, Smowton*)

8980 **Physics and Simulation of Optoelectronic Devices XXII** (*Witzigmann, Osirski, Henneberger, Arakawa*)

9003 **Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII** (*Streubel, Jeon, Tu*)

Displays and Holography

Program Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

9006 **Practical Holography XXVIII: Materials and Applications** (*Bjelkhagen, Bove*)

9004 **Emerging Liquid Crystal Technologies IX** (*Chien*)

9005 **Advances in Display Technologies IV** (*Chien, Lee, Wu*)

Optical Communications: Devices to Systems

Program Chair: **Benjamin Dingel**, Nasfinc Photonics, Inc. (USA)

8971 **Free-Space Laser Communication and Atmospheric Propagation XXVI** (*Hemmati, Boroson*)

8985 **Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII** (*Sadwick, O'Sullivan*)

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9009 **Next-Generation Optical Communication: Components, Sub-Systems, and Systems III** (*Li*)

9010 **Next-Generation Optical Networks for Data Centers and Short-Reach Links** (*Srivastava*)

Physics and Simulation of Optoelectronic Devices XXII

Conference Chairs: **Bernd Witzigmann**, Univ. Kassel (Germany); **Marek Osinski**, The Univ. of New Mexico (USA); **Fritz Henneberger**, Humboldt-
Univ. zu Berlin (Germany); **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan)

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NUSOD Institute LLC (USA); **Ikuo Suemune**, Hokkaido Univ. (Japan)

Monday 3 February

SESSION 1

Location: Room 121 (Exhibit Level) . Mon 8:30 am to 10:00 am

Light Emitting Diodes

Session Chair: **Bernd Witzigmann**, Univ. Kassel (Germany)

8:30 am: **Multi-quantum barrier effects on the efficiency droop of GaN-based
LEDs** (*Invited Paper*), Joachim Piprek, NUSOD Institute LLC (USA) [8980-1]

9:00 am: **Monte Carlo-drift-diffusion simulation of current transport in III-N
LEDs**, Pyry Kivisaari, Toufik Sadi, Jani Oksanen, Jukka Tulkki, Aalto Univ. School
of Science and Technology (Finland) [8980-2]

9:20 am: **Top ITO nano transmission grating GaN LED simulations for light
extraction improvement**, Travis V. R. Robinson, Tattiana K. C. Davenport,
Gabriel M. Halpin, Xiaomin Jin, California Polytechnic State Univ., San Luis
Obispo (USA); Xiang-Ning Kang, Guo-yi Zhang, Peking Univ. (China) . . . [8980-66]

9:40 am: **High-voltage LED for general lighting application**, Schang-jing Hon,
EPSTAR Corp. (Taiwan) [8980-4]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 121 (Exhibit Level) Mon 10:30 am to 11:50 am

Electromagnetics I

Session Chair: **Thomas A. Klar**, Johannes Kepler Univ. Linz (Austria)

10:30 am: **High-bandwidth low-loss suspended silica splitters**, Soheil Soltani,
Andrea M. Armani, The Univ. of Southern California (USA) [8980-5]

10:50 am: **Topology-optimized broad-banded surface relief transmission
grating**, Jacob Andkjær, Christian P. Ryder, Peter C. Nielsen, Thomas P.
Rasmussen, Kristian J. Buchwald, Ibsen Photonics A/S (Denmark); Ole Sigmund,
Technical Univ. of Denmark (Denmark) [8980-6]

11:10 am: **Optical modelling of incoherent substrate light-trapping
in silicon thin film multi-junction solar cells with finite elements and
domain decomposition**, Martin Hammerschmidt, Konrad-Zuse-Zentrum für
Informationstechnik Berlin (Germany); Daniel Lockau, Helmholtz-Zentrum
Berlin für Materialien und Energie GmbH (Germany) and Konrad-Zuse-Zentrum
für Informationstechnik Berlin (Germany); Lin Zschiedrich, JCMwave GmbH
(Germany) and Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany);
Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin
(Germany) [8980-7]

11:30 am: **Use of a hybrid ray-thin film interference model for the
optimization of a FTIR FOEWS**, Jeremy R. Godin, Patricia Nieva, Univ. of
Waterloo (Canada) [8980-8]

Lunch Break Mon 11:50 am to 1:20 pm

SESSION 3

Location: Room 121 (Exhibit Level) . . Mon 1:20 pm to 2:50 pm

Laser Dynamics

Session Chair: **Ikuo Suemune**, Hokkaido Univ. (Japan)

1:20 pm: **Relaxation-oscillation-free semiconductor laser with optical
feedback** (*Invited Paper*), Daan Lenstra, Technische Univ. Eindhoven
(Netherlands) [8980-9]

1:50 pm: **Rate-equation description of multi-mode semiconductor lasers**,
Mirvais Yousefi, Photonic Sensing Solutions (Netherlands); Daan Lenstra,
Technische Univ. Eindhoven (Netherlands) [8980-10]

2:10 pm: **Dynamics of semiconductor lasers with frequency shifted
feedback**, Yoann Noblet, Joshua P. Toomey, Deborah M. Kane, Macquarie Univ.
(Australia) [8980-11]

2:30 pm: **Modeling of mode-locked semiconductor lasers with external
periodic forcing**, Rostislav Arkhipov, Aleksandr Pimenov, Mindaugas Radziunas,
Andrei G. Vladimirov, Weierstrass-Institut für Angewandte Analysis und
Stochastik (Germany) [8980-12]

Coffee Break Mon 2:50 pm to 3:20 pm

SESSION 4

Location: Room 121 (Exhibit Level) . . Mon 3:20 pm to 5:40 pm

Metal Nanocavities

Session Chair: **Geert Morthier**, Univ. Gent (Belgium)

3:20 pm: **Metal-cavity submonolayer quantum-dot surface-emitting
microlasers** (*Invited Paper*), Pengfei Qiao, Univ. of Illinois at Urbana-Champaign
(USA); Chien-Yao Lu, Princeton Optronics, Inc. (USA); Dieter H. Bimberg,
Technische Univ. Berlin (Germany); Shun Lien Chuang, Univ. of Illinois at Urbana-
Champaign (USA) [8980-13]

3:50 pm: **Nanolasers with 3D Nanocavities** (*Invited Paper*), Yeshiaahu Fainman,
Univ. of California, San Diego (USA) [8980-14]

4:20 pm: **Recent progress in plasmonic and metallic cavity nanolasers**
(*Invited Paper*), Cun-Zheng Ning, K. Ding, M. Hill, Z. C. Liu, L. J. Yin, Arizona
State Univ. (USA) [8980-15]

4:50 pm: **Electromagnetic modes in nanophotonics** (*Invited Paper*), Philippe
Lalanne, Institut d'Optique (France) [8980-16]

5:20 pm: **Observation of high-Q resonance modes from metal-coated
nanocavities and future prospect based on cavity mode simulation**, Hiroyuki
Kurosawa, Nagisa Ishihara, Ryo Takemoto, Nahid A. Jahan, Hideaki Nakajima,
Hidekazu Kumano, Ikuo Suemune, Hokkaido Univ. (Japan) [8980-17]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 121 (Exhibit Level) . Tue 10:30 am to 12:00 pm

Nano Lasers

Session Chair: **Cun-Zheng Ning**, Arizona State Univ. (USA)

- 10:30 am: **Hybrid metal/semiconductor lasers based on confined Tamm plasmons (Invited Paper)**, Clementine Symonds, Guillaume L'Heureux, Univ. Claude Bernard Lyon 1 (France); Jean-Paul Hugonin, Jean-Jacques Greffet, Institut d'Optique Graduate School (France); Stefano Azzini, Julien Laverdant, Univ. Claude Bernard Lyon 1 (France); Aristide Lemaître, Pascale Senellart, Lab. de Photonique et de Nanostructures (France); Joel Bellessa, Univ. Claude Bernard Lyon 1 (France) [8980-18]
 - 11:00 am: **Dye-doped spheres with plasmonic semi-shells: from directional fluorescence to lasing modes**, Nikita Arnold, Boyang Ding, Calin Hrelescu, Thomas A. Klar, Johannes Kepler Univ. Linz (Austria) [8980-19]
 - 11:20 am: **Epsilon-near-zero-slot waveguides and their applications in ultrafast laser beam steering**, Kaifeng Shi, Wangshi Zhao, Zhaolin Lu, Rochester Institute of Technology (USA) [8980-20]
 - 11:40 am: **An electrically driven semiconductor single-photon source working at T = 150 K**, Tilmar Kümmell, Wolf A. Quitsch, Oleh M. Fedorych, Univ. Duisburg-Essen (Germany); Carsten Kruse, Arne Gust, Detlef Hommel, Univ. Bremen (Germany); Gerd Bacher, Univ. Duisburg-Essen (Germany) [8980-21]
- Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 6

Location: Room 121 (Exhibit Level) . . . Tue 1:30 pm to 3:30 pm

Semiconductor-based Plasmonics

Session Chair: **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan)

- 1:30 pm: **ZnO as a tunable metal: New surface plasmon polaritons at telecommunication wavelengths (Invited Paper)**, Fritz Henneberger, Humboldt-Univ. zu Berlin (Germany) [8980-22]
 - 2:00 pm: **Using semiconductors and ceramics as new materials for plasmonic and metamaterials devices (Invited Paper)**, Alexandra Boltasseva, Purdue Univ. (USA) [8980-23]
 - 2:30 pm: **Development of ZnO films for near-IR plasmonics (Invited Paper)**, David C. Look, Wright State Univ. (USA) [8980-24]
 - 3:00 pm: **Laser processing of conductive oxides for near IR plasmonics (Invited Paper)**, Alberto Piqué, Heungsoo Kim, Nicholas A. Charipar, Scott A. Mathews, U.S. Naval Research Lab. (USA) [8980-25]
- Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 7

Location: Room 121 (Exhibit Level) . . . Tue 4:00 pm to 5:20 pm

III-Nitride-based Optoelectronics

Session Chair: **Fritz Henneberger**, Humboldt-Univ. zu Berlin (Germany)

- 4:00 pm: **Numerical simulation of deep UV avalanche photodetectors**, Enrico Bellotti, Boston Univ. (USA); Francesco Bertazzi, Politecnico di Torino (Italy) [8980-26]
- 4:20 pm: **Simulation of water photo electrolysis with III-nitride semiconductor nanowires**, Bernd Witzigmann, Univ. Kassel (Germany); Lorenzo Caccamo, Hao Shen, Andreas Waag, Technische Univ. Braunschweig (Germany) [8980-27]
- 4:40 pm: **Numerical simulation of III-nitride lattice-matched structures for THz QC lasers**, Sara Shishehchi, Roberto Paiella, Enrico Bellotti, Boston Univ. (USA) [8980-28]
- 5:00 pm: **Numerical modeling of improvement in slope sensitivity of InGaN-based ring laser rotation sensor**, Hemashilpa Kalagara, Petr G. Eliseev, Marek Osirski, The Univ. of New Mexico (USA) [8980-29]

Wednesday 5 February

SESSION 8

Location: Room 121 (Exhibit Level) . Wed 8:40 am to 10:00 am

Semiconductor Lasers

Session Chair: **Nikolay N. Ledentsov**, VI Systems GmbH (Germany)

- 8:40 am: **Theoretical and experimental analysis of unidirectionality of asymmetrically-coupled semiconductor ring or disk lasers**, Geert Morthier, Pauline Mechet, Univ. Gent (Belgium) [8980-30]
 - 9:00 am: **Simulation of III-V strained quantum-well lasers with coupled concentric racetrack resonators**, Jaime Viegas, Peng Xing, Solomon M. Serunjogi, Masdar Institute of Science & Technology (United Arab Emirates) [8980-31]
 - 9:20 am: **Temperature dependences of subwavelength semiconductor lasers: geometric invariance and the spontaneous emission factor**, Joseph S. T. Smalley, Qing Gu, Matthew Puckett, Yeshaiahu Fainman, Univ. of California, San Diego (USA) [8980-81]
 - 9:40 am: **Modeling of optical gain in GaInNAs quantum wells by using 8-band and 10-band models**, Marta Gladysiewicz, Marek S. Wartak, Wilfrid Laurier Univ. (Canada) and Wroclaw Univ. of Technology (Poland) [8980-33]
- Coffee Break Wed 10:00 am to 10:30 am

SESSION 9

Location: Room 121 (Exhibit Level) Wed 10:30 am to 11:50 am

Plasmonics

Session Chair: **Philippe Lalanne**, Institut d'Optique (France)

- 10:30 am: **Plasmonic enhancement and losses in light-emitting quantum-well structures incorporating metallic gratings**, Toufik Sadi, Jani Oksanen, Jukka Tulkki, Aalto Univ. (Finland) [8980-34]
 - 10:50 am: **Analysis of hybridized surface plasmon resonance sensor with metallic nanoparticles for high sensitivity**, Byeong-Hyeon Lee, Geum-Yoon Oh, Hong-Seung Kim, Tae-Kyeong Lee, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) [8980-35]
 - 11:10 am: **Enhancement of Goos-Hänchen effect in a prism-waveguide coupling system with magneto-optic material**, Tingting Tang, Univ. of Electronic Science and Technology of China (China) and Chengdu Univ. of Information Technology (China); Lei Bi, Longjiang Deng, Jun Qin, Univ. of Electronic Science and Technology of China (China) [8980-36]
 - 11:30 am: **Active plasmonic metamaterial based on transparent conducting oxide**, Riaz R. Haque, Wangshi Zhao, Runchen Zhao, Kaifeng Shi, Zhaolin Lu, Rochester Institute of Technology (USA) [8980-37]
- Lunch/Exhibition Break Wed 11:50 am to 1:40 pm

OPTO

SESSION 10

Location: Room 121 (Exhibit Level) . . Wed 1:40 pm to 3:10 pm

Photovoltaics Modeling

Joint Session with Conferences 8980 and 8981

Session Chairs: **Alexandre Freundlich**, Univ. of Houston (USA);
Bernd Witzigmann, Univ. Kassel (Germany)

1:40 pm: **Analytical modeling of III-V solar cells close to the fundamental limit** (*Invited Paper*), Matthew P. Lumb, U.S. Naval Research Lab. (USA); Myles A. Steiner, John F. Geisz, National Renewable Energy Lab. (USA); Robert J. Walters, National Renewable Energy Lab. (USA) and U.S. Naval Research Lab. (USA) [8981-38]

2:10 pm: **Electrical and optical modeling of an amorphous silicon solar cell with a graded intrinsic layer and a periodically corrugated metallic back reflector**, Tom H. Anderson, The Univ. of Edinburgh (United Kingdom); Muhammad Faryad, The Pennsylvania State Univ. (USA); Tom G. Mackay, The Univ. of Edinburgh (United Kingdom); Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA) [8981-39]

2:30 pm: **Optimizing light absorption in a thin film p-i-n solar cell using a quasi-periodic grating**, Mahmoud Atalla, The Pennsylvania State Univ. (USA) [8980-38]

2:50 pm: **Factors limiting the efficiency of laser power converters under low- and high-intensity illumination**, Jayanta Mukherjee, Scott Jarvis, Tom Wilson, Univ. of Surrey (United Kingdom); Matthew Perren, EADS Astrium (France); Stephen J. Sweeney, Univ. of Surrey (United Kingdom) [8981-58]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 11

Location: Room 121 (Exhibit Level) . . Wed 3:40 pm to 5:20 pm

Laser Injection Locking

Session Chair: **Hans Christian Schneider**,
Technische Univ. Kaiserslautern (Germany)

3:40 pm: **Rate equation analysis of frequency chirp in optically injection-locked quantum cascade lasers**, Cheng Wang, Institut National des Sciences Appliquées de Rennes (France); Frédéric Grillot, Télécom ParisTech (France); Vassilios I. Kovanis, The Ohio State Univ. (USA); Joshua Bodyfelt, Massey Univ. Albany (New Zealand); Jacky Even, Institut National des Sciences Appliquées de Rennes (France) [8980-40]

4:00 pm: **Effect of light backscattering on high-speed modulation performance in strongly injection-locked unidirectional semiconductor ring lasers**, Gennady A. Smolyakov, Marek Osinski, The Univ. of New Mexico (USA) [8980-41]

4:20 pm: **Experimental and simulation analysis of stimulated Brillouin scattering in continuous wave regime**, Rafael Sanchez-Lara, José A. Alvarez-Chávez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Lelio de la Cruz May, Francisco Méndez Martínez, Univ. Autónoma del Carmen (Mexico) [8980-42]

4:40 pm: **Reflective semiconductor optical amplifier submitted to strong optical feedback and coupled to long external cavity**, Myke Rolan Ruiz Prado, Pascal Besnard, Thierry Chartier, CNRS-Fonctions Optiques pour les Technologistes de l'information (France); Fabienne Saliou, Sy Dat Le, Qian Deniel, Philippe Chanclou, Orange SA (France) [8980-43]

5:00 pm: **Numerical analysis of frequency chirp in strongly injection-locked semiconductor ring lasers**, Fei-Hung Chu, Gennady A. Smolyakov, Marek Osinski, The Univ. of New Mexico (USA) [8980-44]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Carrier transport in dichromatic color-coded semipolar (20-2-1) and (20-21) III-N LEDs, Mikhail V. Kisin, Chih-Li Huang, Hussein S. El-Ghoroury, Ostendo Technologies, Inc. (USA) [8980-3]

Generation of pulse trains with high-repetition-rate in anomalous dispersion decreasing fibers, Dmitry A. Korobko, Ulyanovsk State Univ. (Russian Federation); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland); Igor O. Zolotovskii, Ulyanovsk State Univ. (Russian Federation) [8980-59]

Adaptive sampling strategies for fast nano-optical simulations, Martin Hammerschmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Jan Pomplun, Sven Burger, Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) and JCMwave GmbH (Germany) [8980-60]

Modeling of opto-electronics in complex photonic integrated circuits, Cristina Arellano, VPIphotonics GmbH (Germany); Sergei Mingaleev, Eugene Sokolov, VPI Development Ctr. (Belarus); Igor Koltchanov, Andre Richter, VPIphotonics GmbH (Germany) [8980-61]

Toward bound-to-continuum photon absorption with quantum tunneling in type-II nanostructures: a source-radiation scheme using perfectly-matched layers, Chi-Ti Hsieh, Academia Sinica (Taiwan); Shu-Wei Chang, Academia Sinica (Taiwan) and National Chiao Tung Univ. (Taiwan) [8980-62]

Modified metal-dielectric-metal plasmonic waveguide with enhanced figure-of-merit, Chang Y. Jeong, Myunghwan Kim, Sangin Kim, Ajou Univ. (Korea, Republic of) [8980-63]

Low-loss plasmonic waveguide on SOI platform, Chang Y. Jeong, Myunghwan Kim, Sangin Kim, Ajou Univ. (Korea, Republic of) [8980-64]

Design and simulation of an optical waveguide for integration with a light source based on SRO, Jesús Alarcón Salazar, Ignacio Enrique Zaldivar Huerta, Mariano Aceves-Mijares, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [8980-65]

Optical property tuning of gold-nanocap-coated dielectric nanoparticles, Sunghwan Kim, Taehyeong Kim, Joonhan Park, Ajou Univ. (Korea, Republic of) [8980-67]

GGPU-based parallel computing of PIC-FDTD simulation for the development of novel terahertz radiation devices, Tsuyoshi Iwata, Akiko Okajima, Tatsunosuke Matsui, Mie Univ. (Japan) [8980-68]

Graphical computational method for active materials in simulation of optical electromagnetics, Mary J. Potasek, Evgueni Parilov, Karl Beeson, Simphotek Inc. (USA) [8980-70]

Impact of the gain model on the stability assessment in semiconductor DFB lasers, Ivan A. Aldaya-Garde, Gabriel Campuzano, Tecnológico de Monterrey (Mexico); Christophe Gosset, Frédéric Grillot, Télécom ParisTech (France); Cheng Wang, Télécom ParisTech (France) and Univ. Européenne de Bretagne (France); Gerardo A. Castañón, Tecnológico de Monterrey (Mexico) [8980-71]

Plasmonic gap-mode nanocavities at telecommunication wavelengths, PiJu Cheng, Academia Sinica (Taiwan); Chen-Ya Weng, National Taiwan Ocean Univ. (Taiwan) and Academia Sinica (Taiwan); Shu-Wei Chang, Academia Sinica (Taiwan) and National Chiao Tung Univ. (Taiwan); Tzy-Rong Lin, National Taiwan Ocean Univ. (Taiwan) [8980-72]

Influence of nonlinear gain on the stability limit of a semiconductor laser with optical feedback, Yuanlong Fan, Yanguang Yu, Jiangtao Xi, Qinghua Guo, Univ. of Wollongong (Australia); Zhao Wang, Xi'an Jiaotong Univ. (China) [8980-73]

Occurrence of Talbot effect in time domain in a dual-mode coaxial optical fiber, Jyoti Anand, Enakshi K. Sharma, Univ. of Delhi South Campus (India) [8980-74]

Characteristics of microwave frequency combs generated by a semiconductor laser under dynamical dual-beam injection, Yu-Shan Juan, Cheng-Ting Lin, Yuan Ze Univ. (Taiwan) [8980-75]

Physical modeling of RF source generation based on electro-optic modulation and laser injection locking, Shouyuan Shi, Garrett J. Schneider, Dennis W. Prather, Univ. of Delaware (USA) [8980-76]

Analysis of evanescent fiber optic sensors using Meep as a simulation tool, Liliana Zdravkova, Patricia Nieva, Univ. of Waterloo (Canada) [8980-77]

Highly-strained $\text{In}_x\text{Ga}_{1-x}\text{As}_{1-y}\text{Sb}_y/\text{GaSb}$ for mid-infrared devices, Charles R. Meyer II, Justin S. Grayer, Dan Paterson, Emily Cheng, Gregory E. Triplett, Univ. of Missouri-Columbia (USA) [8980-78]

Analysis of quantum cascade lasers using an equivalent circuit model, Saba Soltani, Islamic Azad Univ. of Tabriz (Iran, Islamic Republic of); K. Abedi, Shahid Beheshti Univ. (Iran, Islamic Republic of) [8980-79]

Study on K_2Te solar blind ultraviolet cathode, Xiaofeng Li, North Night Vision Technology Co., Ltd. (China); Gui Lin Zeng, North Night Vision Technology Group Co., Ltd. (China) and Kunming Institute of Physics (China) [8980-80]

Thermal considerations in electrically-pumped metallo-dielectric nanolasers, Janelle C. Shane, Qing Gu, Univ. of California, San Diego (USA); Felipe Vallini, Univ. Estadual de Campinas (Brazil); Brett Wingad, Joseph S. T. Smalley, Univ. of California, San Diego (USA); Newton C. Frateschi, Univ. Estadual de Campinas (Brazil); Yeshaiahu Fainman, Univ. of California, San Diego (USA) [8980-82]

Thursday 6 February

SESSION 12

Location: Room 121 (Exhibit Level) . . Thu 8:20 am to 10:00 am

Graphene Optoelectronics

Session Chair: **Enrico Bellotti**, Boston Univ. (USA)

8:20 am: **Graphene-based transverse epsilon-near-zero metamaterial**, Mohamed A. K. Othman, Caner Guclu, Filippo Capolino, Univ. of California, Irvine (USA) [8980-45]

8:40 am: **Efficient nonlinear generation of THz plasmons in graphene/TI**, Xianghan Yao, Alexey A. Belyanin, Texas A&M Univ. (USA) [8980-46]

9:00 am: **Electronic band structure and photo-emission spectra of graphene on silicon substrate**, Brahmanandam Javvaji, Abhilash Ravikumar, Bhamy Shenoy, D. Roy Mahapatra, Gopalkrishna Hegde, Indian Institute of Science (India) [8980-47]

9:20 am: **Novel approaches to enhance graphene absorption and electro-optic property**, Kaifeng Shi, Wangshi Zhao, Binying Zhao, Zhaolin Lu, Rochester Institute of Technology (USA) [8980-48]

9:40 am: **Broadband high photoresponse graphene photodetector**, Yongzhe Zhang, Nanyang Technological Univ. (Singapore) and North China Electric Power Univ. (China); Tao Liu, Bo Meng, Xiaohui Li, Guozhen Liang, Xiaonan Hu, Qijie Wang, Nanyang Technological Univ. (Singapore) [8980-49]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 13

Location: Room 121 (Exhibit Level) . Thu 10:30 am to 11:50 am

Electromagnetics II

Session Chair: **Laurent Chusseau**, Univ. Montpellier 2 (France)

10:30 am: **Non-reciprocal optical devices based on linear silicon photonic crystals**, Davi Franco Rego, Vitaly Felix Rodriguez-Esquerre, Univ. Federal da Bahia (Brazil) [8980-50]

10:50 am: **Supersymmetry for integrated mode division multiplexing**, Mohammad-Ali Miri, Matthias Heinrich, Demetrios N. Christodoulides, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . [8980-51]

11:10 am: **Multimode interferometers based on non conventional waveguides**, Ana Julia R. F. de Oliveira, Univ. Federal da Bahia (Brazil) and Univ. Federal do Vale do São Francisco (Brazil); Vitaly Felix Rodriguez-Esquerre, Univ. Federal da Bahia (Brazil) [8980-52]

11:30 am: **Ultra-thin low loss Si_3N_4 optical waveguides at 1310 nm**, Soon Thor Lim, Ching Eng Png, Alagappan Gandhi, A*STAR Institute of High Performance Computing (Singapore) [8980-53]

Lunch/Exhibition Break Thu 11:50 am to 1:20 pm

SESSION 14

Location: Room 121 (Exhibit Level) . . . Thu 1:20 pm to 2:50 pm

Quantum Dot Lasers

Session Chair: **Daan Lenstra**, Technische Univ. Delft (Netherlands)

1:20 pm: **Group-velocity slowdown in quantum-dots and quantum-dot molecules** (*Invited Paper*), Hans Christian Schneider, Stephan Michael, Technische Univ. Kaiserslautern (Germany); Weng W. Chow, Sandia National Labs. (USA) [8980-54]

1:50 pm: **Monte Carlo markovian modeling of modal competition in dual-wavelength semiconductor lasers**, Laurent Chusseau, Fabrice Philippe, Univ. Montpellier 2 (France); Alain Jean-Marie, INRIA Sophia Antipolis - Méditerranée (France) and Univ. Montpellier 2 (France) [8980-55]

2:10 pm: **Nondegenerate four-wave mixing in a dual-mode injection-locked $\text{InAs}/\text{InP}(100)$ quantum dot laser**, Cheng Wang, Institut National des Sciences Appliquées de Rennes (France); Frédéric Grillot, Ivan A. Aldaya-Garde, Christophe Gosset, Télécom ParisTech (France); Thomas Batte, Institut National des Sciences Appliquées de Rennes (France); Etienne Decerle, Yenista Optics (France); Jacky Even, Institut National des Sciences Appliquées de Rennes (France) [8980-56]

2:30 pm: **Ultra-strongly sub-Poissonian light generation in a quantum dot-bimodal cavity system**, Wen Zhang, Zhongyuan Yu, Yumin Liu, Yiwei Peng, Beijing Univ. of Posts and Telecommunications (China) [8980-57]

Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Conference Chairs: **Alexandre Freundlich**, Univ. of Houston (USA); **Jean-François Guillemoles**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

Program Committee: **Harry A. Atwater Jr.**, California Institute of Technology (USA); **Kylie Catchpole**, The Australian National Univ. (Australia); **Gavin Conibeer**, The Univ. of New South Wales (Australia); **Nicholas J. Ekins-Daukes**, Imperial College London (United Kingdom); **Raymond Hoheisel**, U.S. Naval Research Lab. (USA); **Christiana B. Honsberg**, Arizona State Univ. (USA); **Seth M. Hubbard**, Rochester Institute of Technology (USA); **Daniel Lincot**, Ecole Nationale Supérieure de Chimie de Paris (France); **Antonio Martí**, Univ. Politécnica de Madrid (Spain); **Marek Osinski**, The Univ. of New Mexico (USA); **Masakazu Sugiyama**, The Univ. of Tokyo (Japan); **Robert J. Walters**, U.S. Naval Research Lab. (USA); **David M. Wilt**, Air Force Research Lab. (USA); **Peichen Yu**, National Chiao Tung Univ. (Taiwan)

Monday 3 February

INTRODUCTION AND OPENING REMARKS

Location: Room 226 (Mezzanine) 8:00 am to 8:10 pm

Alexandre Freundlich, Univ. of Houston (USA);

Jean-Francois Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

SESSION 1

Location: Room 226 (Mezzanine) . . . Mon 8:10 am to 10:00 am

Physics of Nano-Engineered Photovoltaics I

Session Chairs: **Alexandre Freundlich**, Univ. of Houston (USA);

Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

8:10 am: **High-efficiency nanopillar solar cells employing wide-bandgap minority carrier recombination barriers** (*Invited Paper*), Giacomo Mariani, Michael Haddad, Abhejit Rajagopal, Diana L. Huffaker, Univ. of California, Los Angeles (USA) [8981-50]

8:30 am: **Simulation of absorption, photogeneration, and carrier extraction in nanostructure-based and ultra-thin-film solar cell devices beyond the classical picture** (*Invited Paper*), Urs Aeberhard, Forschungszentrum Jülich GmbH (Germany). [8981-1]

9:00 am: **The effects of electric field on InGaAs quantum well i-region placement in InAlGaAs solar cells**, Christopher G. Bailey, Matthew P. Lumb, Raymond Hoheisel, Maria Gonzalez, U.S. Naval Research Lab. (USA); David V. Forbes, Rochester Institute of Technology (USA); Michael K. Yakes, Phillip P. Jenkins, Louise C. Hirst, Robert J. Walters, U.S. Naval Research Lab. (USA) [8981-2]

9:20 am: **Enhanced light absorption in InGaN multiple quantum-wells solar cell with three-dimensional quasi-periodic air-void GaN layer**, Yu-Lin Tsai, Da-Wei Lin, Chun-Kai Chang, Chien-Chung Lin, Peichen Yu, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) [8981-3]

9:40 am: **Absorption enhancement and dark current reduction in quantum-dot solar cells**, Seth M. Hubbard, Kristina Driscoll, Stephen J. Polly, Staffan Hellström, David V. Forbes, Rochester Institute of Technology (USA); Rao Tatavarti, MicroLink Devices, Inc. (USA) [8981-4]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 226 (Mezzanine) . . Mon 10:30 am to 12:10 pm

Emerging Photovoltaic Materials

Session Chair: **Steven A. Ringel**, The Ohio State Univ. (USA)

10:30 am: **Preparation and study of artificial graphene-type semiconductor superlattices** (*Invited Paper*), Daniel Vanmaekelbergh, Utrecht Univ. (Netherlands); Christophe Delerue, Eferpi Kalesaki, Univ. des Sciences et Technologies de Lille (France); Cristiane Morais Smith, Utrecht Univ. (Netherlands); Wiel Evers, Technische Univ. Delft (Netherlands) [8981-5]

11:00 am: **Group IV clathrates: synthesis, optoelectronic properties, and photovoltaic applications** (*Invited Paper*), Adele C. Tamboli, Aaron D. Martinez, Lakshmi Krishna, Lauryn L. Baranowski, Mark T. Lusk, Eric S. Toberer, Colorado School of Mines (USA) [8981-6]

11:30 am: **New approaches for improving the photovoltaic performances of kesterite $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ thin film solar cells**, Giovanni Altamura, CEA Grenoble (France) and Joseph Fourier Univ. (France); Louis Grenet, Charles Roger, Frederic Roux, CEA Grenoble (France); Valérie Reita, Institut NÉEL (France); Raphael Fillon, H. Fournier, S. Perraud, CEA Grenoble (France); Henri Mariette, CEA Grenoble (France) and Institut NÉEL (France) and Joseph Fourier Univ. (France) [8981-7]

11:50 am: **Micrometric characterization methods of thin-film solar cells using luminescence emissions**, Amaury Delamarre, Gilbert El-Hajje, Myriam Paire, Jean-François Guillemoles, Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) [8981-8]

Lunch Break Mon 12:10 pm to 1:30 pm

SESSION 3

Location: Room 226 (Mezzanine) Mon 1:30 pm to 3:00 pm

Up-Conversion and Spectral Shaping

Session Chair: **Laurent Lombez**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

1:30 pm: **Upconverter materials and upconversion solar-cell devices: simulation and characterization regarding the broad solar spectrum** (*Invited Paper*), Stefan Fischer, Benjamin Fröhlich, Fraunhofer-Institut für Solare Energiesysteme (Germany); Aruna Ivaturi, Heriot-Watt Univ. (United Kingdom); Barbara Herter, Sebastian Wolf, Fraunhofer-Institut für Solare Energiesysteme (Germany); Karl W. Krämer, Univ. Bern (Switzerland); Bryce S. Richards, Heriot-Watt Univ. (United Kingdom); Jan Christoph Goldschmidt, Fraunhofer-Institut für Solare Energiesysteme (Germany) [8981-9]

2:00 pm: **Enhanced performance of up-conversion photovoltaic (UC-PV) devices via photonic crystals and plasmonic layers**, Bryce S. Richards, Jose Marques-Hueso, Sean K. W. MacDougall, Heriot-Watt Univ. (United Kingdom); Karl W. Krämer, Univ. Bern (Switzerland); Jonathan A. S. Morton, Eliyas D. Mammo, Georgios E. Arnaoutakis, Aruna Ivaturi, Heriot-Watt Univ. (United Kingdom) [8981-10]

2:20 pm: **Cutoff wavelength optimization for high-efficiency split spectrum photovoltaics**, Chandler Downs, Thomas E. Vandervelde, Tufts Univ. (USA) [8981-11]

2:40 pm: **Interdependence of reabsorption and internal energy losses in luminescent solar concentrators**, Jennefer Digaum, Stephen M. Kuebler, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8981-12]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 4

Location: Room 226 (Mezzanine) Mon 3:30 pm to 5:20 pm

**Advanced Photovoltaic Concepts:
MEG and Hot Carrier Solar Cells**

Session Chair: **Seth M. Hubbard**,
Rochester Institute of Technology (USA)

3:30 pm: **Ab-initio studies of nanoparticle photovoltaics: multiple-exciton generation, exotic core-phase nanoparticles, and complementary transport channels** (*Invited Paper*), Gergely T. Zimányi, Márton Vörös, Univ. of California, Davis (USA); Stefan Wippermann, Max-Planck-Institut für Eisenforschung GmbH (Germany); Guilia Galli, Univ. of California, Davis (USA) [8981-13]

4:00 pm: **Phonon decay simulation for hot-carrier solar cells**, Hugo Levard, Sana Laribi, Julien Vidal, EDF Recherche & Développement (France); Jean-François Guillemoles, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France) [8981-14]

4:20 pm: **Hot-carrier solar cell spectral insensitivity: Why develop the hot carrier solar cell when we have multi-junction devices?**, Louise C. Hirst, U.S. Naval Research Lab. (USA); Matthew P. Lumb, Raymond Hoheisel, The George Washington Univ. (USA); Simon Philipps, Andreas W. Bett, Fraunhofer-Institut für Solare Energiesysteme (Germany); Robert J. Walters, U.S. Naval Research Lab. (USA) [8981-15]

4:40 pm: **Hot-carrier solar cell absorbers: materials, mechanisms, and nanostructures**, Gavin Conibeer, The Univ. of New South Wales (Australia) [8981-16]

5:00 pm: **Understanding the evolution of the biexciton quantum yield in “giant” CdSe/CdS colloidal nanocrystals as a function of the core size and shell thickness**, Sid Sampat, The Univ. of Texas at Dallas (USA); Benjamin Magnum, Yagnaseni Ghosh, Han Htoon, Jennifer A. Hollingsworth, Los Alamos National Lab. (USA); Anton V. Malko, The Univ. of Texas at Dallas (USA) [8981-17]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 226 (Mezzanine) . . . Tue 10:30 am to 12:00 pm

Advances Toward Tandems with Active Silicon Subcells

Session Chair: **Alexandre Freundlich**, Univ. of Houston (USA)

10:30 am: **Silicon tandem solar cells: The ultimate photovoltaic solution?** (*Keynote Presentation*), Martin A. Green, The Univ. of New South Wales (Australia) [8981-18]

11:10 am: **Optical requirements for >30% tandem solar cells built on crystalline silicon**, Niraj N. Lal, Thomas P. White, Kylie R. Catchpole, The Australian National Univ. (Australia) [8981-19]

11:30 am: **Advances in III-V/active-silicon multijunction photovoltaics for high efficiency** (*Invited Paper*), Steven A. Ringel, Tyler J. Grassman, John A. Carlin, Christopher Ratcliff, Daniel J. Chmielewski, The Ohio State Univ. (USA); Stephen P. Bremner, Ibrahim Al-Mansouri, Martin A. Green, The Univ. of New South Wales (Australia); Elisa Garcia-Tabares, Ignacio Rey-Stolle, Carlos Algora del Valle, Univ. Politécnica de Madrid (Spain) [8981-20]

Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 6

Location: Room 226 (Mezzanine) Tue 1:30 pm to 3:10 pm

Intermediate Band Solar Cells

Session Chair: **Gavin Conibeer**,
The Univ. of New South Wales (Australia)

1:30 pm: **Modeling intermediate band solar cells: a roadmap to high efficiency** (*Invited Paper*), Jacob J. Krich, Univ. of Ottawa (Canada); Liang Feng, Nanjing Univ. (China); Alexandre W. Walker, Univ. of Ottawa (Canada) . . . [8981-21]

2:00 pm: **Simulation of an intermediate-band solar cell comprising superlattices of electronically-mismatched semiconductor alloys**, Alexandre Freundlich, Akhil Mehrotra, Liberty Falcon, Univ. of Houston (USA) . . . [8981-22]

2:20 pm: **Imaging quasi fermi level splitting in intermediate-band solar cells**, Jean-François Guillemoles, Laurent Lombez, Amaury Delamarre, Gilbert El-Hajje, Pierre Rale, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France); Kentaroh Watanabe, Masakazu Sugiyama, Yoshitaka Okada, Ryo Tamaki, Yasushi Shoji, The Univ. of Tokyo (Japan) [8981-23]

2:40 pm: **InAs/AlAsSb self-assembled quantum dots for next-generation solar cells** (*Invited Paper*), Ramesh Babu Laghumavarapu, Meng Sun, Baolai L. Liang, Paul J. Simmonds, Diana L. Huffaker, Univ. of California, Los Angeles (USA) [8981-24]

Coffee Break Tue 3:10 pm to 3:40 pm

SESSION 7

Location: Room 226 (Mezzanine) Tue 3:40 pm to 5:30 pm

Space Photovoltaics and Radiation Effect

Session Chair: **Alexandre I. Fedoseyev**, CFD Research Corp. (USA)

3:40 pm: **Modeling space radiation effects in multijunction solar cells** (*Invited Paper*), Scott R. Messenger, U.S. Naval Research Lab. (USA) . . [8981-25]

4:10 pm: **Increased radiation tolerance in thin IMM solar cells using back reflection**, Akhil Mehrotra, Alexandre Freundlich, Univ. of Houston (USA) [8981-26]

4:30 pm: **Degradation modeling of InGaP/GaAs/Ge triple-junction solar cells irradiated by protons**, Sergey I. Maximenko, U.S. Naval Research Lab. (USA); Matthew P. Lumb, The George Washington Univ. (USA); Scott R. Messenger, U.S. Naval Research Lab. (USA); Raymond Hoheisel, The George Washington Univ. (USA); Chaffra A. Affouda, David Scheiman, U.S. Naval Research Lab. (USA); Maria Gonzalez, Sotera Defense Solutions, Inc. (USA); Justin R. Lorentzen, Phillip P. Jenkins, Robert J. Walters, U.S. Naval Research Lab. (USA) . . [8981-27]

4:50 pm: **Enhancement of radiation tolerance with the use of a doping superlattice solar cell**, Michael A. Slocum, Seth M. Hubbard, David V. Forbes, Rochester Institute of Technology (USA) [8981-28]

5:10 pm: **Conductive-space solar-cell coverglass replacement technology**, David M. Wilt, Zach S. Levin, Air Force Research Lab. (USA) [8981-29]

Wednesday 5 February

SESSION 8

Location: Room 226 (Mezzanine) . . . Wed 9:00 am to 10:00 am

Advanced Designs for Concentrator Photovoltaics

Session Chair: **Maria Gonzalez**, Naval Research Lab. (USA)

9:00 am: **Experimental demonstration of a self-tracking solar concentrator**, Volker Zagolla, Eric J. Tremblay, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8981-31]

9:20 am: **Design of sub-wavelength dielectric antireflective grading for multijunction concentrator photovoltaics**, Wei Wang, Alexandre Freundlich, Univ. of Houston (USA) [8981-32]

9:40 am: **Cu(In,Ga)Se₂ mesa microdiodes: study of edge recombination and behaviour under concentrated sunlight**, Myriam Paire, Cyril Jean, Laurent Lombez, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France); Stéphane Collin, Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France); Daniel Lincot, Jean-François Guillemoles, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France) . . . [8981-33]

Coffee Break Wed 10:00 am to 10:30 am

OPTO

Conference 8981 · Location: Room 226 (Mezzanine)

SESSION 9

Location: Room 226 (Mezzanine) . . Wed 10:30 am to 12:10 pm

Advances in Organic Photovoltaics

Session Chair: **Jean-François Guillemoles**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

10:30 am: **Small molecule organic solar cells: from molecules to devices** (*Keynote Presentation*), Karl Leo, Technische Univ. Dresden (Germany) .[8981-34]

11:10 am: **Ag nanoparticle-blended plasmonic organic solar cells: performance enhancement or detractor?**, Tze Chien Sum, Bo Wu, Nripan Mathews, Nanyang Technological Univ. (Singapore)[8981-35]

11:30 am: **Directed energy transfer through size-gradient nanocrystal layers into Si substrates**, Michael Nimmo, Louis Caillard, William deBenedetti, Hue M. Nguyen, Yves Chabal, Yuri Gartstein, Anton V. Malko, The Univ. of Texas at Dallas (USA)[8981-36]

11:50 am: **Hybrid bulk heterojunction solar cells based on low-band-gap polymers and CdSe nanocrystals**, Sergey V. Dayneko, National Research Nuclear Univ. MEPhI (Russian Federation); Alexey R. Tameev, Marine G. Tedoradze, A.N. Frumkin Institute of Physical Chemistry and Electrochemistry (Russian Federation); Igor L. Martynov, Pavel Linkov, Pavel S. Samokhvalov, National Research Nuclear Univ. MEPhI (Russian Federation); Igor R. Nabiev, Univ. de Reims Champagne-Ardenne (France) and National Research Nuclear Univ. MEPhI (Russian Federation); Alexander A. Chistyakov, National Research Nuclear Univ. MEPhI (Russian Federation)[8981-37]

Lunch/Exhibition Break Wed 12:10 pm to 1:40 pm

SESSION 10

Location: Room 121 (Exhibit Level) . . Wed 1:40 pm to 3:10 pm

Photovoltaics Modeling

Joint Session with Conferences 8980 and 8981

Session Chairs: **Alexandre Freundlich**, Univ. of Houston (USA); **Bernd Witzigmann**, Univ. Kassel (Germany)

1:40 pm: **Analytical modeling of III-V solar cells close to the fundamental limit** (*Invited Paper*), Matthew P. Lumb, U.S. Naval Research Lab. (USA); Myles A. Steiner, John F. Geisz, National Renewable Energy Lab. (USA); Robert J. Walters, National Renewable Energy Lab. (USA) and U.S. Naval Research Lab. (USA)[8981-38]

2:10 pm: **Electrical and optical modeling of an amorphous silicon solar cell with a graded intrinsic layer and a periodically corrugated metallic back reflector**, Tom H. Anderson, The Univ. of Edinburgh (United Kingdom); Muhammad Faryad, The Pennsylvania State Univ. (USA); Tom G. Mackay, The Univ. of Edinburgh (United Kingdom); Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA)[8981-39]

2:30 pm: **Optimizing light absorption in a thin film p-i-n solar cell using a quasi-periodic grating**, Mahmoud Atalla, The Pennsylvania State Univ. (USA)[8980-38]

2:50 pm: **Factors limiting the efficiency of laser power converters under low- and high-intensity illumination**, Jayanta Mukherjee, Scott Jarvis, Tom Wilson, Univ. of Surrey (United Kingdom); Matthew Perren, EADS Astrium (France); Stephen J. Sweeney, Univ. of Surrey (United Kingdom)[8981-58]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 11

Location: Room 226 (Mezzanine) Wed 3:40 pm to 5:10 pm

Advances in Multijunction Materials and Devices

Session Chair: **David M. Wilt**, Air Force Research Lab. (USA)

3:40 pm: **Modeling, design, and experimental results for high-efficiency multi-junction solar cells lattice matched to InP** (*Invited Paper*), Maria Gonzalez, Sotera Defense Solutions, Inc. (USA) and U.S. Naval Research Lab. (USA); Matthew P. Lumb, The George Washington Univ. (USA); Michael K. Yakes, U.S. Naval Research Lab. (USA); Christopher G. Bailey, U.S. Naval Research Lab. (USA) and National Research Council (USA); Joseph G. Tischler, Igor Vurgafman, U.S. Naval Research Lab. (USA); Louise C. Hirst, U.S. Naval Research Lab. (USA) and National Research Council (USA); Joshua Abell, Jerry R. Meyer, U.S. Naval Research Lab. (USA); Jessica G. J. Adams, Glen Hillier, MicroLink Devices, Inc. (USA); David V. Forbes, Seth M. Hubbard, Rochester Institute of Technology (USA); Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom); Robert J. Walters, U.S. Naval Research Lab. (USA)[8981-40]

4:10 pm: **Ga-rich Ga_{0.9}In_{0.1}-P solar cells on Si with 2 eV bandgap for ideal III-V Si photovoltaics**, Christopher Ratcliff, Tyler J. Grassman, The Ohio State Univ. (USA); John A. Carlin, The Ohio State Univ. (USA); Daniel J. Chmielewski, Steven A. Ringel, The Ohio State Univ. (USA)[8981-41]

4:30 pm: **Detailed physics based modeling of triple-junction InGaP/GaAs/Ge solar cell**, Alexandre I. Fedoseyev, Timothy Bald, Ashok Raman, CFD Research Corp. (USA); David V. Forbes, Seth M. Hubbard, Rochester Institute of Technology (USA); Alexandre Freundlich, Univ. of Houston (USA)[8981-42]

4:50 pm: **Variable-temperature carrier dynamics in bulk (In)GaAsNSb materials grown by MOVPE for multi-junction solar cells**, Yongkun Sin, Stephen LaLumondiere, Nathan P. Wells, William T. Lotshaw, Steven C. Moss, The Aerospace Corp. (USA); Tae Wan Kim, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA)[8981-43]

SESSION PWED

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Design strategy for low emissivity windows with effective insulation, Mike P. Watts, Impattern Solutions (USA)[8981-53]

An innovative microlens array design applied on light pipe, Jong-Woei Whang, Xiao-Rong Wu, Shih-Min Chao, National Taiwan Univ. of Science and Technology (Taiwan)[8981-54]

A high-efficiency optical light pipe based on modular microlens design, Jong-Woei Whang, Ya-Chieh Ho, Shih-Min Chao, National Taiwan Univ. of Science and Technology (Taiwan)[8981-55]

Impact of light management on photovoltaic characteristics of GaAs solar cells with photonic crystals and quasi-photonic crystals, Tung-Ting Yang, Peichen Yu, Muming Hung, National Chiao Tung Univ. (Taiwan); Martin D. B. Charlton, Univ. of Southampton (United Kingdom)[8981-57]

The optimization of textured a-Si:H solar cells with a fully three-dimensional simulation, Chun-Yao Lee, Hui-Hsin Hsiao, Tsung-Jui Yang, Yuh-Renn Wu, National Taiwan Univ. (Taiwan); Chun-Ming Yeh, Chien-Fu Huang, Yung-Tsung Liu, Chia-Ming Fan, Industrial Technology Research Institute (Taiwan)[8981-59]

Extraordinary resonance in highly-lossy media and its application to ultrathin solar cells, Sungyong Seo, Kyu-Tae Lee, Jae Yong Lee, L. Jay Guo, Univ. of Michigan (USA)[8981-60]

On the light-trapping mechanism in silicon solar cells with backside diffraction gratings, Markus Wellenzohn, Rainer Hainberger, AIT Austrian Institute of Technology GmbH (Austria)[8981-61]

Stable efficiency analysis of ZnS/CIGS solar cells possessing by thermal treatment, Jyh-Jier J. Ho, National Taiwan Ocean Univ. (Taiwan)[8981-62]

Be implant activation and damage recovery study in N-type GaSb, Nassim Rahimi, Andrew A. Aragon, Orlando S. Romero, Thomas J. Rotter, Tito L. Busani, Olga Lavrova, Ganesh Balakrishnan, The Univ. of New Mexico (USA); Luke F. Lester, Virginia Polytechnic Institute and State Univ. (USA)[8981-63]

Cheap and efficient plasmonic solar cell, Mohamed A. Swillam, Ahmed E. Khalifa, The American Univ. in Cairo (Egypt)[8981-65]

Broadband antireflective GaOOH nanostructures for solar-cell applications, Jae Su Yu, Jung Woo Leem, Kyung Hee Univ. (Korea, Republic of)[8981-66]

Thursday 6 February

SESSION 12

Location: Room 226 (Mezzanine) Thu 8:30 am to 10:10 am

Advances in Light Trapping

Session Chair: **Peichen Yu**, National Chiao Tung Univ. (Taiwan)

8:30 am: **Silicon solar-cell enhancement by plasmonic silver nanocubes**, Ryan J. Veenkamp, Shuyu Y. Ding, Ian J. Smith, Winnie N. Ye, Carleton Univ. (Canada) [8981-44]

8:50 am: **Device performance of ultra-thin GaAs single-junction solar cells with a reflective backscattering layer**, Shi Liu, Jacob Becker, Ying-Shen Kuo, Weiquan Yang, Yong-Hang Zhang, Arizona State Univ. (USA). [8981-45]

9:10 am: **Optimum feature size of randomly textured glass substrates for maximum scattering inside thin-film silicon solar cells**, Nasim Sahraei, Selvaraj Venkataraj, Armin G. Aberle, Marius Peters, National Univ. of Singapore (Singapore) [8981-47]

9:30 am: **Simulation of scattering effects in thin-film solar cells with random surface texturing**, Zhabiz Rahimi, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [8981-48]

9:50 am: **Optical scattering by anodized aluminum oxide for light management in thin film photovoltaics**, Brian Roberts, Qi Chen, Pei-Cheng Ku, Univ. of Michigan (USA) [8981-49]

Coffee Break Thu 10:10 am to 10:40 am

SESSION 13

Location: Room 226 (Mezzanine) . . . Thu 10:40 am to 11:50 am

Physics of Nano-Engineered Photovoltaics II

Session Chair: **Myriam Paire**, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

10:40 am: **InP-based nano solar cells** (*Invited Paper*), Florian Proise, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France); Amaury Delamarre, Anne-Laure Joudrier, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Christian Njel, Univ. de Versailles Saint-Quentin-en Yvelines (France); José Alvarez, Lab. de Génie Électrique de Paris (France); Anne-Marie Gonçalves, Univ. de Versailles Saint-Quentin-en Yvelines (France); Aristide Lemaître, Lab. de Photonique et de Nanostructures (France); Arnaud Etcheberry, Univ. de Versailles Saint-Quentin-en Yvelines (France); Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France) [8981-51]

11:10 am: **Dedicated nanoantenna element for vertical nanorods in plasmonic photovoltaics**, Hossein Alisafaei, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) [8981-52]

11:30 am: **Extending the operational wavelength of thermophotovoltaics through superlattice and barrier engineering**, Abigail S. Licht, Dante F. DeMeo, Tufts Univ. (USA); Jean-Baptiste Rodriguez, Institut d'Electronique du Sud (France); Thomas E. Vandervelde, Tufts Univ. (USA). [8981-64]

CLOSING REMARKS

Location: Room 226 (Mezzanine) 11:50 am to 12:00 pm

Alexandre Freundlich, Univ. of Houston (USA);

Jean-Francois Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France)

Optical Components and Materials XI

Conference Chairs: **Michel J. F. Digonnet**, Stanford Univ. (USA); **Shibin Jiang**, AdValue Photonics, Inc. (USA)

Program Committee: **Jean-Luc Adam**, Univ. de Rennes 1 (France); **Joel Bagwell**, Edmund Optics Inc. (USA); **Rolindes Balda**, Univ. del País Vasco (Spain); **Robert P. Dahlgren**, Silicon Valley Photonics, Ltd. (USA), Univ. of California, Santa Cruz (United States); **Leonid Glebov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Seppo K. Honkanen**, Univ. of Eastern Finland (Finland); **Jacques Lucas**, Univ. de Rennes 1 (France); **Yasutake Ohishi**, Toyota Technological Institute (Japan); **Aydogan Ozcan**, Univ. of California, Los Angeles (USA); **Giancarlo C. Righini**, Museo Storica della Fisica e Ctr Studi e Ricerche Enrico Fermi (Italy); **Setshisa Tanabe**, Kyoto Univ. (Japan); **John M. Zavada**, National Science Foundation (USA)

Monday 3 February

SESSION 1

Location: Room 222 (Mezzanine) . . . Mon 8:00 am to 10:30 am

Lasers and Amplifiers

- 8:00 am: **High-power resonantly-pumped holmium-doped fibre sources** (*Invited Paper*), Alexander V. Hemming, Nikita Simakov, John Haub, Defence Science and Technology Organisation (Australia); Adrian L. Carter, Nuferr (USA) [8982-1]
- 8:30 am: **Titanium-enhanced Raman microcavity laser**, Nishita Deka, Ashley J. Maker, Andrea M. Armani, The Univ. of Southern California (USA) [8982-2]
- 8:50 am: **Fibercore AstroGain fiber: multichannel erbium doped fibers for optical space communications**, Mark D. Hill, Rebecca L. Gray, Fibercore Ltd. (United Kingdom) [8982-3]
- 9:10 am: **Novel low-phase-noise low-amplitude-noise semiconductor laser**, Steven Coleman, Alex Rosiewicz, EM4, Inc. (USA) [8982-4]
- 9:30 am: **Spatially resolved in-core temperature measurement in rare-earth doped fibers during pumping**, Julia Fiebrandt, Martin Leich, Sonja Unger, Matthias Jäger, Manfred Rothhardt, Hartmut Bartelt, Institut für Photonische Technologien e.V. (Germany) [8982-5]
- 9:50 am: **Low-threshold integrated microlaser emitting in the blue formed from thulium-doped silica**, Simin Mehrabani, Andrea M. Armani, The Univ. of Southern California (USA) [8982-6]
- 10:10 am: **High-gain 1.3- μ m GaInNAs SOA with fast-gain dynamics and enhanced temperature stability**, Dimitrios Fitsios, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Gianni Giannoulis, Nikos Iliadis, National Technical Univ. of Athens (Greece); Ville-Markus Korpijärvi, Jukka Viheriälä, Anti Laakso, Tampere Univ. of Technology (Finland); Stefanos Dris, Maria Spyropoulou, Hercules Avramopoulos, National Technical Univ. of Athens (Greece); George T. Kanellos, Ctr. for Research and Technology Hellas (Greece); Nikos Pleros, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Mircea D. Guina, Tampere Univ. of Technology (Finland) [8982-7]
- Coffee Break Mon 10:30 am to 11:00 am

SESSION 2

Location: Room 222 (Mezzanine) . . Mon 11:00 am to 12:00 pm

Nanophotonics

- 11:00 am: **Cavity-enhanced perfect mid-infrared absorption in perforated graphene**, Alexander Y. Zhu, Fei Yi, Jason C. Reed, Ertugrul Cubukcu, Univ. of Pennsylvania (USA) [8982-8]
- 11:20 am: **Investigation of liquid crystal materials doped with quantum dots: properties and potential applications**, Katarzyna Komorowska, Krystian Zygadlo, Bartłomiej Cichy, Michal P. Nikodem, Wrocław Research Centre EIT+ (Poland) [8982-9]
- 11:40 am: **Growth model of transparent conductive graphene**, Shih-Hao Chan, Chien-Cheng Kuo, Sheng-Hui Chen, National Central Univ. (Taiwan) [8982-10]
- Lunch Break Mon 12:00 pm to 1:20 pm

SESSION 3

Location: Room 222 (Mezzanine) Mon 1:20 pm to 3:30 pm

Fiber and Waveguide Fabrication

- 1:20 pm: **Materials growth and processing in the capillaries of photonic crystal fibres: towards the lab-in-a-fibre protocol** (*Invited Paper*), Ioannis Konidakis, Maria Konstantaki, Stavros Pissadakis, Foundation for Research and Technology-Hellas (Greece) [8982-11]
- 1:50 pm: **GeO₂ glass ceramic planar waveguides fabricated by RF-sputtering**, Alessandro Chiasera, Univ. degli Studi di Trento (Italy); Carlos E. Macchi, Univ. Nacional del Centro de la Provincia de Buenos Aires (Argentina); Sebastiano Mariuzzi, Univ. degli Studi di Trento (Italy); Sreeramulu Valligatla, Istituto di Fotonica e Nanotecnologie (Italy) and Univ. of Hyderabad (India) and Univ. degli Studi di Trento (Italy); Stefano Varas, Maurizio Mazzola, Istituto di Fotonica e Nanotecnologie (Italy); Nicola Bazzanella, Univ. degli Studi di Trento (Italy); Lorenzo Lunelli, Cecilia Pederzoli, Fondazione Bruno Kessler (Italy); Narayana R. Rao, Univ. of Hyderabad (India); Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) and Museo Storica della Fisica e Ctr Studi e Ricerche Enrico Fermi (Italy); Alberto Somoza, Univ. Nacional del Centro de la Provincia de Buenos Aires (Argentina); Roberto S. Brusa, Univ. degli Studi di Trento (Italy); Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy) [8982-12]
- 2:10 pm: **Low-loss titanium-dioxide strip waveguides by atomic layer deposition**, Markus Häyrynen, Matthieu Roussey, Vishal Gandhi, Markku Kuittinen, Seppo Honkanen, Univ. of Eastern Finland (Finland) [8982-13]
- 2:30 pm: **Efficient “disc-to-fiber” multimaterial stacked coextrusion for optical fibers**, Guangming Tao, Ayman F. Abouraddy, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8982-14]
- 2:50 pm: **Flexible glass flat-fibre chips and femtosecond laser inscription as enabling technologies for photonic devices**, Christos Riziotis, National Hellenic Research Foundation (Greece); Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus); Christos Markos, National Hellenic Research Foundation (Greece); Andreas Posporis, Charalambos Koutsides, Cyprus Univ. of Technology (Cyprus); Andrew S. Webb, Christopher Holmes, James C. Gates, Jayanta K. Sahu, Peter G. R. Smith, Univ. of Southampton (United Kingdom) [8982-15]
- 3:10 pm: **Fabrication of AsS single-mode microstructured optical fibers for supercontinuum generation in the mid-IR**, Laurent Brilland, PERFOS (France); Perrine Toupin, Sciences Chimiques de Rennes (France); Celine Caillaud, Johann Troles, Univ. de Rennes 1 (France); Laurent Provino, David Mechin, PERFOS (France) [8982-16]
- Coffee Break Mon 3:30 pm to 4:00 pm

SESSION 4

Location: Room 222 (Mezzanine) Mon 4:00 pm to 5:50 pm

Metamaterials and Plasmonics

- 4:00 pm: **Ultrathin metals and nano-structuring for photonic applications** (*Invited Paper*), Valerio Pruneri, ICFO - Institut de Ciències Fotòniques (Spain) [8982-17]
- 4:30 pm: **Metamaterial selective emitters for photodiodes**, Dante F. DeMeo, Tufts Univ. (USA); Corey Shemelya, The Univ. of Texas at El Paso (USA); Nicole Pfeister Latham, Tufts Univ. (USA); Xueyuan Wu, Chris Bingham, Willie Padilla, Boston College (USA); Thomas E. Vanderveelde, Tufts Univ. (USA) [8982-18]
- 4:50 pm: **Multilevel light-bending in nanoplasmonics**, Mohamed H. El Sherif, Osman S. Ahmed, Mohamed H. Bakr, McMaster Univ. (Canada); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) [8982-19]
- 5:10 pm: **Simplification of plasmonic lenses based on wave interference method**, Quentin Levesque, Patrick Bouchon, ONERA (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France); Riad Haïdar, ONERA (France); Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France) . [8982-20]
- 5:30 pm: **Using dynamic metamaterials for monolithically-integrated multilayer polarization filters**, Nicole Pfeister, Tufts Univ. (USA); Corey Shemelya, The Univ. of Texas at El Paso (USA); Thomas J. Rotter, Ganesh Balakrishnan, The Univ. of New Mexico (USA); Thomas E. Vanderveelde, Tufts Univ. (USA) [8982-21]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 222 (Mezzanine) . . . Tue 10:30 am to 12:00 pm

Microstructured Fibers and Components

- 10:30 am: **Unusual 3D lithography approaches for fabrication of polymeric photonic microstructures (Invited Paper)**, Pietro Ferraro, Istituto Nazionale di Ottica (Italy) [8982-22]
 - 11:00 am: **Nanolaminate structures fabricated by ALD for reducing propagation losses and enhancing the third-order optical nonlinearities**, Lasse Karvonen, Aalto Univ. (Finland); Tapani Alasaarela, Henri Jussila, Aalto Univ. School of Science and Technology (Finland); Seyed Soroush Mehravar, College of Optical Sciences, The Univ. of Arizona (USA); Ya Chen, Antti Säynätjoki, Aalto Univ. (Finland); Robert A. Norwood, Nasser N. Peyghambarian, Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Seppo Honkanen, Univ. of Eastern Finland (Finland); Harri Lipsanen, Aalto Univ. School of Science and Technology (Finland) [8982-23]
 - 11:20 am: **Split-gate and asymmetric contact carbon nanotube optical devices**, Mark A. Hughes, Kevin P. Homewood, Richard J. Curry, Univ. of Surrey (United Kingdom); Yutaka Ohno, Takashi Mizutani, Nagoya Univ. (Japan) [8982-24]
 - 11:40 am: **Optical magnetic scattering from sub-wavelength rectangular apertures**, Dukhyung Lee, Sanghoon Han, Young-Mi Bahk, Ji Yeah Rhie, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of) [8982-25]
- Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 6

Location: Room 222 (Mezzanine) Tue 1:30 pm to 3:10 pm

Yb-Doped Glasses and Fibers

- 1:30 pm: **Optical properties of Yb-doped fibers prepared by gas phase doping**, Florian Lindner, Claudia Aichele, Anka Schwuchwo, Martin Leich, Andy Scheffel, Sonja Unger, Institut für Photonische Technologien e.V. (Germany) [8982-27]
 - 1:50 pm: **Gamma-radiation-induced degradation of single-mode passive and ytterbium-doped optical fibers**, Briana Singleton, James Petrosky, Michael Pochet, Air Force Institute of Technology (USA); Nicholas G. Usechak, Air Force Research Lab. (USA); Susan M. White, The Ohio State Univ. (USA) [8982-28]
 - 2:10 pm: **Impact of photodarkening on Yb lifetime in Al-silicate fibres**, Riccardo Piccoli, Swansea Univ. (United Kingdom); David Mechin, PERFOS (France); Thierry Robin, iX Fiber SAS (France); Stefano Taccheo, Swansea Univ. (United Kingdom) [8982-29]
 - 2:30 pm: **Novel observations on photodarkening in ytterbium-doped aluminosilicate fibers**, Joan J. Montiel i Ponsoda, Aalto Univ. School of Electrical Engineering (Finland); Magnus Engholm, Mid Sweden Univ. (Sweden); Lars Norin, Acreo AB (Sweden); Seppo Honkanen, Univ. of Eastern Finland (Finland); Harri Lipsanen, Aalto Univ. School of Science and Technology (Finland) [8982-30]
 - 2:50 pm: **Up-conversion emission tuning in triply-doped Yb³⁺/Tm³⁺/Er³⁺ novel fluoro-phosphate glass and glass-ceramics**, Yannick Ledemi, Andrée-Anne Trudel, Ctr. d'optique, photonique et laser (Canada); Victor A. Garcia Rivera, Univ. de São Paulo (Brazil); Younés Messaddeq, Ctr. d'optique, photonique et laser (Canada) [8982-31]
- Coffee Break Tue 3:10 pm to 3:40 pm

SESSION 7

Location: Room 222 (Mezzanine) Tue 3:40 pm to 5:50 pm

Components and Detectors

- 3:40 pm: **Reliability considerations for high-speed germanium waveguide photodetectors (Invited Paper)**, Zhijuan Tu, Zhiping Zhou, Xingjun Wang, Peking Univ. (China) [8982-32]
- 4:10 pm: **Fabrication and characterization of 120 degree optical hybrids as all-fiber monolithic 3x3 couplers**, Elyes Khettal, Nicolas Godbout, Wendy-Julie Madore, Mikael Leduc, Ecole Polytechnique de Montréal (Canada) [8982-33]
- 4:30 pm: **Fast and precise continuous focusing with focus tunable lenses**, Selina Casutt, Michael Bueeler, Mark Blum, Manuel Aschwanden, Optotune AG (Switzerland) [8982-34]
- 4:50 pm: **Anti-reflective surface structuring of optical components: a review**, Catalin M. Florea, Sotera Defense Solutions, Inc. (USA); Jasbinder S. Sanghera, U.S. Naval Research Lab. (USA); Rajendra Joshi, The Univ. of North Carolina at Charlotte (USA); Lynda E. Busse, U.S. Naval Research Lab. (USA); Kevin J. Major, The Univ. of North Carolina at Charlotte (USA); Menelaos K. Poutos, Univ. of North Carolina at Charlotte (USA); Leslie B. Shaw, Ishwar D. Aggarwal, U.S. Naval Research Lab. (USA) [8982-35]
- 5:10 pm: **High spectral contrast filtering produced by multiple reflections from paired Bragg gratings in PTR glass**, Daniel Ott, Marc SeGall, Ivan B. Divliansky, George B. Venus, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8982-36]
- 5:30 pm: **Design and characterization of avalanche photodiodes in submicron CMOS technologies**, Lucio Pancheri, Univ. degli Studi di Trento (Italy); Toufik Bendib, Univ. degli Studi di Trento (Italy) and Univ. of Batna (Algeria); Gian-Franco Dalla Betta, Univ. degli Studi di Trento (Italy); David Stoppa, Fondazione Bruno Kessler (Italy) [8982-37]

Wednesday 5 February

SESSION 8

Location: Room 222 (Mezzanine) . . . Wed 8:00 am to 10:30 am

Optical and Electronic Properties of Materials

- 8:00 am: **Rare-earth emission and nanoparticles in glasses (Invited Paper)**, Anne-Marie Jurdyk, Alice Berthelot, Univ. Claude Bernard Lyon 1 (France) [8982-26]
 - 8:30 am: **Electrical properties of amorphous chalcogenide/silicon heterojunctions modified by ion implantation**, Yanina Fedorenko, Mark A. Hughes, Russell M. Gwilliam, Kevin P. Homewood, Daniel W. Hewak, Univ. of Surrey (United Kingdom); Tae-Hoon Lee, Stephen R. Elliott, Univ. of Cambridge (United Kingdom); Richard J. Curry, Univ. of Surrey (United Kingdom) [8982-38]
 - 8:50 am: **Multi-band reflectance spectroscopy of carbonaceous lithium iron phosphate battery electrodes versus state of charge**, Krishna Iyer, Liliana Zdravkova, Ryan C. Norris, Victor L. Chabot, Patricia Nieva, Aiping Yu, Univ. of Waterloo (Canada); Xiaohui Wang, General Motors of Canada (Canada); Shih-Ken Chen, General Motors Corp. (USA) [8982-39]
 - 9:10 am: **Mechanisms of persistent luminescence in ZnGa₂O₄:Cr: an outstanding biomarker for in-vivo imaging**, Bruno Viana, Aurelie Bessiere, Suchinder Sharma, Didier Gourier, Ecole Nationale Supérieure de Chimie de Paris (France); Neelima Basavaraju, Kaustubh Priolkar, Goa Univ. (India); Laurent Binet, Ecole Nationale Supérieure de Chimie de Paris (France); Adrie J. J. Bos, Pieter Dorenbos, Technische Univ. Delft (Netherlands); Thomas Maldiney, Cyrille Richard, Daniel Scherman, Univ. Paris Descartes (France) [8982-40]
 - 9:30 am: **Optical and electronic properties of bismuth-implanted glasses**, Mark A. Hughes, Yanina Federenko, Russell M. Gwilliam, Kevin P. Homewood, Univ. of Surrey (United Kingdom); Daniel W. Hewak, Univ. of Southampton (United Kingdom); Tae-Hoon Lee, Stephen R. Elliott, Univ. of Cambridge (United Kingdom); Richard J. Curry, Univ. of Surrey (United Kingdom) [8982-41]
 - 9:50 am: **Quantitative characterization of photodoping phenomena in amorphous chalcogenide GeS₂ film**, Yoshihisa Murakami, Moriaki Wakaki, Tokai Univ. (Japan) [8982-42]
 - 10:10 am: **Dielectric functions of AZO films grown on c-plane sapphire substrate by pulsed laser deposition**, Mohammad T. Yaseen, R. Thangavel, Yia Chang, Academia Sinica (Taiwan) [8982-43]
- Coffee Break Wed 10:30 am to 11:00 am

OPTO

SESSION 9

Location: Room 222 (Mezzanine) . . Wed 11:00 am to 12:00 pm

Sensors

11:00 am: **Longitudinal strain sensing with photonic crystal fibers and fiber Bragg gratings**, Tadeusz Tenderenda, Michal Murawski, Michal Szymanski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Lukasz Szostkiewicz, InPhoTech Ltd. (Poland); Martin Becker, Manfred Rothhardt, Hartmut Bartelt, Institut für Photonische Technologien e.V. (Germany); Pawel Mergo, Krzysztof Poturaj, Mariusz Makara, Krzysztof Skorupski, Univ. of Maria Curie-Skłodowska (Poland); Pawel Marc, Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland) [8982-44]

11:20 am: **Super low power consumption middle infrared LED-PD optopairs for chemical sensing**, Nikolay D. Stoyanov, Khafiz M. Salikhov, Karina V. Kalinina, LED Microsensor NT, LLC (Russian Federation) [8982-46]

11:40 pm: **Influence of the mode field diameter on the strain sensitivity of different fibres**, Michal Murawski, Tadeusz Tenderenda, Marek Napierała, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Lukasz Szostkiewicz, InPhoTech Ltd. (Poland); Ariel Lukowski, Zbigniew Holdynski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Mateusz Slowikowski, InPhoTech Ltd. (Poland); Michal Szymanski, Lukasz Ostrowski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Pawel Marc, Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland) [8982-47]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Evanescent field scanning optical microscopy, Vitaly Sukhareenko, Roger Dorsinville, The City College of New York (USA) [8982-48]

Diode-pumped white-light emission from dysprosium- and samarium-doped glasses, Rami R. Bommareddi, Alabama A&M Univ. (USA) [8982-49]

Continuously-tunable dual-wavelength fiber laser using two polymer Bragg gratings, Byeong Kwon Choi, Yong Seok Kwon, Ik Gon Park, Chungnam National Univ. (Korea, Republic of); Jun Gyu Seo, Hak Kyu Lee, ChemOptics Inc. (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of) [8982-50]

Optical glass with tightest refractive index and dispersion tolerances for high-end optical designs, Ralf Jedamzik, Steffen Reichel, Peter Hartmann, SCHOTT AG (Germany) [8982-51]

Characterization of diced ridge waveguides in pure and

Er-doped lithium-niobate-on-insulator (LNOI) substrates, Detlef Kip, Sergiy Suntsov, Christian E. Rueter, Helmut-Schmidt Univ. (Germany); Greg Stone, Volkmar Dierolf, Lehigh Univ. (USA); Hui Hu, Wolfgang Sohler, Univ. Paderborn (Germany) [8982-52]

Acousto-optical tunable transmissive grating beam splitter, Anthony Dieulangard, Jean-Claude Kastelik, Samuel Dupont, Joseph Gazelet, Univ. de Valenciennes et du Hainaut-Cambrésis (France) [8982-53]

Temperature insensitive Sagnac interferometer based on the subwavelength diameter H-shaped microfiber, Min-Seok Yoon, Young-Geun Han, Hoel Chung, Hanyang Univ. (Korea, Republic of) [8982-54]

Superluminal propagation in a highly-nonlinear fiber embedded in a SBS laser ring cavity, Dinghuan Deng, Weiqing Gao, Meisong Liao, Zhongchao Duan, Tonglei Cheng, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-55]

Experimental and theoretical study of supercontinuum generation in an As₂S₃ chalcogenide microstructured optical fiber, Weiqing Gao, Toyota Technological Institute (Japan); Mohammed El Amraoui, Univ. Laval (Canada); Meisong Liao, Hiroyasu Kawashima, Zhongchao Duan, Dinghuan Deng, Tonglei Cheng, Takenobu Suzuki, Toyota Technological Institute (Japan); Younés Messaddeq, Ctr. d'optique, photonique et laser (Canada); Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-56]

Broadband optical parametric gain by novel highly-nonlinear tellurite hybrid microstructured optical fiber with four zero-dispersion wavelengths, Tuan H. Tong, Tonglei Cheng, Koji Asano, ZhongChao Duan, Weiqing Gao, Dinghuan Deng, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-57]

In-band pumping of Tm-doped single-mode tellurite composite fiber, Kefeng Li, Xiaokang Fan, Lei Zhang, Wentao Li, Peiwen Kuan, Danping Chen, Lili Hu, Shanghai Institute of Optics and Fine Mechanics (China) [8982-58]

The nature of induced color centers in Yb-Al- and Yb-Ce-Al-doped high-power silica fiber lasers, Magnus Engholm, Mid Sweden Univ. (Sweden); Lars Norin, Acreo AB (Sweden) [8982-59]

High-efficiency photocathode for fast timing response photomultipliers, Junqi Xie, Argonne National Lab. (USA) [8982-61]

A novel highly-nonlinear three-core chalcogenide-tellurite fiber, Tonglei Cheng, Zhongchao Duan, Nur Asyikin, Weiqing Gao, Dinghuan Deng, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-62]

Dispersive wave generation in a tellurite hybrid microstructured optical fiber with two zero dispersion wavelengths, Zhongchao Duan, Dinghuan Deng, Tuan H. Tong, Xiaojie Xue, Tonglei Cheng, Weiqing Gao, Meisong Liao, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-63]

Optical RAM row access using WDM-enabled all-passive row/column decoders, Sotirios Papaioannou, Theonitsa Alexoudi, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); George T. Kanellos, Ctr. for Research and Technology Hellas (Greece); Amalia Miliou, Nikos Pleross, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece) [8982-64]

Infrared absorption and fluorescence properties of Ho-doped KPb₂Br₅, EIEI Brown, Uwe H. Hömmerich, Simone Hyater-Adams, Hampton Univ. (USA); Olusola Oyejoba, Univ. of Lagos (Nigeria); Sudhir B. Trivedi, Brimrose Corp. of America (USA) [8982-66]

A novel acousto-optic modulation-deflection mechanism using refractive index grating as graded index beam router, Alireza Jangjoo, Payam Noor Univ. of Shiraz (Iran, Islamic Republic of) [8982-67]

Development of chalcogenide glass with thermal stability for molded infrared lens, Ju H. Choi, Woo Young Lee, Hye-Jeong Kim, Jeong-Ho Kim, Du Hwan Cha, Hee Young Kang, Korea Photonics Technology Institute (Korea, Republic of) [8982-68]

Broadband photosensor with a tunable frequency range built on the basis of nanoscale carbon structure with field localization, Alexander N. Yakunin, Garif G. Akchurin, Institute of Precision Mechanics and Control (Russian Federation); Nikolay P. Abanshin, Boris I. Gorfinkel, Volga-Svet Co. Ltd. (Russian Federation) [8982-69]

Light-induced self-written waveguides based on NaYF₄/polymer composites for the C-band amplification, Xiaojie Xue, Toyota Technological Institute (Japan); Tatsuya Yamashita, Toyota Central R&D Labs., Inc. (Japan); Weiqing Gao, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-70]

Theoretical investigation of pulse-dependent optical parametric amplification for microstructured optical fiber, Edmund P. Samuel, Tuan H. Tong, Koji Asano, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) [8982-71]

Nonlinear behavior of dispersive optics in ultrafast laser systems, Olga Razskazovskaya, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Trang Trung Luu, Eleftherios Goulielmakis, Max-Planck-Institut für Quantenoptik (Germany); Ferenc Krausz, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany); Vladimir Pervak, Max-Planck-Institut für Quantenoptik (Germany) and Ludwig-Maximilians-Univ. München (Germany) and Ultrafast Innovations GmbH (Germany) [8982-72]

Improving Shack-Hartmann wavefront sensor by using sub-wavelength annular apertures, Hao-Jung Chang, Ming-Han Chung, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8982-73]

Large dynamic range silicon photomultipliers for high-energy physics experiments, Thomas Ganka, Christoph Dietzinger, Univ. der Bundeswehr München (Germany); Peter Iskra, Florian Wiest, KETEK GmbH (Germany); Walter Hansch, Univ. der Bundeswehr München (Germany) [8982-74]

Upconversion, size analysis, and fiber filling of NaYF₄: Ho³⁺, Yb³⁺ crystals and nanocolloids, Darayas N. Patel, Oakwood Univ. (USA); Sergey Sarkisov, SSS Optical Technologies, LLC (USA); Ashley Lewis, Donald Wright III, Oakwood Univ. (USA) [8982-75]

Mitigating dispersive spectrometer size-performance limitations with HTVS optical components, Jeffery T. Meade, Bradford B. Behr, Yusuf Bismilla, Andrew T. Cenko, Brandon DesRoches, Arie Henkin, Elizabeth A. Munro, Jared Slaa, Scott Baker, Tornado Spectral Systems (Canada); David Rempel, Perimeter Medical Imaging (Canada); Arsen R. Hajian, Tornado Spectral Systems (Canada) [8982-76]

Robust long-wavelength infrared tellurium-based chalcogenide glass fiber produced by multimaterial coextrusion, Guangming Tao, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); He Ren, Jiangsu Normal Univ. (China); Soroush Shabahang, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Xunsi Wang, Ningbo Univ. (China); Zhiyong Yang, The Australian National Univ. (Australia); Ayman F. Abouraddy, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8982-77]

Scalable fabrication of digitally-designed spherical multimaterial particles enabled by in-fiber emulsification, Guangming Tao, Joshua J. Kaufman, Soroush Shabahang, Ayman F. Abouraddy, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8982-78]

Fiber Bragg grating filter using evaporated-induced self assembly of silica nano particles, Krister Hammarling, Zhang Renyung, Hans-Erik Nilsson, Mid Sweden Univ. (Sweden) [8982-79]

Optomechanical optic modulator based on carbon nanotube coated fiber Bragg grating, Shivananju B. N., Ashish Suri, Sundarajan Asokan, Abha Misra, Indian Institute of Science (India) [8982-80]

Simulation-based design of a pixel for backside-illuminated CMOS image sensor with thick photo-electric conversion element, Toshiki Arai, Hiroshi Shimamoto, Japan Broadcasting Corp. (Japan) [8982-81]

Low-loss coupling and splicing of standard single-mode fibers with all-solid soft-glass microstructured fibers for supercontinuum generation, Michal Murawski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Grzegorz Stepniewski, Institute of Electronic Materials Technology (Poland), Univ. of Warsaw (Poland); Tadeusz Tenderenda, Marek Napierala, Zbigniew Holdynski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Lukasz Szostkiewicz, Mateusz Slowikowski, InPhoTech Ltd. (Poland); Michal Szymanski, Lukasz Ostrowski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland); Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Ryszard R. Buczynski, Institute of Electronic Materials Technology (Poland), Univ. of Warsaw (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland), InPhoTech Ltd. (Poland) [8982-82]

The novel dual-waveband SWIR InGaAs FPAs with monolithic integration filter microstructure, Heng-jing Tang, Xue Li, Yunji Wang, Weibo Duan, Xiumei Shao, Haimei Gong, Shanghai Institute of Technical Physics (China) . . . [8982-83]

Organic Photonic Materials and Devices XVI

Conference Chairs: **Christopher E. Tabor**, Air Force Research Lab. (USA); **Francois Kajzar**, Univ. Politehnica of Bucharest (Romania); **Toshikuni Kaino**, Tohoku Univ. (Japan); **Yasuhiro Koike**, Keio Univ. (Japan)

Program Committee: **Chantal Andraud**, Ecole Normale Supérieure de Lyon (France); **Werner J. Blau**, Trinity College Dublin (Ireland); **Andreas Bräuer**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Fabrice Charra**, Commissariat à l'Énergie Atomique (France); **Raluca Dinu**, GigOptix, Inc. (USA); **Manfred Eich**, Technische Univ. Hamburg-Harburg (Germany); **Alain F. Fort**, Institut de Physique et Chimie des Matériaux de Strasbourg (France); **James G. Grote**, Air Force Research Lab. (USA); **F. Kenneth Hopkins**, Air Force Research Lab. (USA); **Alex K. Y. Jen**, Univ. of Washington (USA); **Michael H. C. Jin**, Johns Hopkins Univ. Applied Physics Lab. (USA); **Eunyoung Kim**, Yonsei Univ. (Korea, Republic of); **Jang-Joo Kim**, Seoul National Univ. (Korea, Republic of); **Nakjoong Kim**, Hanyang Univ. (Korea, Republic of); **Isabelle N. Ledoux-Rak**, Ecole Normale Supérieure de Cachan (France); **Charles Y. C. Lee**, Air Force Office of Scientific Research (USA); **Kwang-Sup Lee**, Hannam Univ. (Korea, Republic of); **Misoon Y. Mah**, Asian Office of Aerospace Research and Development (Japan); **Seth R. Marder**, Georgia Institute of Technology (USA); **Antoni C. Mitus**, Wroclaw Univ. of Technology (Poland); **Jaroslav Mysliwiec**, Wroclaw Univ. of Technology (Poland); **Robert L. Nelson**, Air Force Research Lab. (USA); **Robert A. Norwood**, College of Optical Sciences, The Univ. of Arizona (USA); **Jean-Michel Nunzi**, Queen's Univ. (Canada); **Shuji Okada**, Yamagata Univ. (Japan); **Akira Otomo**, National Institute of Information and Communications Technology (Japan); **Ileana Rau**, Univ. Politehnica of Bucharest (Romania); **Niyazi Sedar Sariciftci**, Johannes Kepler Univ. Linz (Austria); **Devanand K. Shenoy**, Defense Advanced Research Projects Agency (USA); **Kenneth D. Singer**, Case Western Reserve Univ. (USA); **Attila A. Szep**, Air Force Research Lab. (USA); **Rebecca E. Taylor**, Lockheed Martin Space Systems Co. (USA); **Jeong-Weon Wu**, Ewha Womans Univ. (Korea, Republic of); **Shiyoshi Yokoyama**, Kyushu Univ. (Japan); **Roberto Zamboni**, Istituto per la Sintesi Organica e la Fotoreattività (Italy)

Monday 3 February

SESSION 1

Location: Room 276 (Mezzanine) . . . Mon 8:20 am to 10:00 am

Nonlinear Optics I

Session Chair: **Yasuhiro Koike**, Keio Univ. (Japan)

8:20 am: **Molecular engineering routes for quadratic nonlinear optics: the role of metal and lanthanide complexes for multifunctional nonlinear materials** (*Keynote Presentation*), Isabelle N. Ledoux-Rak, Joseph Zyss, Anu Singh, Ecole Normale Supérieure de Cachan (France) [8983-1]

9:00 am: **Optimization of the electronic third-order nonlinearity of cyanine-like molecules for all optical switching**, Honghua Hu, Trenton R. Ensley, Matthew Reichert, Manuel Ferdinandus, Davorin Peceli, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Olga V. Prjonskaia, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and National Academy of Sciences (Ukraine); David J. Hagan, Eric W. Van Stryland, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) and Univ. of Central Florida (USA); Seth R. Marder, Georgia Institute of Technology (USA); Alex K. Y. Jen, Univ. of Washington (USA); Joel M. Hales, Joseph W. Perry, Georgia Institute of Technology (USA) [8983-3]

9:20 am: **Second-order nonlinear susceptibilities in non-electrically-poled DR1PMMA guest-host polymers**, Atsushi Sugita, Yasuaki Sato, Kazuma Ito, Yoshimasa Kawata, Shigeru Tasaka, Shizuoka Univ. (Japan) [8983-4]

9:40 am: **Surface-plasmon-enhanced third-order harmonic generation of organic materials**, Fanghui Ren, Xiangyu Wang, Oregon State Univ. (USA); Zhong-An Li, Jingdong Luo, Sei-Hum Jang, Alex K. Y. Jen, Univ. of Washington (USA); Alan X. Wang, Oregon State Univ. (USA) [8983-5]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 276 (Mezzanine) . . Mon 10:30 am to 11:50 am

Nonlinear Optics II

Session Chair: **Isabelle N. Ledoux-Rak**, Ecole Normale Supérieure de Cachan (France)

10:30 am: **Electronic structure and nonlinear optical response of polymethine dyes for all-optical switching applications** (*Invited Paper*), Jean-Luc Bredas, Georgia Institute of Technology (USA) [8983-6]

11:00 am: **Second harmonic generation at the air-water interface: molecular organization, supramolecular assemblies, and chirality** (*Invited Paper*), Emmanuel Benichou, Noëlle Lascoux, Isabelle Russier-Antoine, Christian Jonin, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) [8983-7]

11:30 am: **Production of waveguides on DR13-doped PMMA by femtosecond laser pulses**, Paulo Henrique D. Ferreira, Renan Stefanutti, Felipe J. Pavinatto, Cleber R. Mendonça, Univ. de São Paulo (Brazil) [8983-8]

Lunch Break Mon 11:50 am to 1:20 pm

SESSION 3

Location: Room 276 (Mezzanine) . . . Mon 1:20 pm to 3:20 pm

OLED and OLET

Session Chair: **Jean-Luc Bredas**, Georgia Institute of Technology (USA)

1:20 pm: **Progress and challenges in electrolyte-gated organic light-emitting transistors** (*Invited Paper*), Clara Santato, Francesca Soavi, Univ. degli Studi di Bologna (Italy); Jonathan J. Sayago, Ecole Polytechnique de Montréal (Canada) [8983-9]

1:50 pm: **On deoxyribonucleic acid (DNA) based BIOLEDs** (*Invited Paper*), Remigiusz Grykien, Beata Luszczynska, Ireneusz Glowacki, Jacek Ulanski, Technical Univ. of Lodz (Poland); Ileana Rau, Roxana Zgarian, François Kajzar, Univ. Politehnica of Bucharest (Romania) [8983-10]

2:20 pm: **Alternating current electroluminescence with self-assembled low-dimensional nanomaterials/polymer blends** (*Invited Paper*), Cheolmin Park, Sung Hwan Cho, Seong Soon Jo, Yonsei Univ. (Korea, Republic of) . . . [8983-11]

2:50 pm: **Progress in OLED device with high efficiency at high luminance** (*Invited Paper*), Zhenghong Lu, Univ. of Toronto (Canada) [8983-12]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 4

Location: Room 276 (Mezzanine) . . . Mon 3:50 pm to 5:50 pm

Fiber and Waveguide

Session Chair: **Ileana Rau**, Univ. Politehnica of Bucharest (Romania)

3:50 pm: **Optical properties of Sulfur copolymers for Infrared applications**, Soha Namnabat, College of Optical Sciences, The Univ. of Arizona (USA); Jared J. Gabriel, Jeffrey Pyun, The Univ. of Arizona (USA); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) [8983-13]

4:10 pm: **Multidirectional waveguide arrays: an artificial compound eye in a planar architecture**, Ian D. Hosein, Hao Lin, Matthew R. Ponte, Dinesh Baskar, Kalaichelvi Saravanamuttu, McMaster Univ. (Canada) [8983-14]

4:30 pm: **Mode-coupling mechanism in poly(methyl methacrylate)-based graded-index plastic optical fiber**, Takahiro Kashiwazaki, Azusa Inoue, Yasuhiro Koike, Keio Univ. (Japan) [8983-15]

4:50 pm: **Longitudinal versus transversal excitation in doped graded-index polymer optical fibers**, María Asunción Illarramendi, Jon Arrue, Igor Ayesta, Univ. del País Vasco (Spain); Felipe Jimenez, Univ del País Vasco (Spain); Joseba Zubia, Iñaki Bikandi, Univ. del País Vasco (Spain); Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) [8983-16]

5:10 pm: **Graded-index plastic optical fiber based on a novel partially-fluorinated polymer**, Hiroki Yamamoto, Yasuhiro Koike, Atsushi Kondo, Kenji Makino, Azusa Inoue, Keio Univ. (Japan) [8983-17]

5:30 pm: **Proteins detection by polymer optical fibers sensitised with overlayers of block and random copolymers**, Alexandros El Sachat, Christos Markos, Anastasia Meristoudi, Stergios Pispas, Christos Riziotis, National Hellenic Research Foundation (Greece) [8983-18]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 276 (Mezzanine) . . . Tue 10:30 am to 12:30 pm

Nano Photonic

Session Chair: **François Kajzar**, Univ. Politehnica of Bucharest (Romania)

- 10:30 am: **Laser trapping studies toward fabrication of organic materials and devices (Keynote Presentation)**, Hiroshi Masuhara, National Chiao Tung Univ. (Taiwan); Teruki Sugiyama, Instrument Technology Research Ctr. (Taiwan); Ken-Ichi Yuyama, National Chiao Tung Univ. (Taiwan); Anwar Usman, King Abdullah Univ. of Science and Technology (Saudi Arabia) [8983-19]

- 11:10 am: **Studies of functionalized nanoparticles for photonic and sensing applications (Invited Paper)**, Katarzyna Matczyszyn, Wroclaw Univ. of Technology (Poland); Marta Gordel, Wroclaw Univ. of Technology (Poland) and Ecole Normale Supérieure de Cachan (France); Aleksandra Bednarska, Claude Nogues, Ecole Normale Supérieure de Cachan (France); Joanna Olesiak-Banska, Dominika Wawrzynczyk, Wroclaw Univ. of Technology (Poland); Pawel Jaworski, Polish Academy of Science (Poland); Marcin Nyk, Wroclaw Univ. of Technology (Poland); Krzysztof Pawlik, Polish Academy of Science (Poland); Malcolm Buckle, Ecole Normale Supérieure de Cachan (France); Marek Samoc, Wroclaw Univ. of Technology (Poland) [8983-20]

- 11:40 am: **Laser inscription of surface structures and induction of optical anisotropy in azo-benzene substituted photochromic polymers and other systems (Invited Paper)**, Andrzej Miniewicz, Lech Sznitko, Ewa Szlapa, Pawel Karpinski, Antoni C. Mitus, Grzegorz Pawlik, Wroclaw Univ. of Technology (Poland); Ewa Schab-Balcerzak, Institute of Polymer Chemistry (Poland). [8983-21]

- 12:10 pm: **Epitaxial growth of a methoxy-functionalized quaterphenylene on dielectric surfaces**, Frank Balzer, Rong Sun, Univ. of Southern Denmark (Denmark); Manuela Schiek, Carl von Ossietzky Univ. Oldenburg (Denmark); Horst-Günter Rubahn, Univ. of Southern Denmark (Denmark); Arne Lützen, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [8983-22]

Lunch/Exhibition Break Tue 12:30 pm to 2:00 pm

SESSION 6

Location: Room 276 (Mezzanine) Tue 2:00 pm to 3:30 pm

Pattern Formation

Session Chair: **Hiroshi Masuhara**, National Chiao Tung Univ. (Taiwan)

- 2:00 pm: **2D- and 3D-patterned organic-inorganic hybrid systems for photonic applications (Invited Paper)**, Kwang-Sup Lee, Sumin Jeon, Hannam Univ. (Korea, Republic of); Yoon Deok Han, Korea Univ. (Korea, Republic of); Redouane Krini, Rudolf Zentel, Johannes Gutenberg Univ. Mainz (Germany); Jinsoo W. Joo, Korea Univ. (Korea, Republic of) [8983-23]

- 2:30 pm: **Fully-updatable holographic stereogram display device based on organic monolithic compound**, Naoto Tsutsumi, Kenji Kinashi, Kyoto Institute of Technology (Japan); Kazuhiro Tada, Kodai Fukuzawa, Yutaka Kawabe, Chitose Institute of Science and Technology (Japan) [8983-24]

- 2:50 pm: **Numerical studies on self-organized liquid crystal microphotonic systems**, Tatsunosuke Matsui, Mie Univ. (Japan) and Mie CUTE (Japan); Masahiro Kitaguchi, Akiko Okajima, Mie Univ. (Japan). [8983-25]

- 3:10 pm: **Photorefractive device using self-assembled monolayer coated indium-tin-oxide electrodes**, Kenji Kinashi, Kento Masumura, Wataru Sakai, Naoto Tsutsumi, Kyoto Institute of Technology (Japan) [8983-26]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 7

Location: Room 276 (Mezzanine) Tue 4:00 pm to 6:00 pm

Absorption and Excitation

Session Chair: **Andrzej Miniewicz**,
Wroclaw Univ. of Technology (Poland)

- 4:00 pm: **Two-photon solvatochromism of 4-dimethylamino-4'-nitrostilbene (DANS)**, Geoffrey R. Wicks, Aleksander K. Rebane, Mikhail Drobizhev, Montana State Univ. (USA) [8983-27]

- 4:20 pm: **Mechanisms of the three- and four-photon induced photobleaching of red fluorescent proteins**, Mikhail Drobizhev, Caleb Stoltzfus, Aleksander K. Rebane, Thomas Hughes, Montana State Univ. (USA); Igor Topol, SAIC-Frederick, Inc. (USA); Lauren M. Barnett, The Univ. of Montana (USA) . . [8983-28]

- 4:40 pm: **Breaking of two-photon absorption inversion symmetry in trans-versus cis- platinum(II) acetylacetonate complexes**, Aleksander K. Rebane, Geoffrey R. Wicks, Montana State Univ. (USA); Abigail H. Shelton, Univ. of Florida (USA); Mikhail Drobizhev, Montana State Univ. (USA); Randi S. Price, Khalil A. Abboud, Univ. of Florida (USA); Charles F. Campana, Bruker AXS, Inc. (USA); Kirk S. Schanze, Univ. of Florida (USA) [8983-29]

- 5:00 pm: **Pushing the limits of vertical external-cavity surface-emitting organic lasers**, Zhuang Zhao, Tatiana Leang, Univ. Paris 13 (France); Sébastien Chenais, Sébastien Forget, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France) [8983-30]

- 5:20 pm: **Random lasing in liquid and solid solutions oversaturated with organic laser dye**, Lech Sznitko, Konrad Cypriak, Adam Szukalski, Andrzej Miniewicz, Jaroslaw Mysliwiec, Wroclaw Univ. of Technology (Poland). [8983-31]

- 5:40 pm: **Polymeric single-mode Fabry-Pérot cavity**, Mohammad Amin A. Tadayon, Univ. of Minnesota (USA); Martha- Elizabeth E. Baylor, Carleton College (USA); Shai Ashkenazi, Univ. of Minnesota (USA) [8983-32]

Wednesday 5 February

SESSION 8

Location: Room 276 (Mezzanine) . . . Wed 8:20 am to 10:00 am

Novel Polymers and Organics

Session Chair: **Christopher E. Tabor**, Air Force Research Lab. (USA)

- 8:20 am: **Electroactive vibrantly-colored processable conjugated polymers in display- and window-type devices (Keynote Presentation)**, John R. Reynolds, Georgia Institute of Technology (USA). [8983-33]

- 9:00 am: **Near-IR photothermal properties of conjugated polymers (Invited Paper)**, Eunkyong Kim, Yonsei Univ. (Korea, Republic of) [8983-34]

- 9:30 am: **Janus tectons: a versatile platform for decoupling self-assembled chromophores from metallic substrates (Invited Paper)**, André-Jean Attias, Ping Du, Antoine Colas, Fabrice Mathevet, David Kreher, Univ. Pierre et Marie Curie (France); Fabrice Charra, Commissariat à l'Énergie Atomique (France) [8983-35]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 9

Location: Room 276 (Mezzanine) . . Wed 10:30 am to 12:00 pm

OPV

Session Chair: **John R. Reynolds**, Georgia Institute of Technology (USA)

- 10:30 am: **Efficient small-molecule photovoltaic cells using nanostructured template (Invited Paper)**, Tetsuya Taima, Ying Zhou, Takayuki Kuwabara, Kohshin Takahashi, Kanazawa Univ. (Japan) [8983-37]

- 11:00 am: **Plasmonic and morphological effects of metal nanoparticle inclusions in organic photovoltaics**, Christopher E. Tabor, Dennis P. Butcher Jr., Air Force Research Lab. (USA); Chun-Wan Yen, Massachusetts Institute of Technology (USA); Michael F. Durstock, Air Force Research Lab. (USA); Laura Fabris, Robert C. Wadams, Rutgers, The State Univ. of New Jersey (USA); Hilmar Koerner, Air Force Research Lab. (USA); David W. McComb, Imperial College London (United Kingdom); Frank J. Scheltens, The Ohio State Univ. (USA) [8983-38]

- 11:20 am: **Optical intensity analysis of organic solar cell with metallic nanoparticles in the photoactive layer**, Kwan-Yong Lee, Sun-Joo Park, Do-Hyun Kim, Young-Joo Kim, Yonsei Univ. (Korea, Republic of) [8983-40]

- 11:40 am: **Patterning of photoelectrode for I₂-free solid-state dye-sensitized solar cells**, Byeonggwon Kim, Jeonghun Kim, Jong Kwan Koh, Jong Hak Kim, Eunkyong Kim, Yonsei Univ. (Korea, Republic of) [8983-41]

Lunch/Exhibition Break Wed 12:00 pm to 1:20 pm

SESSION 10

Location: Room 276 (Mezzanine) Wed 1:20 pm to 3:10 pm

EO-Polymer Devices

Session Chair: **Toshikuni Kaino**, Tohoku Univ. (Japan)

1:20 pm: **All EO polymer waveguide devices for next-generation optical communication network** (*Invited Paper*), Akira Otomo, Toshiki Yamada, Shin-ichiro Inoue, Yoshinari Awaji, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) [8983-42]

1:50 pm: **Efficient poling in TiO₂/electro-optic polymer/TiO₂ multilayer slot waveguide modulators**, Yasufumi Enami, Kochi Univ. of Technology (Japan); Jingdong Luo, Alex K. Y. Jen, Univ. of Washington (USA) [8983-43]

2:10 pm: **All-polymer electro-optic modulator design, characterization, and application integration**, David K. Eng, Stephen T. Kozacik, Shouyuan Shi, Benjamin C. Olbricht, Dennis W. Prather, Univ. of Delaware (USA) [8983-44]

2:30 pm: **Progress towards dual-slot modulator for millimeter-wave photonics**, Matthew R. Konkol, Stephen T. Kozacik, David L. K. Eng, Maciej Murakowski, Brock M. Overmiller, Mathew J. Zablocki, Benjamin C. Olbricht, Janusz Murakowski, Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA) [8983-45]

2:50 pm: **High-refractive index core/EO polymer cladding waveguide for 100 pm/V modulator**, Shiyoshi Yokoyama, Feng Qiu, Andrew M. Spring, Feng Yu, Kazuhiro Yamamoto, Kyushu Univ. (Japan) [8983-46]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 11

Location: Room 276 (Mezzanine) Wed 3:40 pm to 6:00 pm

Biophotonics

Session Chair: **Eunyoung Kim**, Yonsei Univ. (Korea, Republic of)

3:40 pm: **Conjugated polymer biomedical sensors** (*Invited Paper*), Ifor D. Samuel, Ashu K. Bansal, Shuoben Hou, Mario E. Giardini, Univ. of St. Andrews (United Kingdom) [8983-47]

4:10 pm: **Latest advances in biomaterials: from deoxyribonucleic acid to nucleobases** (*Invited Paper*), Fahima Ouchen, Air Force Research Lab. (USA); Eliot F. Gomez, Univ. of Cincinnati (USA); Donna M. Joyce, Adrienne Williams, Emily M. Heckman, Carrie M. Bartsch, Air Force Research Lab. (USA); Perry P. Yaney, Univ. of Dayton (USA); Narayanan Venkat, Univ. of Dayton Research Institute (USA); Matthew B. Dickerson, Kristi M. Singh, Steve S. Kim, Air Force Research Lab. (USA); Andrew J. Steckl, Univ. of Cincinnati (USA); Guru Subramanyam, Univ. of Dayton (USA); Henry D. Young, Rajesh R. Naik, James G. Grote, Air Force Research Lab. (USA) [8983-48]

4:40 pm: **Biopolymer conformations and dopant aggregation in DNA-based complexes for photonics application** (*Invited Paper*), Ileana Rau, Gratiela Tihan, Mihaela Mandroiu, Roxana Zgjian, François Kajzar, Univ. Politehnica of Bucharest (Romania) [8983-49]

5:10 pm: **A general approach of chromophores biocompatibilization for in vivo applications in biophotonics** (*Invited Paper*), Chantal Andraud, Ecole Normale Supérieure de Lyon (France) [8983-65]

5:40 pm: **Bio-hybrid integrated system for wide-spectrum solar energy harvesting**, Kathleen E. Martin, Matthew K. Erdman, Hope Quintana, The Univ. of New Mexico (USA); John A. Shelnett, Univ. of Georgia (USA); Julio Martinez, Olga Lavrova, Tito L. Busani, The Univ. of New Mexico (USA) [8983-50]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Triphenylamine-based acrylate polymers for photorefractive composite, Ha N. Giang, Kenji Kinashi, Wataru Sakai, Naoto Tsutsumi, Kyoto Institute of Technology (Japan) [8983-51]

FDTD analysis of photonic nanojet from self-organized liquid crystal microsystems, Akiko Okajima, Mie Univ. (Japan); Tatsunosuke Matsui, Mie Univ. (Japan) and Mie CUTE (Japan) [8983-52]

Room-temperature working NIR sensor by solution-processed networked SWNT FET, Ihn Hwang, Yonsei Univ. (Korea, Republic of) [8983-53]

Diffraction can mimic saturation in multiphoton absorbers, Mary J. Potasek, Evgueni Parilov, Simphotek Inc. (USA); Mark Walker, General Dynamics (USA) [8983-54]

Tunable photonic band gap of photonic crystal cell fabricated using block copolymer and hydrogel with electric field, Youngbin Baek, Sung Nam Lee, Dongmyung Shin, Hongik Univ. (Korea, Republic of); Nakjoong Kim, Hanyang Univ. (Korea, Republic of) [8983-55]

NIR-sensitive conductive polymers for transparent electrochromic photo-thermo-electric converters, Byeongwan Kim, Haijin Shin, Teahoon Park, Hanwhuy Lim, Eunyoung Kim, Yonsei Univ. (Korea, Republic of) [8983-56]

Nanostructured conductive polymer/GaAs epilayer hybrid heterojunction solar cells, Yi-Chun Lai, Huai-Te Pan, Kai-Yuan Cheng, Peichen Yu, Hsin-Fei Meng, Gou-Chung Chi, National Chiao Tung Univ. (Taiwan) [8983-57]

Characteristics of periodic silicon nanorods arrays for conductive polymer/silicon heterojunction solar cells, Yi-Chun Lai, Yang-Yue Huang, Wei-Sheng Weng, Peichen Yu, National Chiao Tung Univ. (Taiwan); Martin D. B. Charlton, Univ. of Southampton (United Kingdom); Hsin-Fei Meng, Gou-Chung Chi, National Chiao Tung Univ. (Taiwan) [8983-58]

White-light-amplified spontaneous emission, Kin Long Chan, Guixin Li, Kok-wai Cheah, Hong Kong Baptist Univ. (Hong Kong, China) [8983-59]

Surface charge measurements and (dis)charging dynamics of organic semiconductors in various media using optical tweezers, Rebecca Grollman, Kyle Peters, Oksana Ostroverkhova, Oregon State Univ. (USA) [8983-60]

Sustainable UV-curable low refractive index resins with novel polymers for polymer cladding materials, Hiroki Tokoro, Takako Ishikawa, Nobuyuki Koike, Yohzoh Yamashina, DIC Corp. (Japan) [8983-61]

Synthesis and electro-optic properties of the chromophore-containing NLO polyarylate polymers, Haohui Ren, Technical Institute of Physics and Chemistry (China); Chengcheng Peng, Technical Institute of Physics and Chemistry (China) and Chinese Academy of Sciences (China); Shuhui Bo, Guofang Fan, Guangming Xu, Hui Zhao, Zhen Zhen, Xinhou Liu, Technical Institute of Physics and Chemistry (China) [8983-62]

Design of Mach-Zehnder interference modulators composed of enhanced electro-optic active polymers, Guangming Xu, Jialei Liu, Haohui Ren, Guofang Fan, Zhen Zhen, Xinhou Liu, Technical Institute of Physics and Chemistry (China) [8983-63]

Reflection resonance switching in metamaterial twisted nematics liquid crystal cell, Yeon Ui Lee, E. Y. Choi, Jae-Heun Woo, E. S. Kim, Jeong-Weon Wu, Ewha Womans Univ. (Korea, Republic of) [8983-64]

Ultrafast Phenomena and Nanophotonics XVIII

Conference Chairs: **Markus Betz**, Technische Univ. Dortmund (Germany); **Abdulahkem Y. Elezzabi**, Univ. of Alberta (Canada); **Jin-Joo Song**, Univ. of California, San Diego (USA); **Kong-Thon Tsen**, Arizona State Univ. (USA)

Program Committee: **Mischa Bonn**, FOM Institute for Atomic and Molecular Physics (Netherlands); **Alan D. Bristow**, West Virginia Univ. (USA); **Yujie J. Ding**, Lehigh Univ. (USA); **Kazuhiko Hirakawa**, The Univ. of Tokyo (Japan); **Rupert Huber**, Univ. Regensburg (Germany); **Robert A. Kaindl**, Lawrence Berkeley National Lab. (USA); **Dai-Sik Kim**, Seoul National Univ. (Korea, Republic of); **Torsten Meier**, Univ. Paderborn (Germany); **Walter Pfeiffer**, Univ. Bielefeld (Germany); **Mark I. Stockman**, Georgia State Univ. (USA); **Chi-Kuang Sun**, National Taiwan Univ. (Taiwan); **Fabrice Vallee**, Univ. Claude Bernard Lyon 1 (France); **Klaas Wynne**, Univ. of Glasgow (United Kingdom)

Sunday 2 February

SESSION 1

Location: Room 270 (Mezzanine) . . . Sun 10:00 am to 12:00 pm

Nonlinear Optical Phenomena

Session Chair: **Markus Betz**, Technische Univ. Dortmund (Germany)

10:00 am: **Ultrafast thermal nonlinear optics: it may not be an oxymoron!** (*Invited Paper*), Jacob B. Khurgin, Johns Hopkins Univ. (USA) [8984-1]

10:30 am: **Nonlinear optical properties of novel two-dimensional crystals** (*Invited Paper*), Nardeep Kumar, Qiannan Cui, Frank Ceballos, Rui Wang, Hui-Chun Chien, Hsin-Ying Chiu, The Univ. of Kansas (USA); Sina Najmaei, Pulickel M. Ajayan, Jun Lou, Rice Univ. (USA); Dawei He, Yongsheng Wang, Beijing Jiaotong Univ. (China); Hui Zhao, The Univ. of Kansas (USA) [8984-2]

11:00 am: **Second harmonic generation from metallic nanoparticles: playing with shapes to unravel the origin of the response**, Isabelle Russier-Antoine, Noëlle Lascoux, Christian Jonin, Emmanuel Benichou, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) [8984-3]

11:20 am: **Ultrafast nonlinear dynamics in gas-filled kagomé photonic crystal fiber**, Silvia M. Rodrigues, Margarida Facão, Sofia C. Latas, Mário F. S. Ferreira, Univ. de Aveiro (Portugal) [8984-4]

11:40 am: **Polarization dynamics of vector solitons in mode-locked fiber laser**, Veronika Tsaturian, Sergey Sergeyev, Chengbo Mou, Aleksey G. Rozhin, Aston Univ. (United Kingdom); Vitaly Mikhailov, Paul S. Westbrook, Bryan Rabin, OFS Labs. (USA); Sergei K. Turitsyn, Aston Univ. (United Kingdom) [8984-5]

Lunch Break Sun 12:00 pm to 1:30 pm

SESSION 2

Location: Room 270 (Mezzanine) Sun 1:30 pm to 3:10 pm

Active Plasmonics

Session Chair: **Jacob B. Khurgin**, Johns Hopkins Univ. (USA)

1:30 pm: **Ultra-compact plasmonic MOS-based electro-optic switches and modulators** (*Invited Paper*), Volker J. Sorger, Zhuoran Li, Chenran Ye, Chen Huang, The George Washington Univ. (USA); Richard Soref, Univ. of Massachusetts Boston (USA) [8984-6]

2:00 pm: **Ultrafast two photon absorption generated free carrier modulation in a silicon nanoplasmonic resonator**, Michael P. Nielsen, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8984-7]

2:20 pm: **Active plasmonics: merging metals with semiconductors** (*Invited Paper*), Parinda Vasa, Indian Institute of Technology Bombay (India) [8984-8]

2:50 pm: **Active plasmonics with surface acoustic waves**, Claudia Ruppert, Frederike Förster, Technische Univ. Dortmund (Germany); Artur Zrenner, Univ. Paderborn (Germany); Jörg Kinzel, Achim Wixforth, Hubert J. Krenner, Univ. Augsburg (Germany); Markus Betz, Technische Univ. Dortmund (Germany) [8984-9]

Coffee Break Sun 3:10 pm to 3:40 pm

SESSION 3

Location: Room 270 (Mezzanine) Sun 3:40 pm to 5:40 pm

THz Phenomena

Session Chair: **Abdulahkem Y. Elezzabi**, Univ. of Alberta (Canada)

3:40 pm: **Feasibility of GaN-based room-temperature THz laser in a spoof plasmon waveguide** (*Invited Paper*), Greg Sun, Univ. of Massachusetts Boston (USA) [8984-10]

4:10 pm: **THz acoustic spectroscopy based on GaN nanostructures** (*Invited Paper*), Kung-Hsuan Lin, Academia Sinica (Taiwan) [8984-11]

4:40 pm: **Modeling of ultrafast THz interactions in molecular crystals**, Pernille Klarskov Pedersen, Technical Univ. of Denmark (Denmark); Stewart J. Clark, Durham Univ. (United Kingdom); Peter U. Jepsen, DTU Fotonik (Denmark) [8984-12]

5:00 pm: **Ultrastrong light-matter coupling between superconducting complementary THz metasurfaces and Landau levels in semiconductors**, Giacomo Scaleri, Curdin Maissen, ETH Zurich (Switzerland); Sara Cibella, Istituto di Fotonica e Nanotecnologie (Italy); Pasquale Carelli, Univ. Degli Studi Dell Aquila (Italy); Roberto Leoni, Istituto di Fotonica e Nanotecnologie (Italy); Christophe Charpentier, Werner Wegscheider, Mattias Beck, Jérôme Faist, ETH Zurich (Switzerland) [8984-13]

5:20 pm: **Optical response of tightly-coupled THz metamaterials**, Ji-Hun Kang, Q-Han Park, Korea Univ. (Korea, Republic of) [8984-14]

Monday 3 February

SESSION 4

Location: Room 270 (Mezzanine) . . . Mon 8:30 am to 10:00 am

Nanoplasmonics I

Session Chair: **Volker J. Sorger**, The George Washington Univ. (USA)

8:30 am: **Plasmonic nanostructures by design** (*Invited Paper*), Xiaoqin Li, The Univ. of Texas at Austin (USA) [8984-50]

9:00 am: **Optimizing adiabatic nanofocusing: k-vector imaging and control**, Martin Esmann, Simon F. Becker, Jens H. Brauer, Ralf Vogelgesang, Petra Gross, Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) [8984-16]

9:20 am: **Si-based nanoplasmonic resonant devices for all-optical integrated circuits**, Michael P. Nielsen, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) [8984-17]

9:40 am: **Coherent oscillations in plasmonic Ag atomic layer deposition films**, Ryan E. Compton, Sharka M. Prokes, Orest J. Glembocki, Irina R. Pala, Helen K. Gerardi, Jeffrey C. Owrutsky, U.S. Naval Research Lab. (USA) . [8984-18]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 5

Location: Room 270 (Mezzanine) . . Mon 10:30 am to 12:15 pm

Ultrafast Dynamics in Carbon Nanomaterials

Session Chair: **Markus Betz**, Technische Univ. Dortmund (Germany)

10:30 am: **Ultrafast spectroscopy of carbon nanomaterials** (*Invited Paper*), Junichiro Kono, Rice Univ. (USA) [8984-19]

11:15 am: **Carrier multiplication and optical gain in graphene** (*Invited Paper*), Ermin Malic, Florian Wendler, Technische Univ. Berlin (Germany) [8984-20]

11:45 am: **Transient plasmons in graphene** (*Invited Paper*), Javier Garcia de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) [8984-21]

Lunch Break Mon 12:15 pm to 2:15 pm

Conference 8984 · Location: Room 270 (Mezzanine)

SESSION 6

Location: Room 270 (Mezzanine) Mon 2:15 pm to 3:15 pm

Coherent Optical Phenomena I

Session Chair: **Ermin Malic**, Technische Univ. Berlin (Germany)

2:15 pm: **Optical three-dimensional coherent spectroscopy** (*Invited Paper*), Hebin Li, Florida International Univ. (USA) and Univ. of Colorado (USA); Alan D. Bristow, West Virginia Univ. (USA) and Univ. of Colorado (USA); Mark E. Siemens, Univ. of Denver (USA) and Univ. of Colorado (USA); Galan Moody, Steven T. Cundiff, JILA (USA) and Univ. of Colorado (USA) [8984-22]

2:45 pm: **Quantum coherence controls the charge separation in a prototypical artificial light-harvesting system** (*Invited Paper*), Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) [8984-23]

Coffee Break Mon 3:15 pm to 3:45 pm

SESSION 7

Location: Room 270 (Mezzanine) Mon 3:45 pm to 5:15 pm

Coherent Optical Phenomena II

Session Chair: **Christoph Lienau**,
Carl von Ossietzky Univ. Oldenburg (Germany)

3:45 pm: **The role of coherence for light-trapping in thin-film silicon solar cells** (*Invited Paper*), Martin Aeschlimann, Technische Univ. Kaiserslautern (Germany); Tobias Brixner, Julius-Maximilians-Univ. Würzburg (Germany); Dominik Differt, Matthias Hensen, Univ. Bielefeld (Germany); Christian Kramer, Julius-Maximilians-Univ. Würzburg (Germany); Florian Lükermann, Univ. Bielefeld (Germany); Pascal Melchior, Technische Univ. Kaiserslautern (Germany); Walter Pfeiffer, Univ. Bielefeld (Germany); Martin Piecuch, Christian Schneider, Technische Univ. Kaiserslautern (Germany); Helmut Stiebig, Christian Strüber, Univ. Bielefeld (Germany); Philip Thielen, Technische Univ. Kaiserslautern (Germany) [8984-24]

4:15 pm: **Two-color coherent control of XUV and THz radiation: experiment and theory**, Aram Gragossian, The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8984-25]

4:35 pm: **New aspects of coherently-controlled currents in GaAs**, Elmar Sternemann, Thorben Jostmeier, Technische Univ. Dortmund (Germany); Huynh Thanh Duc, Torsten Meier, Univ. Paderborn (Germany); Markus Betz, Technische Univ. Dortmund (Germany) [8984-26]

4:55 pm: **Transient Cherenkov radiation from an inhomogeneous resonant medium excited by an ultrashort laser pulse at superluminal velocity**, Rostislav Arkhipov, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany); Mikhail V. Arkhipov, St. Petersburg State Univ. (Russian Federation); Ihar Babushkin, Humboldt-Univ. zu Berlin (Germany); Yuri A. Tolmachev, Saint-Petersburg State Univ. (Russian Federation) [8984-27]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 8

Location: Room 270 (Mezzanine) . . . Tue 10:30 am to 12:00 pm

Nanophotonics

Session Chair: **Xiaoqin Li**, The Univ. of Texas at Austin (USA)

10:30 am: **Overcoming the diffraction limit with the use of disordered nanostructures** (*Invited Paper*), Wonshik Choi, Eunsung Seo, Wonjun Choi, Korea Univ. (Korea, Republic of) [8984-28]

11:00 am: **Ultrafast optical microscopy on single semiconductor nanowires** (*Invited Paper*), Minah Seo, Rohit P. Prasankumar, Jinkyoungh Yoo, Shadi A. Dayeh, Samuel T. Picraux, Antoinette J. Taylor, Los Alamos National Lab. (USA) [8984-29]

11:30 am: **Principles of perfect and ultrathin anti-reflection with applications to transparent electrode** (*Invited Paper*), Q-Han Park, KyoungHo Kim, Korea Univ. (Korea, Republic of) [8984-30]

Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 9

Location: Room 270 (Mezzanine) Tue 1:30 pm to 3:10 pm

Cavity-Related Phenomena

Session Chair: **Walter Pfeiffer**, Univ. Bielefeld (Germany)

1:30 pm: **Ultrafast tristable spin memory of a coherent polariton gas** (*Invited Paper*), Yoan Léger, Institut National des Sciences Appliquées de Rennes (France); Roland Cerna, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Taofiq K. Paraiso, California Institute of Technology (USA); Michiel Wouters, Univ. Antwerpen (Belgium); François Morier-Genoud, Marcia Portella-Oberli, Benoit Deveaud-Pledran, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8984-31]

2:00 pm: **Formation and control of transverse patterns in a quantum-fluid of microcavity polaritons**, Przemyslaw Lewandowski, Univ. Paderborn (Germany); Vincenzo Ardizzone, Lab. Pierre Aigrain (France); Yuen Chi Tse, The Chinese Univ. of Hong Kong (Hong Kong, China); Nai-Hang Kwong, College of Optical Sciences, The Univ. of Arizona (USA) and The Chinese Univ. of Hong Kong (China); Ming Ho Luk, The Chinese Univ. of Hong Kong (Hong Kong, China); Andreas Lücke, Univ. Paderborn (Germany); Marco Abbarchi, Lab. Pierre Aigrain (France) and Lab. de Photonique et de Nanostructures (France); Jacqueline I. Bloch, Lab. de Photonique et de Nanostructures (France); Emmanuel Baudin, Lab. Pierre Aigrain (France); Elisabeth Galopin, Aristide Lemaître, Lab. de Photonique et de Nanostructures (France); Pui Tang Leung, The Chinese Univ. of Hong Kong (Hong Kong, China); Philippe Roussignol, Lab. Pierre Aigrain (France); Rolf Binder, College of Optical Sciences, The Univ. of Arizona (USA); Jérôme Tignon, Lab. Pierre Aigrain (France); Stefan Schumacher, Univ. Paderborn (Germany) [8984-32]

2:20 pm: **Coupled electron-hole-photon systems in two-dimensional semiconductors** (*Invited Paper*), Chih-Wei Lai, Michigan State Univ. (USA) [8984-33]

2:50 pm: **Ultrafast nonlocal control of spontaneous emission in photonic crystals**, Chaoyuan Jin, Technische Univ. Eindhoven (Netherlands); Robert John, Max-Planck-Institut für Physik komplexer Systeme (Germany); Milo Y. Swinkels, Thang B. Hoang, Leonardo Midolo, René P. J. van Veldhoven, Andrea Fiore, Technische Univ. Eindhoven (Netherlands) [8984-34]

Coffee Break Tue 3:10 pm to 3:40 pm

SESSION 10

Location: Room 270 (Mezzanine) Tue 3:40 pm to 5:40 pm

THz Detection and Imaging

Session Chair: **Tobias Kampfrath**,
Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany)

3:40 pm: **THz detection in graphene nanotransistors** (*Invited Paper*), Alessandro Tredicucci, Lab. NEST (Italy) [8984-35]

4:10 pm: **Imaging ultrafast dynamics on the nanoscale with a THz-STM** (*Invited Paper*), Tyler L. Cocker, Univ. of Alberta (Canada) and Univ. Regensburg (Germany); Vedran Jelic, Manisha Gupta, James R. Hoffman, Sean J. Molesky, Jacob A. J. Burgess, Glenda B. De Los Reyes, Lyubov V. Titova, Ying Y. Tsui, Mark R. Freeman, Frank A. Hegmann, Univ. of Alberta (Canada) [8984-36]

4:40 pm: **Ultrafast THz-pulse-induced tunneling dynamics in an STM**, Vedran Jelic, Univ. of Alberta (Canada); Tyler L. Cocker, Univ. of Alberta (Canada) and Univ. Regensburg (Germany); James R. Hoffman, Manisha Gupta, Reginald Miller, Sean J. Molesky, Jacob A. J. Burgess, Univ. of Alberta (Canada); Glenda B. De Los Reyes, University of Alberta (Canada); Lyubov V. Titova, Ying Y. Tsui, Mark R. Freeman, Frank A. Hegmann, Univ. of Alberta (Canada) [8984-37]

Conference 8984 · Location: Room 270 (Mezzanine)

5:00 pm: **Broadband THz imaging in gas and multiple quantum-well media**, Chia-Yeh Li, The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Jeffrey G. Cederberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [8984-38]

5:20 pm: **Silicon wafer thickness measurement using terahertz time domain spectroscopy**, Chih-Yu Jen, Christiaan Richter, Rochester Institute of Technology (USA) [8984-39]

Wednesday 5 February

SESSION 11

Location: Room 270 (Mezzanine) . . . Wed 8:30 am to 10:20 am

Spins Dynamics and Ultrafast Magnetism

Session Chair: **Yoan Léger**,

Institut National des Sciences Appliquées de Rennes (France)

8:30 am: **Ultrafast spin precession and transport controlled and probed with terahertz radiation** (*Invited Paper*), Tobias Kampfrath, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Marco Battiato, Uppsala Univ. (Sweden); Alexander Sell, Univ. Konstanz (Germany); Frank Freimuth, Forschungszentrum Jülich GmbH (Germany); Alfred Leitenstorfer, Univ. Konstanz (Germany); Martin Wolf, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Rupert Huber, Univ. Regensburg (Germany); Peter M. Oppeneer, Uppsala Univ. (Sweden); Markus Münzenberg, Univ. Göttingen (Germany) [8984-40]

9:00 am: **Terahertz radiation from magnetic excitations in diluted magnetic semiconductors** (*Invited Paper*), Rakchanok Rungsawang, Ecole Supérieure de Physique et de Chimie Industrielles (France); Florent Perez, Univ. Pierre et Marie Curie (France); Dimitri Oustinov, Ecole Normale Supérieure (France); Javier Gomez, Univ. Pierre et Marie Curie (France); Valery Kolkovskiy, Grzegorz Karczewski, Tomasz Wojtowicz, Institute of Physics (Poland); Julien Madéo, Nathan Jukam, Sukhdeep S. Dhillon, Ecole Normale Supérieure (France); Jérôme Tignon, Ecole Normale Supérieure (France) and Univ. Pierre et Marie Curie (France) [8984-41]

9:30 am: **Quantum tricks with femtosecond light pulses teach magnetic devices to think ultrafast** (*Invited Paper*), Ilias E. Perakis, Univ. of Crete (Greece) [8984-42]

10:00 am: **Optical tailoring of robust electron and hole spin polarization in bulk germanium**, Jan Lohrenz, Timo Paschen, Christine Hautmann, Markus Betz, Technische Univ. Dortmund (Germany) [8984-43]

Coffee Break Wed 10:20 am to 10:50 am

SESSION 12

Location: Room 270 (Mezzanine) . . Wed 10:50 am to 12:10 pm

Strong-Field Phenomena I

Session Chair: **Peter Dombi**,

Max-Planck-Institut für Quantenoptik (Germany)

10:50 am: **Laser near-field acceleration of strong-field few-cycle photo-emitted electrons from a sharp metal tip** (*Invited Paper*), Petra Gross, Jan Vogelsang, Bjoern Piglosiewicz, Slawa Schmidt, Doo-Jae Park, Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany) [8984-44]

11:20 am: **Extreme nonlinear optical processes with beams carrying orbital angular momentum** (*Invited Paper*), Christian Spielmann, Michael Zürch, Christian Kern, Abbe School of Photonics (Germany); Peter Hansinger, Abbe School of Photonics (Germany); Alexander A. Dreischuh, Sofia Univ. "St. Kliment Ohridski" (Bulgaria) [8984-45]

11:50 am: **Extending hgh spectroscopy to new molecular species**, Felicity C. McGrath, Emma R. Simpson, Peter Hawkins, Thomas Siegel, Dane Austin, Zsolt Diveki, Amelle Zair, Imperial College London (United Kingdom); Marta Castillejo, Consejo Superior de Investigaciones Científicas (Spain); Jonathan P. Marangos, Imperial College London (United Kingdom) [8984-46]

Lunch/Exhibition Break Wed 12:10 pm to 1:50 pm

SESSION 13

Location: Room 270 (Mezzanine) Wed 1:50 pm to 3:00 pm

Strong-Field Phenomena II

Session Chair: **Christian Spielmann**,
Abbe School of Photonics (Germany)

1:50 pm: **Ultrafast strong-field plasmonics** (*Invited Paper*), Peter Dombi, Max-Planck-Institut für Quantenoptik (Germany) and Wigner Research Ctr. for Physics (Hungary) [8984-47]

2:20 pm: **Terahertz-field-induced luminescence from structured metallic layers**, Krzysztof Iwaszczuk, DTU Fotonik (Denmark); Maksim Zalkovskij, Technical Univ. of Denmark (Denmark); Andrew C. Strikwerda, Peter U. Jepsen, DTU Fotonik (Denmark) [8984-48]

2:40 pm: **Filamentation compression in the near-infrared in the 1.6 μ m to 2 μ m region**, Steffen Driever, Damien Bigourd, Imperial College London (United Kingdom); Nikita Fedorov, Commissariat à l'Énergie Atomique (France); Marion Cornet, Imperial College London (United Kingdom); David Nóvoa Fernández, Univ. de Vigo (Spain); Sébastien Montant, Stephane Petite, Dominique Descamps, Eric Cormier, Eric Constant, Univ. Bordeaux 1 (France); Julio San Román, Univ. de Salamanca (Spain); Amelle Zair, Imperial College London (United Kingdom) [8984-49]

Coffee Break Wed 3:00 pm to 3:30 pm

BEST STUDENT PAPER AWARDS CEREMONY

Location: Room 270 (Mezzanine) 3:30 pm to 3:40 pm

Join us as we award PhD student or postdoc (within the first two years after graduation) for their best student paper.

Award Sponsor: **FEMTO LASERS**

SESSION 14

Location: Room 270 (Mezzanine) Wed 3:40 pm to 5:10 pm

Nanoplasmonics II

Session Chair: **Abdulhakem Y. Elezzabi**, Univ. of Alberta (Canada)

3:40 pm: **Electromagnetic near-fields: from optical response to microscopy** (*Invited Paper*), Nir Rotenberg, Boris le Feber, FOM Institute for Atomic and Molecular Physics (Netherlands); Javier Garcia de Abajo, ICFO - Institut de Ciències Fotòniques (Spain); Laurens K. Kuipers, FOM Institute for Atomic and Molecular Physics (Netherlands) [8984-51]

4:10 pm: **Engineering plasmonic and dielectric directional nanoantennas**, Andre Hildebrandt, Matthias Reichelt, Torsten Meier, Jens Förstner, Univ. Paderborn (Germany) [8984-52]

4:30 pm: **Polarization-modulated second-harmonic generation from sub-wavelength Archimedean nanospirals**, Roderick B. Davidson, Ryan Rhoades, Jed I. Ziegler, Sergey M. Avanesyan, Richard F. Haglund Jr., Vanderbilt Univ. (USA) [8984-53]

4:50 pm: **Universal control of femtosecond pulses beyond the diffraction limit for phase investigation on the nanoscale**, Nicolò Accanto, Lukasz Piatkowski, Jana B. Nieder, Jan Renger, Marta Castro-Lopez, Francesco Pastorelli, Daan Brinks, Niek F. van Hulst, ICFO - Institut de Ciències Fotòniques (Spain) [8984-54]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Ultrafast fluorescence polarization spectroscopy of near-infrared dye in picosecond dynamic range, Kenneth J. Zhou, Stony Brook Univ. (USA); Lin Wang, The Herbert Irving Comprehensive Cancer Ctr. (USA) and Kunming Medical College (China) [8984-55]

Review of the negative-index materials, Dongshan Zhu, China Satellite Maritime Tracking & Control Dept. (China); Liheng Ma, National Univ. of Defense Technology (China) [8984-56]

Funneling of millimeter waves through 5-nm gap, Young-Mi Bahk, Jiyeah Rhie, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of) [8984-57]



Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII

Conference Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **Créidhe M. O'Sullivan**, National Univ. of Ireland, Maynooth (Ireland)

Program Committee: **Robert H. Giles**, Univ. of Massachusetts Lowell (USA); **R. Jennifer Hwu**, InnoSys, Inc. (USA); **J. Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland); **Zachary D. Taylor**, Univ. of California, Los Angeles (USA); **Michael C. Wanke**, Sandia National Labs. (USA); **Tianxin Yang**, Tianjin Univ. (China); **Jiangfeng Zhou**, Univ. of Southern Florida (USA)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 1

Location: Room 220 (Mezzanine) . . . Tue 10:30 am to 12:10 pm

Terahertz Sources I

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
Tianxin Yang, Tianjin Univ. (China)

- 10:30 am: **ErAs:GaAs extrinsic photoconductivity: a new alternative for 1550-nm-driven THz sources (Invited Paper)**, Matthieu Martin, Elliott R. Brown, Wright State Univ. (USA) [8985-1]
 - 11:10 am: **Plasmonic photoconductive terahertz optoelectronics**, Shang Hua Yang, Christopher W. Berry, Ning Wang, Mohammad R. Hashemi, Mona Jarrahi, Univ. of Michigan (USA) [8985-2]
 - 11:30 am: **Narrowband continuous-wave terahertz generation and imaging**, Brian D. Dolasinski, Peter E. Powers, Univ. of Dayton (USA) [8985-3]
 - 11:50 am: **Nonlinear optical resonators for tunable THz emission**, Raju Sinha, Mustafa Karabiyik, Chowdhury Al-Amin, Phani K. Vabbina, Nezhil Pala, Florida International Univ. (USA) [8985-4]
- Lunch/Exhibition Break Tue 12:10 pm to 1:30 pm

SESSION 2

Location: Room 220 (Mezzanine) Tue 1:30 pm to 3:30 pm

Terahertz Sources II

Session Chairs: **Tianxin Yang**, Tianjin Univ. (China);
Laurence P. Sadwick, InnoSys, Inc. (USA)

- 1:30 pm: **Photonic devices for tunable continuous-wave terahertz generation and detection (Invited Paper)**, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) [8985-5]
- 2:10 pm: **Silicon gradient index lens for THz pulse extraction**, Sang-Gil Park, Ki-Hun Jeong, KAIST (Korea, Republic of) [8985-6]
- 2:30 pm: **A cost-effective terahertz continuous-wave system based on a compact dual-mode laser diode**, Han-Cheol Ryu, Sahmyook Univ. (Korea, Republic of); Namje Kim, Kiwon Moon, Sang-Pil Han, Jeong-Woo Park, Hyunsung Ko, Eui Su Lee, Electronics and Telecommunications Research Institute (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of); Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) [8985-7]

2:50 pm: **Non-contact thickness and conductivity measurement using a continuous-wave terahertz spectrometer based on a 1.3 μm dual-mode laser**, Kiwon Moon, Namje Kim, Jeong-Woo Park, Sang-Pil Han, Hyunsung Ko, Eui Su Lee, Il-Min Lee, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) [8985-8]

3:10 pm: **Intense THz supercontinuum generation from metallic thin films with nano-pore-structures**, Cunlin Zhang, LiangLiang Zhang, Capital Normal Univ. (China) [8985-9]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 3

Location: Room 220 (Mezzanine) Tue 4:00 pm to 5:40 pm

Terahertz Sources III

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
Robert H. Giles, Univ. of Massachusetts Lowell (USA)

- 4:00 pm: **Non-contact probes for THz-integrated devices based on fiber-coupled photomixers**, Matthieu Martin, Elliott R. Brown, Wright State Univ. (USA) [8985-10]
- 4:20 pm: **Terahertz emission in organic crystals pumped by conventional laser wavelength**, Carlo Vicario, Balazs Monoszai, Paul Scherrer Institut (Switzerland); Blanca Ruiz, Mojca Jazbinsek, Carolina C. Medrano, Rainbow Photonics AG (Switzerland); Christoph P. Hauri, Paul Scherrer Institut (Switzerland) [8985-11]
- 4:40 pm: **Generation of broadband THz pulses (1-14 THz) with organic crystal DSTMS pumped by compact fs fiber lasers**, Mojca Jazbinsek, Blanca Ruiz, Carolina C. Medrano, Peter Günter, Rainbow Photonics AG (Switzerland) [8985-12]
- 5:00 pm: **Direct observation of terahertz photoluminescence from multi-layer epitaxial graphene on SiC under excitation by a mid-IR quantum cascade laser**, Peter Q. Liu, Giacomo Scalari, Federico Valmorra, Curdin Maissen, Sabine S. Riedi, ETH Zurich (Switzerland); Alfredo Bismuto, ETH Zurich (Switzerland), Alpes Lasers SA (Switzerland); Jerome Faist, ETH Zurich (Switzerland) . [8985-13]
- 5:20 pm: **Confinement loss scaling law analysis in tube lattice fibers for terahertz applications**, Masruri Masruri, Univ. degli Studi di Parma (Italy); Luca Vincetti, Univ. degli Studi di Modena e Reggio Emilia (Italy); Stefano Selleri, Annamaria Cucinotta, Carlo Molardi, Univ. degli Studi di Parma (Italy) . [8985-14]

Wednesday 5 February

SESSION 4

Location: Room 220 (Mezzanine) . . . Wed 8:00 am to 10:00 am

New Developments in THz, RF, Millimeter-Waves, and Sub-Millimeter Waves I

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA);
R. Jennifer Hwu, InnoSys, Inc. (USA)

- 8:00 am: **Epitaxial graphene devices: improving performance through materials and design optimization (Invited Paper)**, Joshua A. Robinson, The Pennsylvania State Univ. (USA) [8985-15]
- 8:30 am: **Optical design for translation of THz medical imaging technology (Invited Paper)**, Zachary D. Taylor, Univ. of California, Los Angeles (USA) [8985-16]
- 9:00 am: **High-speed and broadband RF spectrum analyzer based on spectral hole burning in rare-earth-ion doped crystal**, Perrine Berger, Loic Morvan, Daniel Dolfi, Thales Research & Technology (France); Héloïse Linget, Anne Louchet-Chauvet, Thierry Chanelière, Lab. Aimé Cotton (France) and Univ. Paris-Sud 11 (France); Jean-Louis Le Gouet, Univ. Paris-Sud 11 (France) and Lab. Aimé Cotton (France) [8985-17]

9:20 am: **10,000-fold field-enhancement for millimeter-wave transmission through one-nanometer gaps**, Sanghoon Han, Young-Mi Bahk, Namkyoo Park, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of) [8985-18]

9:40 am: **Terahertz polarization imaging for colorectal cancer detection**, Pallavi Doradla, Univ. of Massachusetts Lowell (USA); Karim Alavi, Univ. of Massachusetts Medical School (USA); Cecil S. Joseph, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8985-19]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 5

Location: Room 220 (Mezzanine) . . Wed 10:30 am to 11:50 am

Spectroscopy I

Session Chairs: **Zachary D. Taylor**, Univ. of California, Los Angeles (USA); **Laurence P. Sadwick**, InnoSys, Inc. (USA)

10:30 am: **Terahertz plasmonic waveguide sensing based on metal rod array structures**, Borwen You, National Taiwan Univ. (Taiwan) and National Cheng-Kung Univ. (Taiwan); Chien-Chun Peng, Ja-Yu Lu, National Cheng Kung Univ. (Taiwan); Hung-Hsuan Chen, Jia-Shing Jhang, Chin-Ping Yu, National Sun Yat-Sen Univ. (Taiwan); Tze-An Liu, Jin-Long Peng, Industrial Technology Research Institute (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) and Academia Sinica (Taiwan) [8985-20]

10:50 am: **Doping profile recognition in silicon using terahertz time-domain spectroscopy**, Chih-Yu Jen, Christiaan Richter, Rochester Institute of Technology (USA) [8985-21]

11:10 am: **Widening the span of GHz spacing optical frequency comb by increasing the pulse-shortening rate in RHML fiber lasers**, Tianxin Yang, Yuchen Zhang, Tianhe Wang, Tianjin Univ. (China); Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8985-22]

11:30 am: **Innovative evaluation methods for terahertz-spectra by combining different chemometric tools**, Frank Ellrich, Daniel Molter, Joachim Jonuscheit, Georg von Freyermann, René Beigang, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Frank Platte, Konstantinos Nalpanitidis, IANUS Simulation GmbH (Germany); Thorsten Sprenger, Daniel Hübsch, HÜBNER GmbH (Germany) [8985-23]

BEST STUDENT PAPER AWARDS CEREMONY

Location: Room 220 (Mezzanine) . . . 11:50 am to 12:00 pm

Join us as we award the best student paper(s) for the Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VII conference.

Award Sponsor: **HÜBNER GmbH & Co. KG**

Lunch/Exhibition Break Wed 12:00 pm to 1:40 pm

SESSION 6

Location: Room 220 (Mezzanine) Wed 1:40 pm to 3:00 pm

Spectroscopy II

Session Chairs: **Jiangfeng Zhou**, Univ. of South Florida (USA); **Zachary D. Taylor**, Univ. of California, Los Angeles (USA)

1:40 pm: **Design and engineering of organic molecules for customizable terahertz tags**, Bala Pesala, CSIR - Central Electronics Engineering Research Institute (India); Shaumik Ray, Central Electronics Engineering Research Institute (India); Jyotirmayee Dash, Kathirvel Nallappan, CSIR - Central Electronics Engineering Research Institute (India); Vaibhav Kaware, Nitin Basutkar, Ashootosh Ambade, Kavita Joshi, CSIR - National Chemical Lab. (India) [8985-24]

2:00 pm: **Terahertz spectroscopy of concrete for evaluating the critical hydration level**, Bala Pesala, Jyotirmayee Dash, CSIR - Central Electronics Engineering Research Institute (India); Shaumik Ray, Central Electronics Engineering Research Institute (India); Kathirvel Nallappan, CSIR - Central Electronics Engineering Research Institute (India); Saptarshi Sasmal, CSIR - Structural Engineering Research Ctr. (India) [8985-25]

2:20 pm: **Compact and reconfigurable fiber-based terahertz spectrometer at 1550 nm**, Alireza Zandieh, Daniel M. Hailu, David Biesty, TeTechS Inc. (Canada); Mohamed Missous, The Univ. of Manchester (United Kingdom); Daryoosh Saeedkia, TeTechS Inc. (Canada) [8985-26]

2:40 pm: **Terahertz selective and reversible volatile vapor detection using micro-porous polymer structure**, Ja-Yu Lu, National Cheng Kung Univ. (Taiwan); Borwen You, National Taiwan Univ. (Taiwan); Cheng-Han Ho, National Cheng Kung Univ. (Taiwan) [8985-27]

Coffee Break Wed 3:00 pm to 3:30 pm

SESSION 7

Location: Room 220 (Mezzanine) Wed 3:30 pm to 5:30 pm

Detectors

Session Chairs: **Robert H. Giles**, Univ. of Massachusetts Lowell (USA); **Jiangfeng Zhou**, Univ. of South Florida (USA)

3:30 pm: **Broadband monopole optical nano-antennas**, Rongguo Zhou, Jun Ding, Bayaner Arigong, Yuankun Lin, Hualiang Zhang, Univ. of North Texas (USA) [8985-29]

3:50 pm: **Ultrabroadband phased-array electronic warfare (EW) receivers based on optical techniques**, Brock M. Overmiller, Christopher A. Schuetz, Garrett J. Schneider, Janusz A. Murakowski, Dennis W. Prather, Univ. of Delaware (USA) [8985-30]

4:10 pm: **Nb₅N₆ microbolometers integrated with diffractive lens array for THz imaging**, Lin Kang, Xuecou Tu, Qingkai Mao, Cao Wan, Jian Chen, Peiheng Wu, Nanjing Univ. (China) [8985-31]

4:30 pm: **High-performance room-temperature THz nanodetectors with a split ring antenna**, Leonardo Viti, Scuola Normale Superiore (Italy); Daniele Ercolani, Scuola Normale Superiore (Italy); Dominique Coquillat, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France); Wojciech Knap, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France); Lucia Sorba, Miriam S. Vitiello, Scuola Normale Superiore (Italy) [8985-32]

4:50 pm: **Extraction and accuracy control of optical parameters for materials by terahertz time-domain spectroscopy signal**, Dongxiong Ling, Dongguan Univ. of Technology (China) [8985-33]

5:10 pm: **Possibilities to make the panoramic receiver-frequencymeter in terahertz band at the base of Josephson junctions**, Alexander Denisov, State Research Ctr. of Superconductive Radioelectronics - Iceberg (Ukraine); Jing hui Qiu, Harbin Institute of Technology (China) [8985-34]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Continuous wave terahertz radiation using frequency-swept optical beat source, Yong Seok Kwon, Byeong Kwon Choi, Myeong Ock Ko, Chungnam National Univ. (Korea, Republic of); Sang-Pil Han, Namje Kim, Electronics and Telecommunications Research Institute (Korea, Republic of); Han-Cheol Ryu, Sahmyook Univ. (Korea, Republic of); Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of) [8985-55]

Strong absorption of molecules inside terahertz nano-slot antenna, Jiyeah Rhie, Hyeong-Ryeol Park, Young-Mi Bahk, Dai-Sik Kim, Seoul National Univ. (Korea, Republic of) [8985-56]

Dispersion-flattened THz photonic crystal fiber, Soeun Kim, Young Soo Lee, Chul Kang, Bok Hyeon Kim, Chul-Sik Kee, Gwangju Institute of Science and Technology (Korea, Republic of); Chung Ghiu Lee, Chosun Univ. (Korea, Republic of) [8985-57]

Subharmonic mixing at 0.6 THz in an AlGaAs/InGaAs/AlGaAs field effect transistor, Valeria Giliberti, Alessandra Di Gaspare, Istituto di Fotonica e Nanotecnologie (Italy); Sebastian Boppel, Alvydas Lisauskas, Hartmut G. Roskos, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany); Michele Ortolani, Univ. degli Studi di Roma La Sapienza (Italy) and Istituto di Fotonica e Nanotecnologie (Italy) [8985-58]

Coded and compressive THz imaging with metamaterials, Claire M. Watts, David Shrekenhamer, Boston College (USA); John A. Montoya, The Univ. of New Mexico (USA); Guy Lipworth, John D. Hunt, Duke Univ. (USA); Tim Sleasman, Boston College (USA); Sanjay Krishna, The Univ. of New Mexico (USA); David R.

Conference 8985 · Location: Room 220 (Mezzanine)

Smith, Duke Univ. (USA); Willie Padilla, Boston College (USA). [8985-59]

Lunch/Exhibition Break Thu 11:50 am to 1:20 pm

Thursday 6 February

SESSION 8

Location: Room 220 (Mezzanine) Thu 8:00 am to 10:00 am

New Developments in THz, RF, Millimeter-Waves, and Sub-Millimeter Waves II

Session Chairs: **Robert H. Giles**, Univ. of Massachusetts Lowell (USA); **Laurence P. Sadwick**, InnoSys, Inc. (USA)

8:00 am: **Active metasurfaces**, Ada-Simona Popescu, Igor Bendoyan, Andrii B. Golovin, The City College of New York (USA); Alain Bergeron, Linda Marchese, Marc Terroux, INO (Canada); David T. Crouse, The City College of New York (USA). [8985-35]

8:20 am: **Nonreciprocity and gyromagnetically-induced transparency of metasurfaces**, Alexander B. Khanikaev, The Univ. of Texas at Austin (USA) and Queens College (USA); S. Hossein Mousavi, The Univ. of Texas at Austin (USA); Jeffery W. Allen, Monica S. Allen, Air Force Research Lab. (USA); Gennady B. Shvets, The Univ. of Texas at Austin (USA) [8985-36]

8:40 am: **RF-photonic wideband measurements of energetic pulses on NIF enhanced by compressive sensing algorithms**, Jason T. Chou, Lawrence Livermore National Lab. (USA); George C. Valley, The Aerospace Corp. (USA); Vincent J. Hernandez, Corey V. Bennett, Lawrence Pelz, John E. Heebner, Jean-Michel G. Di Nicola, Mark Bowers, Lawrence Livermore National Lab. (USA) [8985-37]

9:00 am: **Terahertz applications: trends and challenges**, Thierry Robin, Clementine Bouye, Jacques Cochard, TEMATYS (France) [8985-38]

9:20 am: **RF-wave generation using external-cavity laser diodes frequency-enhanced by a single optical cavity by using orthogonally-polarized modes**, Tomoyuki Uehara, Hagiwara Kohei, Toshihide Tanigaki, Kenichiro Tsuji, Noriaki Onodera, National Defense Academy of Japan (Japan) [8985-39]

9:40 am: **3D transitions between waveguides and transmission lines in multilayer monolithic millimeter-wave (mmW) integrated circuits (MMMICs) on liquid crystal polymer (LCP) substrates**, Yifei Zhang, Shouyuan Shi, Richard D. Martin, Dennis W. Prather, Univ. of Delaware (USA) [8985-40]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 9

Location: Room 220 (Mezzanine) . . . Thu 10:30 am to 11:50 am

Terahertz, RF, Millimeter-Wave, and Sub-Millimeter-Wave Passive Components

Session Chairs: **J. Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland); **Michael C. Wanke**, Sandia National Labs. (USA)

10:30 am: **Compact notch microwave photonic filter using SOI microring and microdisk resonators**, Li Liu, Jianji Dong, Ting Yang, Xinliang Zhang, Dingshan Gao, Huazhong Univ. of Science and Technology (China) [8985-41]

10:50 am: **Techniques for the modelling of QUBIC: a next-generation quasi-optical bolometric interferometer for cosmology**, Stephen P. Scully, Donnacha Gayer, David Bennet, Cr  idhe O'Sullivan, Marcin Gradziel, National Univ. of Ireland, Maynooth (Ireland) [8985-42]

11:10 am: **Dual-frequency laser harmonic phase locking: Ultra-narrow line width of an optically carried signal at 300 GHz**, Joachim B  rner, Thales Research & Technology (France); Katarzyna Balakier, Univ. College London (United Kingdom); Gregoire Pillet, Loic Morvan, Thales Research & Technology (France); Cyril C. Renaud, Univ. College London (United Kingdom); Daniel Dolfi, Thales Research & Technology (France). [8985-43]

11:30 am: **Dual-frequency characterization of bending loss in hollow flexible terahertz waveguides**, Pallavi Doradla, Robert H. Giles, Univ. of Massachusetts Lowell (USA) [8985-44]

SESSION 10

Location: Room 220 (Mezzanine) Thu 1:20 pm to 3:00 pm

RF, Sub-Millimeter-Wave, and Millimeter-Wave Sources

Session Chairs: **Laurence P. Sadwick**, InnoSys, Inc. (USA); **Michael C. Wanke**, Sandia National Labs. (USA)

1:20 pm: **A widely-tunable narrow linewidth RF source utilizing an integrated heterogeneous photonic module**, David W. Grund Jr., Garrett J. Schneider, Janusz A. Murakowski, Dennis W. Prather, Univ. of Delaware (USA) [8985-45]

1:40 pm: **An ultra-wide bandwidth analog front-end circuit for 60-GHz wireless communication receiver**, Masanori Furuta, Toshiba Corp. (Japan) [8985-46]

2:00 pm: **Photonic generation of continuously-tunable microwave signals exploiting two tunable external-cavity lasers based on a polymer Bragg grating**, Seung Bin K. Ahn, Sunduck Kim, Young-Geun Han, Hanyang Univ. (Korea, Republic of) [8985-47]

2:20 pm: **Continuously-tunable microwave photonic filter based on a multiwavelength fiber laser incorporating polarization-differential time delay and nonlinear polarization rotation**, Young Bo Shim, Sunduck Kim, Young-Geun Han, Hanyang Univ. (Korea, Republic of) [8985-48]

2:40 pm: **On the metrological performances of optoelectronic oscillators based on whispering gallery mode resonators**, Khaldoun Saleh, Aur  lien Coillet, R  mi Henriet, Patrice Salzenstein, Laurent Larger, Yanne K. Chembo, FEMTO-ST (France) [8985-49]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 11

Location: Room 220 (Mezzanine) Thu 3:30 pm to 5:10 pm

New Developments in THz, RF, Millimeter-Waves, and Sub-Millimeter Waves III

Session Chairs: **R. Jennifer Hwu**, InnoSys, Inc. (USA); **J. Anthony Murphy**, National Univ. of Ireland, Maynooth (Ireland)

3:30 pm: **Graphene-based optical modulator realized in metamaterial split-ring resonators operating in the THz frequency range**, Riccardo Degl'Innocenti, David Jessop, Yash D. Shah, Juraj Sibik, Axel Zeitler, Piran R. Kidambi, Stephan Hoffman, Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom) [8985-50]

3:50 pm: **Polymeric waveguide components for THz quantum cascade laser outcoupling**, Fabrizio Castellano, Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom) [8985-51]

4:10 pm: **Enhanced transmission and beam confinement using bullseye plasmonic lenses at THz frequencies**, Tanner J. Heggie, David A. Naylor, Brad G. Gom, Univ. of Lethbridge (Canada); Evgueni V. Bordatchev, National Research Council Canada (Canada) [8985-52]

4:30 pm: **An optically-controlled microwave phase stabilizer based on polarization interference technique using semiconductor optical amplifier**, Han Chen, Mingming Sun, Xiaohan Sun, Southeast Univ. (China) [8985-53]

4:50 pm: **Analysis for multi-tone signal transmission using phase modulation in microwave photonic systems**, Sandeep K. Arya, Guru Jambheshwar Univ. of Science and Technology (India) [8985-54]

Gallium Nitride Materials and Devices IX

Conference Chairs: **Jen-Inn Chyi**, National Central Univ. (Taiwan); **Yasushi Nanishi**, Ritsumeikan Univ. (Japan); **Hadis Morkoç**, Virginia Commonwealth Univ. (USA)

Conference Co-Chairs: **Joachim Piprek**, NUSOD Institute LLC (USA); **Euijoon Yoon**, Seoul National Univ. (Korea, Republic of); **Hiroshi Fujioka**, The Univ. of Tokyo (Japan)

Program Committee: **Hiroshi Amano**, Nagoya Univ. (Japan); **Jong Hyeob Baek**, Korea Photonics Technology Institute (Korea, Republic of); **Shigefusa F. Chichibu**, Tohoku Univ. (Japan); **Bernard Gil**, Univ. Montpellier 2 (France); **Nicolas Grandjean**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Hideki Hirayama**, RIKEN (Japan); **Stacia Keller**, Univ. of California, Santa Barbara (USA); **Michael Kneissl**, Technische Univ. Berlin (Germany); **Hao-Chung Kuo**, National Chiao Tung Univ. (Taiwan); **Narihiko Maeda**, NTT Photonics Labs. (Japan); **Koh Matsumoto**, Taiyo Nippon Sanso EMC Ltd. (Japan); **Hideto Miyake**, Mie Univ. (Japan); **Yong-Tae Moon**, LG Electronics Inc. (Korea, Republic of); **Ki-Bum Nam**, Seoul Semiconductor (Korea, Republic of); **Ümit Özgür**, Virginia Commonwealth Univ. (USA); **Ulrich T. Schwarz**, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); **Tae-Yeon Seong**, Korea Univ. (Korea, Republic of); **Jong-In Shim**, Hanyang Univ. (Korea, Republic of); **Chih-Chung Yang**, National Taiwan Univ. (Taiwan)

Monday 3 February

SESSION 1

Location: Room 111 (Exhibit Level) . Mon 8:00 am to 10:00 am

Growth I

Session Chair: **Hadis Morkoç**, Virginia Commonwealth Univ. (USA)

8:00 am: **Large-area bow-free n⁺ GaN templates by HVPE for LEDs** (*Invited Paper*), Jacob H. Leach, Yevgeniy Shishkin, Kevin Udway, Edward A. Preble, Keith R. Evans, Kyra Technologies, Inc. (USA) [8986-1]

8:30 am: **Growth of bulk GaN crystal by Na flux method** (*Invited Paper*), Yusuke Mori, Osaka Univ. (Japan) [8986-2]

9:00 am: **Examination of growth rate during hydride vapor phase epitaxy of GaN on ammonothermal GaN seeds**, Boleslaw Lucznik, Michal Bockowski, Institute of High Pressure Physics (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland); Izabella Grzegory, Institute of High Pressure Physics (Poland) [8986-3]

9:15 am: **Free-standing HVPE-GaN crystals obtained from ammonothermally grown GaN substrates as seeds for the HVPE and high nitrogen pressure solution growth**, Michal Bockowski, Institute of High Pressure Physics (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland); Izabella Grzegory, Institute of High Pressure Physics (Poland) [8986-4]

9:30 am: **Recent developments on highly-resistive GaN substrates obtained by ammonothermal method**, Marcin Zajac, Roman Doradzinski, Robert Dwilinski, Malgorzata Iwinska, Robert Kucharski, Ammono Sp. z o.o. (Poland); Jerzy Krupka, Warsaw Univ. of Technology (Poland); Romuald Stankiewicz, Ammono Sp. z o.o. (Poland) [8986-5]

9:45 am: **Homoepitaxial growth of AlN films on freestanding AlN (0001) substrates by metalorganic vapor phase epitaxy**, Tomohiro Morishita, Asahi Kasei Corp. (Japan); Motoaki Iwaya, Tetsuya Takeuchi, Satoshi Kamiyama, Isamu Akasaki, Meijo Univ. (Japan) [8986-6]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 111 (Exhibit Level) Mon 10:30 am to 12:00 pm

Growth II

Session Chair: **Hiroshi Fujioka**, The Univ. of Tokyo (Japan)

10:30 am: **The growth optimization for high-quality crack-free GaN on pre-strained Si (111)** (*Invited Paper*), Wang Nang Wang, C. Liu, Univ. of Bath (United Kingdom); Hao-Chung Kuo, C. Y. Chen, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan) and National Chiao Tung Univ. (Taiwan); C. J. Sun, G. T. Chen, M. S. Hu, Veeco Taiwan, Inc. (Taiwan); A. Paranjpe, George Pappasoulotis, Veeco Instruments Inc. (USA) [8986-7]

11:00 am: **GaN on Si: a promising route for integrated photonics** (*Invited Paper*), Fabrice Semon, Mohammad J. Rashid, Guillaume Gommé, Sylvain Sergent, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Bruno Gayral, Diane Sam-Giao, Commissariat à l'Énergie Atomique (France); Philippe Boucaud, Delphine Néel, Xavier Checoury, Institut d'Électronique Fondamentale (France) and Univ. Paris Sud (France); Thierry Guillet, Christelle Brimont, Meletios Mexis, Lab. Charles Coulomb (France); François Réveret, Joel Leymarie, Institut Pascal (France); Sophie Bouchoule, Lab. de Photonique et de Nanostructures (France) [8986-8]

11:30 am: **(20-21) GaN growth on 2" patterned sapphire substrates**, Tobias Meisch, Maryam Alimoradi-Jazi, Ferdinand Scholz, Univ. Ulm (Germany) [8986-9]

11:45 am: **Low extended defect density non-polar a-plane GaN films grown on nanowire templates**, Hsun Chih Kuo, Tae Su Oh, S. J. Kim, Xiaoqing Pan, Pei-Cheng Ku, Univ. of Michigan (USA) [8986-10]

Lunch Break Mon 12:00 pm to 1:15 pm

SESSION 3

Location: Room 111 (Exhibit Level) . . Mon 1:15 pm to 3:00 pm

Growth III

Session Chair: **Michal Bockowski**, Institute of High Pressure Physics (Poland)

1:15 pm: **New directions in GaN material research: thinner and smaller** (*Invited Paper*), Jung Han, Yale Univ. (USA) [8986-11]

1:45 pm: **Application of BN for GaN devices** (*Invited Paper*), Yasuyuki Kobayashi, Hirosaki Univ. (Japan); Kazuhide Kumakura, Tetsuya Akasaka, Hideki Yamamoto, NTT Basic Research Labs. (Japan); Toshiki Makimoto, Waseda Univ. (Japan) [8986-12]

2:15 pm: **RF-MBE growth of GaN on alpha-Ga₂O₃ and mist CVD growth of Ga₂O₃ on GaN**, Tohru Honda, Tomohiro Yamaguchi, Takumi Hatakeyama, Daiki Tajimi, Yohei Sugiura, Kogakuin Univ. (Japan) [8986-13]

2:30 pm: **The impact of the development on GaN-on-Si(100) substrate using pulsed laser deposition**, Kun-Ching Shen, Ming-Chien Jiang, Hsu-Hung Hsueh, Yu-Cheng Kao, Hung-I Lin, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan); Dong-Sing Wu, National Chung Hsing Univ. (Taiwan) and Da-Yeh Univ. (Taiwan) [8986-14]

2:45 pm: **Defect-assisted exfoliation of GaN/InGaN flexible nanomembranes for optoelectronic applications**, Rami T. ElAfandy, Mohammed A. Majid, Ahmed B. Slimane, Ahmed A. Al-Jabr, Tien Khee Ng, Boon S. Ooi, King Abdullah Univ. of Science and Technology (Saudi Arabia) [8986-15]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 4

Location: Room 111 (Exhibit Level) . . Mon 3:30 pm to 6:00 pm

Material Characterization I

Session Chair: **Yasushi Nanishi**, Ritsumeikan Univ. (Japan)

3:30 pm: **Defects in nitride semiconductors** (*Invited Paper*), Anna Cavallini, Univ. degli Studi di Bologna (Italy) [8986-16]

4:00 pm: **Strain and charge density mapping of piezoelectric semiconductor heterostructures by sub-nanometer resolution inline electron holography** (*Invited Paper*), Sang Ho Oh, Pohang Univ. of Science and Technology (Korea, Republic of) [8986-17]

4:30 pm: **Suppression of thermal conductivity in In_xGa_{1-x}N alloys by nanometer-scale disorder** (*Invited Paper*), Trong V. Tong, Univ. of Illinois at Urbana-Champaign (USA) [8986-18]

Conference 8986 · Location: Room 111 (Exhibit Level)

5:00 pm: **Measurement of the indium concentration in high-indium content InGaN layers by scanning transmission electron microscopy and atom probe tomography** (*Invited Paper*), Andreas Rosenauer, Knut Müller, Thorsten Mehrrens, Marco Schowalter, Timo Aschenbrenner, Carsten Kruse, Detlef Hommel, Univ. Bremen (Germany); Lars Hoffmann, Andreas Hangleiter, Technische Univ. Braunschweig (Germany); Pyuck-Pa Choi, Dierk Raabe, Max-Planck-Institut für Eisenforschung GmbH (Germany) [8986-19]

5:30 pm: **Polarized time-resolved photoluminescence measurements of m-plane AlGaIn/GaN MQWs**, Daniel Rosales, Bernard Gil, Thierry Bretagnon, Univ. Montpellier 2 (France); Fan Zhang, Morteza Monavarian, Vitaliy Avrutin, Serdal Okur, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [8986-20]

5:45 pm: **Optical and structural nanocharacterization of extended defects in GaN nanocolumns by low-temperature scanning transmission electron microscopy cathodoluminescence**, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Marcus Müller, Otto-von-Guericke Univ. Magdeburg (Germany); Gordon Schmidt, Christopher Karbaum, Peter Veit, Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany); Arne Urban, Joerg Malindretos, Angela Rizzi, Georg-August-Univ. Göttingen (Germany) [8986-21]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 111 (Exhibit Level) . Tue 10:30 am to 12:15 pm

Material Characterization II

Session Chair: **Jürgen Christen**, Otto-von-Guericke-Univ. Magdeburg (Germany)

10:30 am: **Integrated photonics on silicon with wide bandgap GaN semiconductor** (*Invited Paper*), Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8986-22]

11:00 am: **Gain saturation in InGaN superluminescent diodes**, Anna Kafar, Szymon Stanczyk, Institute of High Pressure Physics (Poland); Grzegorz Targowski, TopGaN Ltd. (Poland); Tadek Suski, Piotr Perlin, Institute of High Pressure Physics (Poland) [8986-23]

11:15 am: **Time-resolved photoluminescence of GaN/AlN quantum dots emitting at 300 nm**, Julien Sellés, Guillaume Cassabois, Thierry Guillet, Univ. Montpellier 2 (France); Fabrice Sémont, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) [8986-24]

11:30 am: **Cathodoluminescence study on defects in strained InGaN green laser diodes grown on semi-polar (20-21) GaN substrate**, Lucja Marona, Marcin Sarzynski, Ewa Grzanka, Przemek Wisniewski, Piotr Perlin, Tadek Suski, Institute of High Pressure Physics (Poland); Robert Czernecki, TopGaN Ltd. (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland) [8986-25]

11:45 am: **Origin of non-radiative losses in thick InGaIn/GaN QWs**, Felix Nippert, Technische Univ. Berlin (Germany); Anna Nirschl, Ines Pietzonka, Hans-Jürgen Lugauer, OSRAM Opto Semiconductors GmbH (Germany); Thomas Kure, Christian Nenstiel, Gordon Callsen, Max Bügler, Technische Univ. Berlin (Germany); Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany); Axel Hoffmann, Technische Univ. Berlin (Germany) [8986-26]

12:00 pm: **Point defect management in AlGaIn by fermi-level control during growth**, Marc P. Hoffmann, Ronny Kirste, Zachary Bryan, Isaac Bryan, Ramon Collazo, Zlatko Sitar, North Carolina State Univ. (USA); Michael Gerhold, U.S. Army Research Office (USA) [8986-27]

Lunch/Exhibition Break Tue 12:15 pm to 1:30 pm

SESSION 6

Location: Room 111 (Exhibit Level) . . . Tue 1:30 pm to 3:15 pm

Material Characterization III

Session Chair: **Jung Han**, Yale Univ. (USA)

1:30 pm: **Simultaneous optical and structural investigation of defects in polar, semipolar, and nonpolar nitride heterostructures** (*Invited Paper*), Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany) [8986-28]

2:00 pm: **Radiative and nonradiative decay of excitons in GaN nanowires** (*Invited Paper*), Christian Hauswald, Timur Flissikowski, Holger Grahn, Lutz Geelhaar, Henning Riechert, Oliver Brandt, Paul-Drude-Institut für Festkörperelektronik (Germany) [8986-29]

2:30 pm: **Direct verification of commonly-used rate-equation model in III-nitride material by detailed analysis of photoluminescence decay curves**, Hitoshi Manabe, Kanazawa Institute of Technology (Japan); Hiroki Goto, Haruo Sunakawa, Toshiharu Matsueda, Furukawa Co., Ltd. (Japan); Akiko Okada, Waseda Univ. (Japan); Hidetoshi Shinohara, Hiromi Nishihara, Hiroshi Goto, Toshiba Machine Co., Ltd. (Japan); Jun Mizuno, Waseda Univ. (Japan); Akira Usui, Furukawa Co., Ltd. (Japan); Atsushi A. Yamaguchi, Kanazawa Institute of Technology (Japan) [8986-30]

2:45 pm: **Linear and nonlinear optical properties of polarity-controlled AlGaIn waveguides for integrated optics**, Martin Rigler, Univ. of Ljubljana (Slovenia); Jože Buh, Jožef Stefan Institute (Slovenia); Marc P. Hoffman, Ronny Kirste, Wei Guo, Isaac S. Bryan, North Carolina State Univ. (USA); Seiji Mita, HexaTech, Inc. (USA); Ramon Collazo, Zlatko Sitar, North Carolina State Univ. (USA); Marko Zgonik, Univ. of Ljubljana (Slovenia), Jožef Stefan Institute (Slovenia) . . [8986-31]

3:00 pm: **Correlation of optical properties and defect structures of semipolar GaN on pre-patterned sapphire substrates using cathodoluminescence microscopy**, Sebastian Metzner, Frank Bertram, Thomas Hempel, Otto-von-Guericke-Univ. Magdeburg (Germany); Tobias Meisch, Univ. Ulm (Germany); Stephan Schwaiger, Univ. Ulm (Germany) and Osram Herbrenchtingen (Germany); Ferdinand Scholz, Univ. Ulm (Germany); Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany) [8986-32]

Coffee Break Tue 3:15 pm to 3:45 pm

SESSION 7

Location: Room 111 (Exhibit Level) . . . Tue 3:45 pm to 6:00 pm

Nanostructures and Devices I

Session Chair: **Eva Monroy**, CEA Grenoble (France)

3:45 pm: **Growth of GaN dots with semi-polar orientations for UV LEDs fabrication** (*Invited Paper*), Julien Brault, Benjamin Damilano, Aimeric Courville, Mathieu Leroux, Abdelkarim Kahouli, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Borge Vinter, Univ. de Nice Sophia Antipolis (France); Philippe Vennéguès, Sébastien Chenot, Philippe De Mierry, Jean Massies, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) [8986-33]

4:15 pm: **GaN, InGaIn, and AlGaIn quantum dots in nanowires heterostructures: growth and optical properties** (*Invited Paper*), Bruno Daudin, Thomas Auzelle, Gabriel Tourbot, Karine Hestroffer, Commissariat à l'Énergie Atomique (France); Aurélie Pierret, Commissariat à l'Énergie Atomique (France); Luiz Zagonel, Lab. Photons Et Matière (France) and Ctr. National de la Recherche Scientifique (France); Luiz Tizei, Sophie Meuret, Lab. de Physique des Solides (France) and Ctr. National de la Recherche Scientifique (France); Catherine Bougerol, Institut NEEL (France) and Ctr. National de la Recherche Scientifique (France); Bruno Gayral, Commissariat à l'Énergie Atomique (France); Mathieu Kociak, Lab. de Physique des Solides (France) and Ctr. National de la Recherche Scientifique (France) [8986-34]

4:45 pm: **Realization of the high conversion efficiency solar cells using high InN molar fraction GaInN active layer** (*Invited Paper*), Motoaki Iwaya, Hironori Kurokawa, Yosuke Katsu, Taiji Yamamoto, Tetsuya Takauchi, Satoshi Kamiyama, Isamu Akasaki, Meijo Univ. (Japan); Hiroshi Amano, Nagoya Univ. (Japan) [8986-35]

5:15 pm: **Dependence of emission wavelength on the growth condition of regularly patterned InGaIn/GaN quantum-well nanorod arrays**, Chang-Gan Tu, Che-Hao Liao, Wen-Ming Chang, Chia-Ying Su, Yu-Feng Yao, Horng-Shyang Chen, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8986-36]

5:30 pm: **The formation of hexagonal-shaped InGaIn-nanodisk on GaN-nanowire observed in plasma source molecular beam epitaxy**, Tien Khee Ng, Anwar Gasim, Dongkyu Cha, Bilal Janjua, Yang Yang, King Abdullah Univ. of Science and Technology (Saudi Arabia); Shafat Jahangir, Univ. of Michigan (USA); Chao Zhao, King Abdullah Univ. of Science and Technology (Saudi Arabia); Pallab K. Bhattacharya, Univ. of Michigan (USA); Boon S. Ooi, King Abdullah Univ. of Science and Technology (Saudi Arabia) [8986-37]

5:45 pm: **Room-temperature single-photon emission from site-controlled GaN quantum dots**, Mark Holmes, Kihyun Choi, Satoshi Kako, Munetaka Arita, Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [8986-38]

Wednesday 5 February

SESSION 8

Location: Room 111 (Exhibit Level) · Wed 8:00 am to 10:15 am

Nanostructures and Devices II

Session Chair: **Julien Brault**,

Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France)

8:00 am: **Strong coupling and lasing in all-dielectric GaN microcavities at room temperature** (*Invited Paper*), Pavlos Savvidis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Konstantinos Daskalakis, Foundation for Research and Technology-Hellas (Greece) and Imperial College London (United Kingdom) and Univ. of Crete (Greece); Peter Eldridge, Foundation for Research and Technology-Hellas (Greece); Emmanuil Trichas, Nikolaos Pelekanos, Univ. of Crete (Greece) and Foundation for Research and Technology-Hellas (Greece); Eleuterios Iliopoulos, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Eva Monroy, CEA Grenoble (France) [8986-39]

8:30 am: **Progress on III-nitride materials for intersubband optoelectronics** (*Invited Paper*), Mark Beeler, Edith Bellet-Amalric, CEA Grenoble (France); Catherine Bougerol, Institut NÉEL (France); Eva Monroy, CEA Grenoble (France) [8986-40]

9:00 am: **P-type InN nanowires: towards ultrahigh-speed nanoelectronics and nanophotonics**, Songrui Zhao, McGill Univ. (Canada) [8986-41]

9:15 am: **Optical characterization of highly-germanium-doped GaN nanowires**, Christian Nienstiel, Max Bügler, Gordon Callens, Technische Univ. Berlin (Germany); Jörg Schörmann, Jörg Teubert, Pascal Hille, Martin H. Eickhoff, Justus-Liebig-Univ. Giessen (Germany); Axel Hoffmann, Technische Univ. Berlin (Germany) [8986-42]

9:30 am: **MOCVD-grown dislocation-free InGaN nanowires with a 2.5 eV band gap for photovoltaics**, Hsun Chih Kuo, Tae Su Oh, S. J. Kim, Xiaoping Pan, Pei-Cheng Ku, Univ. of Michigan (USA) [8986-43]

9:45 am: **Mode and polarization control in gallium nitride nanowire lasers**, George T. Wang, Sandia National Labs. (USA); Huiwen Xu, The Univ. of New Mexico (USA); Jeremy B. Wright, Sandia National Labs. (USA); Antonio Hurtado, The Univ. of New Mexico (United Kingdom); Ting-Shan Luk, Jeffrey J. Figiel, Sandia National Labs. (USA); Luke F. Lester, The Univ. of New Mexico (USA); Qiming Li, Igal Brener, Sandia National Labs. (USA) [8986-44]

10:00 am: **Comprehensive and rigorous theoretical analyses of InGaN solar cells in whole composition range and a serious bottleneck when fabricating on bulk GaN substrate**, Akihiko Yoshikawa, Chiba Univ. (Japan); Kazuhide Kusakabe, Chiba Univ (Japan); Naoki Hashimoto, Chiba Univ. (Japan) . . [8986-45]
Coffee Break Wed 10:15 am to 10:45 am

SESSION 9

Location: Room 111 (Exhibit Level) Wed 10:45 am to 12:00 pm

Electrical Properties and Devices

Session Chair: **Jen-Inn Chyi**, National Central Univ. (Taiwan)

10:45 am: **Defects in GaN-based transistors** (*Invited Paper*), Steven A. Ringel, Aaron Arehart, Anup Sasikumar, Zeng Zhang, The Ohio State Univ. (USA); Jim Speck, Erin C. H. Kyle, Micha Fireman, Stephen Kaun, Univ. of California, Santa Barbara (USA); Ronald D. Schrimpf, Dan Fleetwood, Vanderbilt Univ. (USA) [8986-47]

11:15 am: **Effect of electron density on cutoff frequency of III-N HFETs** (*Invited Paper*), Arvydas Matulionis, Ctr. for Physical Sciences and Technology (Lithuania); Hadis Morkoç, Virginia Commonwealth Univ. (USA) [8986-48]

11:45 am: **Electrical characteristics of AlGaIn-GaN high electron mobility transistors and AlGaIn Schottky diodes irradiated with protons**, Yongkun Sin, Brendan Foran, Nathan Presser, Stephen LaLumondiere, William Lotshaw, Steven C. Moss, The Aerospace Corp. (USA) [8986-49]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

SESSION 10

Location: Room 111 (Exhibit Level) .. Wed 1:30 pm to 3:15 pm

LED I

Session Chair: **Uwe Strauss**,

OSRAM Opto Semiconductors GmbH (Germany)

1:30 pm: **III-nitride tunnel junctions for efficient solid state lighting** (*Invited Paper*), Siddharth Rajan, Sriram Krishnamoorthy, Fatih Akyol, The Ohio State Univ. (USA) [8986-46]

2:00 pm: **Monolithic white-light-emitting diodes grown by MOCVD** (*Invited Paper*), Benjamin Damilano, Kaddour Lekhal, Hyonju Kim-Chauveau, Sakhawat Hussain, Eric Frayssinet, Julien Brault, Sébastien Chenot, Philippe Vennéguès, Philippe de Mierry, Jean Massies, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) [8986-50]

2:30 pm: **Optical properties of InGaIn/GaN MQW LEDs grown on Si (111) substrates with low threading dislocation densities**, Shigeya Kimura, Jumpei Tajima, Hajime Nago, Toshiaki Hikosaka, Hisashi Yoshida, Kenjiro Uesugi, Shinya Nunoue, Toshiba Corp. (Japan) [8986-51]

2:45 pm: **Nanoscale indium fluctuation in the InGaIn quantum-well LED to the efficiency droop with a fully 3D simulation model**, Tsung-Jui Yang, Yuh-Renn Wu, National Taiwan Univ. (Taiwan); Jim Speck, Univ. of California, Santa Barbara (USA) [8986-52]

3:00 pm: **InGaIn/GaN quantum-well light-emitting diode grown on patterned Si (110) substrate**, Chia-Ying Su, Chih-Yen Chen, Zhan Hui Liu, Ta-Wei Chang, Pei-Ying Shih, Horng-Shyang Chen, Che-Hao Liao, Chieh Hsieh, Wang-Hsien Chou, Chen-Hung Shen, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [8986-53]

Coffee Break Wed 3:15 pm to 3:45 pm

SESSION 11

Location: Room 111 (Exhibit Level) .. Wed 3:45 pm to 6:00 pm

Lasers

Session Chair: **Joachim Piprek**, NUSOD Institute LLC (USA)

3:45 pm: **Design and lasing characteristics of GaN vertical elongated cavity surface-emitting lasers** (*Invited Paper*), Masao Kawaguchi, Osamu Imafuji, Kentaro Nagamatsu, Kazuhiko Yamanaka, Shinichi Takigawa, Takuma Katayama, Panasonic Semiconductor Discrete Devices Co., Ltd. (Japan) [8986-54]

4:15 pm: **Recent advances in c-plane GaN visible lasers** (*Invited Paper*), Uwe Strauss, Thomas Hager, Fabian Kopp, André Somers, Christoph Eichler, Clemens Vierheilg, Andreas Löffler, Jelena Ristic, Adrian Avramescu, OSRAM Opto Semiconductors GmbH (Germany) [8986-55]

4:45 pm: **Evolution of thermal stability of InGaIn laser diodes emitting in the range of 390-436 nm**, Agata Bojarska, Jakub Goss, Lucja Marona, Anna Kafar, Szymon Stanczyk, Institute of High Pressure Physics (Poland); Irina Makarowa, Grzegorz Targowski, TopGaIn Ltd. (Poland); Tadek Suski, Piotr Perlin, Institute of High Pressure Physics (Poland) and TopGaIn Ltd. (Poland) [8986-56]

5:00 pm: **Can hole-electron plasma oscillation stabilize cavity-free lasing in InGaIn structures?**, Agata Bojarska, Institute of High Pressure Physics (Poland); Igor V. Smetanin, P.N. Lebedev Physical Institute (Russian Federation); Alexandr Khachapuridze, Institute of High Pressure Physics (Poland); Robert Czernecki, Institute of High Pressure Physics (Poland) and TopGaIn Ltd. (Poland); Tadek Suski, Institute of High Pressure Physics (Poland); Piotr Perlin, Institute of High Pressure Physics (Poland) and TopGaIn Ltd. (Poland) [8986-57]

5:15 pm: **Advances in AlGaInN laser diode technology**, Stephen P. Najda, TopGaIn Ltd. (Poland) [8986-58]

5:30 pm: **Understanding the aging mechanisms of InGaIn-based laser diodes: a study based on micro-CL and micro-PL measurements**, Matteo Meneghini, Simone Carraro, Gaudenzio Meneghesso, Univ. degli Studi di Padova (Italy); Giovanna Mura, Univ. degli Studi di Cagliari (Italy); Francesca Rossi, Consiglio Nazionale delle Ricerche (Italy); Katarzyna Holc, Thomas Weig, Lukas Schade, Joachim Wagner, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Enrico Zanoni, Univ. degli Studi di Padova (Italy) [8986-59]

5:45 pm: **InGaIn laser diodes with graded-index separate confinement heterostructure**, Szymon Stanczyk, Anna Kafar, Institute of High Pressure Physics (Poland); Tomasz Czeszanowski, Technical Univ. of Lodz (Poland); Robert Czernecki, Grzegorz Targowski, TopGaIn Ltd. (Poland); Mike A. R. Leszczynski, Institute of High Pressure Physics (Poland) and TopGaIn Ltd. (Poland); Tadek Suski, Institute of High Pressure Physics (Poland); Piotr Perlin, Institute of High Pressure Physics (Poland) and TopGaIn Ltd. (Poland) . . [8986-60]



Conference 8986 · Location: Room 111 (Exhibit Level)

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Highly-uniform InGaN/GaN blue LED properties through the novel design of gas injector in a large scale MOCVD, Jun Woo Kim, Sun Woon Kim, In Hoe Hur, Kyung Ho Yoo, Soo Goan Park, Seong June Jo, Choo Ho Kim, Yoon Joon Choi, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Hyeong Soo Park, Semes Co., Ltd. (Korea, Republic of) [8986-75]

Multi-wavelength light emission from three-dimensional AlGaIn quantum wells fabricated on facet structures, Ken Kataoka D.D.S., Kyoto Univ. (Japan); Masanori Yamaguchi, Kensuke Fukushima, Ushio Inc. (Japan); Mitsuru Funato, Yoichi Kawakami, Kyoto Univ. (Japan) [8986-76]

Optical properties of m-plane GaN grown on patterned Si(112) substrates by MOCVD using a two-step approach, Natalia Izyumskaya, Serdal Okur, Fang Zhang, Morteza Monavarian, Vitaliy Avrutin, Ümit Özgür, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Christopher Karbaum, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Universität Magdeburg (Germany); Hadis Morkoç, Virginia Commonwealth Univ. (USA) [8986-77]

Characterization of 380nm UV-LEDs grown on free-standing GaN by atmospheric pressure metal-organic chemical vapor deposition, Chen-Yu Shieh, National Central Univ. (Taiwan); Zhen-Yu Li, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan); Jenq-Yang Chang, National Central Univ. (Taiwan); Gou-Chung Chi, National Central Univ. (Taiwan) and National Chiao Tung Univ. (Taiwan) [8986-78]

Internal and external quantum efficiencies of InGaIn/GaN LEDs with short-period superlattice (SPSL), Ilya E. Titkov, Univ. of Dundee (United Kingdom); Andrei F. Tsatsulnikov, Wsevolod V. Lundin, Alexey V. Sakharov, Ioffe Physico-Technical Institute (Russian Federation); Amit Yadav, Vera L'vovna Zerova, Modestas Zulonas, Edik U. Ratailov, Univ. of Dundee (United Kingdom) [8986-79]

Nanometer-scale optical and structural properties of an AlInN/GaN-based microcavity characterized by cathodoluminescence spectroscopy in a transmission electron microscope, Gordon Schmidt, Otto-von-Guericke-Universität Magdeburg (Germany); Marcus Müller, Otto-von-Guericke-Universität Magdeburg (Germany); Anja Dempewolf, Silke Petzold, Peter Veit, Frank Bertram, Christoph Berger, Armin Dadgar, Alois J. Krost, Jürgen Christen, Otto-von-Guericke-Universität Magdeburg (Germany) [8986-80]

Impact of extended defects on optical properties of (1-101)GaN grown on patterned Si, Serdal Okur, Natalia Izyumskaya, Fan Zhang, Vitaliy Avrutin, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Christopher Karbaum, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Universität Magdeburg (Germany); Hadis Morkoç, Ümit Özgür, Virginia Commonwealth Univ. (USA) [8986-81]

Carrier diffusion length in p- and n-type GaN determined from photoluminescence and cathodoluminescence, Shopan D. Hafiz, Fan Zhang, Morteza Monavarian, Vitaliy Avrutin, Hadis Morkoç, Ümit Özgür, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Christopher Karbaum, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Universität Magdeburg (Germany); Bernard Gil, Univ. Montpellier 2 (France) [8986-82]

Effect of temperature and electric field on the degradation in AlGaIn/GaN heterojunction field effect transistors upon electrical stress, Congyong Zhu, Fan Zhang, Romualdo A. Ferreyra, Vitaliy Avrutin, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [8986-83]

Fabrication and characterization of periodic gallium nitride subwavelength nanostructures for antireflection surfaces, Jae Su Yu, Yeong Hwan Ko, Kyung Hee Univ. (Korea, Republic of) [8986-85]

Selective area growth for p-side down InGaIn/GaN light-emitting diodes by metal-organic chemical vapor deposition, Hsueh-Hsing Liu, Meng-Jie Lee, Ta Lin, Geng-Yen Lee, Nien-Tze Yeh, National Central Univ. (Taiwan); Jen-Inn Chyi, National Central Univ. (Taiwan) and Academia Sinica (Taiwan) [8986-86]

Thursday 6 February

SESSION 12

Location: Room 123 (Exhibit Level) . . Thu 8:30 am to 10:00 am

LED Efficiency Droop I

Joint Session with Conferences 8986 and 9003

Session Chair: **Joachim Piprek**, NUSOD Institute LLC (USA)

8:30 am: **Auger carrier leakage in III-nitride LEDs** (*Invited Paper*), Friedhard Römer, Christian Range, Marcus Deppner, Bernd Witzigmann, Univ. Kassel (Germany) [8986-61]

9:00 am: **Measurement of Auger effect and droop in LEDs by energy analysis of electron emission in vacuum** (*Invited Paper*), Claude Weisbuch, Jim Speck, Justin Iveland, J. Perretti, L. Martinelli, M. Piccardo, Univ. of California, Santa Barbara (USA) [9003-35]

9:30 am: **Microscopic models of non-radiative and high-current effects in LEDs: state of the art and future developments** (*Invited Paper*), Enrico Bellotti, Boston Univ. (USA); Francesco Bertazzi, Marco Calciati, Xiangyu Zhou, Giovanni Ghione, Michele Goano, Politecnico di Torino (Italy) [9003-36]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 13

Location: Room 123 (Exhibit Level) . Thu 10:30 am to 12:00 pm

LED Efficiency Droop II

Joint Session with Conferences 8986 and 9003

Session Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

10:30 am: **Microscopic many-body investigation of the efficiency droop in GaN-based light-emitting devices** (*Invited Paper*), Jorg Hader, Jerome V. Moloney, Nonlinear Control Strategies, Inc. (USA) and The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Universität Marburg (Germany) [9003-37]

11:00 am: **The efficiency droop in III-V semiconductor light-emitting diodes** (*Invited Paper*), E. Fred Schubert, Rensselaer Polytechnic Institute (USA) [9003-38]

11:30 am: **Low-temperature studies of the efficiency droop in InGaIn-based light-emitting diodes** (*Invited Paper*), Jong-In Shim, Hyunsung Kim, Dong-Pyo Han, Dong-Soo Shin, Hanyang Univ. (Korea, Republic of); Kyu-Sang Kim, Sangji Univ. (Korea, Republic of) [8986-62]

Lunch/Exhibition Break Thu 12:00 pm to 1:00 pm

SESSION 14

Location: Room 111 (Exhibit Level) . . . Thu 1:00 pm to 3:00 pm

LED II

Session Chair: **Jong-In Shim**, Hanyang Univ. (Korea, Republic of)

1:00 pm: **Recent progress of deep UV LEDs and potential applications** (*Invited Paper*), Kyoung Hoon Kim, LG Innotek (Korea, Republic of) [8986-63]

1:30 pm: **Performance of DUV-LEDs fabricated on HVPE-AlN substrates** (*Invited Paper*), Toru Kinoshita, Tokuyama Corp. (Japan) and Kobe Univ. (Japan); Toshiyuki Obata, Toru Nagashima, Hiroyuki Yanagi, Tokuyama Corp. (Japan); Baxter Moody, HexaTech, Inc. (USA); Ramon Collazo, North Carolina State Univ. (USA); Shin-ichiro Inoue, National Institute of Information and Communications Technology (Japan) and Kobe Univ. (Japan); Yoshinao Kumagai, Akinori Koukita, Tokyo Univ. of Agriculture and Technology (Japan); Zlatko Sitar, North Carolina State Univ. (USA) [8986-64]

2:00 pm: **High-power pseudomorphic mid-ultraviolet light-emitting diodes with improved efficiency and lifetime**, James Grandusky, Jianfeng Chen, Craig G. Moe, Ken Kitamura, Mark C. Mendrick, Muhammad Jamil, Masato Toita, Shawn R. Gibb, Leo J. Schowalter, Crystal IS, Inc. (USA) [8986-65]

2:15 pm: **Boost in deep-UV electroluminescence from tunnel-injection GaN/AlN quantum dot LEDs by polarization-induced doping**, Jai K. Verma, Vladimir V. Protasenko, S. M. Islam, Huiji Xing, Debdeep Jena, Univ. of Notre Dame (USA) [8986-66]

2:30 pm: **Enhanced charge carrier injection for UV LEDs emitting below 250 nm**, Frank Mehnke, Tim Wernicke, Christian Kuhn, Martin Guttman, Christian Reich, Tim Kolbe, Technische Univ. Berlin (Germany); Arne Knauer, Ferdinand-Braun-Institut (Germany) and Leibniz-Institut für Höchstfrequenztechnik (Germany); Viola Kueller, Ferdinand-Braun-Institut (Germany); Jens Rass, Technische Univ. Berlin (Germany); Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany) [8986-67]

2:45 pm: **Fabrication of periodic light-extraction structures on sapphire substrate for electron-beam-pumped deep-ultraviolet light sources**, Fumitsugu Fukuyo, Mie Univ. (Japan) and Hamamatsu Photonics K.K. (Japan); Hideto Miyake, Kazumasa Hiramatsu, Mie Univ. (Japan); Harumasa Yoshida, Yuji Kobayashi, Hamamatsu Photonics K.K. (Japan) [8986-68]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 15

Location: Room 111 (Exhibit Level) . . . Thu 3:30 pm to 5:45 pm

LED III

Session Chair: **Hadis Morkoç**, Virginia Commonwealth Univ. (USA)

3:30 pm: **Recombination and energy relaxation mechanisms in LEDs by energy analysis of electron emission in vacuum** (*Invited Paper*), Jacques Peretti, Lucio Martinelli, Ecole Polytechnique (France); Justin Iveland, Univ. of California, Santa Barbara (USA); Marco Piccardo, Ecole Polytechnique (France); Claude Weisbuch, Ecole Polytechnique (France) and Univ. of California, Santa Barbara (USA); Jim Speck, Univ. of California, Santa Barbara (USA) [8986-69]

4:00 pm: **Highly-efficient InGaN MQW LEDs grown on 200-mm Si substrates** (*Invited Paper*), Masaaki Onomura, Toshiba Matsushita Display Technology Co., Ltd. (Japan) [8986-70]

4:30 pm: **High-voltage LED for general lighting application** (*Invited Paper*), Schang-jing Hon, EPISTAR Corp. (Taiwan) [8986-71]

5:00 pm: **LED electron leakage dependence on the material properties of the electron blocker layer**, Joachim Piprek, NUSOD Institute LLC (USA) . . [8986-72]

5:15 pm: **Nanoscale imaging of GaN-based LED structures with semipolar InGaN QWs using scanning transmission electron microscope cathodoluminescence**, Marcus Müller, Otto-von-Guericke Univ. Magdeburg (Germany); Sebastian Metzner, Gordon Schmidt, Peter Veit, Silke Petzold, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Robert Leute, Dominik Heinz, Junjun Wang, Tobias Meisch, Ferdinand Scholz, Univ. Ulm (Germany) [8986-73]

5:30 pm: **Light-emitting diodes using InGaN/GaN nanowires grown on SiO₂/Si**, Junseok Heo, Ajou Univ. (Korea, Republic of); Shafat Jahangir, Pallab K. Bhattacharya, Univ. of Michigan (USA) [8986-74]

Oxide-based Materials and Devices V

Conference Chairs: **Ferechteh H. Teherani**, Nanovation (France); **David C. Look**, Wright State Univ. (USA); **David J. Rogers**, Nanovation (France)

Program Committee: **Philippe Bove**, Nanovation (France); **Ivan Bozovic**, Brookhaven National Lab. (USA); **Won Kook Choi**, Korea Institute of Science and Technology (Korea, Republic of); **Jean-Jacques Delaunay**, The Univ. of Tokyo (Japan); **Aleksandra B. Djurišić**, The Univ. of Hong Kong (Hong Kong, China); **Michael D. Gerhold**, U.S. Army Research Office (USA); **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany); **Axel Hoffmann**, Technische Univ. Berlin (Germany); **Masashi Kawasaki**, Tohoku Univ. (Japan); **Katharina Lorenz**, Instituto Superior Técnico (Portugal); **Andreia Luisa da Rosa**, Univ. Bremen (Germany); **Tariq Manzur**, Naval Undersea Warfare Ctr. (USA); **Tatsuo Okada**, Kyushu Univ. (Japan); **Thierry Pauporté**, Ecole Nationale Supérieure de Chimie de Paris (France); **Robert Plana**, Lab. d'Analyse et d'Architecture des Systèmes (France); **Manijeh Razeghi**, Northwestern Univ. (USA); **Vinod Eric Sandana**, Graphos (France); **Bruno Viana**, Ecole Nationale Supérieure de Chimie de Paris (France); **Magnus Willander**, Linköping Univ. (Sweden); **Takafumi Yao**, Tohoku Univ. (Japan); **Jae Su Yu**, Kyung Hee Univ. (Korea, Republic of)

Sunday 2 February

INTRODUCTION AND OPENING REMARKS

Location: Room 113 (Exhibit Level) 8:20 am to 8:30 am

Ferechteh H. Teherani, Nanovation (France)

SESSION 1

Location: Room 113 (Exhibit Level) . . . Sun 8:30 am to 9:50 am

Transparent Conducting Oxides

Session Chair: **Axel Hoffmann**, Technische Univ. Berlin (Germany)

8:30 am: **Ultrathin ZnO films for transparent conductors and plasmonics**, David C. Look, Wright State Univ. (USA); Buguo Wang, Solid State Scientific Corp. (USA); Kevin D. Leedy, Darren B. Thomson, Air Force Research Lab. (USA); Naho Itagaki, Koichi Matsushima, Iping Surhariadi, Kyushu Univ. (Japan) [8987-1]

8:50 am: **TiO₂ anode materials for lithium-ion batteries with different morphology and additives**, Xiang Liu, The Univ. of Hong Kong (Hong Kong, China); Yip Hang Ng, The Univ. of Hong Kong (China); Yu Hang Leung, The Univ. of Hong Kong (Hong Kong, China); Fang Zhou Liu, The Univ. of Hong Kong (China); Aleksandra B. Djurišić, Mao Hai Xie, Wai Kin Chan, The Univ. of Hong Kong (Hong Kong, China) [8987-68]

9:10 am: **Mid-infrared extraordinary transmission through Ga-doped ZnO films with 2D hole arrays** (*Invited Paper*), Justin W. Cleary, Air Force Research Lab. (USA); Nima Nader Esfahani, Solid State Scientific Corp. (USA); Junpeng Guo, The Univ. of Alabama in Huntsville (USA); Joshua Hendrickson, Kevin D. Leedy, Air Force Research Lab. (USA); David C. Look, Wyle Labs. (USA) [8987-4]

9:30 am: **Low-temperature aqueous solution deposition of ZnO based TCO films for optoelectronic applications** (*Invited Paper*), Jacob J. Richardson, Evan C. O'Hara, Solution Deposition Systems, Inc. (USA) [8987-34]

Coffee Break Sun 9:50 am to 10:15 am

SESSION 2

Location: Room 113 (Exhibit Level) . Sun 10:15 am to 12:50 pm

Photon-induced Phenomena

Session Chairs: **David C. Look**, Wright State Univ. (USA); **Michael Molinari**, Univ. de Reims Champagne-Ardenne (France)

10:15 am: **Visible luminescence in bulk and nanostructured ZnO** (*Invited Paper*), Matthew R. Phillips, Univ. of Technology, Sydney (Australia); Suranan Anantachaisilp, Mahidol Univ. (Thailand); Liangchen Zhu, Laurent L. Cheong Lem, Univ. of Technology, Sydney (Australia); Christian Nenstiel, Technische Univ. Berlin (Germany); Siwaporn Meejoo Smith, Mahidol Univ. (Thailand); Cuong Ton-That, Univ. of Technology, Sydney (Australia); Axel Hoffmann, Technische Univ. Berlin (Germany) [8987-6]

10:35 am: **Exciton and phonon dynamics in ZnO nanostructures** (*Invited Paper*), Axel Hoffmann, Technische Univ. Berlin (Germany) [8987-7]

10:55 am: **Trions and biexcitons in nonpolar homoepitaxial ZnO/(Zn,Mg)O quantum wells** (*Invited Paper*), Thierry Bretagnon, Bernard Gil, Thierry Guillet, Christelle Brimont, Univ. Montpellier 2 (France); Jean Michel Chauveau, Univ. de Nice Sophia Antipolis (France) [8987-8]

11:15 am: **Nanoscale optical and electrical characterizations of ZnO nanostructures by near-field microscopy** (*Invited Paper*), Michael Molinari, Bogdan Bercu, Louis Giraudet, Univ. de Reims Champagne-Ardenne (France) [8987-9]

11:35 am: **Emission characteristics of electrically- and optically-pumped single ZnO micro-spherical crystal** (*Invited Paper*), Daisuke Nakamura, Tetsuya Shimogaki, Koshi Fusazaki, Yasuaki Mizokami, Mitsuhiro Higashihata, Hiroshi Ikenoue, Tatsuo Okada, Kyushu Univ. (Japan) [8987-10]

11:55 am: **Spatial mapping of exciton lifetimes in single ZnO nanowires**, Frank Güell, Univ. de Barcelona (Spain); Juan S. Reparaz, Technische Univ. Berlin (Germany) and Institut Català de Nanociència i Nanotecnologia (Spain); Gordon Callsen, Technische Univ. Berlin (Germany); Markus R. Wagner, Technische Univ. Berlin (Germany) and Institut Català de Nanociència i Nanotecnologia (Spain); Joan Ramón Morante, Univ. de Barcelona (Spain) and Institut de Recerca en Energia de Catalunya (Spain); Axel Hoffmann, Technische Univ. Berlin (Germany) [8987-11]

12:10 pm: **Carrier dynamics in dilute II-VI oxide highly-mismatched alloys** (*Invited Paper*), Yan-Cheng Lin, Wu-Ching Chou, National Chiao Tung Univ. (Taiwan); Jen-Inn Chyi, National Central Univ. (Taiwan); Tooru Tanaka, Saga Univ. (Japan) [8987-12]

12:30 pm: **Optical characterization of laterally- and vertically-structured oxides and semiconductors** (*Invited Paper*), Péter Petrik, Research Institute for Technical Physics and Materials Science (Hungary); Nitish Kumar, Technische Univ. Delft (Netherlands); Emil Agocs, Balint Fodor, Research Institute for Technical Physics and Materials Science (Hungary); Sylvania F. Pereira, Technische Univ. Delft (Netherlands); Tivadar Lohner, Miklós Fried, Research Institute for Technical Physics and Materials Science (Hungary); Hendrik Paul Urbach, Technische Univ. Delft (Netherlands) [8987-13]

Lunch Break Sun 12:50 pm to 2:10 pm

SESSION 3

Location: Room 113 (Exhibit Level) . . . Sun 2:10 pm to 3:30 pm

Doping and Band Structure Studies of Oxides

Session Chairs: **Aleksandra B. Djurišić**, The Univ. of Hong Kong (Hong Kong, China); **Guy Garry**, Thales Research & Technology (France)

2:10 pm: **Computational design of a novel semiconducting tetrahedral MnO alloy** (*Invited Paper*), Stephan Lany, Haowei Peng, National Renewable Energy Lab. (USA) [8987-14]

2:30 pm: **Development of blue excitable persistent phosphor of Ce³⁺-doped garnet ceramics by bandgap engineering and metal-sensitization** (*Invited Paper*), Jumpei Ueda, Setsuhisa Tanabe, Kyoto Univ. (Japan) . . [8987-15]

2:50 pm: **Doping of Ga₂O₃ bulk crystals and nanowires by ion implantation**, Katharina Lorenz, João G. Correia, Luis C. Alves, Eduardo Alves, Univ. Técnica de Lisboa (Portugal); I. López, Emilio Nogales, Bianchi Méndez, J. Piqueras, Univ. Complutense de Madrid (Spain); M. B. Barbosa, João P. Araujo, Univ. do Porto (Portugal); Jorge N. Gonçalves, Joana Rodrigues, M. Peres, Teresa Monteiro, Univ. de Aveiro (Portugal); Encarna Garcia Villora, Kiyoshi Shimamura, National Institute for Materials Science (Japan) [8987-16]

3:10 pm: **Carrier doping into infinite-layer iron oxide thin films by rare-earth substitution** (*Invited Paper*), Akira Chikamatsu, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Tsukasa Katayama, Ryosuke Takagi, The Univ. of Tokyo (Japan); Yasushi Hirose, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan) and Kanagawa Academy of Science and Technology (Japan); Tomoteru Fukumura, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Tetsuya Hasegawa, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan) and Kanagawa Academy of Science and Technology (Japan) [8987-17]

Coffee Break Sun 3:30 pm to 4:00 pm

SESSION 4

Location: Room 113 (Exhibit Level) . . . Sun 4:00 pm to 5:50 pm

Doping and Band Structure Studies of ZnO

Session Chair: **Aleksandra B. Djurišić**,
The Univ. of Hong Kong (Hong Kong, China)

4:00 pm: **Issues in the growth of p-type zinc oxide** (*Keynote Presentation*), Takafumi Yao, Tohoku Univ. (Japan) and National Institute of Advanced Industrial Science and Technology (Japan) [8987-18]

4:30 pm: **Interstitial zinc complexes in ZnO** (*Invited Paper*), Norbert H. Nickel, Marc A. Gluba, Nicole Karpensky, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [8987-19]

4:50 pm: **Effects of aluminum doping on Fermi level in polycrystalline ZnO films** (*Invited Paper*), Junjun Jia, Yuzo Shigesato, Aoyama Gakuin Univ. (Japan) [8987-5]

5:10 pm: **Electronic properties modification in ZnO thin films via surface modification by carboxylic acids** (*Invited Paper*), Josef W. Spalanka, Univ. of Wisconsin-Madison (USA); Yu Liu, Johns Hopkins Univ. (USA); Padma Gopalan, Univ. of Wisconsin-Madison (USA); Howard Katz, Johns Hopkins Univ. (USA); Paul G. Evans, Univ. of Wisconsin-Madison (USA) [8987-46]

5:30 pm: **Theoretical investigations of electronic and optical properties of functionalized zinc-oxide nanowires**, Michael Lorke, Adriel D. Garcia, Andrea Luisa da Rosa, Thomas Frauenheim, Univ. Bremen (Germany) [8987-20]

Monday 3 February

SESSION 5

Location: Room 113 (Exhibit Level) . Mon 8:00 am to 10:00 am

Highly-Correlated Oxides I

Session Chairs: **Hideki Yamamoto**, NTT Basic Research Labs. (Japan); **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany)

8:00 am: **Atomic collision effect during PLD processes: nonstoichiometry control in transparent superconductors** (*Invited Paper*), Taro Hitosugi, Tohoku Univ. (Japan) [8987-21]

8:20 am: **Augmented methods for growth and development of novel multi-cation oxides** (*Invited Paper*), Hideki Yamamoto, Yoshiharu Krockenberger, NTT Basic Research Labs. (Japan); Michio Naito, Tokyo Univ. of Agriculture and Technology (Japan) [8987-22]

8:40 am: **Synthesis, interface symmetry, and electronic properties of heteroepitaxial VO₂ films** (*Invited Paper*), Franklin Wong, Shriram Ramanathan, Harvard School of Engineering and Applied Sciences (USA) [8987-23]

9:00 am: **Infrared near-field study of stripe states in strained vanadium dioxide films** (*Invited Paper*), Mengkun Liu, Univ. of California, San Diego (USA) [8987-24]

9:20 am: **Metal-insulator phase transition oxide materials for micro- and nano-electronics** (*Invited Paper*), Guy Garry, Thales Research & Technology (France) [8987-25]

9:40 am: **Transient Faraday rotation and magnetization precession in EuO** (*Invited Paper*), Takayuki Makino, Univ. of Fukui (Japan) and RIKEN (Japan) [8987-26]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 113 (Exhibit Level) Mon 10:30 am to 12:25 pm

Highly-Correlated Oxides II

Session Chairs: **Hideki Yamamoto**, NTT Basic Research Labs. (Japan); **Hanns-Ulrich Habermeier**, Max-Planck-Institut für Festkörperforschung (Germany)

10:30 am: **Photocarrier recombination and localization dynamics of LaAlO₃/SrTiO₃ heterostructures**, Yasuhiro Yamada, Kyoto Univ. (Japan); Hiroki K. Sato, SLAC National Accelerator Lab. (USA) and Univ. of Tokyo (Japan); Yasuyuki Hikita, SLAC National Accelerator Lab. (USA) and Stanford Univ. (USA); Yoshihiko Kanemitsu, Kyoto Univ. (Japan) [8987-27]

10:50 am: **Low-temperature transport of LaAlO₃/SrTiO₃ interfaces** (*Invited Paper*), Stefano Gariglio, Alexandre Fete, Danfeng Li, Daniela Stornaiuolo, Jean-Marc Triscone, Univ. of Geneva (Switzerland) [8987-28]

11:10 am: **Epitaxial growth of LaAlO₃ on SrTiO₃-buffered Si(001) substrates by atomic layer deposition** (*Invited Paper*), John G. Ekerdt, Thong Ngo, Daniel J. Groom, Agham S. Posadas, Martin D. McDaniel, Alexander A. Demkov, The Univ. of Texas at Austin (USA) [8987-29]

11:30 am: **Light-induced thermoelectric voltages in complex oxide superlattices** (*Invited Paper*), Hanns-Ulrich Habermeier, Stefan Heinze, Max-Planck-Institut für Festkörperforschung (Germany) [8987-30]

11:50 am: **Signatures of uncondensed electron-hole Cooper pairs in highly-excited ZnO** (*Invited Paper*), Marijn A. M. Versteegh, Kavli Institute of Nanoscience Delft (Netherlands); A. J. van Lange, H. T. C. Stoof, Jaap I. Dijkhuis, Utrecht Univ. (Netherlands) [8987-31]

12:10 pm: **Raman study of magnetic phase transitions of hexagonal manganites**, Ji-Yeon Nam, Ewha Woman's Univ. (Korea, Republic of); Nguyen Thi Minh Hien, Ewha Womans Univ. (Korea, Republic of); Nguyen Thi Huyen, Kiok Han, Ewha Woman's Univ. (Korea, Republic of); Xiang-Bai Chen, Konkuk Univ. (Korea, Republic of); S. W. Cheong, Rutgers, The State Univ. of New Jersey (USA); D. Lee, T. W. Noh, Seoul National Univ. (Korea, Republic of); N. H. Sung, Beongki Cho, Gwangju Institute of Science and Technology (Korea, Republic of); In-Sang Yang, Ewha Womans Univ. (Korea, Republic of) [8987-95]

Lunch Break Mon 12:25 pm to 1:40 pm

SESSION 7

Location: Room 113 (Exhibit Level) . . Mon 1:40 pm to 3:40 pm

Thin Films and Bulk Processing

Session Chairs: **Manijeh Razeghi**, Northwestern Univ. (USA); **Michael Gerhold**, U.S. Army Research Office (USA)

1:40 pm: **Is ZnO as a universal semiconductor material an oxy-moron?** (*Invited Paper*), Na Lu, Ian T. Ferguson, The Univ. of North Carolina at Charlotte (USA) [8987-58]

2:00 pm: **Novel method for reclaim/reuse of bulk GaN substrates after MOVPE GaN growth via sacrificial ZnO buffer layers** (*Invited Paper*), Abdallah Ougazzaden, Georgia Tech-Lorraine (France); Subramanian Sundaram, Georgia Tech-CNRS (France); K. Pantzas, Georgia Tech-Lorraine (France); Tarik Moudakir, Georgia Tech-CNRS (France); David J. Rogers, Ferechteh Hosseini Teherani, Philippe Bove, Vinod E. Sandana, Nanovation (France); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) [8987-33]

2:20 pm: **Sputtering growth of single-crystalline ZnO-based semiconductors on lattice mismatched substrates** (*Invited Paper*), Naho Itagaki, Koichi Matsushima, Iping Suhariadi, Daisuke Yamashita, Hyunwoong Seo, Giichiro Uchida, Kazunori Koga, Masaharu Shiratani, Kyushu Univ. (Japan) [8987-35]

2:40 pm: **Role of grain boundaries in ZnO** (*Invited Paper*), Yukio Sato, Yuichi Ikuhara, The Univ. of Tokyo (Japan) [8987-36]

3:00 pm: **Solvothermal crystal growth of ZnO** (*Invited Paper*), Dirk Ehrentraut, Soraa, Inc. (USA) and Tohoku Univ. (Japan) [8987-96]

3:20 pm: **Optical and electrical properties of ZnO bulk crystals with and without lithium grown by the hydrothermal technique**, Buguo Wang, Air Force Research Lab. (USA) and Solid State Scientific Corp. (USA); Bruce Claffin, Air Force Research Lab. (USA); David C. Look, Air Force Research Lab. (USA) and Wright State Univ. (USA); Michael Callahan, Teleos Solar, Inc. (USA) . . . [8987-37]

Coffee Break Mon 3:40 pm to 4:00 pm

SESSION 8

Location: Room 113 (Exhibit Level) . . Mon 4:00 pm to 6:05 pm

Growth, Properties, and Applications of Nanostructures

Session Chairs: **Jose Luis Pau Vizcaino**, Univ. Autónoma de Madrid (Spain); **Philippe Bove**, Nanovation (France)

4:00 pm: **Plasma-enhanced ALD of MgO as a passivation layer for enhanced photoluminescence of ZnO nanowires** (*Invited Paper*), Jusang Park, Yonsei Univ. (Korea, Republic of) [8987-38]

4:20 pm: **ZnO micro/nanocrystals grown by laser-assisted flow deposition** (*Invited Paper*), Joana Rodrigues, António J. S. Fernandes, Diogo Mata, Rui F. Silva, António F. da Cunha, Maria R. Correia, Univ. de Aveiro (Portugal); Luis C. Alves, Katharina Lorenz, Univ. Técnica de Lisboa (Portugal); Armando J. Neves, Florinda M. Costa, Teresa Monteiro, Univ. de Aveiro (Portugal) [8987-39]

4:40 pm: **Metal-oxide semiconductor nanostructures for energy and sensing applications** (*Invited Paper*), Jae Su Yu, Kyung Hee Univ. (Korea, Republic of) [8987-40]

OPTO

Conference 8987 · Location: Room 113 (Exhibit Level)

5:00 pm: **Effect of electrical field and atmosphere on the processing of nanocrystalline zinc oxide** (*Invited Paper*), Benjamin Dargatz, Jesus Gonzalez-Julian, Olivier Guillon, Friedrich-Schiller-Univ. Jena (Germany) [8987-41]

5:20 pm: **Fabrication of nanodiamond-doped tellurite fibers with decreased loss**, Yinlan Ruan, Hong Ji, The Univ. of Adelaide (Australia); Brant C. Gibson, The Univ. of Melbourne (Australia); Tanya M. Monro, Heike Ebendorff-Heidepriem, The Univ. of Adelaide (Australia) [8987-42]

5:35 pm: **Upconversion properties of Er³⁺-doped oxyfluoride glass-ceramics containing SrF₂ nanocrystals**, C. R. Kesavulu, Univ. de São Paulo (Brazil); K. Kiran Kumar, C. K. Jayasankar, Sri Venkateswara Univ. (India) [8987-43]

5:50 pm: **Flexible binder free functionalized carbon nanotube electrodes for ultracapacitor**, Badekai Ramachandra Bhat, Aravinda L. S Bhat, Udaya K. Bhat, National Institute of Technology, Karnataka (India) [8987-89]

2:30 pm: **Controlling the properties of electro-deposited ZnO nanowire arrays for photodetector, gas sensor, and light-emitting diode applications** (*Invited Paper*), Thierry Pauporté, Oleg Lupan, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Lee Chow, Univ. of Central Florida (USA); Maria Tchernycheva, Univ. Paris-Sud 11 (France) [8987-57]

Coffee Break Tue 2:50 pm to 3:20 pm

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 9

Location: Room 113 (Exhibit Level) . Tue 10:30 am to 11:30 am

ZnO-based Transistors

Session Chair: **Takafumi Yao**, Tohoku Univ. (Japan)

10:30 am: **Flexible aluminum-doped zinc-oxide thin-film transistor fabricated on plastic substrates** (*Invited Paper*), Dedong Han, Peking Univ. (China) [8987-44]

10:50 am: **ZnO-based transparent nanodiodes and thin-film-transistor applications** (*Invited Paper*), Toshihiko Maemoto, Yi Sun, Satoshi Sasaki, Kazuto Koike, Mitsuaki Yano, Osaka Institute of Technology (Japan); Seiya Kasai, Hokkaido Univ. (Japan); Shigehiko Sasa, Osaka Institute of Technology (Japan) [8987-45]

11:10 am: **MgZnO/ZnO heterojunction-based high-electron mobility field effect transistors grown by PLD**, David J. Rogers, Ferechteh Hosseini Teherani, Philippe Bove, Vinod E. Sandana, Nanovation (France); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) [8987-47]

Lunch/Exhibition Break Tue 11:30 am to 1:50 pm

SESSION 10

Location: Room 113 (Exhibit Level) . . . Tue 1:50 pm to 2:50 pm

Oxide-based Detectors

Session Chairs: **David J. Rogers**, Nanovation (France); **Jong-Ho Lee**, Korea Institute of Industrial Technology (Korea, Republic of)

1:50 pm: **High response solar-blind MgZnO photodetectors grown by molecular beam epitaxy** (*Invited Paper*), Winston V. Schoenfeld, Ming Wei, Casey Boutwell, Huiyong Liu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8987-54]

2:10 pm: **Single nanowire ZnO devices fabricated by dielectrophoresis: light detectors and gas sensors** (*Invited Paper*), Jose Luis Pau Vizcaino, Carlos García Núñez, Antonio García Marín, Carlos Guerrero, Eduardo Ruiz, Juan Piqueras, Univ. Autónoma de Madrid (Spain) [8987-55]

SESSION 11

Location: Room 113 (Exhibit Level) . . . Tue 3:20 pm to 5:45 pm

Oxide-based Light Emitters

Session Chairs: **David J. Rogers**, Nanovation (France);
Thierry Pauporté, Ecole Nationale Supérieure de Chimie de Paris (France)

3:20 pm: **Blue/red electroluminescence from hybrid Eu:phosphors/ZnO-nanowires/p-GaN LED** (*Invited Paper*), Bruno Viana, Oleg Lupan, Thierry Pauporté, Maroua Dhaouadi, Fabienne Pelle, Ecole Nationale Supérieure de Chimie de Paris (France); Lucie Devis, Thierry Gacoin, Ecole Polytechnique (France) [8987-48]

3:45 pm: **β -Ga₂O₃ and single-crystal phosphors for high-brightness white LEDs and LDs, and β -Ga₂O₃ potential for next generation of power devices** (*Invited Paper*), Encarna Garcia Villora, National Institute for Materials Science (Japan); Stelian Arjoca, Kiyoshi Shimamura, National Institute for Materials Science (Japan), Graduate School of Advanced Science and Engineering, Waseda Univ. (Japan); Daisuke Inomata, Kazuo Aoki, KOHA Co., Ltd. (Japan) [8987-49]

4:05 pm: **Effects of surface treatment of ITO anode layer patterned with shadow mask technology on characteristics of organic light-emitting diodes** (*Invited Paper*), Jong-Ho Lee, Bum-Ho Choi, Korea Institute of Industrial Technology (Korea, Republic of) [8987-50]

4:25 pm: **Investigation of ZnO-based ultraviolet light-emitting diodes** (*Invited Paper*), Ching-Ting Lee, Hao-Yu Chang, National Cheng Kung Univ. (Taiwan) [8987-51]

4:45 pm: **ZnO luminescent nanobox by 3D-nanotemplate PLD** (*Invited Paper*), Azusa N. Hattori, Hidekazu Tanaka, Osaka Univ. (Japan) [8987-52]

5:05 pm: **UV detectors and LEDs in different metal oxide nanostructures and the influence from the piezoelectric effect** (*Invited Paper*), Magnus Willander, Linköping Univ. (Sweden) [8987-53]

5:25 pm: **Excitation process and LED applications of samarium-doped TiO₂ thin films** (*Invited Paper*), Xinwei Zhao, Yutaka Aizawa, Susumu Harako, Tokyo Univ. of Science (Japan); Shuji Komuro, Toyo Univ. (Japan) [8987-94]

Wednesday 5 February

SESSION 12

Location: Room 113 (Exhibit Level) . Wed 8:00 am to 10:20 am

Energy Harvesting Storage: Materials and Devices

Session Chairs: **Vinod Eric Sandana**; **Magnus Willander**,
Linköping Univ. (Sweden)

8:00 am: **Ferrite engineering for oxide spintronics and photonics** (*Invited Paper*), Hitoshi Tabata, Munetoshi Seki, The Univ. of Tokyo (Japan) [8987-32]

8:20 am: **High-efficiency heterojunction solar cells on crystalline germanium substrates** (*Invited Paper*), Bahman Hekmatshoar, Davood Shahrjerdi, Marinus Hopstaken, Keith E. Fogel, IBM Thomas J. Watson Research Ctr. (USA) [8987-59]

8:40 am: **Material properties of high-mobility TCOs and application to solar cells** (*Invited Paper*), Florian Ruske, Steffi Schönauf, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Sven Ring, Sebastian Neubert, Florian Welker, Bernd Stannowski, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) and PVcomB (Germany); Volker Sittinger, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany); Stefan Götzendörfer, Berliner Glas KGaA Herbert Kubatz GmbH & Co. (Germany); Bernd Rech, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [8987-60]

9:00 am: **Ag nanowire-embedded ITO thin films as a near-infrared transparent and flexible anode for the flexible organic solar cells** (*Invited Paper*), Han-Ki Kim, Kyung Hee Univ. (Korea, Republic of) [8987-61]

9:20 am: **Light trapping considerations in self-assembled ZnO nanorod arrays for quantum-dot sensitized solar cells** (*Invited Paper*), Juan A. Zapien, ChunYan Luan, City Univ. of Hong Kong (Hong Kong, China); King Tai Cheung, The Univ. of Hong Kong (Hong Kong, China); Yishu Foo, City Univ. of Hong Kong (Hong Kong, China); Qing Shen, The Univ. of Electro-Communications (Japan) [8987-62]

9:40 am: **Oxides for sustainable photovoltaics with Earth-abundant materials** (*Invited Paper*), Alexander Wagner, Mathieu Stahl, Nikolai Ehrhardt, Andreas Fahl, Johannes Ledig, Andreas Waag, Andrey Bakin, Technische Univ. Braunschweig (Germany) [8987-63]

10:00 am: **Optical and photovoltaic properties of silicon wire solar cells with controlled ZnO nanorods antireflection coating** (*Invited Paper*), Jae Hyun Kim, Seong-Ho Baek, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) [8987-64]

Coffee Break Wed 10:20 am to 10:50 am

SESSION 13

Location: Room 113 (Exhibit Level) Wed 10:50 am to 12:25 pm

Energy Harvesting Storage: Metal Oxides and Graphene

Session Chair: **Bruno Viana**,

Ecole Nationale Supérieure de Chimie de Paris (France)

10:50 am: **ZnO nanowires and PbS quantum dots for third-generation solar cells** (*Invited Paper*), Basma M. El Zein, Institut d'Electronique, de Microélectronique et de Nanotechnologie (France) and King Abdullah Univ. of Science and Technology (Saudi Arabia); Mutalifu Abulikemu, Erkki Alarousu, Omar F. Mohammed, Enrico Traversa, King Abdullah Univ. of Science and Technology (Saudi Arabia); Elhadj Dogheche, Univ. des Sciences et Technologies de Lille (France) [8987-65]

11:10 am: **Graphene oxide: preparation, functionalization, and electrochemical applications** (*Invited Paper*), Yang Liu, Jinghong Li, Tsinghua Univ. (China). [8987-66]

11:30 am: **Chemical bonding and stability of multilayer graphene oxide layers** (*Invited Paper*), Yves J. Chabal, Cheng Gong, The Univ. of Texas at Dallas (USA); Suenne Kim, Si Zhou, Yike Hu, Georgia Institute of Technology (USA); Muge Acik, The Univ. of Texas at Dallas (USA); Walt de Heer, Claire Berger, Angelo Bongiorno, Eliso Riedo, Georgia Institute of Technology (USA) [8987-67]

11:50 am: **Energy generation and storage: combining ZnO piezoelectric generators and graphene-based ultracapacitors**, Vinod E. Sandana, Graphos (France) [8987-69]

12:10 pm: **Engineering metal oxide structures for efficient photovoltaic devices**, Isabella Concina, Univ. degli Studi di Brescia (Italy) [8987-70]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Magnetoelectric-coupling in the 2D antiferromagnet: β -NaMnO₂, Ionna T. Bakaimi, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Alexandros Lappas, Othon Adamopoulos, Foundation for Research and Technology-Hellas (Greece); Mark A. Green, Univ. of Kent (United Kingdom); Artem Abakumov, Univ. Antwerpen (Belgium) [8987-71]

Optical properties of ZnO thin films dispersed with noble metal nanoparticles synthesized by sol-gel method, Moriaki Wakaki, Eisuke Yokoyama, Takushi Noguchi, Tokai Univ. (Japan) [8987-72]

Lattice location of Hf and its interaction with other impurities in LiNbO₃: an integrated review, Jose Gonçalves Marques, Katharina Lorenz, Univ. Técnica de Lisboa (Portugal) [8987-73]

Fiber-optic surface plasmon resonance-based ammonia sensor utilizing ITO/bromocresol purple thin films, Satyendra K. Mishra, Shivani Bhardwaj, Banshi D. Gupta, Indian Institute of Technology Delhi (India) [8987-74]

Fibre-optic surface plasmon resonance-based hydrogen sulphide gas sensor utilizing Cu/ZnO nanoparticles, Satyendra K. Mishra, Charul Varshney, Banshi D. Gupta, Indian Institute of Technology Delhi (India) [8987-75]

Numerical and experimental study of SnO_x | Ag | SnO_x multilayer as indium-free transparent electrode for organic solar cells, Adrien Bou, Institut Matériaux Microélectronique Nanosciences de Provence (France) and Crosslux (France); Philippe Torchio, Damien Barakel, Thierry François, Institut Matériaux Microélectronique Nanosciences de Provence (France); Pierre-Yves Thoulon, Marc Ricci, Crosslux (France) [8987-76]

Surface plasmon resonance-based fiber-optic ammonia gas sensor using polymer films containing ester group, Satyendra K. Mishra, Sandeep N. Tripathi, Veena Choudhary, Banshi D. Gupta, Indian Institute of Technology Delhi (India) [8987-77]

Control of optical and electrical properties of ZnO nanocrystals by nanosecond-laser annealing, Tetsuya Shimogaki, Taihei Ofuji, Norihiro Tetsuyama, Hirotaka Kawahara, Mitsuhiro Higashihata, Hiroshi Ikenoue, Daisuke Nakamura, Tatsuo Okada, Kyushu Univ. (Japan) [8987-78]

Electroluminescence from ZnO nanowire-based heterojunction LED, Daisuke Nakamura, Norihiro Tetsuyama, Tetsuya Shimogaki, Mitsuhiro Higashihata, Hiroshi Ikenoue, Tatsuo Okada, Kyushu Univ. (Japan) [8987-79]

Investigation of the cathodic electrochemical deposition of iron oxide films on nickel-based alloy substrates, Thierry Pauporté, Christophe Goujon, Ecole Nationale Supérieure de Chimie de Paris (France); Carine Mansour, Sophie Delaunay, EDF (France) [8987-80]

Multi-layer insulator for low-voltage and breakdown-voltage enhancement in electrowetting-on-dielectric, Anggita Hapsari Grisatya, Yong Hyub Won, KAIST (Korea, Republic of) [8987-81]

Tailor-made ZnO@SnO₂ networks for high-efficiency photovoltaic devices, Riccardo Milan, Isabella Concina, Alberto Vomiero, Gurpreet Singh Selopal, Giorgio Sberveglieri, Univ. degli Studi di Brescia (Italy); Mauro Epifani, Consiglio Nazionale delle Ricerche (Italy) [8987-82]

Photoluminescence study of nitrogen doped MgZnO thin films grown by RF-plasma assisted MBE, Muhammad M. Morshed, Jianlin Liu, Univ. of California, Riverside (USA) [8987-83]

Effect of lithium-ion implantation of varying fluence on the optical properties of ZnMgO, Shantanu Saha, Saurabh Nagar, Indian Institute of Technology Bombay (India); S.K. Gupta, Bhabha Atomic Research Ctr. (India); Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [8987-84]

Plasma treatment of p-GaN/n-ZnO nanorod light-emitting diodes, Yu Hang Leung, The Univ. of Hong Kong (Hong Kong, China); Alan M. C. Ng, South Univ. of Science and Technology of China (China); Aleksandra B. Djurišić, Wai Kin Chan, The Univ. of Hong Kong (Hong Kong, China); Patrick W. K. Fong, Hsien Fei H. Lui, Charles C. Surya, The Hong Kong Polytechnic Univ. (Hong Kong, China) [8987-85]

Nanostructured ZnO for energy-harvesting applications, David J. Rogers, Ferechteh Hosseini Teherani, Philippe Bove, Vinod E. Sandana, Nanovation (France); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) . [8987-86]

Investigation of ZnO nanorod array ultraviolet photodetectors, Ching-Ting Lee, Hsin-Ying Lee, Tzu-Shun Lin, National Cheng Kung Univ. (Taiwan) . [8987-87]

InGaZnO and ZnO/Al₂O₃ multilayer structures measured by optical and x-ray techniques, Péter Petrik, Emil Agocs, Balint Fodor, Research Institute for Technical Physics and Materials Science (Hungary); Beatrix Pollakowski, Sabine Zakel, Physikalisch-Technische Bundesanstalt (Germany); Thomas Gumprecht, Erlangen Graduate School in Advanced Optical Technologies (Germany); Burkhard Beckhoff, Physikalisch-Technische Bundesanstalt (Germany); Zoltan Labadi, Zsofia Baji, Research Institute for Technical Physics and Materials Science (Hungary); Michael Jank, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); Andreas Nutsch, Physikalisch-Technische Bundesanstalt (Germany) [8987-88]

Design and synthesis of new low band gap organic semiconductors for photovoltaic applications, Murali M. G., Indian Institute of Science (India); Udaya K. Dalimba, National Institute of Technology, Karnataka (India) . . [8987-90]

Graphene versus oxides for transparent electronics applications, Vinod E. Sandana, Graphos (France); David J. Rogers, Ferechteh Hosseini Teherani, Philippe Bove, Nanovation (France); Manijeh Razeghi, Northwestern Univ. (USA) [8987-91]

Thermal expansion and electron-phonon interaction in TiO₂ thin films studied by spectroscopic ellipsometry, Rong-Jun Zhang, Fan Zhang, Fudan Univ. (China) [8987-92]

Optical imaging and storage capabilities in AB₂O₄:Cr³⁺ (A=Zn, Mg, B=Ga, Al), Aurelie Bessiere, Suchinder Sharma, Didier Gourier, G. Sraiki, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Przemyslaw J. Deren, D. Rudnicka, A. Watras, Institute of Low Temperature and Structure Research (Poland); Neelima Basavaraju, Kaustubh Priolkar, Goa Univ. (India); Thomas Maldiney, Cyrille Richard, Daniel Scherman, Univ. Paris Descartes (France); Manijeh Razeghi, Northwestern Univ. (USA) [8987-93]

Nickel oxide growth on Si(111) and c-Al₂O₃ by pulsed laser deposition, Vinod Eric Sandana, David J. Rogers, Ferechteh H. Hosseini Teherani, Philippe Bove, Nanovation (France); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) [8987-97]



Integrated Optics: Devices, Materials, and Technologies XVIII

Conference Chairs: **Jean Emmanuel Broquin**, IMEP-LAHC (France); **Gualtiero Nunzi Conti**, Istituto di Fisica Applicata Nello Carrara (Italy)

Conference Co-Chairs: **Pierre Berini**, Univ. of Ottawa (Canada); **Christoph M. Greiner**, LightSmyth Technologies, Inc. (USA)

Program Committee: **Pavel Cheben**, National Research Council Canada (Canada); **Xudong Fan**, Univ. of Michigan (USA); **Sonia M. Garcia-Blanco**, Univ. Twente (Netherlands); **Helmut Heidrich**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Min-Cheol Oh**, Pusan National Univ. (Korea, Republic of); **François Royer**, Univ. Jean Monnet Saint-Etienne (France); **Jens Schmid**, National Research Council Canada (Canada); **Frank Schmidt**, JCMwave GmbH (Germany); **Yakov Sidorin**, Quarles & Brady LLP (USA); **Stefano Taccheo**, Swansea Univ. (United Kingdom); **Christoph A. Wächter**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Qiwen Zhan**, Univ. of Dayton (USA)

Monday 3 February

SESSION 1

Location: Room 236 (Mezzanine) . . . Mon 8:00 am to 10:10 am

Waveguide Engineering I

Session Chair: **Jean-Emmanuel Broquin**, IMEP-LAHC (France)

8:00 am: **Graphene-based photonic waveguide devices** (*Invited Paper*), Choon-Gi Choi, Electronics and Telecommunications Research Institute (Korea, Republic of) [8988-1]

8:30 am: **On-chip dynamic optical power splitter with liquid crystal waveguides on a silicon backplane**, Florenta A. Costache, Martin Blasl, Kirstin Bornhorst, Haldor Hartwig, Andreas Rieck, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) [8988-2]

8:50 am: **Polymer waveguide end facet roughness and optical input/output coupling loss for OPCB applications**, Hadi Baghsiahi, David Selviah, Univ. College London (United Kingdom); Richard C. Pitwon, Kai Wang, Xyratex Technology Ltd. (United Kingdom) [8988-3]

9:10 am: **III-V semiconductor waveguides for photonic functionality at 780 nm**, Jessica O. Maclean, Mark T. Greenaway, Richard P. Campion, Tadas Pyragius, Christopher J. Mellor, The Univ. of Nottingham (United Kingdom) [8988-4]

9:30 am: **Demonstration of high-performance chalcogenide glass photonic devices by thermal nanoimprint**, Yi Zou, Hongtao Lin, Lan Li, Loise Moreel, Jie Zhou, Danning Zhang, Qingyang Du, Juejun Hu, Univ. of Delaware (USA); Sylvain Danto, Kathleen A. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Jonathan David Musgraves, IRradiance Glass, Inc. (USA); Kevin D. Dobson, Robert Birkmire, Univ. of Delaware (USA) [8988-5]

9:50 am: **Optical loss and crosstalk in multimode photolithographically-fabricated polyacrylate polymer waveguide crossings**, Hadi Baghsiahi, David Selviah, Univ. College London (United Kingdom); Kai Wang, Xyratex Technology Ltd. (United Kingdom) [8988-6]

Coffee Break Mon 10:10 am to 10:40 am

SESSION 2

Location: Room 236 (Mezzanine) . . Mon 10:40 am to 12:30 pm

On-Chip Active Devices

Session Chair: **Sonia M. Garcia-Blanco**, Univ. Twente (Netherlands)

10:40 am: **Recent progress in Ti:sapphire waveguide lasers** (*Invited Paper*), Christos Grivas, Univ. of Southampton (United Kingdom) [8988-7]

11:10 am: **Er-doped tellurite waveguides for power amplifier applications** (*Invited Paper*), Jacob I. Mackenzie, Ganapathy S. Murugan, Univ. of Southampton (United Kingdom); Anthony W. Yu, James B. Abshire, NASA Goddard Space Flight Ctr. (USA) [8988-8]

11:40 am: **All-optical high-speed pulsed generation in SOAs** (*Invited Paper*), Amr S. Helmy, Fangxin Li, Univ. of Toronto (Canada) [8988-9]

12:10 pm: **Electro-optic polymer/silicon hybrid slow light modulator based on photonic crystal nanobeam waveguides**, Shin-ichiro Inoue, Akira Otomo, National Institute of Information and Communications Technology (Japan) [8988-10]

Lunch Break Mon 12:30 pm to 1:50 pm

SESSION 3

Location: Room 236 (Mezzanine) Mon 1:50 pm to 3:20 pm

Non-Reciprocal Devices

Session Chair: **Yakov Sidorin**, Quarles & Brady LLP (USA)

1:50 pm: **Silicon waveguide optical nonreciprocal devices based on magneto-optical phase shift** (*Invited Paper*), Tetsuya Mizumoto, Yuya Shoji, Kota Mitsuya, Tokyo Institute of Technology (Japan) [8988-11]

2:20 pm: **Femtosecond laser processing in magneto-optical glasses**, Qiang Liu, Simon Gross, Benjamin Johnston, Michael Withford, Michael Steel, Macquarie Univ. (Australia) [8988-12]

2:40 pm: **Experimental demonstration of anomalous nonreciprocal optical response of 1D periodic magnetoplasmonic nanostructures**, Lukas Halagacka, Technical Univ. of Ostrava (Czech Republic), Institut d'Électronique Fondamentale (France); Mathias Vanwolleghem, Francois Vaurette, Institut d'Électronique Fondamentale (France); Jamal Ben-Youssef, Univ. de Bretagne Occidentale (France); Philippe Gogol, Navy Yam, Institut d'Électronique Fondamentale (France); Kamil Postava, Technical Univ. of Ostrava (Czech Republic); Beatrice Dagens, Institut d'Électronique Fondamentale (France); Jaromir Pištora, Technical Univ. of Ostrava (Czech Republic) [8988-13]

3:00 pm: **Efficient magneto-optical mode converter on glass**, Jean Philippe Garayt, Univ. Jean Monnet Saint-Etienne (France); François Parsy, IMEP-LAHC (France); Damien Jamon, Univ. Jean Monnet Saint-Etienne (France); Sophie Neveu, Univ. Pierre et Marie Curie (France); François Royer, Univ. Jean Monnet Saint-Etienne (France); Elise Ghibaudo, Jean-Emmanuel Broquin, IMEP-LAHC (France) [8988-14]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 4

Location: Room 236 (Mezzanine) Mon 3:50 pm to 5:40 pm

Diffraction Photonics

Session Chair: **Christoph M. Greiner**, LightSmyth Technologies, Inc. (USA)

3:50 pm: **Polarization-insensitive silicon immersion grating for telecom applications** (*Invited Paper*), Yuichi Higuchi, Yuzo Ishii, Koichi Hadama, Joji Yamaguchi, Tsuyoshi Yamamoto, Nippon Telegraph and Telephone Corp. (Japan) [8988-15]

4:20 pm: **Photonic integrated spectrometer-on-chip based on digital planar holograms**, Giuseppe Calafiore, abeam Technologies, Inc. (USA); Alexander Koshelev, Nano-Optic Devices (USA); Scott Dhuey, Lawrence Berkeley National Lab. (USA); Alexander Goltsov, Pavel Sasorov, Nano-Optic Devices (USA); Sergey Babin, abeam Technologies, Inc. (USA); Stefano Cabrini, The Molecular Foundry (USA); Vladimir Yankov, Nano-Optic Devices (USA); Christophe Perez, abeam Technologies, Inc. (USA) [8988-16]

4:40 pm: **Extraordinary capabilities of optical devices incorporating guided-mode resonance gratings**, Robert Magnusson, The Univ. of Texas at Arlington (USA) [8988-17]

5:00 pm: **Metamaterial Lüneburg lens for Fourier optics on-a-chip**, Hamdam Nikkhal, Trevor J. Hall, Univ. of Ottawa (Canada) [8988-18]

5:20 pm: **Numerical simulation of grating couplers for mode multiplexed systems**, Benjamin Wohlfel, Technische Univ. Berlin (Germany); Sven Burger, JCMwave GmbH (Germany); Christos Stamatidis, Technische Univ. Berlin (Germany); Jan Pomplun, JCMwave GmbH (Germany); Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Lars Zimmermann, IHP GmbH (Germany); Klaus Petermann, Technische Univ. Berlin (Germany) [8988-19]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 236 (Mezzanine) . . . Tue 10:30 am to 12:10 pm

Photonic Integration I

Session Chair: **Jens Schmid**,
National Research Council Canada (Canada)

10:30 am: **Silicon-based packaged products and solutions (Invited Paper)**, Yves Painchaud, Michel Poulin, Martin Pelletier, François Pelletier, Carl Paquet, Michel Cyr, Martin Guy, TeraXion Inc. (Canada) [8988-20]

11:00 am: **Photonic integration in indium-phosphide membranes on silicon (IMOS) (Invited Paper)**, Huub P.M. M. Ambrosius, Jos J.G. M. van der Tol, Josselin Pello, Rui Zhang, Shrivatsa P. Bhat, Gunther Roelkens, Meint K. Smit, Technische Univ. Eindhoven (Netherlands) [8988-21]

11:30 am: **Hybrid photonic chip interferometer for embedded metrology**, Prashant Kumar, Haydn Martin, Univ. of Huddersfield (United Kingdom); Graeme Maxwell, CIP Technologies (United Kingdom); Xiangqian Jiang, Univ. of Huddersfield (United Kingdom) [8988-22]

11:50 am: **Introducing photonic devices for wavelength division multiplexing transceivers on 300-mm SOI wafers using CMOS processes**, Charles Baudot, STMicroelectronics (France); Jean-Marc Fédéli, CEA-LETI (France); Delphine Marris-Morini, Institut d'Électronique Fondamentale (France); Gilles Grand, CEA-LETI (France); Boris Caire-Remonay, STMicroelectronics (France); Sylvie Menezo, CEA-LETI (France); Laurent Vivien, Institut d'Électronique Fondamentale (France); Frederic Boeuf, STMicroelectronics (France); Ian O'Connor, Ecole Centrale de Lyon (France) [8988-23]

Lunch/Exhibition Break Tue 12:10 pm to 1:40 pm

SESSION 6

Location: Room 236 (Mezzanine) Tue 1:40 pm to 3:20 pm

Mid-IR and Millimeter-Wave Devices

Session Chair: **Gualtiero Nunzi Conti**,
Istituto di Fisica Applicata Nello Carrara (Italy)

1:40 pm: **Mid-Infrared AWG based on new low loss silicon/germanium waveguides (Invited Paper)**, Pierre R. Labeye, Mickael Brun, Pierre Barritault, CEA-LETI-Minatec (France); Fahem Boulila, Mathieu Carras, III-V Lab. (France); Sergio Nicoletti, CEA-LETI-Minatec (France) [8988-24]

2:10 pm: **Photonic-integrated circuit on InP for millimeter-wave generation (Invited Paper)**, Frederic van Dijk, Marco Lamponi, III-V Lab. (France); Mourad Chtioui, Thales Air Systems S.A. (France); François Lelarge, Gaël Kervella, III-V Lab. (France); Cyril C. Renaud, Martyn Fice, Univ. College London (United Kingdom); Guillermo Carpintero del Barrio, Univ. Carlos III de Madrid (Spain) [8988-25]

2:40 pm: **SiGe-based platform for mid-IR integrated optics**, Mickael Brun, Jean-Michel Hartmann, Sophie Ortiz, Pierre R. Labeye, Pierre Barritault, Salim Boutami, CEA-LETI-Minatec (France); Fahem Boulila, Mathieu Carras, III-V Lab. (France); Sergio Nicoletti, CEA-LETI-Minatec (France) [8988-26]

3:00 pm: **ZrO₂-TiO₂ thin films and resonators for mid-infrared integrated photonics**, Ningyuan Duan, Univ. of Electronic Science and Technology of China (China); Hongtao Lin, Lan Li, Univ. of Delaware (USA); Lei Bi, Univ. of Electronic Science and Technology of China (China); Juejun Hu, Univ. of Delaware (USA); Haipeng Lu, Xiaolong Weng, Jianliang Xie, Longjiang Deng, Univ. of Electronic Science and Technology of China (China) [8988-27]

Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 7

Location: Room 236 (Mezzanine) Tue 3:50 pm to 5:50 pm

Plasmonics

Session Chair: **Pierre Berini**, Univ. of Ottawa (Canada)

3:50 pm: **Bloch mode spatial harmonic decomposition in integrated localized surface plasmon chain**, Mickael Février, Philippe Gogol, Navy Yam, Robert Megy, Beatrice Dagens, Institut d'Électronique Fondamentale (France) . [8988-28]

4:10 pm: **Novel ultra-compact and ultra-broadband TE-pass polarizer with a silicon hybrid plasmonic waveguide**, Xiaowei Gaun, Peipeng Xu, Yaocheng Shi, Daoxin Dai, Zhejiang Univ. (China) [8988-29]

4:30 pm: **Slow-light enhanced nanoscale plasmonic waveguide sensors and switches**, Yin Huang, Pouya Dastmalchi, Georgios Veronis, Louisiana State Univ. (USA) [8988-30]

4:50 pm: **Integrated power divider/combiner at hybrid orthogonal junctions**, Mohamed H. El Sherif, Osman S. Ahmed, Mohamed H. Bakr, McMaster Univ. (Canada) [8988-31]

5:10 pm: **Optically-readable plasmonic resistive random-access memory integrated with an SOI waveguide**, Alexandros Emoras, The Hebrew Univ. of Jerusalem (Israel) [8988-32]

5:30 pm: **Submicron-integrated plasmonic power splitter**, Mohamed A. Swillam, Marina Ayad, The American Univ. in Cairo (Egypt) [8988-33]

Wednesday 5 February

SESSION 8

Location: Room 236 (Mezzanine) . . . Wed 8:00 am to 10:20 am

Waveguide Engineering II

Session Chair: **François Royer**,
Univ. Jean Monnet Saint-Etienne (France)

8:00 am: **Application of atomic layer deposition in nanophotonics (Invited Paper)**, Seppo Honkanen, Univ. of Eastern Finland (Finland) . . . [8988-34]

8:30 am: **Integrated lithium niobate photonic crystals (Invited Paper)**, Nadège Courjal, Clément Guyot, Gwenn Ulliac, Arnaud Gerthoffer, Fabien Henrot, Wentao Qiu, Jean-Yves Rauch, Maria-Pilar Bernal, Fadi I. Baida, FEMTO-ST (France); Sylvain Ballandras, Frequency Components and Systems (France) [8988-35]

9:00 am: **Chemical inertness of UV-cured optical elastomers within the printed circuit board manufacturing process for embedded waveguide applications**, Kevin L. Kruse, Karl A. Walczak, Brandon W. Swatowski, Michigan Technological Univ. (USA); Nicholas Thomas, Casey D. Demars, Calumet Electronics Corp. (USA); Christopher T. Middlebrook, Michigan Technological Univ. (USA) [8988-36]

9:20 am: **Observation of Raman scattering in glass integrated waveguides: a route towards supercontinuum generation**, Fabien Geoffroy, Lionel Bastard, Jean-Emmanuel Broquin, Grégory Grosa, IMEP-LAHC (France) [8988-37]

9:40 am: **Precision dicing of optical materials**, Lewis G. Carpenter, Peter A. Cooper, Christopher Holmes, James C. Gates, Peter G. R. Smith, Univ. of Southampton (United Kingdom) [8988-38]

10:00 am: **Ion beam irradiated optical channel waveguides**, István Bányász, Wigner Research Ctr. for Physics of the H.A.S. (Hungary); Miklós Fried, Zsolt Zolnai, István Rajta, Research Institute for Technical Physics and Materials Science (Hungary); Gyula Nagy, Hungarian Academy of Sciences (Hungary); Vladimír Havránek, Nuclear Physics Institute of the ASCR, v.v.i. (Czech Republic); Miklós Veres, László Himics, Wigner Research Ctr. for Physics of the H.A.S. (Hungary); Simone Berneschi, Stefano Pelli, Gualtiero Nunzi Conti, Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy) [8988-39]

Coffee Break Wed 10:20 am to 10:50 am

OPTO

Conference 8988 · Location: Room 236 (Mezzanine)

SESSION 9

Location: Room 236 (Mezzanine) . . Wed 10:50 am to 12:20 pm

Sensors I

Session Chair: **Xudong Fan**, Univ. of Michigan (USA)

10:50 am: **Integrated optofluidics for on-chip biological sample preparation and analysis** (*Invited Paper*), Hong Cai, Joshua W. Parks, Univ. of California, Santa Cruz (USA); Tomas Wall, Brigham Young Univ. (USA); Kaelyn D. Leake, Tomas Yuzvinsky, Univ. of California, Santa Cruz (USA); Jungkyu Kim, Texas Tech Univ. (USA); Ricardo Carrion Jr., Jean L. Patterson, Texas Biomedical Research Institute (USA); Richard A. Mathies, Univ. of California, Berkeley (USA); Aaron R. Hawkins, Brigham Young Univ. (USA); Holger Schmidt, Univ. of California, Santa Cruz (USA) [8988-40]

11:20 am: **Optofluidic hybrid platform with integrated solid core waveguides**, Romeo Bernini, Genni Testa, Gianluca Persichetti, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) [8988-41]

11:40 am: **Graphene functionalized leaky cavity mode biosensor based on silicon nanowire array**, Qiushi Guo, Hai Zhu, Univ. of Pennsylvania (USA); Feng Liu, Shanghai Normal Univ. (China); Alexander Y. Zhu, Jason C. Reed, Fei Yi, Ertugrul Cubukcu, Univ. of Pennsylvania (USA) [8988-42]

12:00 pm: **Sensitivity of Mach-Zehnder interferometer for dissolved gas monitoring**, Susan Lindcrantz, Olav G. Hellese, Univ. of Tromsø (Norway); Firehun T. Dullo, Stian A. Solbø, Northern Research Institute, Tromsø (Norway); Jean-Claude Tinguely, Balpreet S. Ahluwalia, Univ. of Tromsø (Norway) . [8988-43]

Lunch/Exhibition Break Wed 12:20 pm to 1:50 pm

SESSION 10

Location: Room 236 (Mezzanine) Wed 1:50 pm to 3:10 pm

Sensors II

Session Chair: **Silvia Soria**,
Istituto di Fisica Applicata Nello Carrara (Italy)

1:50 pm: **Design and simulation of a semiconductor chip-based visible NIR spectrometer for Earth observation**, Joanna Coote, ZiNIR Ltd. (United Kingdom); Emma R. Woolliams, Nigel Fox, National Physical Lab. (United Kingdom); Ian D. Goodyer, Stephen J. Sweeney, ZiNIR Ltd. (United Kingdom) [8988-44]

2:10 pm: **High-contrast GeTe₄ waveguides for mid-infrared biomedical sensing applications**, Vinita Mittal, James S. Wilkinson, Ganapathy Senthil Murugan, Univ. of Southampton (United Kingdom) [8988-55]

2:30 pm: **Detection and calculation of reflected spectral shifts in fiber Bragg gratings (FBG) in polarization maintaining optical fiber for structural health monitoring (SHM) of fiber composite reinforced aluminum pressure vessels**, Joel Quintana, Kai Zhao, Virgilio Gonzalez, Jack Chessa, The Univ. of Texas at El Paso (USA) [8988-68]

2:50 pm: **Refractive index sensing utilizing photonic crystal nano-beam cavity with slotted stack**, Peipeng Xu, Zhejiang Univ. (China); Kaiyuan Yao, Univ. of California, Los Angeles (USA); Jiajiu Zheng, Xiaowei Guan, Yaocheng Shi, Zhejiang Univ. (China) [8988-47]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 11

Location: Room 236 (Mezzanine) Wed 3:40 pm to 5:30 pm

Photonics Integration II

Session Chair: **Pavel Cheben**,
National Research Council Canada (Canada)

3:40 pm: **Heterogeneous photonic integrated circuits and their applications in computing, networking, and imaging** (*Invited Paper*), S. J. Ben Yoo, Univ. of California Davis (USA) [8988-48]

4:10 pm: **Investigation of temperature dependence on optical current transducers consisting of a polymeric photonic IC and a high birefringence spun fiber**, Woo-Sung Chu, Sung-Moon Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8988-49]

4:30 pm: **Enabling all-optical logic gates through inverse design in passive photonic crystal structures**, Imanol Andonegui, Angel J. Garcia-Adeva, Univ. del Pais Vasco (Spain) [8988-50]

4:50 pm: **Stable planar microcavities based on mesoscopic photonic crystals**, Giovanni Magno, Lab. d'Analyse et d'Architecture des Systèmes (France) and Politecnico di Bari (Italy); Marco Grande, Politecnico di Bari (Italy); Antoine Monmayrant, Françoise Lozes-Dupuy, Olivier Gauthier-Lafaye, Lab. d'Analyse et d'Architecture des Systèmes (France) and Univ. de Toulouse (France); Giovanna Calò, Vincenzo Petruzzelli, Politecnico di Bari (Italy) . [8988-51]

5:10 pm: **A polarization modulation in monolithically-integrated devices at 300 mbps**, Muhammad Azhar Naeem, Univ. of the Punjab (Pakistan); Mohsin Haji, Barry M. Holmes, David C. Hutchings, John H. Marsh, Anthony E. Kelly, Univ. of Glasgow (United Kingdom) [8988-52]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Monolithically integrated DWDM DFB laser array fabricated by a modified SAG technique, Can Zhang, Song Liang, Liangshun Han, Baojun Wang, Hongliang Zhu, Wei Wang, Institute of Semiconductors (China) [8988-53]

Numerical analysis of optical resonances in 3D nanoresonators, Sven Burger, JCMwave GmbH (Germany) and Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Lin Zschiedrich, Jan Pomplun, JCMwave GmbH (Germany); Frank Schmidt, JCMwave GmbH (Germany) and Konrad-Zuse-Zentrum (Germany) [8988-54]

Waveguide sensors for liquid using gapped optical fibers, Kazutaka Baba, Keita Chiba, Sendai National College of Technology (Japan) [8988-56]

Plasmonic slot nano-waveguides with flattened Luneburg lens-based optical couplers, Bayaner Arigong, Rongguo Zhou, HyoungSoo Kim, YuanKun Lin, Hualiang Zhang, Univ. of North Texas (USA) [8988-57]

A broadband silicon electro-absorption modulator (EAM) using Schottky diode, Uiseok Jeong, Korea Univ. (Korea, Republic of); Dong Chul Han, Korea Univ. (Korea, Republic of) and SAMSUNG Electronics Co. (Korea, Republic of); Dong Ho Lee, Kyungwoon Lee, Jung Ho Park, Korea Univ. (Korea, Republic of) . [8988-59]

Optical isolation for optical ICs using a self-assembled scattering monolayer, Guang-Hao Huang, Jun-Whee Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8988-60]

1300-nm thermo-optic tunable lasers based on polymeric Bragg reflection waveguide devices for low-cost OCT, Chi-Hun Sung, Jun-Whee Kim, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of) [8988-61]

Orthogonal solutions for asymmetric-coupled waveguide arrays: an elegant, analytical approach, Niharika Kohli, Univ. of Delhi South Campus (India); Sangeeta Srivastava, Univ. of Delhi (India); Enakshi K. Sharma, Univ. of Delhi South Campus (India) [8988-62]

On the resonance frequency of an integrated optical ring resonator with low radius of curvature, Daaa Khalil, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt); Amr Wageeh, Salwa El-Sabban, Gamal A. F. M. Khalaf, Helwan Univ. (Egypt) [8988-63]

Piezoforce and contact resonance microscopy correlated with Raman spectroscopy applied to a non-linear optical material and to a lithium battery material, Rimma Dekhter, Gabi Zeltzer, Oleg Zinoviev, Nanonics Imaging Ltd. (Israel); Michael Roth, The Hebrew Univ. of Jerusalem (Israel); Bernhard Roling, Philipps-Univ. Marburg (Germany); Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel). [8988-64]

Inverse scattering designs of dispersion-engineered single-mode planar waveguides, Alexander R. May, Francesco Poletti, Michalis N. Zervas, Univ. of Southampton (United Kingdom) [8988-65]

Temperature sensitivity of waveguide Mach-Zehnder interferometer, Firehun T. Dullo, Norut Tromsø (Norway); Viktor Sokolov, Cyprien Chauvet, Susan Lindecrantz, Univ. of Tromsø (Norway); Stian A. Solbø, Norut Teknologi (Norway); Olav G. Hellesø, Univ. of Tromsø (Norway). [8988-66]

High-efficient and broadband nanoabsorbers and nanoreflectors based on metallic dielectric periodical structures, Joaquim Isidio Lima Jr., Juarez Caetano da Silva, Vitaly Felix Rodriguez-Esquerre, Univ. Federal da Bahia (Brazil); Cosme Eustaquio Rubio Mercedes, Univ. Estadual de Mato Grosso do Sul (Brazil) [8988-67]

Electric field sensors consisting of polymeric photonic integrated chips, Sung-Wook Heo, Woo-Sung Chu, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of). [8988-69]

The performance analysis of an electro-optic polymer modulator, Guofang Fan, Technical Institute of Physics and Chemistry (China) [8988-70]

Towards an optical biosensor based on WGM microbubble resonators, Ambra Giannetti, Sara Tombelli, Cosimo Trono, Simone Berneschi, Istituto di Fisica Applicata Nello Carrara (Italy); Daniele Farnesi, Ctr. Studi e Ricerche Enrico Fermi (Italy) and Istituto di Fisica Applicata Nello Carrara (Italy) and UNIPRESS (Italy); Andrea Barucci, Silvia Soria, Gualtiero Nunzi Conti, Francesco Baldini, Istituto di Fisica Applicata Nello Carrara (Italy) [8988-71]

Portable dual-beam generator using a hybrid integrated guided-wave beam aligner, Hong-Shik Lee, Korea Institute of Lighting Technology (Korea, Republic of); Vivek Raj Shrestha, Sang-Shin Lee, Kwangwoon Univ. (Korea, Republic of) [8988-72]

Smart Photonic and Optoelectronic Integrated Circuits XVI

Conference Chairs: **Louay A. Eldada**, Quanergy, Inc. (USA); **Ei-Hang Lee**, Inha Univ. (Korea, Republic of); **Sailing He**, Royal Institute of Technology (Sweden)

Program Committee: **Ray T. Chen**, The Univ. of Texas at Austin (USA); **Shanhui Fan**, Stanford Univ. (USA); **Chennupati Jagadish**, The Australian National Univ. (Australia); **Jürgen Jahns**, FernUniv. Hagen (Germany); **David V. Plant**, McGill Univ. (Canada); **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Ali Serpengüzel**, Koç Univ. (Turkey); **Michael Watts**, Massachusetts Institute of Technology (USA); **Dan-Xia Xu**, National Research Council Canada (Canada)

Wednesday 5 February

KEYNOTE SESSION

Location: Room 228 (Mezzanine) 8:30 am to 9:10 am

Session Chair: **Sailing He**, KTH Royal Institute of Technology (Sweden)

8:30 am: **III-V semiconductor optoelectronic devices from UV to THz: recent advances and future trends** (*Keynote Presentation*), Manijeh Razeghi, Northwestern Univ. (USA) [8989-1]

SESSION 1

Location: Room 228 (Mezzanine) . . . Wed 9:10 am to 10:30 am

Advanced Active OEICs

Session Chair: **Sailing He**, KTH Royal Institute of Technology (Sweden)

9:10 am: **Output power enhancement in microlasers by selective pumping** (*Invited Paper*), Hakan E. Tureci, Li Ge, Omer Malik, Princeton Univ. (USA) [8989-2]

9:40 am: **High-quality large-area ELOG InP on silicon for photonic integration using conventional optical lithography** (*Invited Paper*), Himanshu Kataria, Wondrosen T. Metaferia, Carl Junesand, KTH Royal Institute of Technology (Sweden); Chong Zhang, John E. Bowers, Univ. of California, Santa Barbara (USA); Sebastian Lourduodoss, KTH Royal Institute of Technology (Sweden) [8989-3]

10:10 am: **Photonic Mach-Zehnder modulators driven by surface acoustic waves in AlGaAs technology**, Antonio Crespo-Poveda, Andrés Cantarero, Mauricio M. de Lima Jr., Univ. de València (Spain); Rudolf Hey, Klaus Biermann, Paulo V. Santos, Abbes Tahraoui, Paul-Drude-Institut für Festkörperelektronik (Germany); Bernardo Gargallo, Univ. Politècnica de Valencia (Spain); Iñigo Artundo, VLC Photonics (Spain); Pascual Muñoz, Univ Politècnica de Valencia (Spain) and VLC Photonics (Spain) [8989-4]

Coffee Break Wed 10:30 am to 11:00 am

SESSION 2

Location: Room 228 (Mezzanine) . . Wed 11:00 am to 12:00 pm

Optical Phased Array OEICs

Session Chair: **Louay A. Eldada**, Quanergy, Inc. (USA)

11:00 am: **Very large-scale silicon photonics** (*Invited Paper*), Michael Watts, Massachusetts Institute of Technology (USA) [8989-5]

11:30 am: **Fully-integrated hybrid silicon free-space beam steering source with 32-channel phased array** (*Invited Paper*), Jared C. Hulme, Jonathan K. Doyle, Martijn J. Heck, Jock T. Bovington, Michael L. Davenport, John E. Bowers, Univ. of California, Santa Barbara (USA) [8989-6]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

SESSION 3

Location: Room 228 (Mezzanine) Wed 1:30 pm to 3:30 pm

PICs for Optical Interconnects

Joint Session with Conferences 8989 and 8991

Session Chair: **Louay A. Eldada**, Quanergy, Inc. (USA)

1:30 pm: **Advances in integrated photonic circuits for packet-switched interconnection** (*Invited Paper*), Kevin Williams, Ripalta Stabile, Technische Univ. Eindhoven (Netherlands) [8991-41]

2:00 pm: **Silicon nanophotonics integration for chip-scale optical communication** (*Invited Paper*), Andrew Grieco, Univ. of California, San Diego (USA); Dawn T. Tan, Singapore Univ. of Technology & Design (Singapore); Kazuhiro Ikeda, Nara Institute of Science and Technology (Japan); Maziar P. Nezhad, Univ. of California, San Diego (USA) and RWTH Aachen (Germany); Matthew Puckett, Yehshaihu Fainman, Univ. of California, San Diego (USA) [8989-7]

2:30 pm: **Optical transceiver ICs based on 3D die-stacking of optoelectronic devices** (*Invited Paper*), Harmen J. S. Dorren, Technische Univ. Eindhoven (Netherlands) [8989-8]

3:00 pm: **Silicon photonic integrated devices for datacenter optical networks** (*Invited Paper*), Marco Fiorentino, Chin-Hui Chen, Géza Kurczveil, Di Liang, Zhen Peng, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8991-42]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 4

Location: Room 228 (Mezzanine) Wed 4:00 pm to 5:20 pm

Advanced Hybrid PICs

Session Chair: **Sailing He**, KTH Royal Institute of Technology (Sweden)

4:00 pm: **2D and 3D heterogeneous photonic integrated circuits** (*Invited Paper*), S. J. Ben Yoo, Univ. of California, Davis (USA) [8989-9]

4:30 pm: **Hybrid integration of RF photonic devices** (*Invited Paper*), Lute Maleki, Vladimir S. Ilchenko, Andrey B. Matsko, OEwaves, Inc. (USA) [8989-10]

5:00 pm: **Observation of optically-induced transparency effect in silicon nanophotonic wires with graphene**, Longhai Yu, Jiajiu Zheng, Daoxin Dai, Sailing He, Zhejiang Univ. (China) [8989-11]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Plastic and atmosphere two medium Infrared photonic detector switch, Tao Yang, Jilin Electric Power Survey & Design Institute (China); Yujing Yang, Jilin Teacher's Institute of Engineering & Technology (China) [8989-29]

Low-Loss and low-crosstalk graded-index polymer optical waveguide circuit fabricated using an imprint method, Yohei Yamashita, Takaaki Ishigure, Keio Univ. (Japan) [8989-30]

Inter-channel crosstalk in densely-aligned multimode polymer parallel optical waveguides, Takuya Kudo, Takaaki Ishigure, Keio Univ. (Japan) [8989-31]

Thursday 6 February

SESSION 5

Location: Room 228 (Mezzanine) Thu 8:00 am to 10:40 am

Advances in Silicon Photonics and Optoelectronics

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

8:00 am: **Recent results in silicon photonics at the University of Southampton** (*Invited Paper*), Graham T. Reed, Goran Z. Mashanovich, Frederic Y. Gardes, David J. Thomson, Youfang Hu, Jordi Soler Penades, Milos Nedeljkovic, A. Khokar, P. Thomas, Callum Littlejohns, A. Ahmad, Scott Reynolds, Rob P. Topley, C. Mitchell, S. Stankovic, Nathan Owens, Xia Chen, P. R. Wilson, L. Ke, Taha M. Ben Masaud, A. Tarazona, Harold M. H. Chong, Univ. of Southampton (United Kingdom) [8989-12]

8:30 am: **Silicon photonic modulators and receivers for short reach optical interconnects** (*Invited Paper*), David V. Plant, McGill Univ. (Canada) . . . [8989-13]

9:00 am: **Electronic interfaces to silicon photonics** (*Invited Paper*), Anthony L. Lentine, Jonathan A. Cox, William A. Zortman, Daniel J. Savignon, Sandia National Labs. (USA) [8989-14]

9:30 am: **Design methodologies for silicon photonic integrated circuits** (*Invited Paper*), Lukas Chrostowski, The Univ. of British Columbia (Canada) [8989-15]

10:00 am: **Traveling wave electrode design for ultra-compact carrier-injection HBT-based electroabsorption modulator in a 130nm BiCMOS process**, Enjin Fu, Valencia M. J. Koomson, Tufts Univ. (USA); Pengfei Wu, Z. Rena Huang, Rensselaer Polytechnic Institute (USA) [8989-16]

10:20 am: **An integrated CMOS detection system for optical short-pulse**, Chang-Gun Kim, Young-Wan Choi, Nam-Pyo Hong, Chung-Ang Univ. (Korea, Republic of) [8989-17]

Coffee Break Thu 10:40 am to 11:00 am

SESSION 6

Location: Room 228 (Mezzanine) . . . Thu 11:00 am to 12:10 pm

Smart Photon Manipulation Systems

Session Chair: **Louay A. Eldada**, Quanergy, Inc. (USA)

11:00 am: **Local slow-light engineering: a strategic way to use slow light** (*Invited Paper*), Khaled Mnaymneh, Univ. of Michigan (USA) [8989-18]

11:30 am: **Towards optoelectronic architectures for integrated neuromorphic processors**, Romain Martinenghi, Antonio Baylón Fuentes, Maxime Jacquot, Yanne K. Chembo, Laurent Larger, FEMTO-ST (France) [8989-19]

11:50 am: **Precision alignment of integrated optics in surface electrode ion traps for quantum information processing**, Amber L. Young, Jeffrey D. Hunker, Robert R. Boye, Andrew E. Hollowell, Raymond A. Haltli, Matthew G. Blain, Edwin J. Heller, Francisco M. Benito, Craig Clark, A. Robert Ellis, Shanalyn A. Kemme, Peter Maunz, Sally Samora, Jonathan Sterk, Chris P. Tigges, Joel R. Wendt, Daniel L. Stick, Sandia National Labs. (USA) [8989-20]

Lunch/Exhibition Break Thu 12:10 pm to 1:30 pm

SESSION 7

Location: Room 228 (Mezzanine) Thu 1:30 pm to 3:40 pm

Smart Optoelectronic Sensing Systems

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

1:30 pm: **LiDAR sensors for real-time high-accuracy 3D mapping and object detection, tracking, identification, and classification**, Louay A. Eldada, Quanergy, Inc. (USA) [8989-21]

2:00 pm: **Monolithic device for on-chip fast optical phase conjugation integrating an image sensor and a spatial light modulator**, Timothe LaForest, Antoine Dupret, Arnaud Verdant, CEA-LETI-Minatec (France); François Ramaz, Ecole Supérieure de Physique et de Chimie Industrielles (France); Sylvain Gigan, Institut Langevin (France); Gilles Tessier, Ecole Supérieure de Physique et de Chimie Industrielles (France) [8989-22]

2:20 pm: **Integrated ridge waveguides in germanium on gallium arsenide for long wavelength infrared detection of chemical warfare simulant triethylphosphate**, Parker Wray, Yi Zou, The Univ. of Texas at Austin (USA); Swapnajt Chakravarty, Omega Optics, Inc. (USA); Dakota Crisp, Southeast Missouri State Univ. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [8989-23]

2:40 pm: **Glucose sensing by means of silicon photonics** (*Invited Paper*), Ronny Bockstaele, Eva Ryckeboer, Nannicha Hattasan, Yannick De Koninck, Muhammad Muneeb, Steven Verstuyft, Danaë G. Delbeke, Wim Bogaerts, Gunther Roelkens, Roel G. Baets, Univ. Gent (Belgium) [8989-24]

3:10 pm: **A novel phase-sensitive SPR biosensor array based on prism phase modulator**, Sailing He, KTH Royal Institute of Technology (Sweden) . . . [8989-25]

Coffee Break Thu 3:40 pm to 4:00 pm

SESSION 8

Location: Room 228 (Mezzanine) Thu 4:00 pm to 5:20 pm

Mode Conversion and Polarization Control Structures

Session Chair: **El-Hang Lee**, Inha Univ. (Korea, Republic of)

4:00 pm: **Highly-efficient nanofocusing for integrated on-chip nanophotonics** (*Invited Paper*), Hyuck Choo, California Institute of Technology (USA) . . [8989-26]

4:30 pm: **Mode conversion/coupling in submicron SOI (silicon-on-insulator) waveguides and the applications** (*Invited Paper*), Daoxin Dai, Zhejiang Univ. (China) [8989-27]

5:00 pm: **Metal membrane with dimer slots as a universal polarizer**, Sergej V. Zhukovsky, DTU Fotonik (Denmark); Maksim Zalkovskij, Radu Malureanu, Technical Univ. of Denmark (Denmark); Christian Kremers, Bergische Univ. Wuppertal (Germany); Dmitry N. Chigrin, Bergische Univ. Wuppertal (Germany) and RWTH Aachen (Germany); Peter T. Tang, IPU (Denmark); Peter U. Jepsen, DTU Fotonik (Denmark); Andrei V. Lavrinenko, Technical Univ. of Denmark (Denmark) [8989-28]

OPTO

Silicon Photonics IX

Conference Chairs: **Joel Kubby**, Univ. of California, Santa Cruz (USA); **Graham T. Reed**, Univ. of Southampton (United Kingdom)

Program Committee: **Laurence W. Cahill**, La Trobe Univ. (Australia); **Philippe M. Fauchet**, Vanderbilt Univ. (USA); **L. Cary Gunn**, Genalyte, Inc. (USA); **Siegfried Janz**, National Research Council Canada (Canada); **Andrew P. Knights**, McMaster Univ. (Canada); **Laura Maria Lechuga**, Catalan Institute of Nanoscience and Nanotechnology (Spain); **Sebania Libertino**, Istituto per la Microelettronica e Microsistemi (Italy); **Goran Z. Mashanovich**, Univ. of Southampton (United Kingdom); **Ching Eng J. Png**, A*STAR Institute of High Performance Computing (Singapore); **Andrew W. Poon**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Haisheng Rong**, Intel Corp. (USA); **Holger Schmidt**, Univ. of California, Santa Cruz (USA); **Dan-Xia Xu**, National Research Council Canada (Canada); **Zhiping Zhou**, Peking Univ. (China)

Monday 3 February

SESSION 1

Location: Room 301 (Esplanade) . . . Mon 8:00 am to 10:10 am

Waveguides I

Session Chair: **Graham T. Reed**,
Univ. of Southampton (United Kingdom)

8:00 am: **A compact and low-loss silicon waveguide crossing for O-band optical interconnect**, Yi Zhang, Univ. of Delaware (USA); Matthew Streshinsky, Ari Novack, A*STAR Institute of Microelectronics (Singapore) and National Univ. of Singapore (Singapore); Yangjin Ma, Shuyu Yang, Univ. of Delaware (USA); Andy E. J. Lim, Guo-Qiang Lo, A*STAR Institute of Microelectronics (Singapore); Tom W. Baehr-Jones, Univ. of Delaware (USA); Michael Hochberg, A*STAR Institute of Microelectronics (Singapore) and Univ. of Delaware (USA) and National Univ. of Singapore (Singapore) [8990-1]

8:20 am: **Launching of multi-project wafer runs in ePIXfab with micron-scale silicon rib waveguide technology**, Timo Aalto, Matteo Cherchi, Mikko Harjanne, Sami Ylinen, Markku Kapulainen, Tapani Vehmas, VTT Technical Research Ctr. of Finland (Finland) [8990-2]

8:40 am: **The Euler bend: paving the way for high-density integration on micron-scale semiconductor platforms**, Matteo Cherchi, Sami Ylinen, Mikko Harjanne, Markku Kapulainen, Tapani Vehmas, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland) [8990-3]

9:00 am: **Low-loss spiral waveguides with ultra-small footprint on a micron scale SOI platform**, Matteo Cherchi, Sami Ylinen, Markku Kapulainen, Mikko Harjanne, Tapani Vehmas, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland) [8990-4]

9:20 am: **A new generation of ultra-dense optical I/O for silicon photonics (Invited Paper)**, Mitchell S. Wlodawski, Victor I. Kopp, Jongchul Park, Jonathan Singer, Eric E. Hubner, Daniel Neugroschl, Norman Chao, Azriel Z. Genack, Chiral Photonics, Inc. (USA) [8990-5]

9:50 am: **A high-performance SOI grating coupler with completely vertical emission**, Hsin-Lun Tseng, Phoebe Hsiao, Chih-Wei Tseng, Neil Na, National Tsing Hua Univ. (Taiwan) [8990-6]

Coffee Break Mon 10:10 am to 10:30 am

SESSION 2

Location: Room 301 (Esplanade) . . Mon 10:30 am to 12:00 pm

Waveguides II

Session Chair: **Graham T. Reed**,
Univ. of Southampton (United Kingdom)

10:30 am: **Erasable diffractive grating couplers for wafer scale testing in silicon-on-insulator**, Rob P. Topley, Gregorio Martinez-Jimenez, Univ. of Southampton (United Kingdom); Liam O'Faolain, Univ. of St. Andrews (United Kingdom); Noel Healy, Sakellaris Mallis, David J. Thompson, Frederic Y. Gardes, Anna C. Peacock, David N. Payne, Goran Z. Mashanovich, Graham T. Reed, Univ. of Southampton (United Kingdom) [8990-7]

10:50 am: **Cost-effective single-etched TM-mode SOI grating couplers for broadband perfectly vertical coupling**, George Dabos, Aristotle Univ. of Thessaloniki (Greece); Dimitris Kalavrouziotis, National Technical Univ. of Athens (Greece); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece); Dimitris M. Tsiokos, Aristotle Univ. of Thessaloniki (Greece) and Ctr. for Research and Technology Hellas (Greece) [8990-8]

11:10 am: **Tolerance analysis for efficient MMI devices in silicon photonics**, Carmen Vázquez García, Alberto Tapetado, Massachusetts Institute of Technology (USA) and Univ. Carlos III de Madrid (Spain); Jason S. Orcutt, Huaiyu C. Meng, Rajeev J. Ram, Massachusetts Institute of Technology (USA) . . [8990-9]

11:30 am: **Monolithic integration of micron to sub-micron waveguides with 2D mode-size converters in SOI platform (Invited Paper)**, Sujith Chandran, Saket Kaushal, Bijoy K. Das, Indian Institute of Technology Madras (India) [8990-10]

Lunch Break Mon 12:00 pm to 1:00 pm

SESSION 3

Location: Room 301 (Esplanade) Mon 1:00 pm to 3:30 pm

Waveguides III

Session Chair: **Andrew P. Knights**, McMaster Univ. (Canada)

1:00 pm: **Silicon photonic crystals (Invited Paper)**, Liam O'Faolain, Univ. of St. Andrews (United Kingdom) [8990-11]

1:30 pm: **Design and fabrication of 8-channel AWGs with 2- μ m-SOI for optical interconnects**, Sidharth Ravindran, Bijoy K. Das, Indian Institute of Technology Madras (India) [8990-12]

1:50 pm: **The evolution of angled MMI structure on the SOI platform**, Youfang Hu, David J. Thomson, Frederic Y. Gardes, Goran Z. Mashanovich, Graham T. Reed, Univ. of Southampton (United Kingdom) [8990-13]

2:10 pm: **Fabrication-tolerant optical filters for dense integration on a micron-scale SOI platform**, Matteo Cherchi, Sami Ylinen, Mikko Harjanne, Markku Kapulainen, Tapani Vehmas, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland); George T. Kanellos, Ctr. for Research and Technology Hellas (Greece); Dimitris Fitsios, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece) [8990-14]

2:30 pm: **Apodized grating silicon waveguides for tunable optical delay lines**, Saeed Khan, Sasan Fathpour, Univ. of Central Florida (USA) [8990-15]

2:50 pm: **Silicon nanomembrane-based compact true-time-delay module on unconventional substrates**, Harish Subbaraman, Omega Optics, Inc. (USA); Xiaochuan Xu, Ray T. Chen, The Univ. of Texas at Austin (USA) [8990-16]

3:10 pm: **Ge quantum-well optical interconnects on bulk silicon**, Papichaya Chaisakul, Institut d'Électronique Fondamentale (France); Delphine Marris-Morini, Univ. Paris-Sud 11 (France); Jacopo Frigerio, Daniel Christina, Politecnico di Milano (Italy); Mohamed Said Rouified, Univ. Paris-Sud 11 (France); Stefano C. Cecchi, Politecnico di Milano (Italy); Paul Crozat, Univ. Paris-Sud 11 (France); Giovanni Isella, Politecnico di Milano (Italy); Laurent Vivien, Univ. Paris-Sud 11 (France) [8990-17]

Coffee Break Mon 3:30 pm to 3:50 pm

SESSION 4

Location: Room 301 (Esplanade) Mon 3:50 pm to 6:30 pm

Sources

Session Chair: **Philippe M. Fauchet**, Vanderbilt Univ. (USA)

3:50 pm: **Hybrid-integrated external cavity lasers for high-density Si-photonics WDM transceiver platform (Invited Paper)**, Aaron J. Zilkie, Bhavin J. Bijlani, Pegah Seddighian, Saeed Fatholouloumi, Daniel C. Lee, Wei Qian, Joan Fong, Roshanak Shafiiha, Dazeng Feng, B. Jonathan Luff, Mehdi Asghari, Kotura, Inc. (USA) [8990-18]

4:20 pm: **Characteristics of avalanche electroluminescent nanoscale Si light sources in SOI technology**, Christo Janse van Rensburg, INSiAVA (Pty) Ltd. (South Africa) and Univ. of Pretoria (South Africa); Monuko du Plessis, Petrus J. Venter, Univ. of Pretoria (South Africa) and INSiAVA (Pty) Ltd. (South Africa) [8990-19]

4:40 pm: **High-intensity 100-nW 5GHz silicon avalanche LED utilizing carrier energy and momentum engineering**, Lukas W. Snyman, Tshwane Univ. of Technology (South Africa) and Micro Systems SA (South Africa); Jean-Luc Polleux, Univ. Paris-Est Marne-la-Vallée (France); Kingsley A. Ogudo, Tshwane Univ. of Technology (South Africa) and Micro Systems SA (South Africa); Carlos Viana, Sebastain Wahl, Univ. Paris-Est Marne-la-Vallée (France) [8990-20]

5:00 pm: **Enhanced infrared transmission from Er-doped SiO₂/nc-Si multilayer waveguides under lateral electrical pumping**, Halina Krzyzanowska, Vanderbilt Univ. (USA); Karl S. Ni, Yijing Fu, Univ. of Rochester (USA); Philippe M. Fauchet, Vanderbilt Univ. (USA) [8990-21]

5:20 pm: **Dual-facet coupling of SOA array on 4-µm silicon-on-insulator implementing a hybrid integrated SOA-MZI wavelength converter**, Theonitsa Alexoudi, Dimitris Fitsios, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); George T. Kanellos, Ctr. for Research and Technology Hellas (Greece); Nikos Pleros, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Tolga Tekin, Technische Univ. Berlin (Germany); Matteo Cherchi, Sami Ylinen, Mikko Harjanne, Markku Kapulainen, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland) [8990-22]

5:40 pm: **Mid-infrared nonlinear silicon photonics** (*Invited Paper*), Xiaoping Liu, OFS Labs. (USA); Bart Kuyken, Univ. Gent (Belgium); William M. J. Green, IBM Thomas J. Watson Research Ctr. (USA); Richard M. Osgood, Columbia Univ. (USA); Roel G. Baets, Gunther Roelkens, Univ. Gent (Belgium) [8990-23]

6:10 pm: **Model of charge transport in Er-doped SiO₂/nc-Si multilayers under lateral carrier injection**, Halina Krzyzanowska, Vanderbilt Univ. (USA); Karl S. Ni, Yijing Fu, Univ. of Rochester (USA); Philippe M. Fauchet, Vanderbilt Univ. (USA) [8990-24]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 301 (Esplanade) . . . Tue 10:30 am to 12:10 pm

Lab-on-a-Chip I

Session Chair: **Holger Schmidt**, Univ. of California, Santa Cruz (USA)

10:30 am: **Ultrasensitive optofluidic-nanoplasmonic BioMEMS for life sciences and point-of-care diagnostics** (*Invited Paper*), Ahmet A. Yanik, Univ. of California, Santa Cruz (USA) [8990-25]

11:00 am: **Methods to array photonic crystal microcavities for high-throughput high-sensitivity biosensing on a silicon-chip-based platform** (*Invited Paper*), Ray T. Chen, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Omega Optics, Inc. (USA); Yi Zou, The Univ. of Texas at Austin (USA) and Univ. of Texas at Austin (USA); Wei-Cheng Lai, Liang Zhu, The Univ. of Texas at Austin (USA) [8990-26]

11:30 am: **Silicon photomultipliers applications to biosensors**, Maria Francesca Santangelo, Roberto Pagano, Consiglio Nazionale delle Ricerche (Italy); Salvatore A. Lombardo, Istituto per la Microelettronica e Microsistemi (Italy); Emanuele Luigi Sciuto, Fulvia Sinatra, Univ. degli Studi di Catania (Italy); Delfo N. Sanfilippo, Giorgio P. Fallica, STMicroelectronics (Italy); Sebania Libertino, Istituto per la Microelettronica e Microsistemi (Italy) [8990-27]

11:50 am: **High-performance conformal sensors employing single-crystal silicon nanomembranes**, Xiaochuan Xu, The Univ. of Texas at Austin (USA); Harish Subbaraman, Swapnajit Chakravarty, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [8990-28]

Lunch/Exhibition Break Tue 12:10 pm to 1:30 pm

SESSION 6

Location: Room 301 (Esplanade) Tue 1:30 pm to 3:30 pm

Lab-on-a-Chip II

Session Chair: **L. Cary Gunn**, Genalyte, Inc. (USA)

1:30 pm: **Integrated silicon microring resonator devices for point-of-care diagnostic applications** (*Invited Paper*), Mi Kyoung Park, Jack Sheng Kee, Qing Liu, Yong Shin, Junfeng Song, Guo-Qiang Lo, Dim-Lee Kwong, A*STAR Institute of Microelectronics (Singapore) [8990-29]

2:00 pm: **Sensing platform based on micro-ring resonator and on-chip reference sensors in SOI**, Shahina M. Chakkalakkal Abdulla, Peter J. Harmsma, Bart M. de Boer, Jose M. Pozo, Johannes H. van den Berg, Alfred Abutan, Ronald A. J. Hagen, Dario M. R. LoCascio, TNO (Netherlands) [8990-30]

2:20 pm: **Integrated stripe and slot waveguides in silicon-on-sapphire for mid-infrared VOC detection in water**, Yi Zou, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Omega Optics, Inc. (USA); Xiaochuan xu, Wei-Cheng Lai, Parker Wray, The Univ. of Texas at Austin (USA); Dakota Crisp, Southeast Missouri State Univ. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [8990-31]

2:40 pm: **Silicon molecular sensor chip array with microfluidic and optomechanical interface** (*Invited Paper*), Pavel Chaben, Siegfried Janz, Dan-Xia Xu, Martin Vachon, Nicaulas Sabourin, H. McIntosh, H. Ding, Shurui Wang, Jens Schmid, André Delège, Jean Lapointe, Adam Densmore, Rubin Ma, William Sinclair, S. M. Logan, Roger MacKenzie, Q. Y. Liu, D. Zhang, Greg Lopinski, O. Mozenson, National Research Council Canada (Canada); M. Gilmour, H. Tabor, Public Health Agency of Canada (Canada) and National Microbiology Lab. (Canada) [8990-32]

3:10 pm: **Comparative sensitivity analysis of integrated optical waveguides for near-infrared volatile organic compounds with sub-ppb detection in water**, Wei-Cheng Lai, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Omega Optics, Inc. (USA); Yi Zou, Liang Zhu, Ray T. Chen, The Univ. of Texas at Austin (USA) [8990-33]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 7

Location: Room 301 (Esplanade) Tue 4:00 pm to 5:40 pm

Modulators

Session Chair: **Haisheng Rong**, Intel Corp. (USA)

4:00 pm: **High-speed silicon-based integrated optical modulators for optical fiber telecommunications** (*Invited Paper*), Kensuke Ogawa, Fujikura Ltd. (Japan) [8990-34]

4:30 pm: **High contrast and accurate high-speed simulation of silicon-based modulators**, Ching Eng Png, A*STAR Institute of High Performance Computing (Singapore); Minjie Sun, A*STAR Institute of High Performance Computing (Singapore) and National Univ. of Singapore (Singapore); Soon Thor Lim, A*STAR Institute of High Performance Computing (Singapore); David J. Thomson, Univ. of Southampton (United Kingdom) [8990-35]

4:50 pm: **Comparison of performances of 40 Gbit/s silicon modulators fabricated on 200-mm and 300-mm SOI wafers**, Delphine Marris-Morini, Institut d'Électronique Fondamentale (France); Charles Baudot, STMicroelectronics (France); Jean-Marc Fédéli, CEA-LETI (France); Gilles Rasigade, Institut d'Électronique Fondamentale (France); Nathalie Vuillet, STMicroelectronics (France); Aurélie Souhaité, CEA-LETI (France) and STMicroelectronics (France); Melissa Ziebell, Institut d'Électronique Fondamentale (France); Pierrette Rivalin, CEA-LETI (France); Segolene Olivier, CEA-LETI-Minatec (France); Paul Crozat, David Bouville, Institut d'Électronique Fondamentale (France); Sylvie Menezo, CEA-LETI (France); Frédéric Boeuf, STMicroelectronics (France); Laurent Vivien, Institut d'Électronique Fondamentale (France) [8990-36]

5:10 pm: **Silicon high-speed modulator for advance modulation: device structures and exemplary modulator performance** (*Invited Paper*), Biljana Milivojevic, Christian Raabe, Stefan Wiese, Cisco Optical GmbH (Germany); Anujit Shastri, Cisco Systems Inc. (USA); Mark Webster, Peter Metz, Sanjay Sunder, Bill Chattin, Sean P. Anderson, Bipin Dama, Kal Shastri, Cisco Systems, Inc. (USA) [8990-37]



Wednesday 5 February

SESSION 8

Location: Room 301 (Esplanade) . . . Wed 8:00 am to 10:30 am

Detectors

Session Chair: **Ching Eng J. Png,**

A*STAR Institute of High Performance Computing (Singapore)

8:00 am: **Rapid-melt-growth-based GeSi waveguide photodetectors and avalanche photodetectors** (*Invited Paper*), Neil Na, Chih-Kuo Tseng, National Tsing Hua Univ. (Taiwan); Yimin Kang, Intel Corp. (USA); Ming-Chang M. Lee, National Tsing Hua Univ. (Taiwan). [8990-38]

8:30 am: **Low-cost radioactivity monitoring with scintillating fibers and silicon photomultipliers**, Paolo Finocchiaro, Luigi Cosentino, Alfio Pappalardo, Carlotta Scirè, Sergio Scirè, Gianfranco Vecchio, Istituto Nazionale di Fisica Nucleare (Italy). [8990-39]

8:50 am: **Design and development of a fNIRS system prototype based on SiPM detectors**, Delfo N. Sanfilippo, Giuseppina Valvo, Massimo C. Mazzillo, Angelo Piana, Beatrice Carbone, Lucio Renna, Giorgio P. Fallica, STMicroelectronics (Italy); Diego Agrò, Giuseppe Morsellino, Maurizio Pinto, Riccardo Canicatti, Natale Galio, Univ. degli Studi di Palermo (Italy); A. Tomasino, Gabriele Adamo, Salvatore Stivala, Antonino Parisi, Luciano Curcio, Costantino Giaconia, Alessandro C. Busacca, Univ. degli Studi di Palermo (Italy); Roberto Pagano, Sebania Libertino, Salvatore A. Lombardo, Istituto per la Microelettronica e Microsistemi (Italy) [8990-40]

9:10 am: **Responsivity measurements of 4H-SiC Schottky photodiodes for UV light monitoring**, Gabriele Adamo, Diego Agrò, Salvatore Stivala, Antonino Parisi, Luciano Curcio, A. Andò, A. Tomasino, Costantino Giaconia, Alessandro C. Busacca, Univ. degli Studi di Palermo (Italy); Massimo C. Mazzillo, Delfo N. Sanfilippo, Giorgio P. Fallica, STMicroelectronics (Italy). [8990-41]

9:30 am: **Potentialities of silicon photomultiplier**, Roberto Pagano, Sebania Libertino, Domenico Corso, Consiglio Nazionale delle Ricerche (Italy); Giuseppina Valvo, Delfo N. Sanfilippo, Giorgio P. Fallica, STMicroelectronics (Italy); Salvatore A. Lombardo, Consiglio Nazionale delle Ricerche (Italy). [8990-42]

9:50 am: **SNR measurements of silicon photomultipliers in the continuous wave regime**, Gabriele Adamo, Diego Agrò, Univ. degli Studi di Palermo (Italy); Salvatore Stivala, Univ. degli Studi di Palermo (Italy); Antonino Parisi, Costantino Giaconia, Alessandro C. Busacca, Univ. degli Studi di Palermo (Italy); Giorgio Piero Fallica, STMicroelectronics (Italy) [8990-43]

10:10 am: **Tuneable high-responsivity lateral silicon p-i-n photodiodes with single, dual MOS gate and grating structures**, Kamran Abid, Muhammad A. Naeem, Univ. of the Punjab (Pakistan); Jahan Akbar, Hazara Univ. (Pakistan); Faiz Rahman, ElectrosPELL Ltd. (United Kingdom). [8990-44]

Coffee Break Wed 10:30 am to 11:00 am

SESSION 9

Location: Room 301 (Esplanade) . . Wed 11:00 am to 12:40 pm

Resonators

11:00 am: **Wavelength division multiplexing using 10- and 12-channel silicon photonic transmitters**, Edgar Huante-Ceron, Jason J. Ackert, Andrew P. Knights, McMaster Univ. (Canada) [8990-45]

11:20 am: **Strain engineering in germanium microdisks**, Abdelhamid Ghrib, Moustafa El Kurdi, Institut d'Électronique Fondamentale (France); Mathias Prost, Institut d'Électronique Fondamentale (France) and STMicroelectronics (France); Malo de Kersauson, Institut d'Électronique Fondamentale (France); Ludovic Largeau, Grégoire Beaudoin, Lab. de Photonique et de Nanostructures (France); Sébastien Sauvage, Xavier Checoury, Institut d'Électronique Fondamentale (France); Gérald Ndong, Marc Chaigneau, Razvigor Ossikovski, Ecole Polytechnique (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France); Philippe Boucaud, Institut d'Électronique Fondamentale (France) [8990-46]

11:40 am: **Low-loss and flatband silicon-nanowire-based 5th-order coupled resonator optical waveguides (CROW) fabricated by ArF-immersion lithography process on a 300-mm SOI wafer**, Seok-Hwan Jeong, Daisuke Shimura, Takasi Simoyama, Photonics Electronics Technology Research Association (Japan); Miyoshi Seki, Nobuyuki Yokoyama, Minoru Ohtsuka, Keiji Koshino, National Institute of Advanced Industrial Science and Technology (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan) and PETRA (Japan); Yu Tanaka, Ken Morito, Photonics Electronics Technology Research Association (Japan) [8990-47]

12:00 pm: **Chirped photonic crystal mode converters for broad-band coupling with highly-dispersive photonic crystal microring resonators**, Stanley M. Lo, Vanderbilt Univ. (USA); Jonathan Y. Lee, Univ. of Rochester (USA); Sharon M. Weiss, Philippe M. Fauchet, Vanderbilt Univ. (USA) [8990-48]

12:20 pm: **Tunable silicon self-coupled optical waveguide (SCOW) resonators for optical signal processing** (*Invited Paper*), Linjie Zhou, Jingya Xie, Shulin Li, Qianqian Wu, Zhi Zou, Jianping Chen, Shanghai Jiao Tong Univ. (China) [8990-49]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

A hybrid InGaAsP/Si evanescent laser based on selective area metal bonding for optical interconnection, Hongyan Yu, Lijun Yuan, Institute of Semiconductors (China); Li Tao, Peking Univ. (China); Baojun Wang, Institute of Semiconductors (China); Weixi Chen, Peking Univ. (China); Song Liang, Institute of Semiconductors (China); Yanping Li, Guangzhao Ran, Peking Univ. (China); Jiaoqing Pan, Institute of Semiconductors (China). [8990-50]

Silicon MZI racetrack microring for sensing, Yule Xiong, Winnie N. Ye, Carleton Univ. (Canada) [8990-51]

Optical Interconnects XIV

Conference Chairs: **Henning Schröder**, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); **Ray T. Chen**, The Univ. of Texas at Austin (USA); **Alexei Glebov**, OptiGrate Corp. (USA)

Program Committee: **Bill Blubaugh**, US Conec Ltd. (USA); **Swapnait Chakravarty**, Omega Optics, Inc. (USA); **Patrick B. Chu**, Sandia National Labs. (USA); **Michael W. Haney**, Univ. of Delaware (USA); **Ruth Houbertz-Krauss**, Fraunhofer-Institut für Silicatiforschung (Germany); **Yidong Huang**, Tsinghua Univ. (China); **Wei Jiang**, Rutgers, The State Univ. of New Jersey (USA); **Mikko Karppinen**, VTT Technical Research Ctr. of Finland (Finland); **Ashok V. Krishnamoorthy**, Oracle (USA); **Bert-Jan Offrein**, IBM Zürich Research Lab. (Switzerland); **Hyo-Hoon Park**, KAIST (Korea, Republic of); **Richard C. Pitwon**, Xyratex Technology Ltd. (United Kingdom); **Richard Soref**, Univ. of Massachusetts Boston (USA); **Peter Van Daele**, Univ. Gent (Belgium); **Michael R. Wang**, Univ. of Miami (USA); **Ian H. White**, Univ. of Cambridge (United Kingdom)

Monday 3 February

SESSION 1

Location: Room 302 (Esplanade) Mon 8:00 am to 9:50 am

Optical Waveguide Technologies

Session Chair: **Henning Schröder**, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)

8:00 am: **Graded-index core polymer optical waveguide for high-bandwidth-density optical printed circuit boards: fabrication and characterization** (*Invited Paper*), Takaaki Ishigure, Keio Univ. (Japan) [8991-1]

8:30 am: **Multilayer single-mode polymeric waveguides by imprint patterning for optical interconnects**, Tia Korhonen, Noora Salminen, Annukka Kokkonen, Mikko Karppinen, VTT Technical Research Ctr. of Finland (Finland) [8991-2]

8:50 am: **Laser-written polymer waveguides for embedded printed circuit board computing applications**, Kevin L. Kruse, Christopher T. Middlebrook, Michigan Technological Univ. (USA) [8991-3]

9:10 am: **Performance of step index multimode waveguides with tuned numerical aperture for on-board optical links**, Krzysztof Niewegłowski, Ronny Henker, Klaus-Jürgen Wolter, Frank Ellinger, Technische Univ. Dresden (Germany) [8991-4]

9:30 am: **Photonic wire bonding as an enabling technology for multi-chip photonic systems**, Nicole Lindenmann, Tobias Hoose, Karlsruhe Institut für Technologie (Germany); Sönke Steenhusen, Fraunhofer-Institut für Silicatiforschung (Germany); Muhammad Billah, Sabastian Koeber, Karlsruhe Institut für Technologie (Germany); Ruth Houbertz-Krauss, Fraunhofer-Institut für Silicatiforschung (Germany); Christian Koos, Karlsruhe Institut für Technologie (Germany) [8991-5]

Coffee Break Mon 9:50 am to 10:20 am

SESSION 2

Location: Room 302 (Esplanade) . . Mon 10:20 am to 12:10 pm

Nanophotonics for Optical Interconnects

Session Chair: **Peter Van Daele**, Univ. Gent (Belgium)

10:20 am: **Efficient waveguide coupling interfaces for subwavelength-scale metal-optic cavities** (*Invited Paper*), Kyoungsik Yu, Youngho Jung, KAIST (Korea, Republic of) [8991-6]

10:50 am: **10-40 GHz on-chip micro-optical links with all-integrated Si Av LED optical sources, waveguides, and SiGe detectors**, Kingsley A. Ogudo, Lukas W. Snyman, Tshwane Univ. of Technology (South Africa) and Micro Systems Technology Development SA (South Africa); Jean-Luc Poulleux, Carlos Viana, Zerihun Tegegne, Univ. Paris-Est Marne-la-Vallée (France) [8991-7]

11:10 am: **Fabrication and characteristics of the Si-photonics-integrated vertical resonant-cavity light-emitting diode**, DuanHua Kong, Taek Kim, Sihan Kim, Hyun-Gi Hong, Igor Shcherbatko, Young-Soo Park, Samsung Advanced Institute of Technology (Korea, Republic of); Kyoung-Ho Ha, Gitae Jeong, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [8991-8]

11:30 am: **Fabrication and characterization of multilayer silicon photonic structures for optical interconnects**, Amrita Banerjee, Jun Tan, Siamak Abaslou, Robert Gatlula, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) [8991-9]

11:50 am: **Active photonics for on-chip optical interconnects realized in entirely unmodified advanced microelectronics CMOS processes**, Milos A. Popovic, Univ. of Colorado at Boulder (USA) [8991-47]

Lunch Break Mon 12:10 pm to 1:20 pm

SESSION 3

Location: Room 302 (Esplanade) Mon 1:20 pm to 3:00 pm

Parallel Optical Links and Active Optical Cables

Session Chair: **Bill Blubaugh**, US Conec Ltd. (USA)

1:20 pm: **A 1.3 tb/s parallel optics VCSEL link** (*Invited Paper*), Kobi Hasharoni, Shuki Benjamin, Amir Geron, Stanislav Stepanov, Niv Margalit, Gideon Katz, Michael Mesh, Compass-EOS (Israel) [8991-10]

1:50 pm: **Photonic integration enabling new multiplexing concepts in optical board-to-board and rack-to-rack interconnects** (*Invited Paper*), Dimitrios Apostolopoulos, Paraskevas Bakopoulos, Dimitrios Kalavrouziotis, Giannis Giannoulis, Giannis Kanakis, Nikos Iliadis, Christos Spatharakis, National Technical Univ. of Athens (Greece); Johan Bauwelinck, Univ. Gent (Belgium); Hercules Avramopoulos, National Technical Univ. of Athens (Greece) . . [8991-11]

2:20 pm: **100-gigabit ethernet using a single-wavelength source transmitting a CAP signal with a QAM receiver**, Jinlong Wei, Univ. of Cambridge (United Kingdom); David G. Cunningham, Avago Technologies Ltd. (United Kingdom); Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom) . . [8991-12]

2:40 pm: **Array fiber welding on micro-optical glass substrates for chip-to-fiber coupling**, Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Marco Queiser, Technische Univ. Berlin (Germany); Lars Brusberg, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Norbert Arndt-Staufenbiel, Klaus-Dieter Lang, Technische Univ. Berlin (Germany) [8991-13]

Coffee Break Mon 3:00 pm to 3:30 pm

SESSION 4

Location: Room 302 (Esplanade) Mon 3:30 pm to 5:00 pm

Fiber Optics and Micro-Optics Integration

Session Chair: **Alexei Glebov**, OptiGrate Corp. (USA)

3:30 pm: **Efficient and scalable single-mode waveguide coupling on silicon-based substrates** (*Invited Paper*), Edris M. Mohammed, Ricky J. Tseng, Brandon Rawlings, Shawna M. Liff, Ibrahim Ban, William McFarlane, Miriam R. Reshotko, Peter Chang, Intel Corp. (USA) [8991-14]

4:00 pm: **Fabrication of Fresnel micro lens array in borosilicate glass by F2-laser ablation for glass interposer application**, Lars Brusberg, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Marcel Neitz, Technische Univ. Berlin (Germany); Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Thomas Fricke-Begemann, Jürgen Ihlemann, Laser-Lab. Göttingen e.V. (Germany) [8991-15]

4:20 pm: **Low-loss connections between no-polish optical fibers in elastically deformable connectors**, Tsuyoshi Aoki, Hidenobu Muranaka, Shigenori Aoki, Fujitsu Labs., Ltd. (Japan); Katsuki Suematsu, Mitsuhiro Iwaya, Masato Shiino, Takeshi Yagi, Furukawa Electric Co., Ltd. (Japan) [8991-16]

4:40 pm: **New single-mode multi-fiber expanded-beam passive optical interconnect**, Mike Hughes, Toshiaki Satake, Darrell Childers, US Conec Ltd. (USA) [8991-17]

Tuesday 4 February

SESSION 6

Location: Room 302 (Esplanade) Tue 1:50 pm to 3:40 pm

Optical Interconnect Devices and Switches

Session Chair: **Michael R. Wang**, Univ. of Miami (USA)

1:50 pm: **A holistic way towards high-performance, low-energy and low-cost data centers and HPCs: PhoxTroT** (*Invited Paper*), Tolga Tekin, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany) and Technische Univ. Berlin (Germany); Nikos Pleros, Ctr. for Research and Technology Hellas (Greece); Dimitrios Apostolopoulos, National Technical Univ. of Athens (Greece) [8991-23]

2:20 pm: **Silicon/electro-optic polymer hybrid directional coupler switch**, Oscar D. Herrera, Roland Himmelhuber, Kyung-Jo Kim, Robert A. Norwood, Nasser N. Peyghambarian, The Univ. of Arizona (USA) [8991-24]

2:40 pm: **Tunable optofluidic couplers for dynamic card-to-backplane optical interconnects**, Guomin Jiang, Sarfaraz Baig, Michael R. Wang, Univ. of Miami (USA) [8991-25]

3:00 pm: **Microsecond regime free-space fiber optic switch: 32-port to 32-port scalable device**, Brittany Lynn, Alexander A. Miles, Pierre-Alexandre J. Blanche, John Wissinger, The Univ. of Arizona (USA); Daniel N. Carothers, Texas Instruments Inc. (USA); Robert A. Norwood, Nasser N. Peyghambarian, The Univ. of Arizona (USA) [8991-26]

3:20 pm: **A fully-integrated flexible photonic platform for chip-to-chip optical interconnects**, Lan Li, Yi Zou, Hongtao Lin, Juejun Hu, Univ. of Delaware (USA); Xiaochen Sun, Ning-Ning Feng, LaXense, Inc. (USA); Sylvain Danto, Kathleen A. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Tian Gu, Michael W. Haney, Univ. of Delaware (USA) [8991-27]

Coffee Break Tue 3:40 pm to 4:10 pm

SESSION 7

Location: Room 302 (Esplanade) Tue 4:10 pm to 5:50 pm

Nanophotonics for Optical Interconnects II

Session Chair: **Patrick B. Chu**, Sandia National Labs. (USA)

4:10 pm: **Silicon microphotronics for ultra-low-power interconnects** (*Invited Paper*), Michael Watts, Massachusetts Institute of Technology (USA) . . [8991-28]

4:40 pm: **Plasmonic modulator for three-dimensional chip-to-chip optical interconnects**, Fanghui Ren, Xiangyu Wang, Alan X. Wang, Oregon State Univ. (USA) [8991-29]

5:00 pm: **Tunable nanoscale-efficient plasmonic demultiplexer**, Mohamed A. Swillam, Abdullillah Azzazi, The American Univ. in Cairo (Egypt) [8991-30]

5:20 pm: **Ultra-low and compact loss coplanar waveguide crossing** (*Invited Paper*), Amir Hosseini, Omega Optics, Inc. (USA) [8991-31]

Wednesday 5 February

SESSION 8

Location: Room 302 (Esplanade) . . . Wed 8:00 am to 10:10 am

Optical Interconnect Systems

Session Chair: **Bert-Jan Offrein**, IBM Zürich Research Lab. (Switzerland)

8:00 am: **Transforming computing architectures with a fast and scalable photonic switch fabric** (*Invited Paper*), Clint L. Schow, IBM Thomas J. Watson Research Ctr. (USA) [8991-32]

8:30 am: **Optical RAM-enabled cache memory and optical routing for chip multiprocessors: technologies and architectures** (*Invited Paper*), Nikos Pleros, Ctr. for Research and Technology Hellas (Greece); Pavlos Maniotis, Theonitsa Alexoudi, Dimitris Fitsios, Christos Vagionas, Sotirios Papaioannou, Aristotle Univ. of Thessaloniki (Greece) and Ctr. for Research and Technology Hellas (Greece); Konstantinos Vyrsokinos, George T. Kanellos, Ctr. for Research and Technology Hellas (Greece) [8991-33]

9:00 am: **Demonstration of fully-enabled data centre subsystem with embedded optical interconnect**, Richard C. Pitwon, Alex Worrall, Kai Wang, Paul Stevens, Alistair A. Miller, Xyratex Technology Ltd. (United Kingdom); Katharine Schmidtke, Finisar Corp. (USA) [8991-34]

9:20 am: **Mixed-level optical-system simulation incorporating component-level modeling of interface elements**, Pablo V. Mena, Evan K. Heller, Bryan D. Stone, Enrico Ghillino, Synopsys, Inc. (USA) [8991-35]

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 302 (Esplanade) . . . Tue 10:30 am to 12:30 pm

Silicon Photonic Devices

Session Chair: **Ray T. Chen**, The Univ. of Texas at Austin (USA)

10:30 am: **Silicon-on-insulator optical modulators for integration in photonic optical circuits** (*Invited Paper*), Graham T. Reed, David J. Thomson, Frederic Y. Gardes, Goran Z. Mashanovich, Youfang Hu, K. Li, P. W. Wilson, Univ. of Southampton (United Kingdom); Lars Zimmermann, IHP GmbH (Germany); Henri Porte, Photline Technologies (France); Bernhard Goll, Horst Zimmermann, Technische Univ. Wien (Austria); Dieter Knoll, S. Lischke, IHP GmbH (Germany); S. W. Chen, S. S. H. Hsu, National Tsing Hua Univ. (Taiwan); J. M. Fedeli, CEA-LETI-Minatec (France); Kapil Debnath, Univ. of St. Andrews (United Kingdom); Thomas F. Krauss, The Univ. of York (United Kingdom); Liam O'Faolain, Univ. of St. Andrews (United Kingdom) [8991-18]

11:00 am: **Integrated DWDM silicon photonic transceiver with self-adaptive CMOS circuits for chip-to-chip optical interconnects**, Chin-Hui Chen, Hewlett-Packard Co. (USA); Cheng Li, Texas A&M Univ. (USA) and Hewlett-Packard Co. (USA); Rui Bai, Oregon State Univ. (USA); Ayman Shafiq, Texas A&M Univ. (USA); Marco Fiorentino, Zhen Peng, Hewlett-Packard Co. (USA); Patrick Chiang, Oregon State Univ. (USA) and Fudan Univ. (China); Samuel Palermo, Texas A&M Univ. (USA); Raymond G. Beausoleil, Hewlett-Packard Co. (USA) [8991-19]

11:20 am: **Two-dimensional beam steering on silicon nanomembranes**, David N. Kwong, The Univ. of Texas at Austin (USA); Amir Hosseini, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . [8991-20]

11:40 am: **Composite-CMOS integrated photonics for high-bandwidth WDM optical interconnects** (*Invited Paper*), Timothy Creazzo, Elton Marchena, Stephen B. Krasulick, Skorpis Technologies, Inc. (USA); Paul K. Yu, Skorpis Technologies, Inc. (USA) and Univ. of California, San Diego (USA); Derek A. Van Orden, John Y. Spann, Christopher C. Blivin, Hong Cai, Lina He, John M. Dallesasse, Robert J. Stone, Amit Mizrahi, Skorpis Technologies, Inc. (USA) [8991-21]

12:10 pm: **Hybrid silicon-electro-optic polymer integrated high-performance optical modulators**, Xingyu Zhang, The Univ. of Texas at Austin (USA); Amir Hosseini, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) [8991-22]

Lunch/Exhibition Break Tue 12:30 pm to 1:50 pm

Conference 8991 · Location: Room 302 (Esplanade)

9:40 am: **Fabrication of modulators and 2x2 switches in SOI based on the carrier depletion mechanism for optical interconnects** (*Invited Paper*), Francisco Lopez Royo, Antoine Brimont, Univ. Politècnica de València (Spain); Christos Vagionas, George Dabos, Nikos Pleros, Ctr. for Research and Technology Hellas (Greece) and Aristotle Univ. of Thessaloniki (Greece); Costas Vyrsokinos, Ctr. for Research and Technology Hellas (Greece); Amadeu Griol, Juan Hurtado, Laurent Bellieres, Nuria S. Losilla, Pablo Sanchis, Luis Sanchez, Javier Marti-Sendra, Univ. Politècnica de València (Spain) [8991-36]
Coffee Break Wed 10:10 am to 10:40 am

SESSION 9

Location: Room 302 (Esplanade) . . Wed 10:40 am to 12:10 pm

Manufacturing Technologies

Session Chair: **Richard C. Pitwon**,
Xyratex Technology Ltd. (United Kingdom)

10:40 am: **Development of electro-optical PCBs with embedded waveguides for data center and high-performance computing applications** (*Invited Paper*), Marika P. Immonen, TTM Technologies, Inc. (Finland); Jinhua Wu, Hui Juan Yan, Long Xiu Zhu, Peifeng Chen, Tarja Rapala-Virtanen, TTM Technologies, Inc. (China) [8991-37]
11:10 am: **Polymer integration of optoelectronic devices in on-board and board-to-board optical communication systems**, Erwin Bosman, Bram Van Hoe, Jeroen Missinne, Geert Van Steenberge, Peter Van Daele, Univ. Gent (Belgium) and IMEC (Belgium). [8991-38]
11:30 am: **Optical connecting devices fabricated by self-written waveguide technology for smart optical interconnect**, Osamu Mikami, Yukinobu Soeda, Tadayuki Enomoto, Tokai Univ. (Japan) [8991-39]
11:50 am: **Towards roll-to-roll manufacturing of polymer photonic devices**, Harish Subbaraman, Omega Optics, Inc. (USA); Xiaohui Lin, Zeyu Pan, Ray T. Chen, The Univ. of Texas at Austin (USA) [8991-40]
Lunch/Exhibition Break Wed 12:10 pm to 1:30 pm

SESSION 10

Location: Room 228 (Mezzanine) Wed 1:30 pm to 3:30 pm

PICs for Optical Interconnects

Joint Session with Conferences 8989 and 8991

Session Chair: **Louay A. Eldada**, Quanergy, Inc. (USA)

1:30 pm: **Advances in integrated photonic circuits for packet-switched interconnection** (*Invited Paper*), Kevin Williams, Ripalta Stabile, Technische Univ. Eindhoven (Netherlands) [8991-41]
2:00 pm: **Silicon nanophotonics integration for chip-scale optical communication** (*Invited Paper*), Andrew Grieco, Univ. of California, San Diego (USA); Dawn T. Tan, Singapore Univ. of Technology & Design (Singapore); Kazuhiro Ikeda, Nara Institute of Science and Technology (Japan); Maziar P. Nezhad, Univ. of California, San Diego (USA) and RWTH Aachen (Germany); Matthew Puckett, Yeshaiah Fainman, Univ. of California, San Diego (USA) [8989-7]
2:30 pm: **Optical transceiver ICs based on 3D die-stacking of optoelectronic devices** (*Invited Paper*), Harmen J. S. Dorren, Technische Univ. Eindhoven (Netherlands) [8989-8]
3:00 pm: **Silicon photonic integrated devices for datacenter optical networks** (*Invited Paper*), Marco Fiorentino, Chin-Hui Chen, Géza Kurczveil, Di Liang, Zhen Peng, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8991-42]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Pitch control of multi-channel graded-index core polymer waveguide for optical PCB using the Mosquito method, Ryota Kinoshita, Takaaki Ishigure, Keio Univ. (Japan) [8991-43]

Surface normal coupling to multiple-slot and cover-slotted silicon nanocrystalline waveguides and ring resonators, John Covey, Ray T. Chen, The Univ. of Texas at Austin (USA) [8991-44]

Dual-focus microlens array and Fresnel lens array fabricated by dry etching, Jong-Moo Lee, Electronics and Telecommunications Research Institute (Korea, Republic of) [8991-45]

Quantify the significance of the thermo-optic effect in silicon photonic crystal waveguide electro-optic devices under forward bias, Jun Tan, Siamak Abaslou, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) [8991-46]

OPTO

Photonic Instrumentation Engineering

Conference Chairs: **Yakov G. Soskind**, DHPC Technologies (USA); **Craig Olson**, L-3 Communications (USA)

Program Committee: **James B. Breckinridge**, California Institute of Technology (USA); **James T. A. Carriere**, Ondax, Inc. (USA); **John Corless**, Verity Instruments, Inc. (USA); **David G. Fischer**, NASA Glenn Research Ctr. (USA); **Filipp V. Ignatovich**, Lumetrics, Inc. (USA); **Jacob B. Khurgin**, Johns Hopkins Univ. (USA); **Nada A. O'Brien**, JDSU (USA); **Alain Villeneuve**, Genia Photonics Inc. (Canada)

Sunday 2 February

INTRODUCTION AND OPENING REMARKS

Location: Room 220 (Mezzanine) 1:20 pm to 1:30 pm

Yakov G. Soskind, DHPC Technologies (USA);
Craig Olson, L-3 WESCAM Sonoma Operations (USA)

SESSION 1

Location: Room 220 (Mezzanine) Sun 1:30 pm to 3:00 pm

Sensors and Ruggedized Systems I

Session Chair: **James T. A. Carriere**, Ondax, Inc. (USA)

1:30 pm: **Automated design tools for biophotonic systems** (*Invited Paper*), Giacomo Vacca, Kinetic River Corp. (USA); Hannu Lehtimäki, Plan Energy Ltd. (Finland); Tapio Karras, Design Parametrics, Inc. (USA); Sean Murphy, SKMurphy, Inc. (USA) [8992-1]

2:00 pm: **Miniature near-infrared spectrometer for point-of-use chemical analysis**, Charles A. Hulse, Donald M Friedrich, Marc von Gunten, Christopher G. Pederson, Nada A. O'Brien, JDSU (USA) [8992-2]

2:20 pm: **Multiplex grating Fabry-Perot cavity Bragg sensor based on SWIFTS (stationary-wave integrated Fourier transform spectrometer) technology**, Mikhael de Mengin Poirier, Institut de Planétologie et d'Astrophysique de Grenoble (France) [8992-3]

2:40 pm: **High-sensitivity higher-order Stokes stimulated Brillouin scattering for temperature and strain sensing**, Victor L. Lambin Iezzi, Sébastien Loranger, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [8992-4]

Coffee Break Sun 3:00 pm to 3:30 pm

SESSION 2

Location: Room 220 (Mezzanine) Sun 3:30 pm to 5:10 pm

Sensors and Ruggedized Systems II

Session Chair: **Nada A. O'Brien**, JDSU (USA)

3:30 pm: **Double-clad fiber couplers for efficient multi-modal sensing**, Wendy-Julie Madore, Etienne De Montigny, Olivier Ouellette, Gabriel Bernard, Mikael Leduc, Caroline Boudoux, Nicolas Godbout, Ecole Polytechnique de Montréal (Canada) [8992-5]

3:50 pm: **Influence of laser frequency noise on scanning Fabry-Perot interferometer based laser Doppler velocimetry**, Peter John L. Rodrigo, Christian Pedersen, Technical Univ. of Denmark (Denmark) [8992-6]

4:10 pm: **Surface-plasmon-resonance-based three-channel fiber-optic sensor for aqueous medium**, Roli Verma, Banshi D. Gupta, Indian Institute of Technology Delhi (India) [8992-7]

4:30 pm: **Fiber optics surface-plasmon-resonance-based ethanol sensor**, Roli Verma, Banshi D. Gupta, Indian Institute of Technology Delhi (India) . [8992-8]

4:50 pm: **Graphene-based all-fiber-optic temperature sensor**, Zhe Chen, Jun Zhang, Jianhui Yu, Huihui Lu, Guozhen Liao, Jieryuan Tang, Yunhan Luo, Jinan Univ. (China) [8992-9]

Monday 3 February

SESSION 3

Location: Room 220 (Mezzanine) . . . Mon 8:00 am to 10:00 am

Performance Verification and Characterization I

Session Chair: **Craig Olson**, L-3 Communications (USA)

8:00 am: **Compact large-aperture Fabry-Perot interferometer modules for gas spectroscopy at mid-IR**, Uula Kantojärvi, Aapo Varpula, Tapani Antila, Christer Holmlund, Jussi H. Mäkynen, Antti Näsilä, Rami Mannila, Anna Rissanen, Jarkko E. Antila, VTT Technical Research Ctr. of Finland (Finland); Rolf J. Disch, Torsten A. Waldmann, SICK AG (Germany) [8992-10]

8:20 am: **Measuring the refractive index with precision goniometers: a comparative study**, Stefan Krey, Aiko K. Ruprecht, TRIOPTICS GmbH (Germany) [8992-11]

8:40 am: **Point-spread function-based characterization of optical systems**, Yakov G. Soskind, Ronn P. Walvick, Christopher D. Giranda, David N. Laslo, Richard Gifford, DHPC Technologies (USA) [8992-12]

9:00 am: **Automated assembly of camera modules using active alignment with up to six degrees of freedom**, Kim S. Bräuniger, Daniel Stickler, Daniel Winters, TRIOPTICS GmbH (Germany) [8992-13]

9:20 am: **Prototype development of the fast steering mirror for Giant Magellan Telescope**, Young-Soo Kim, Ju Heon Koh, Hwa Kyoung Jung, Ho June Jung, Korea Astronomy and Space Science Institute (Korea, Republic of); Myung K. Cho, National Optical Astronomy Observatory (USA); Ho-Soon Yang, Korea Research Institute of Standards and Science (Korea, Republic of); Ho-Sang Kim, Kyoung-Don Lee, Institute for Advanced Engineering (Korea, Republic of); Hyo-Sung Ahn, Gwangju Institute of Science and Technology (Korea, Republic of); Won Hyun Park, College of Optical Sciences, The Univ. of Arizona (USA); Sug-Whan Kim, Yonsei Univ. (Korea, Republic of); Byeong-Gon Park, Korea Astronomy and Space Science Institute (Korea, Republic of) [8992-14]

9:40 am: **Automated multi-point analysis with multi-angle photometric spectroscopy**, Travis Burt, Jeff Comerford, Cameron Bricker, Andrew R. Hind, David L. Death, Agilent Technologies Australia (Australia) [8992-15]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 4

Location: Room 220 (Mezzanine) . . Mon 10:30 am to 11:50 am

Performance Verification and Characterization II

Session Chair: **Filipp V. Ignatovich**, Lumetrics, Inc. (USA)

10:30 am: **High-performance high-speed spectrum analysis of laser sources with SWIFTS technology**, Fabrice Thomas, Resolution Spectra Systems (France) and Institut de Planétologie et d'Astrophysique de Grenoble (France); Etienne P. Le Coarer, Institut de Planétologie et d'Astrophysique de Grenoble (France); Christophe Bonneville, Thierry Gonthiez, Eric Morino, Renaud Puget, Bruno Martin, Resolution Spectra Systems (France) [8992-16]

10:50 am: **Image transport using Anderson localized modes in disordered optical fibers**, Salman Karbasi, Ryan J. Frazier, Univ. of Wisconsin-Milwaukee (USA); Karl W. Koch, Corning Incorporated (USA); Thomas Hawkins, Clemson Univ. Research Foundation (USA); John Ballato, Clemson Univ. (USA); Arash Mafi, Univ. of Wisconsin-Milwaukee (USA) [8992-18]

11:10 am: **Improved hyperspectral imaging with a Schmidt-Czerny-Turner spectrograph**, Brian C. Smith, Jason McClure, Princeton Instruments (USA) [8992-19]

11:30 am: **Investigation of jointing technologies for laser viewport elements in vacuum applications to maintain high beam quality and achieve minimal stress-induced birefringence**, André Becker, Julius Weber, Michael Flämlich, Ute Bergner, VACOM Vakuum Komponenten & Messtechnik GmbH (Germany) [8992-20]

Lunch Break Mon 11:50 am to 1:30 pm

SESSION 5

Location: Room 220 (Mezzanine) Mon 1:30 pm to 3:10 pm

Laser-based Photonic Instrumentation I

Session Chair: **Yakov G. Soskind**, DHP Technologies (USA)

1:30 pm: **Coherent frequency combs in mid-infrared produced by self frequency modulated quantum cascade lasers** (*Invited Paper*), Jacob B. Khurgin, Johns Hopkins Univ. (USA) [8992-21]

2:00 pm: **Widely-tunable mid-infrared laser source as key component for molecular spectroscopy systems**, Mathieu Giguère, Rajeev Yadav, Alain Villeneuve, Youngjae Kim, Alexandre Dupuis, Bryan Burgoyne, Genia Photonics Inc. (Canada) [8992-22]

2:20 pm: **Absolutely-referenced distance measurement by combination of time-of-flight and digital holographic methods** (*Invited Paper*), Markus Fratz, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Claudius Weimann, Karlsruher Institut für Technologie (Germany); Harald Wölfelschneider, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Christian Koos, Karlsruher Institut für Technologie (Germany); Heinrich A. Höfler, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8992-23]

2:50 pm: **Combined far-field and multiprobe near-field imaging of hybrid photonic devices**, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Hesham Taha, Nanonics Imaging Ltd. (Israel) [8992-24]

Coffee Break Mon 3:10 pm to 3:40 pm

SESSION 6

Location: Room 220 (Mezzanine) Mon 3:40 pm to 5:00 pm

Laser-based Photonic Instrumentation II

Session Chair: **Alain Villeneuve**, Genia Photonics Inc. (Canada)

3:40 pm: **Ultrawide wavelength range (300nm-2µm) polarization-independent 500gs/s single-shot pulse all-optical real time oscilloscope (ORTO)**, Jean-François Gleyze, Commissariat à l'Énergie Atomique (France); Steve Hocquet, Greenfield Technology (France); Patrice Le Boudec, Romain Arnaud, IDIL Fibres Optiques (France); Denis Penninckx, Commissariat à l'Énergie Atomique (France); Alain Jolly, ALPhANOV (France); Dominique Monnier Bourdin, Greenfield Technology (France); Bruno Chassagne, ALPhANOV (France) [8992-25]

4:00 pm: **Spectroscopy-based photonic instrumentation for the manufacturing industry: contactless measurements of distances, temperatures, and chemical compositions**, Bertrand Noharet, Erik Zetterlund, Oleksandr Tarasenko, Magnus Lindblom, Acreo Swedish ICT AB (Sweden); Jonas Gurell, Swerea IVF (Sweden) [8992-26]

4:20 pm: **Developing dual-beam laser Doppler interferometry system for opto-piezoelectric materials based ultrasonic parking sensors and optofluidics sensors**, Po-Cheng Lai, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8992-27]

4:40 pm: **Influence of primary aberrations on coherent lidar performance**, Qi Hu, Peter John L. Rodrigo, Christian Pedersen, DTU Fotonik (Denmark); Theis F. Q. Iversen, Windar Photonics A/S (Denmark) [8992-28]

Wednesday 5 February

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Improvement of image quality by polarization camera, Ryosuke Kasahara, Izumi Itoh, Hideaki Hirai, Ricoh Co., Ltd. (Japan) [8992-29]

Single-snapshot 2D color measurement by plenoptic imaging system, Kensuke Masuda, Yuuji Yamanaka, Go Maruyama, Shoh Nagai, Hideaki Hirai, Ricoh Co., Ltd. (Japan); Lingfei Meng, Ivana Tosic, Ricoh Innovations, Inc. (USA) [8992-30]

Six-axis interferometric coordinates measurement system for nanometrology, Jan Hrabina, Josef Lazar, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic); Petr Klapetek, Miroslav Valtr, Czech Metrology Institute (Czech Republic); Ondrej Cip, Martin Cizek, Miroslava Hola, Mojmir Sery, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . [8992-31]

Interferometric measurement system for cost effective e-beam writer, Simon Rerucha, Martin Sarbort, Martin Cizek, Jan Hrabina, Josef Lazar, Ondrej Cip, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) [8992-32]



Quantum Sensing and Nanophotonic Devices XI

Conference Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

Conference Co-Chairs: **Eric Tournié**, Univ. Montpellier 2 (France); **Gail J. Brown**, Air Force Research Lab. (USA)

Program Committee: **Jong Hyeob Baek**, Korea Photonics Technology Institute (Korea, Republic of); **Can Bayram**, IBM Thomas J. Watson Research Ctr. (USA); **David A. Cardimona**, Air Force Research Lab. (USA); **Jérôme Faist**, ETH Zurich (Switzerland); **Siamak Forouhar**, Jet Propulsion Lab. (USA); **Michael D. Gerhold**, U.S. Army Research Office (USA); **Sven Höfling**, Julius-Maximilians-Univ. Würzburg (Germany); **Jean-Pierre Huignard**, Jphopto (France); **Hiromasa Ito**, RIKEN (Japan); **Mona Jarrahi**, Univ. of Michigan (USA); **Woo-Gwang Jung**, Kookmin Univ. (Korea, Republic of); **Tsukuru Katsuyama**, Sumitomo Electric Industries, Ltd. (Japan); **Armin Lambrecht**, Fraunhofer-Institut für Physikalische Messtechnik (Germany); **Kwok Keung Law**, Naval Air Warfare Ctr. Weapons Div. (USA); **Giuseppe Leo**, Univ. Paris 7-Denis Diderot (France); **Amy W. K. Liu**, IQE Inc. (USA); **Tariq Manzur**, Naval Undersea Warfare Ctr. (USA); **Jerry R. Meyer**, U.S. Naval Research Lab. (USA); **Jan Misiewicz**, Wrocław Univ. of Technology (Poland); **Oleg Mitrofanov**, Univ. College London (United Kingdom); **Vaidya Nathan**, Air Force Research Lab. (USA); **Minh Nguyen**, Los Alamos National Lab. (USA); **Ekmel Özbay**, Bilkent Univ. (Turkey); **Dimitris Pavlidis**, Boston Univ. (USA); **Joseph G. Pellegrino**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Nicolas Péré-Laperne**, Lab. de Photonique et de Nanostructures (France); **Vincenzo Spagnolo**, Politecnico di Bari (Italy); **Marija Strojnik Scholl**, Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Ferechteh Hosseini Teherani**, Nanovation (France); **Meimei Z. Tidrow**, U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Miriam S. Vitiello**, Consiglio Nazionale delle Ricerche (Italy); **Konstantin L. Vodopyanov**, Stanford Univ. (USA); **Priyalal S. Wijewarnasuriya**, U.S. Army Research Lab. (USA); **Sheng Wu**, California Institute of Technology (USA); **Rui Q. Yang**, The Univ. of Oklahoma (USA); **John M. Zavada**, National Science Foundation (USA)

Sunday 2 February

INTRODUCTION AND OPENING REMARKS

Location: Room 122 (Exhibit Level) 8:00 am to 8:15 am

Manijeh Razeghi, Northwestern Univ. (USA)

KEYNOTE SESSION

Location: Room 122 (Exhibit Level) . . . 8:15 am to 8:45 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

8:15 am: **Smart Sensors: Why and when the origin was and why and where the future will be** (*Keynote Presentation*), Carlo Corsi, Consorzio CREO (Italy) [8993-1]

SESSION 1

Location: Room 122 (Exhibit Level) . . Sun 8:45 am to 10:00 am

New Laser Sources

Session Chairs: **Eric Tournié**, Univ. Montpellier 2 (France); **Manijeh Razeghi**, Northwestern Univ. (USA)

8:45 am: **Exciton-polariton lasers in Magnetic Fields** (*Invited Paper*), Christian Schneider, Julian Fischer, Matthias Amthor, Sebastian Brodbeck, Julius-Maximilians-Univ. Würzburg (Germany); Ivan G. Savenko, Ivan A. Shelykh, Univ. of Iceland (Iceland); Alexander Chernenko, Institute of Solid State Physics (Russian Federation); Arash Rahimi-Iman, Julius-Maximilians-Univ. Würzburg (Germany); Vladimir D. Kulakovskii, Institute of Solid State Physics (Russian Federation); Stephan Reitzenstein, Julius-Maximilians-Univ. Würzburg (Germany); Na Young Kim, Stanford Univ. (USA) and National Institute of Informatics (Japan); Mikhail Durnev, St. Petersburg State Univ. (Russian Federation); Alexey Kavokin, St. Petersburg State Univ. (Russian Federation) and Univ. of Southampton (United Kingdom); Yoshihisa Yamamoto, Stanford Univ. (USA) and National Institute of Informatics (Japan); Alfred Forchel, Martin Kamp, Sven Höfling, Julius-Maximilians-Univ. Würzburg (Germany) [8993-7]

9:05 am: **Random laser on planar GaAs waveguides** (*Invited Paper*), Olivier Gauthier-Lafaye, Lab. d'Analyse et d'Architecture des Systèmes (France); J. Campos, LAAS (France); Antoine Monmayrant, François Lozes-Dupuy, Lab. d'Analyse et d'Architecture des Systèmes (France); K. Bhaktha, Institut Langevin, ESPCI ParisTech, CNRS (France); Patrick Sebbah, Ecole Supérieure de Physique et de Chimie Industrielles (France); Christian Vanneste, Lab. de Physique de la Matière Condensée (France) [8993-8]

9:25 am: **Quantum dot mode locked lasers for coherent frequency comb generation** (*Invited Paper*), Anthony Martinez, Cosimo Calo, Ricardo Rosales, Lab. de Photonique et de Nanostructures (France); Regan Watts, Dublin City Univ. (Ireland); Kamel Merghem, Lab. de Photonique et de Nanostructures (France); Alain Accard, François Lelarge, III-V Lab. (France); Liam Barry, Dublin City Univ. (Ireland); Abderrahim Ramdane, Lab. de Photonique et de Nanostructures (France) [8993-9]

9:45 am: **Whispering gallery optical parametric oscillators**, Ingo Breunig, Albert-Ludwigs-Univ. Freiburg (Germany); Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8993-10]
Coffee Break Sun 10:00 am to 10:30 am

SESSION 2

Location: Room 122 (Exhibit Level) . Sun 10:30 am to 12:00 pm

THz Emitters and Detectors

Session Chairs: **John M. Zavada**, National Science Foundation (USA); **Gail J. Brown**, Air Force Research Lab. (USA)

10:30 am: **Terahertz quantum cascade lasers for time domain spectroscopy** (*Invited Paper*), Sukhdeep S. Dhillon, Joshua Freeman, Jean Maysonnave, Pierrick Cavalie, Kenneth Maussang, Jerome Tignon, Ecole Normale Supérieure (France) [8993-11]

10:50 am: **Vertical-emitting terahertz quantum cascade lasers with a quasi-period Penrose patterning** (*Invited Paper*), Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy) [8993-12]

11:10 am: **Microstrip-antenna-coupled distributed feedback terahertz quantum-cascade lasers**, Tsung-Yu Kao, Xiaowei Cai, Qing Hu, Massachusetts Institute of Technology (USA); John L. Reno, Sandia National Labs. (USA) [8993-13]

11:25 am: **Tunable excitation of two-dimensional plasmon modes in InGaAs/InP HEMT devices for terahertz detection**, Nima Nader Esfahani, Air Force Research Lab. (USA) and Solid State Scientific Corp. (USA) and Univ. of Central Florida (USA); Xin Qiao, Robert E. Peale, Univ. of Central Florida (USA); Walter R. Buchwald, Univ. of Massachusetts Boston (USA) and Solid State Scientific Corp. (USA); Joshua R. Hendrickson, Justin W. Cleary, Air Force Research Lab. (USA) [8993-14]

11:40 am: **Recent progress toward realizing GaN-based THz quantum cascade laser** (*Invited Paper*), Hideki Hirayama, Wataru Terashima, RIKEN (Japan) [8993-15]

Lunch Break Sun 12:00 pm to 1:30 pm

SESSION 3

Location: Room 122 (Exhibit Level) . . . Sun 1:30 pm to 3:15 pm

Quantum Information and Communication Technologies

Session Chairs: **Carlo Sirtori**, Univ. Paris 7-Denis Diderot (France);
Massoud H. Agahi, Harbor-UCLA Medical Ctr. (USA)

1:30 pm: **Efficient coupling between a quantum dot and a gaussian beam via a broadband dielectric antenna: the photonic trumpet** (*Invited Paper*), Joël Bleuse, Julien Claudon, Commissariat à l'Énergie Atomique (France); Niels Gregersen, Technical Univ. of Denmark (Denmark); Mathieu Munsch, Commissariat à l'Énergie Atomique (France) and Univ. Basel (Switzerland); Adrien Delga, Commissariat à l'Énergie Atomique (France); Jesper Mork, Technical Univ. of Denmark (Denmark); Jean-Michel Gérard, Commissariat à l'Énergie Atomique (France) [8993-16]

1:50 pm: **On-chip single-photon sources for integrated quantum circuits**, Martin Kamp, Sven Höfling, Johannes Beetz, Julius-Maximilians-Univ. Würzburg (Germany); Döndü Sahin, Leonardo Midolo, Sartoon Fattahpoor, COBRA Research School (Netherlands); Thang B. Hoang, Andrea Fiore, COBRA Research School (Netherlands); Matthias Lerner, Julius-Maximilians-Univ. Würzburg (Germany) [8993-17]

2:05 pm: **Novel fiber-optic geometries for fast quantum communication**, Jeffrey J. Perkins, Fiberguide Industries, Inc. (USA); Raymond T. Newell, Los Alamos National Lab. (USA); Charles R. Schabacker, Craig B. Richardson, Fiberguide Industries, Inc. (USA) [8993-18]

2:20 pm: **Waveguide single-photon and photon-number-resolving detectors for integrated quantum photonics** (*Invited Paper*), Andrea Fiore, Döndü Sahin, Technische Univ. Eindhoven (Netherlands); Alessandro Gaggero, Istituto di Fotonica e Nanotecnologie (Italy); Zili Zhou, Saedeeh Jahanmirinejad, Technische Univ. Eindhoven (Netherlands); Francesco Mattioli, Roberto Leoni, Istituto di Fotonica e Nanotecnologie (Italy); Johannes Beetz, Matthias Lerner, Sven Höfling, Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany) . . . [8993-19]

2:40 pm: **Series nanowire detector resolving up to twelve photons**, Zili Zhou, Saedeeh Jahanmirinejad, Technische Univ. Eindhoven (Netherlands); Francesco Mattioli, Istituto di Fotonica e Nanotecnologie (Italy); Döndü Sahin, Giulia Frucci, Technische Univ. Eindhoven (Netherlands); Alessandro Gaggero, Roberto Leoni, Istituto di Fotonica e Nanotecnologie (Italy); Andrea Fiore, Technische Univ. Eindhoven (Netherlands) [8993-20]

2:55 pm: **Quantum frequency correlation engineering with a semiconductor microcavity at room temperature** (*Invited Paper*), Sara Ducci, Guillaume Boucher, Andreas Eckstein, Univ. Paris 7-Denis Diderot (France); Aristide Lemaître, Lab. de Photonique et de Nanostructures (France); Marco Liscidini, Univ. degli Studi di Pavia (Italy); John Sipe, Univ. of Toronto (Canada); Ivan Favero, Giuseppe Leo, Univ. Paris 7-Denis Diderot (France) [8993-21]
Coffee Break Sun 3:15 pm to 3:45 pm

SESSION 4

Location: Room 122 (Exhibit Level) . . . Sun 3:45 pm to 5:15 pm

Nanophotonics

Session Chairs: **Yanko Todorov**, Univ. Paris 7-Denis Diderot (France);
Guilhem Gallot, Ecole Polytechnique (France)

3:45 pm: **Confinement of photons and control of their emission using surface addressable photonic crystal membrane** (*Invited Paper*), Xavier Letartre, Cédric Blanchard, Romain Peretti, Corrado Sciancalepore, Ecole Centrale de Lyon (France) [8993-22]

4:05 pm: **Funneling of light in combinations of metal-insulator-metal resonators** (*Invited Paper*), Riad Haïdar, Patrick Bouchon, ONERA (France); Fabrice Pardo, Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France) [8993-23]

4:25 pm: **Design and applications of flexible photonic membranes**, Peter J. Reader-Harris, Blair C. Kirkpatrick, Andrea Di Falco, Univ. of St. Andrews (United Kingdom) [8993-24]

4:40 pm: **Multilayer hole-mask colloidal nanolithography for large-area low-cost complex plasmonics**, Jun Zhao, Univ. Stuttgart (Germany); Sarah Jaber, Paul Mulvaney, The Univ. of Melbourne (Australia); Harald W. Giessen, Univ. Stuttgart (Germany) [8993-25]

4:55 pm: **Infrared near-field imaging and spectroscopy with broadband sources** (*Invited Paper*), Yannick De Wilde, Institut Langevin (France) . . [8993-26]

Monday 3 February

KEYNOTE SESSION

Location: Room 122 (Exhibit Level) . . . 8:30 am to 9:00 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

8:30 am: **Massively-parallel intracavity trace molecular detection in the mid-infrared using broadband frequency combs** (*Keynote Presentation*), Konstantin L Vodopyanov, CREOL, College of Optics and Photonics, University of Central Florida (USA) [8993-2]

SESSION 5

Location: Room 122 (Exhibit Level) . Mon 9:00 am to 10:05 am

Mid-long IR QCLs

Session Chairs: **Carlo Corsi**, Consorzio CREO (Italy); **Manijeh Razeghi**, Northwestern Univ. (USA)

9:00 am: **Room-temperature operation of far-infrared QCLs ($\lambda = 19\text{-}21 \mu\text{m}$)** (*Invited Paper*), Michael Bahriz, Guillaume Lollia, Alexei N. Baranov, Roland Teissier, Univ. Montpellier 2 (France) [8993-27]

9:20 am: **Spectroscopy studies of strain-compensated mid-infrared QCL active regions on misoriented substrates**, Justin Grayer, Charles R. Meyer II, Emily Cheng, Gregory E. Triplett, Denzil Roberts, Univ. of Missouri-Columbia (USA); Peter G. Schunemann, BAE Systems (USA) [8993-28]

9:35 am: **Polarization and isolation control for quantum cascade lasers in the mid-infrared**, Sheng Wu, California Institute of Technology (USA) and Power Environmental Energy Research Institute (USA); Andrei Deev, California Institute of Technology (USA) [8993-29]

9:50 am: **Spatial mode filtering of mid-infrared (mid-IR) laser beams with hollow core fiber optics**, Jason M. Kriesel, Gina M. Hagglund, Nahum Gat, Opto Knowledge Systems, Inc. (USA); Vincenzo Spagnolo, Politecnico di Bari (Italy); Pietro Patimisco, Univ. degli Studi di Bari (Italy) [8993-30]

Coffee Break Mon 10:05 am to 10:35 am

SESSION 6

Location: Room 122 (Exhibit Level) Mon 10:35 am to 11:40 am

Mid-IR Type-II Superlattice Photodetectors

Session Chairs: **Kwok Keung Law**, Naval Air Warfare Ctr. Weapons Div. (USA); **Giuseppe Leo**, Univ. Paris 7-Denis Diderot (France)

10:35 am: **Infrared photodetector development at Fraunhofer IAF** (*Invited Paper*), Frank Rutz, Philipp Kleinow, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Martin Walther, Fraunhofer-IAF (Germany); Rolf Aidam, Wolfgang Bronner, Lutz Kirste, Jasmin Niemasz, Robert Rehm, Johannes Schmitz, Tim Stadelmann, Matthias Wuro, Andreas Wörl, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Alexander Sieck, Johann Ziegler, AIM INFRAROT-MODULE GmbH (Germany) [8993-31]

10:55 am: **Impact of Be-doping on InAs/InAsSb type-II superlattices for infrared detection**, Elizabeth H. Steenbergen, Air Force Research Lab. (USA); Said Elhamri, T. J. Asel, Univ. of Dayton (USA); Gail J. Brown, Air Force Research Lab. (USA) [8993-32]

11:10 am: **Minority carrier lifetime studies of narrow bandgap antimonide superlattices**, Linda Hoglund, David Z. Ting, Arezou Khoshakhlagh, Alexander Soibel, Cory J. Hill, Anita M. Fisher, Sam A. Keo, Sarah D. Gunapala, Jet Propulsion Lab. (USA) [8993-33]

11:25 am: **Analysis of electrical and electro-optical characteristics of midwave infrared InAs/GaSb SL pin photodiodes**, Marie Delmas, Rachid Taalat, Jean-Baptiste Rodriguez, Philippe Christol, Institut d'Electronique du Sud (France); Edouard Giard, Isabelle Ribet-Mohamed, ONERA (France); Julien Imbert, ONERA (France) and III-V Lab. (France); Sophie Derelle, ONERA (France); Virginie Trinite, III-V Lab. (France) [8993-34]

Lunch Break Mon 11:40 am to 1:30 pm

OPTO

SESSION 7

Location: Room 122 (Exhibit Level) . . Mon 1:30 pm to 3:15 pm

Mid-IR Photodetectors

Session Chairs: **Ekmel Özbay**, Bilkent Univ. (Turkey);
Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy)

1:30 pm: **Quantum-engineered interband cascade photovoltaic devices** (*Invited Paper*), Rui Q. Yang, Hossein Lotfi, Lu Li, Robert T. Hinkey, Hao Ye, The Univ. of Oklahoma (USA); J. F. Klem, Sandia National Labs. (USA); L. Lei, T. D. Mishima, J. C. Keay, M. B. Santos, M. B. Johnson, The Univ. of Oklahoma (USA) [8993-36]

1:50 pm: **Recent development on the uncooled mid-infrared PbSe detectors with high detectivity** (*Invited Paper*), Binbin Weng, Jijun Qiu, Lihua Zhao, Zijian Yuan, Caleb Y. Chang, Zhisheng Shi, The Univ. of Oklahoma (USA) [8993-37]

2:10 pm: **Backside-configured surface plasmonic structure for infrared photodetector for enhancement**, Guiru Gu, Xuejun Lu, Univ. of Massachusetts Lowell (USA) [8993-38]

2:25 pm: **InSb photodetectors with PIN and nBn designs**, Axel Evirgen, Johan Abautret, Institut d'Electronique du Sud (France) and SOFRADIR (France); Jean-Philippe Perez, Hocine Ait-Kaci, Philippe Christol, Institut d'Electronique du Sud (France); Joel Fleury, Sagem Défense Sécurité (France); Hervé Sik, Sagem SA (France); Alexandru Nedelcu, Romain Cluzel, Arnaud Cordat, SOFRADIR (France) [8993-39]

2:40 pm: **Design, fabrication, and characterization of InSb avalanche photodiode**, Johan Abautret, Axel Evirgen, Institut d'Electronique du Sud (France) and SOFRADIR (France); Jean-Philippe Perez, Philippe Christol, Institut d'Electronique du Sud (France); Anne Rouvier, Romain Cluzel, Arnaud Cordat, SOFRADIR (France); Johan Rothman, CEA-LETI-Minatec (France) [8993-40]

2:55 pm: **Antenna-coupled microcavity-enhanced quantum well infrared photodetector** (*Invited Paper*), Yanko Todorov, Yuk-Nga Chen, Benjamin Askenazi, Angela Vasanelli, Univ. Paris 7-Denis Diderot (France); Giorgio Biasiol, Lab. Nazionale TASC (Italy); Raffaele Colombelli, Institut d'Electronique Fondamentale (France); Carlo Sirtori, Univ. Paris 7-Denis Diderot (France) [8993-41]

Coffee Break Mon 3:15 pm to 3:45 pm

SESSION 8

Location: Room 122 (Exhibit Level) . . Mon 3:45 pm to 5:15 pm

Integrated and Discrete Mid-IR Optoelectronics

Session Chairs: **Jean-Pierre Huignard**, Jphopto (France);
Sukhdeep S. Dhillon, Ecole Normale Supérieure (France)

3:45 pm: **Mid-IR heterogeneous silicon photonics** (*Invited Paper*), Gunther Roelkens, Utsav Dave, Alban Gassenq, Nannicha Hattasan, Chen Hu, Bart Kuyken, Francois Leo, Aditya Malik, Muhammad Muneeb, Eva Ryckeboer, Sarah Uvin, Zeger Hens, Roel Baets, Univ. Gent (Belgium); Yosuke Shimura, Federica Gencarelli, Benjamin Vincent, Roger Loo, Joris Van Campenhout, IMEC (Belgium); Laurent Cerutti, Jean-Baptiste Rodriguez, Eric Tournie, Institut d'Electronique du Sud, CNRS, Univ. Montpellier 2 (France); Xia Chen, Milos Nedeljkovic, Goran Mashanovich, Li Shen, Noel Healy, Anna Peacock, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom); Xiaoping Liu, Richard Osgood, Columbia Univ. (USA); Will Green, IBM Thomas J. Watson Research Ctr. (USA) [8993-42]

4:05 pm: **Advances toward monolithic broadly-tunable QCL sources** (*Invited Paper*), Mathieu Carras, Gregory Maisons, Bouzid Simozrag, Virginie Trinite, III-V Lab. (France); Mickael Brun, Pierre R. Labeye, Sergio Nicoletti, CEA-LETI-Minatec (France); Fahem Boullilla, III-V Lab. (France); Luis Jorge Orbe, Guillermo Carpintero del Bario, Univ. Carlos III de Madrid (Spain) [8993-43]

4:25 pm: **DFB interband cascade lasers for tunable laser absorption spectroscopy from 3 to 6 μm** (*Invited Paper*), Michael von Edlinger, Julian Scheuermann, Lars Naehle, Christian Zimmermann, Lars Hildebrandt, Marc Fischer, Johannes Koeth, nanoplus GmbH (Germany); Robert Weih, Sven Höfling, Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany) [8993-44]

4:45 pm: **High-performance single-spatial mode GaSb type-I laser diodes around 2.1 μm**, Augustinas Vizbaras, Edgaras Dvinelis, Mindaugas Greibus, Augustinas Trinkunas, Deividas Kovalenkovas, Ieva Žimonyte, Kristijonas Vizbaras, Brolis Semiconductors UAB (Lithuania) [8993-45]

5:00 pm: **Highly-efficient single-mode broadband infrared light source based on PbS quantum dot composites**, Kai Shen, Guomin Jiang, Younghun Paik, Sung Jin Kim, Michael R. Wang, Univ. of Miami (USA) [8993-46]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

KEYNOTE SESSION

Location: Room 122 (Exhibit Level) . . 10:30 am to 11:00 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

10:30 am: **Microwave stabilization and modulation of quantum cascade lasers** (*Keynote Presentation*), Carlo Sirtori, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris 7-Denis Diderot and CNRS (France) [8993-4]

SESSION 9

Location: Room 122 (Exhibit Level) . Tue 11:00 am to 12:15 pm

THz Applications

Session Chairs: **Jean-Yves Bigot**, Institut de Physique et Chimie des Matériaux de Strasbourg (France);
Manijeh Razeghi, Northwestern Univ. (USA)

11:00 am: **Surface plasmon waves for broadband THz spectroscopy** (*Invited Paper*), Oleg Mitrofanov, Univ. College London (United Kingdom); Miguel Navarro-Cia, Univ. College London (United Kingdom) and Imperial College London (United Kingdom); Raimund Mueckstein, Michele Natrella, Chris Graham, Cyril C. Renaud, Alwyn J. Seeds, Univ. College London (United Kingdom); Filip Dominec, Petr Kuzel, Academy of Sciences of the Czech Republic (Czech Republic); Jean-Christophe Delagnes, Patrick Mounaix, Univ. Bordeaux 1 (France) [8993-47]

11:20 am: **Subwavelength metallic waveguides as a universal tool for extreme confinement of THz surface waves** (*Invited Paper*), Juliette Mangeney, D. Gacemi, Ecole Normale Supérieure (France); Raffaele Colombelli, Aloyse Degiron, Institut d'Electronique Fondamentale (France) [8993-48]

11:40 am: **Terahertz near-field probe incorporating a λ/100 aperture for time-domain spectroscopy and imaging**, Alexander Macfaden, Univ. College London (United Kingdom); John L. Reno, Igal Brener, Sandia National Labs. (USA); Oleg Mitrofanov, Univ. College London (United Kingdom) [8993-49]

11:55 am: **Ultrafast terahertz dynamics in bulk and nanostructured materials** (*Invited Paper*), Peter U. Jepsen, DTU Fotonik (Denmark); David G. Cooke, McGill Univ. (Canada); Krzysztof Iwaszczuk, Andrew C. Strikwerda, DTU Fotonik (Denmark); Pernille Klarskov, Maksim Zalkovskij, Technical Univ. of Denmark (Denmark) [8993-50]

Lunch/Exhibition Break Tue 12:15 pm to 1:40 pm

SESSION 10

Location: Room 122 (Exhibit Level) . . . Tue 1:40 pm to 3:25 pm

New Materials and Heterostructures for IR Devices

Session Chairs: **Gert Cauwenberghs**, Univ. of California, San Diego (USA); **Philippe M. Fauchet**, Vanderbilt Univ. (USA)

1:40 pm: **Development of bulk AlInAsSb for L/MWIR detector applications** (*Invited Paper*), Stefan P. Svensson, Wendy L. Sarney, Harry S. Hier, U.S. Army Research Lab. (USA); Ding Wang, Dimitri Donetsky, Gela Kipshidze, Leon Shterengas, Youxi Lin, Gregory Belenky, Stony Brook Univ. (USA) [8993-51]

2:00 pm: **Infrared material development at Army Research Lab** (*Invited Paper*), Priyalal S. Wijewarnasuriya, U.S. Army Research Lab. (USA) [8993-52]

2:20 pm: **GaSb-based photodetectors covering short-wave to long-wave IR grown by molecular beam epitaxy**, Dmitri Lubyshev, Joel M. Fastenau, Yueming Qiu, Amy W. K. Liu, IQE Inc. (USA); Edwin J. Koerperick, Jon T. Olesberg, Dennis Norton Jr., ASL Analytical, Inc. (USA); Mark J. Furlong, IQE IR (United Kingdom) [8993-53]

2:35 pm: **Multi-wafer growth of GaInAs photodetectors on 4" InP by MOCVD for SWIR imaging applications**, Mark J. Furlong, Mark Mattingley, Sung Wook Lim, Matthew Geen, Wynne Jones, IQE IR (United Kingdom) [8993-54]

2:50 pm: **Growth and characterization of 6" InSb substrates for use in large area infrared imaging applications**, Mark J. Furlong, IQE IR (United Kingdom); Gordon Dallas, Greg Meshew, J. Patrick Flint, IQE Inc. (USA); David Small, Rebecca J. Martinez, Andrew Mowbray, IQE IR (United Kingdom) [8993-55]

3:05 pm: **Controlling the transport properties of magnetic devices with magneto-optics** (*Invited Paper*), Jean-Yves Bigot, Michele Albrecht, Mircea Vomir, Institut de Physique et Chimie des Matériaux de Strasbourg (France) [8993-56]

Coffee Break Tue 3:25 pm to 4:00 pm

SESSION 11

Location: Room 122 (Exhibit Level) Tue 4:00 pm to 5:30 pm

Late-Breaking Results and Awards

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

SPIE announces two new awards for Breakthroughs in Human-Centered Research. These Breakthrough Awards will be given to top researchers who are selected to present at this Late-Breaking Results session. The awards will recognize the scientific contribution of the best student and best research scientist who present the most notable recent discoveries with broad impact to benefit our understanding of the human body, its diagnosis, or its medical treatment, in the fields of biosensing, nanomedicine, and related fields. The winners will be presenting their work, and they will be awarded a commemorative plaque as well as a cash prize. Papers are selected and announced the week prior to the conference.

Wednesday 5 February

KEYNOTE SESSION

Location: Room 122 (Exhibit Level) . . . 8:00 am to 8:30 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

8:00 am: **Single-mode tunable quantum cascade lasers for radio-astronomy** (*Keynote Presentation*), Jérôme Faist, Keita Ohtani, Dana Turcinkova, Christopher B. Bonzon, Cristina Benea, Mattias Beck, Giacomo Scalari, ETH Zurich (Switzerland) [8993-3]

SESSION 12

Location: Room 122 (Exhibit Level) . Wed 9:00 am to 10:25 am

New Sensing Techniques

Session Chairs: **Stefan P. Svensson**, U.S. Army Research Lab. (USA); **Manijeh Razeghi**, Northwestern Univ. (USA)

9:00 am: **Infrared hyperspectral standoff detection of explosives using external cavity QCL** (*Invited Paper*), Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Hugger, Jan-Philipp Jarvis, Verena Blattmann, Quankui K. Yang, Ralf Ostendorf, Wolfgang Bronner, Rachid Driad, Rolf Aidam, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) [8993-57]

9:20 am: **Chemical and explosive detections using photo-acoustic effect and quantum cascade lasers**, Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA) [8993-58]

9:35 am: **Advances in broadly tunable QCL external cavity lasers and their use in novel rapid wide bandwidth cavity ringdown spectroscopy**, Leigh J. Bromley, Daylight Solutions Inc. (USA); Toby K. Boyson, UNSW@ADFA (Australia); David B. Caffey, Daylight Solutions Inc. (USA); Maria E. Calzada, Loyola Univ. New Orleans (USA); William B. Chapman, Timothy O. Day, Daylight Solutions Inc. (USA); Abhijit G. Kallapur, UNSW@ADFA (Australia); K. Paul Kirkbride, Flinders Univ. (Australia); David S. Moore, Los Alamos National Lab. (USA); Ian R. Petersen, UNSW@ADFA (Australia); Allen Priest, Daylight Solutions Inc. (USA); Dylan R. Rittman, Los Alamos National Lab. (USA); David Ruiz, Daylight Solutions Inc. (USA); Thomas G. Spence, Loyola Univ. New Orleans (USA); Charles C. Harb, The Univ. of New South Wales (Australia) [8993-59]

9:50 am: **Further developments of capillary absorption spectrometers using small hollow-waveguide fibers** (*Invited Paper*), Jim F. Kelly, Robert L. Sams, Thomas A. Blake, Pacific Northwest National Lab. (USA); Jason M. Kriesel, Opto Knowledge Systems, Inc. (USA) [8993-60]

10:10 am: **Vibration waveform reproduction and location of OTDR based distributed optical-fiber vibration sensing system**, Hui Zhu, Southeast Univ. (China); Chao Pan, Southeast University (China); Xiaohan Sun, Southeast Univ. (China) [8993-61]

Coffee Break Wed 10:25 am to 10:50 am

SESSION 13

Location: Room 122 (Exhibit Level) Wed 10:50 am to 12:00 pm

Plasmonic Bio-sensing

Session Chairs: **Xavier Letartre**, Ecole Centrale de Lyon (France); **Masoud Panjehpour**, Thompson Cancer Survival Ctr. (USA)

10:50 am: **Nanoplasmonic biosensors and photodetectors** (*Invited Paper*), Ekmel Özbay, Bilkent Univ. (Turkey) [8993-63]

11:10 am: **Time-resolved and ultra-sensitive vibrational biospectroscopy with mid-infrared plasmonics** (*Invited Paper*), Hatice Altug, Ronen Adato, Serap Aksu, Dordaneh Etezadi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8993-64]

11:30 am: **Photonic crystal band-edge laser biosensor with silica passivation layer prepared by atomic layer deposition process**, Hyungrae Cha, Jeongkug Lee, Seoul National Univ. (Korea, Republic of); Lukas R. Jordan, Univ. of Minnesota, Twin Cities (USA); Sang-Hyun Oh, Univ. of Minnesota, Twin Cities (USA) and Seoul National Univ. (Korea, Republic of); Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [8993-65]

11:45 am: **Plasmonic metamaterials for biosensing applications: from proteins to cells**, Gennady B. Shvets, The Univ. of Texas at Austin (USA) [8993-66]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

OPTO

Conference 8993 · Location: Room 122 (Exhibit Level)

SESSION 14

Location: Room 122 (Exhibit Level) .. Wed 1:30 pm to 2:55 pm

QCL-based Bio-sensors

Session Chairs: **Adam T. Woolley**, Brigham Young Univ. (USA);
Frank K. Tittel, Rice Univ. (USA)

1:30 pm: **Measures for optimizing pulsed EC-QC laser spectroscopy of liquids and application to multi-analyte blood analysis** (*Invited Paper*), Markus Brandstetter, Cosima Koch, Andreas Genner, Bernhard Lendl, Technische Univ. Wien (Austria) [8993-67]

1:50 pm: **QCL-based integrated sensors for liquids and gases**, Pierre Jouy, Kerstin Hans, Markus Sigrist, ETH Zurich (Switzerland); Markus Mangold, Bela Tuzson, Lukas Emmenegger, EMPA (Switzerland); Philip Waegli, Alexandra Homsy, Lubos Hvozدارa, Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Herbert Looser, FH Aargau Nordwestschweiz - Letzte Aktualisierung (Switzerland); Alexander Wirthmüller, Daniel Hofstetter, Univ. of Neuchâtel (Switzerland); Jérôme Faist, ETH Zurich (Switzerland) [8993-68]

2:05 pm: **Latest improvements in field deployable compound specific isotope analyzer based on quantum cascade lasers and hollow waveguide**, Sheng Wu, California Institute of Technology (USA) and Power Environmental Energy Research Institute (USA); Andrei Deev, California Institute of Technology (USA) [8993-69]

2:20 pm: **Quantum cascade laser-based sensor system for hydrogen peroxide detection**, Wei Ren, Wenzhe Jiang, Nancy Sanchez, Rice Univ. (USA); Pietro Patimisco, Rice Univ. (USA) and Univ. degli Studi di Bari (Italy); Vincenzo Spagnolo, Univ. degli Studi di Bari (Italy); Chung-en Zah, Feng Xie, Lawrence C. Hughes Jr., Corning Incorporated (USA); Robert Griffin, Frank K. Tittel, Rice Univ. (USA) [8993-70]

2:35 pm: **THz signatures of biological macromolecules** (*Invited Paper*), Elliott R. Brown, Wright State Univ. (USA); Edgar A. Mendoza, Redondo Optics, Inc. (USA); W. Zhang, L. Viveros, M. Martin, Wright State Univ. (USA); Yuliya Kuznetsova, A. Neumann, Steven R. Brueck, The Univ. of New Mexico (USA) [8993-71]

Coffee Break Wed 2:55 pm to 3:30 pm

SESSION 15

Location: Room 122 (Exhibit Level) .. Wed 3:30 pm to 4:40 pm

Environmental Sensing

Session Chairs: **Rui Q. Yang**, The Univ. of Oklahoma (USA); **Frank Fuchs**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

3:30 pm: **High-sensitivity QEPAS for environmental monitoring** (*Invited Paper*), Aurore Vicet, Tong Nguyen Ba, Yves Rouillard, Quentin Gaimard, Univ. Montpellier 2 (France) [8993-72]

3:50 pm: **THz quartz-enhanced photoacoustic sensor employing a quantum cascade laser source** (*Invited Paper*), Vincenzo Spagnolo, Patimisco Pietro, Simone Borri, Angelo Sampaolo, Gaetano Scamarcio, Univ. degli Studi di Bari, CNR-IFN (Italy); Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom) [8993-73]

4:10 pm: **Cavity and quartz enhanced photo-acoustic mid-IR sensor**, Pietro Patimisco, Univ. degli Studi di Bari (Italy); Simone Borri, CNR-IFN UOS Bari (Italy); Gaetano Scamarcio, Univ. degli Studi di Bari (Italy); Vincenzo Spagnolo, Politecnico di Bari (Italy); Iacopo Galli, Giovanni Giusfredi, Davide Mazzotti, Paolo de Natale, Istituto Nazionale di Ottica (Italy) and European Lab. for Non-linear Spectroscopy (Italy) [8993-74]

4:25 pm: **Fast automotive diesel exhaust measurement using quantum cascade lasers**, Johannes Herbst, Raimund Brunner, Armin Lambrecht, Fraunhofer-Institut für Physikalische Messtechnik (Germany) [8993-75]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) .. Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Single photon excitation and entanglement transfer using hyperbolic metamaterials, Onur Danaci, Ozgur Mustecapiloglu, Koç Univ. (Turkey) [8993-94]

Experimental realisation of focusing dual wavelengths by a far-field plasmonic lens, Priyamvada Venugopalan, Xiangping Li, Qiming Zhang, Min Gu, Swinburne Univ. of Technology (Australia) [8993-95]

Thursday 6 February

KEYNOTE SESSION

Location: Room 122 (Exhibit Level) ... 8:00 am to 9:00 am

Session Chair: **Manijeh Razeghi**, Northwestern Univ. (USA)

8:00 am: **Monolithic QCL design approaches for improved reliability and affordability** (*Keynote Presentation*), Kwok Keung Law, Naval Air Warfare Ctr. Weapons Div. (USA) [8993-5]

8:30 am: **Near-infrared OPO in an AlGaAs/AlOx waveguide** (*Keynote Presentation*), Cécile Ozanam, Marc Savanier, Univ. Paris 7-Denis Diderot (France); Loïc Lanco, Laboratoire de Photonique et Nanostructures, CNRS-UPR20 (France); Xavier Lafosse, Lab. de Photonique et de Nanostructures (France); Alessio Andronico, Ivan Favero, Sara Ducci, Giuseppe Leo, Univ. Paris 7-Denis Diderot (France) [8993-6]

SESSION 16

Location: Room 122 (Exhibit Level) .. Thu 9:00 am to 10:50 am

Graphene and Quantum Sensing Applications I

Session Chairs: **Konstantin L. Vodopyanov**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA);
Manijeh Razeghi, Northwestern Univ. (USA)

9:00 am: **Widely-electrically-tunable plasmonic antennas with graphene** (*Invited Paper*), Yu Yao, Mikhail A. Kats, Patrice Genevet, Harvard School of Engineering and Applied Sciences (USA); Nanfang Yu, Harvard School of Engineering and Applied Sciences (USA) and Columbia Univ. (USA); Yi Song, Massachusetts Institute of Technology (USA); Raji Shankar, Harvard School of Engineering and Applied Sciences (USA); Jing Kong, Massachusetts Institute of Technology (USA); Marko Loncar, Harvard Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) [8993-76]

9:20 am: **Graphene for transparent conductor applications** (*Invited Paper*), Vinod E. Sandana, Graphos (France) [8993-77]

9:40 am: **Atom chips for quantum sensing with cold thermal atoms** (*Invited Paper*), Sylvain Schwartz, M. Ammar, M. Dupont-Nivet, Landry Huet, Jean-Paul Pocholle, Thales Research & Technology (France); C. Guerlin, J. Reichel, Lab. Kastler Brossel (France); Peter Rosenbusch, Observatoire de Paris (France); Isabelle Bouchoule, Christoph I. Westbrook, Lab. Charles Fabry de l'Institut d'Optique (France) [8993-78]

10:00 am: **A tunable omni-directional sensing platform: strong light-matter interactions enabled by graphene**, Feng Liu, Univ. of Pennsylvania (USA) and Shanghai Normal Univ. (China); Ertugrul Cubukcu, Univ. of Pennsylvania (USA) [8993-79]

10:15 am: **Graphene active plasmonics and their applications to terahertz lasers and sensors**, Taiichi Otsuji, Akira Satou, Tohoku Univ. (Japan); Takayuki Watanabe, Tohoku Univ (Japan); Alexander Dubinov, Institute for Physics of Microstructures (Russian Federation); Vyacheslav Popov, Institute of Radio Engineering and Electronics (Russian Federation); Vladimir Mitin, Univ. at Buffalo (USA); Victor Ryzhii, Tohoku Univ. (Japan) [8993-80]

10:30 am: **Electrical tunability of soft THz parametric resonance by hot electrons in graphene** (*Invited Paper*), Samwel Sekwao, Jean-Pierre Leburton, Univ. of Illinois at Urbana-Champaign (USA) [8993-81]

Coffee Break Thu 10:50 am to 11:00 am

SESSION 17

Location: Room 122 (Exhibit Level) · Thu 11:00 am to 12:45 pm

Graphene and Quantum Sensing Applications II

Session Chairs: **Sheng Wu**, California Institute of Technology (USA);
Keon Jae Lee, KAIST (Korea, Republic of)

11:00 am: **Plasmon-induced emission and broadband absorption with a plasmonic crystal** (*Invited Paper*), Hugo Frederich, Clotilde Lethiec, Univ. Pierre et Marie Curie (France); Fangfang Wen, Rice Univ. (USA); Julien Laverdant, Lab. de Physique de la Matière Condensée et Nanostructures (France); Catherine Schwob, Univ. Pierre et Marie Curie (France); Traian Popescu, Ludovic Douillard, CEA-IRAMIS (France); Laurent Coolen, Agnès Maître, Univ. Pierre et Marie Curie (France)[8993-82]

11:20 am: **THz near-field microscopy of graphene structures** (*Invited Paper*), Oleg Mitrofanov, Univ. College London (United Kingdom) and The Ctr. for Integrated Nanotechnologies (USA); Wenlong Yu, Georgia Institute of Technology (USA); Robert J. Thompson, Univ. College London (United Kingdom); Yuxuan Jiang, Georgia Institute of Technology (USA); Igal Brener, Sandia National Labs. (USA) and The Ctr. for Integrated Nanotechnologies (USA); Wei Pan, Sandia National Labs. (USA); Claire Berger, Walter A. de Heer, Zhigang Jiang, Georgia Institute of Technology (USA)[8993-83]

11:40 am: **Plasmonic resonance absorption spectra in mid-infrared in an array of graphene nanoresonators** (*Invited Paper*), Don C. Abeysinghe, Joshua Myers, Nima Nader Esfahani, Joshua R. Hendrickson, Justin W. Cleary, Dennis E Walker Jr., Air Force Research Lab. (USA); Kuei-Hsien Chen, Academia Sinica (Taiwan); Li-Chyong Chen, National Taiwan Univ. (Taiwan); Shin Mou, Air Force Research Lab. (USA)[8993-84]

12:00 pm: **Electrical readout of thermo-plasmonically actuated nanomechanical structure by graphene strain gauge sensor**, Fei Yi, Alexander Y. Zhu, Jason C. Reed, Hai Zhu, Ertugrul Cubukcu, Univ. of Pennsylvania (USA)[8993-85]

12:15 pm: **Scanning single-emitter fluorescence lifetime imaging**, Andreas W. Schell, Philip Engel, Oliver Benson, Humboldt-Univ. zu Berlin (Germany)[8993-86]

12:30 pm: **Plasmonic sensing with metal nanohole array fabricated using nanospherical-lens lithography**, Yi-Kai Huang, Chang-Han Wang, Han Li, Min-Huan Wang, Yun-Chorng Chang, National Cheng Kung Univ. (Taiwan)[8993-87]

Lunch/Exhibition Break Thu 12:45 pm to 2:00 pm

SESSION 18

Location: Room 122 (Exhibit Level) ... Thu 2:00 pm to 3:10 pm

Single Photon Avalanche Detectors

Session Chairs: **David H. Gracias**, Johns Hopkins Univ. (USA);
Yu-Hwa Lo, Univ. of California, San Diego (USA)

2:00 pm: **100 Mcount/s InGaAs/InP single-photon detector** (*Invited Paper*), Carmelo Scarcella, Gianluca Boso, Fabio Acerbi, Alessandro Ruggeri, Adriano Della Frera, Alberto Tosi, Politecnico di Milano (Italy)[8993-89]

2:20 pm: **Ultra-sensitive nano-injection photon detectors** (*Invited Paper*), Hooman Mohseni, Northwestern Univ. (USA)[8993-90]

2:40 pm: **Integrated electronics for time-resolved array of single-photon avalanche diodes**, Giulia Acconcia, Matteo Crotti, Ivan Rech, Massimo Ghioni, Politecnico di Milano (Italy)[8993-92]

2:55 pm: **Time-resolved optical spectrometer based on a monolithic array of high-precision TDCs and SPADs**, Davide Tamborini, Bojan Markovic, Laura Di Sieno, Davide Contini, Andrea Bassi, Simone Tisa, Alberto Tosi, Franco Zappa, Politecnico di Milano (Italy)[8993-93]

Photonic and Phononic Properties of Engineered Nanostructures IV

Conference Chairs: **Ali Adibi**, Georgia Institute of Technology (USA); **Shawn-Yu Lin**, Rensselaer Polytechnic Institute (USA); **Axel Scherer**, California Institute of Technology (USA)

Program Committee: **Andrea Alù**, The Univ. of Texas at Austin (USA); **William L. Barnes**, Univ. of Exeter (United Kingdom); **Ali Asghar Eftekhar**, Georgia Institute of Technology (USA); **Reginald K. Lee**, Orbits Lightwave, Inc. (USA); **Marko Loncar**, Harvard School of Engineering and Applied Sciences (USA); **Susumu Noda**, Kyoto Univ. (Japan); **Masaya Notomi**, NTT Basic Research Labs. (Japan); **Ekmel Özbay**, Bilkent Univ. (Turkey); **Yong Xu**, Virginia Polytechnic Institute and State Univ. (USA); **Eli Yablonovitch**, Univ. of California, Berkeley (USA); **Rashid Zia**, Brown Univ. (USA)

Monday 3 February

SESSION 1

Location: Room 307 (Esplanade) . . . Mon 8:00 am to 10:00 am

Recent Advances in Engineered Nanostructures

Session Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

8:00 am: **Integrated silicon photonics systems with gain** (*Invited Paper*), William Fegadolli, Se-Heon Kim, Sameer Walavalkar, Andrew Homyk, Axel Scherer, California Institute of Technology (USA) [8994-1]

8:30 am: **Passive and active tuning of optically-resonant nanostructures** (*Invited Paper*), Mark Brongersma, Geballe Lab. for Advanced Materials (USA) [8994-2]

9:00 am: **Enabling nanophotonics with plasmonics and metamaterials** (*Invited Paper*), Vladimir M. Shalaev, Urcan Guler, Gururaj V. Naik, X. Meng, Mikhail Y. Shalaginov, Alexei Lagutchev, Evgenii E. Narimanov, Alexander V. Kildishev, Alexandra Boltasseva, Purdue Univ. (USA) [8994-3]

9:30 am: **Cavity optomechanics: quantum coherent coupling of light and mechanical motion** (*Invited Paper*), Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [8994-4]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 307 (Esplanade) . . Mon 10:30 am to 12:00 pm

Photonic Crystal Resonators and Emitters

Session Chair: **Axel Scherer**, California Institute of Technology (USA)

10:30 am: **Recent progress in high-power single-mode quantum cascade lasers** (*Invited Paper*), Manijeh Razeghi, Northwestern Univ. (USA) [8994-5]

11:00 am: **Development of metal organic vapour phase epitaxy for re-grown photonic crystal surface emitting lasers**, Benjamin J. Stevens, Luke Shepherd, Richard J. E. Taylor, David T. D. Childs, Kristian M. Groom, Salam Khamas, Jay Sarma, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) [8994-6]

11:20 am: **Enhanced transmission in photonic crystals microcavity filters in ridge-waveguide format**, Aju S. Jugessur, The Univ. of Iowa (USA) [8994-7]

11:40 am: **High-performance photonic crystal membrane reflectors by magnetically-guided metal-assisted chemical etching**, Yichen Shuai, The Univ. of Texas at Arlington (USA); Karthik Balasundaram, Parsian K. Mohseni, Univ. of Illinois at Urbana-Champaign (USA); Deyin Zhao, The Univ. of Texas at Arlington (USA); Hongjun Yang, The Univ. of Texas at Arlington (USA) and Semerane, Inc. (USA); Xiuling Li, Univ. of Illinois at Urbana-Champaign (USA); Weidong Zhou, The Univ. of Texas at Arlington (USA) [8994-8]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 3

Location: Room 307 (Esplanade) Mon 1:30 pm to 3:10 pm

Photonic Crystal Waveguides and Fibers

Session Chair: **Daniel Torrent**, Univ. Politècnica de València (Spain)

1:30 pm: **Inhibited coupling hollow-core photonic crystal fiber** (*Invited Paper*), Fetah A. Benabid, Frederic Gérôme, L. Vincetti, Benoit Debord, Meshaal Alharbi, Thomas D. Bradley, XLIM Institut de Recherche (France) [8994-9]

2:00 pm: **Transient dynamic distributed strain sensing using photonics crystal fibres**, Biswajyoti Das, D. Roy Mahapatra, Gopalkrishna M. Hegde, Indian Institute of Science (India); Sathya V. Hanagud, Georgia Institute of Technology (USA) [8994-10]

2:20 pm: **Merged photonic crystal slot waveguide: confining slow modes in tiny volumes**, Matthieu Roussey, Petri A. Stenberg, Arijit Bera, Seppo Honkanen, Markku Kuittinen, Univ. of Eastern Finland (Finland) [8994-11]

2:40 pm: **Inducing and harnessing stimulated Brillouin scattering in photonic integrated circuits** (*Invited Paper*), Benjamin J. Eggleton, The Univ. of Sydney (Australia) [8994-12]

Coffee Break Mon 3:10 pm to 3:40 pm

SESSION 4

Location: Room 307 (Esplanade) Mon 3:40 pm to 5:30 pm

Phononic Crystals, Acoustic Metamaterials, and Optomechanical Structures

3:40 pm: **Active acoustic metamaterials with programmable effective density and elasticity using a fractional derivative controller** (*Invited Paper*), Amr M. Baz, Univ. of Maryland, College Park (USA) [8994-13]

4:10 pm: **Quasi-two-dimensional acoustic metamaterials** (*Invited Paper*), Daniel Torrent, Univ. Politècnica de València (Spain); V. M. Garcia-Chocano, R. Gracia-Salgado, F. Cervera, Univ. Politècnica de Valencia (Spain); José Sánchez-Dehesa, Univ. Politècnica de València (Spain) [8994-14]

4:40 pm: **Design and fabrication of a gradient-index phononic quartz plate** (*Invited Paper*), Tsung-Tsong Wu, Meng-Jhen Chiou, National Taiwan Univ. (Taiwan); Yu-Ching Lin, Takahito Ono, Tohoku Univ. (Japan) [8994-15]

5:10 pm: **Funneled focusing of planar acoustic waves utilizing the metamaterial properties of an acoustic lens**, Ezekiel Walker, Arup Neogi, Arkadii A. Krokhin, Univ. of North Texas (USA); Miguel M. Rojas, Delfino R Contreras, Univ. Autónoma del Estado de México (Mexico) [8994-16]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 307 (Esplanade) . . . Tue 10:30 am to 12:00 pm

Diamond Nanophotonics I

Joint Session with Conferences 8994 and 8997

Session Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

- 10:30 am: **ICP-etched diamond microstructures for photonics and lasers (Invited Paper)**, Erdan Gu, H. Liu, Jennifer E. Hastie, Alan J. Kemp, Martin David Dawson, Univ. of Strathclyde (United Kingdom) [8994-18]
 - 11:00 am: **Prospects of diamond defect centers as quantum light sources (Invited Paper)**, Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [8994-17]
 - 11:30 am: **Photonic and phononic crystal cavities in diamond (Invited Paper)**, Janine Riedrich-Möller, Laura Kipfstuhl, Felix Guldner, Christoph Becher, Univ. des Saarlandes (Germany) [8994-19]
- Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 6

Location: Room 307 (Esplanade) Tue 1:30 pm to 3:20 pm

Diamond Nanophotonics II

Joint Session with Conferences 8994 and 8997

Session Chair: **Dirk R. Englund**,
Massachusetts Institute of Technology (USA)

- 1:30 pm: **Diamond nanostructures for optomechanics and quantum optics (Invited Paper)**, Paul Barclay, Univ. of Calgary (Canada) [8994-20]
 - 2:00 pm: **Diamond photonic devices for quantum-optical networks (Invited Paper)**, Zhihong Huang, Charles Santori, Victor Acosta, Hewlett-Packard Labs. (USA); Andrei Faraon, California Institute of Technology (USA); Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8994-21]
 - 2:30 pm: **Diamond photonics and applications: frequency combs, cavity QED, and optomechanics (Invited Paper)**, Marko Loncar, Harvard School of Engineering and Applied Sciences (USA) [8994-22]
 - 3:00 pm: **Fabrication of GaP disk resonator arrays coupled to nitrogen-vacancy centers in diamond**, Nicole Thomas, Russell Barbour, Univ. of Washington (USA); Yuncheng Song, Minjoo L. Lee, Yale Univ. (USA); Kai-Mei C. Fu, Univ. of Washington (USA) [8997-1]
- Coffee Break Tue 3:20 pm to 3:50 pm

SESSION 7

Location: Room 307 (Esplanade) Tue 3:50 pm to 5:20 pm

Graphene Nanophotonics

Session Chair: **Marko Loncar**,
Harvard School of Engineering and Applied Sciences (USA)

- 3:50 pm: **Optical properties of graphene: from the THz to the UV (Invited Paper)**, Tony F. Heinz, Columbia Univ. (USA) [8994-23]
- 4:20 pm: **On-chip graphene optoelectronic devices for high-speed modulation and photodetection (Invited Paper)**, Dirk R. Englund, Massachusetts Institute of Technology (USA) [8994-24]
- 4:50 pm: **Graphene plasmonics (Invited Paper)**, Tony Low, Phaedon Avouris, IBM Thomas J. Watson Research Ctr. (USA) [8994-25]

Wednesday 5 February

SESSION 8

Location: Room 307 (Esplanade) Wed 8:00 am to 9:50 am

Design and Characterization of Plasmonic Structures

Session Chair: **Tony Low**, IBM Thomas J. Watson Research Ctr. (USA)

- 8:00 am: **Materials and fields at the nanoscale: design and engineering of photonic-plasmonic resonant nanostructures (Invited Paper)**, Luca Dal Negro, Boston Univ. (USA) [8994-26]
 - 8:30 am: **Engineering optical properties of colloidal quantum dots in metallic nanostructures**, Jayson Briscoe, Sang-Yeon Cho, New Mexico State Univ. (USA) [8994-27]
 - 8:50 am: **Optical characterization of plasmonic membranes and examples of their applications**, L. Andrea Dunbar, Rolf Eckert, Branislav D. Timotijevic, Ross P. Stanley, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [8994-28]
 - 9:10 am: **Efficient coupling of InGaAs quantum dots to propagating surface plasmons in lithographically defined Au-waveguides on GaAs**, Michael Kaniber, Gregor Bracher, Nicolas Coca-Lopez, Konrad Schraml, Max Bichler, Jonathan J. Finley, Technische Univ. München (Germany) [8994-29]
 - 9:30 am: **Design optimization and fabrication of plasmonic nano sensor**, Salah El Zohary, Univ. of Tokushima (Japan); Abdullillah Azzazi, The American Univ. in Cairo (Egypt); Hiroyuki Okamoto, Anan National College of Technology (Japan); Toshihiro Okamoto, Masanobu Haraguchi, Univ. of Tokushima (Japan); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) [8994-31]
- Coffee Break Wed 9:50 am to 10:30 am

SESSION 9

Location: Room 307 (Esplanade) Wed 10:30 am to 12:00 pm

Nanoplasmonic Structures and Devices

Session Chair: **John B. Pendry**,
Imperial College London (United Kingdom)

- 10:30 am: **Broadband three-dimensional plasmonic metamaterials at optical frequencies (Invited Paper)**, Jennifer A. Dionne, Stanford Univ. (USA) [8994-32]
 - 11:00 am: **Experimental and modelling results for plasmon soliton waves**, Gilles Renversez, Institut Fresnel (France); Wiktor Walasik, Institut Fresnel (France) and ICFO - Institut de Ciències Fotòniques (Spain); Mélinda Olivier, Univ. de Rennes 1 (France) and Univ. Pardubice (Czech Republic); Yaroslav V. Kartashov, Institute of Spectroscopy (Russian Federation); Virginie Nazabal, Univ. de Rennes 1 (France); Petr Nemeč, Univ. Pardubice (Czech Republic); Mathieu Chauvet, FEMTO-ST (France) [8994-33]
 - 11:20 am: **CMOS-compatible metallic nanostructures for visible and infrared filtering**, Ujwol Palanchoke, Salim Boutami, Jérôme Hazart, CEA-LETI-Minatec (France) [8994-34]
 - 11:40 am: **Efficient plasmonic energy conversion to an electrical signal using a plasmon field effect transistor**, Hossein Shokri Kojori, Univ. of Miami (USA); Juhyung Yun, Univ. at Buffalo (USA); Younghun Paik, Univ. of Miami (USA); Joondong Kim, Kunsan National Univ. (Korea, Republic of); Wayne A. Anderson, Univ. at Buffalo (USA); Sung Jin Kim, Univ. of Miami (USA) [8994-35]
- Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

OPTO

Conference 8994 · Location: Room 307 (Esplanade)

SESSION 10

Location: Room 307 (Esplanade) Wed 1:30 pm to 3:00 pm

Novel Properties and Application of Plasmonic Structures

Session Chair: **Luca Dal Negro**, Boston Univ. (USA)

1:30 pm: **The sub-nanoscale optical response of plasmonic materials** (*Invited Paper*), John B. Pendry, Imperial College London (United Kingdom) [8994-37]

2:00 pm: **Calculating van der Waals interactions between plasmonic nanoparticles using transformation optics**, Rongkuo Zhao, Yu Luo, Antonio I. Fernandez-Dominguez, John B. Pendry, Imperial College London (United Kingdom) [8994-47]

2:20 pm: **Complex DNA plasmonics**, Na Liu, Max-Planck Institut für Intelligente Systeme (Germany); Baoquan Ding, National Ctr. for Nanoscience and Technology of China (China) [8994-38]

2:40 pm: **Cylindrical channel plasmon resonance for single-molecule sensing**, Brandon Terranova, Alyssa Bellingham, Sylvia Herbert, Adam K. Fontecchio, Drexel Univ. (USA) [8994-39]

Coffee Break Wed 3:00 pm to 3:30 pm

SESSION 11

Location: Room 307 (Esplanade) Wed 3:30 pm to 5:30 pm

Nano-Antenna-based Structures for Photonic Applications

Session Chair: **Jennifer A. Dionne**, Stanford Univ. (USA)

3:30 pm: **Highly-local enhancement of the spontaneous emission of InGaAs quantum dots and CdSe nanocrystals using plasmonic bowtie nanoantennas**, Konrad Schraml, Matthias Spiegl, Mathias Kammerlocher, Gregor Bracher, Benedikt Mayer, Kai Müller, Max Bichler, Jonathan J. Finley, Michael Kaniber, Walter Schottky Institut (Germany) [8994-40]

3:50 pm: **Controllable emission of quantum dots coupled to magneto-electric Mie-type resonances of subwavelength all-dielectric nanoantennas**, Isabelle Staude, Manuel Decker, The Australian National Univ. (Australia); Nche T. Fofang, Sheng Liu, Jason Dominguez, Sandia National Labs. (USA); Andrey E. Miroshnichenko, Dragomir N. Neshev, The Australian National Univ. (Australia); Ting S. Luk, Igal Brener, Sandia National Labs. (USA); Yuri S. Kivshar, The Australian National Univ. (Australia) [8994-41]

4:10 pm: **Nano antenna elements for controlling optical phase**, Yuval Yifat, Zeev Iluz, Michal Eitan, Amir Boag, Jacob Scheuer, Yael Hanein, Tel Aviv Univ. (Israel) [8994-42]

4:30 pm: **Wavelength and polarization selective photodetection using coupled plasmonic nanoantennas**, Jayson Briscoe, Sang-Yeon Cho, New Mexico State Univ. (USA) [8994-43]

4:50 pm: **Photophysical study of plasmonic propagation in nanoparticle chains**, Alexandre Grégoire, Samuel Ouellet, Olivier Ratelle, Denis Boudreau, Univ. Laval (Canada) [8994-44]

5:10 pm: **Application of plasmonic subwavelength structuring to enhance infrared detection**, David W. Peters, Paul S. Davids, Jin K. Kim, Darin Leonhardt, Thomas E. Beechem III, Stephen W. Howell, Taisuke Ohta, Joel R. Wendt, John A. Montoya, Sandia National Labs. (USA) [8994-45]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Observing transverse Anderson localization in random air line-based fiber, Minghan Chen, Ming-Jun Li, Corning Incorporated (USA) [8994-64]

Fabrication and evaluation of active spectral filter with metal-insulator-metal structure for visible light communication, Kensuke Murai, National Institute of Advanced Industrial Science and Technology (Japan); Yasushi Oshikane, Fumihiko Yamamoto, Osaka Univ. (Japan); Shoichi Mochizuki, National Institute of Advanced Industrial Science and Technology (Japan); Kou Hattori, Osaka Univ. (Japan); Toshiyuki Mihara, National Institute of Advanced Industrial Science and Technology (Japan); Motohiro Nakano, Osaka Univ. (Japan) [8994-65]

Efficient harmonic generation in double-near-zero-permittivity slabs, Maria A. Vincenti, Domenico de Ceglia, National Research Council (USA) and U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA); Michael Scalora, U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA); Joseph W. Haus, Univ. of Dayton (USA) and National Research Council (USA) and U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA) [8994-66]

Phase-resolved unidirectional scattering in all-dielectric silicon nanodisks, Manuel Decker, Isabelle Staude, The Australian National Univ. (Australia); Matthias Falkner, Friedrich-Schiller-Univ. Jena (Germany); Jason Dominguez, Sandia National Labs. (USA); Andrey E. Miroshnichenko, Dragomir N. Neshev, The Australian National Univ. (Australia); Igal Brener, Sandia National Labs. (USA); Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany); Yuri S. Kivshar, The Australian National Univ. (Australia) [8994-67]

Performance improvement of transmitted Bessel beams emitted from subwavelength annular aperture coupled with periodic grating, Chun-Hung Weng, Ming-Han Chung, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [8994-68]

Chiral plasmonics: route towards strong and broadband chiro-optical response, Greshma Nair, Haobijam J. Singh, Murugesan Venkatapathi, Ambarish Ghosh, Indian Institute of Science (India) [8994-69]

Acousto-optic interaction induced photonic band gaps in silicon slab waveguides, Tzy-Rong Lin, National Taiwan Ocean Univ. (Taiwan); Jin-Chen Hsu, National Yunlin Univ. of Science and Technology (Taiwan); Chiang-Hsin Lin, Yun-Cheng Ku, National Taiwan Ocean Univ. (Taiwan) [8994-70]

Effective focusing method using simple Au double block with surface plasmon, Hong-Gyu Ahn, Seung-Han Park, Yonsei Univ. (Korea, Republic of) [8994-71]

Anderson localized modes in a disordered glass optical fiber, Salman Karbasi, Seyed Rasoul Hosseini, Univ. of Wisconsin-Milwaukee (USA); Karl W. Koch, Corning Incorporated (USA); Thomas Hawkins, John Ballato, Clemson Univ. (USA); Arash Mafi, Univ. of Wisconsin-Milwaukee (USA) [8994-72]

Plasmonic emission enhancement from Er³⁺-doped tellurite glass via negative-nanobowtie, Victor A. Garcia Rivera, Univ. de São Paulo (Brazil); Yannick Ledemi Sr., Younès Messaddeq Sr., Ctr. d'optique, photonique et laser (Canada) and Univ. Laval (Canada); Euclides Marega Jr., Univ. de São Paulo (Brazil) [8994-73]

Growth of ZnO nanowire array on a fiber end face and reflection modification, Igor V. Melnikov, Mikhail Y. Nazarkin, Andrey A. Machnev, Alexei S. Shuliatyev, Dmitry G. Gromov, National Research Univ. of Electronic Technology (Russian Federation) [8994-74]

High absorption and polarization-independent thin-film absorber with gold nanorod array, Guangyao Su, Deng Xiao, Zhaoyu Zhang, Peking Univ. Shenzhen Graduate School (China) [8994-75]

2D impedance-matched zero-index metamaterial, Philip A. Munoz, Yang Li, Shota Kita, Orad Reshef, Marko Loncar, Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) [8994-76]

Thursday 6 February

SESSION 12

Location: Room 307 (Esplanade) Thu 8:00 am to 9:50 am

Photonic Metamaterials

Session Chair: **Kenneth B. Crozier**, Harvard Univ. (USA)

8:00 am: **Integrated nanophotonic isolator without magnetism: angular-momentum biased metamaterials** (*Invited Paper*), Dimitrios Sounas, Andrea Alù, The Univ. of Texas at Austin (USA) [8994-46]

8:30 am: **Dirac-cone based negative/zero/positive refractive index metamaterials**, Yang Li, Philip A. Munoz, Shota Kita, Orad Reshef, Marko Loncar, Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) [8994-47]

8:50 am: **Transmission in a 1D split-ring resonator metamaterial containing a nonlinear barrier: soliton modes**, Arthur R. McGurn, Western Michigan Univ. (USA) [8994-48]

9:10 am: **The negative refraction under out-of-plane incident condition: an experimental study**, Silvia Romano, Consiglio Nazionale delle Ricerche (Italy); Edoardo De Tommasi, Istituto per la Microelettronica e Microsistemi (Italy); Anna Chiara De Luca, Ivo Rendina, Consiglio Nazionale delle Ricerche (Italy); Stefano Cabrini, The Molecular Foundry (USA) and Lawrence Berkeley National Lab. (USA); Vito Mocella, Consiglio Nazionale delle Ricerche (Italy) [8994-49]

9:30 am: **ENZ waveguide of Al-doped zinc oxide for telecommunication applications**, Hossein Alisafaei, Daniel B. Fullager, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) [8994-50]

Coffee Break Thu 9:50 am to 10:20 am

SESSION 13

Location: Room 307 (Esplanade) . . . Thu 10:20 am to 12:00 pm

Optical Properties of Metasurfaces

Session Chair: **Andrea Alù**, The Univ. of Texas at Austin (USA)

10:20 am: **Flat optics based on metasurfaces** (*Invited Paper*), Nanfang Yu, Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) [8994-51]

10:50 am: **Multispectral imaging with silicon nanowires and wafer-scale metasurfaces for single-molecule Raman scattering** (*Invited Paper*), Kenneth B. Crozier, Harvard Univ. (USA) [8994-52]

11:20 am: **Coupling between a metasurface and intersubband transitions in a quantum well explained via classical electrodynamics**, Salvatore Campione, Univ. of California, Irvine (USA); Alexander Benz, John F. Klem, Michael B. Sinclair, Igal Brener, Sandia National Labs. (USA); Filippo Capolino, Univ. of California, Irvine (USA) [8994-53]

11:40 am: **Stokes parameter sensor using an integrated cavity array metasurface**, Isroel Mandel, David T. Crouse, The City College of New York (USA) [8994-54]

Lunch/Exhibition Break Thu 12:00 pm to 1:30 pm

SESSION 14

Location: Room 307 (Esplanade) Thu 1:30 pm to 3:00 pm

Novel Phenomena and Devices in Photonic Nanostructures I

Session Chair: **Shawn-Yu Lin**, Rensselaer Polytechnic Institute (USA)

1:30 pm: **Control thermal radiation with nanophotonic structures** (*Invited Paper*), Shanhui Fan, Stanford Univ. (USA) [8994-55]

2:00 pm: **Near-infrared cut-off filters based on CMOS nanostructures for ambient light sensors and image sensors**, Stephan Junger, Nanko Verwaal, Wladimir Tschekalinskij, Norbert Weber, Fraunhofer-Institut für Integrierte Schaltungen (IIS) (Germany) [8994-56]

2:20 pm: **Flexible optical-infrared metafilter**, Jean-Baptiste Brückner, Institut Matériaux Nanoelectronique de Provence (France); Vincent Brissonneau, Commissariat à l'Énergie Atomique (France); Abdelkerim Ferchichi, LTM CNRS (France); Judikaël Le Rouzo, Ludovic Escoubas, Institut Matériaux Microélectronique Nanosciences de Provence (France); Christophe Dubarry, Commissariat à l'Énergie Atomique (France); Cécile Gourgou, LTM CNRS (France); Jean-Jacques Simon, Institut Matériaux Microélectronique Nanosciences de Provence (France); Gérard Berginc, Thales Optronique S.A.S. (France) [8994-57]

2:40 pm: **An all-dielectric broadband high-transmission efficiency circular polarizer**, Arvinder S. Chadha, Deyin Zhao, Weidong Zhou, The Univ. of Texas at Arlington (USA) [8994-58]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 15

Location: Room 307 (Esplanade) Thu 3:30 pm to 5:20 pm

Novel Phenomena and Devices in Photonic Nanostructures II

Session Chair: **Shanhui Fan**, Stanford Univ. (USA)

3:30 pm: **Recent advances of three-dimensional optical photonic crystal: light trapping and manipulation** (*Invited Paper*), Shawn-Yu Lin, Rensselaer Polytechnic Institute (USA); Mei-Li Hsieh, Rensselaer Polytechnic Institute (USA) and National Chiao Tung Univ. (Taiwan); Ping Kuang, James A. Bur, Rensselaer Polytechnic Institute (USA) [8994-59]

4:00 pm: **Mechanical free optical technology for nanostructures inspection**, Maxim Ryabko, Samsung Advanced Institute of Technology (Korea, Republic of); Sergey N. Koptyaev, Alexander Shcherbakov, Alexey D. Lantsov, Samsung Advanced Institute of Technology (Russian Federation) [8994-60]

4:20 pm: **Magnetolectric coupling in cylindrical inclusions**, Diana Strickland, Southwest Research Institute (USA); Andrea Alù, The Univ. of Texas at Austin (USA); Arturo Ayon, The Univ. of Texas at San Antonio (USA) [8994-61]

4:40 pm: **A quantum tunneling theory for nanophotonics**, Joseph W. Haus, Univ. of Dayton (USA); Domenico de Ceglia, U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA) and National Research Council (USA); Maria A. Vincenti, National Research Council (USA) and U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA); Michael Scalora, U.S. Army Aviation & Missile Research, Development & Engineering Ctr. (USA) [8994-62]

5:00 pm: **Fluorescence quenching metrology of graphene and 2D nanostructures**, Maziar Ghazinejad, California State Univ., Fresno (USA); Mihrimah Ozkan, Cengiz S. Ozkan, Univ. of California, Riverside (USA) . [8994-63]



High Contrast Metastructures III

Conference Chairs: **Connie J. Chang-Hasnain**, Univ. of California, Berkeley (USA); **David Fattal**, Hewlett-Packard Labs. (USA); **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Weimin Zhou**, U.S. Army Research Lab. (USA)

Program Committee: **Markus Christian Amann**, Walter Schottky Institut (Germany); **Il-Sug Chung**, Technical Univ. of Denmark (Denmark); **Ernst-Bernhard Kley**, Friedrich-Schiller-Univ. Jena (Germany); **Philippe Lalanne**, Institut d'Optique Graduate School (France); **John R. Lawall**, National Institute of Standards and Technology (USA); **Tien-Chang Lu**, National Chiao Tung Univ. (Taiwan); **Rainer F. Mahrt**, IBM Zürich Research Lab. (Switzerland); **Gunther Roelkens**, Univ. Gent (Belgium); **Pierre Viktorovitch**, Ecole Centrale de Lyon (France); **Alan Eli Willner**, The Univ. of Southern California (USA); **Ming C. Wu**, Univ. of California, Berkeley (USA); **Anshi Xu**, Peking Univ. (China)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

SESSION 1

Location: Room 112 (Exhibit Level) . . . Tue 1:30 pm to 3:00 pm

Harnessing Light

Session Chair: **David Fattal**, Hewlett-Packard Labs. (USA)

- 1:30 pm: **High-contrast grating for flat optics**, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-1]
- 2:00 pm: **High-index contrast/photonic crystal gratings: a wealth of new photonic functionality (Invited Paper)**, Pierre Viktorovitch, Corrado Sciancalepore, Xavier Letartre, Ecole Centrale de Lyon (France); Badhise Ben-Bakir, CEA-LETI-Minatec (France); Sylvie Menezo, CEA-LETI (France) . . . [8995-2]
- 2:30 pm: **High-refractive-index gratings for spectroscopic and laser applications (Invited Paper)**, Uwe D. Zeitner, Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8995-3]
- Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 2

Location: Room 112 (Exhibit Level) . . . Tue 3:30 pm to 5:45 pm

Integrated Optics I

Session Chair: **Connie J. Chang-Hasnain**, Univ. of California, Berkeley (USA)

- 3:30 pm: **Narrowband absorption enhancement and broadband circular polarizers using high-contrast gratings (Invited Paper)**, Ekmel Özbay, Ahmet E. Akosman, Bilkent Univ. (Turkey); Mehmet Mutlu, Bilkent Univ. (Turkey) and Stanford Univ. (USA) [8995-4]
- 4:00 pm: **Controlling the spatial flow of light using photonic gauge field induced by temporal modulations (Invited Paper)**, Shanhuai Fan, Kejie Fang, Stanford Univ. (USA) [8995-5]
- 4:30 pm: **Efficient and broadband blazing with artificial dielectrics (Invited Paper)**, Philippe Lalanne, Institut d'Optique d'Aquitaine (France) . [8995-6]
- 5:00 pm: **Low-loss propagation in semiconductor $Al_xGa_{1-x}As$ waveguides**, Latif M. Bibas, Farah A. Abed, Erbil Technical Institute (Iraq) [8995-7]
- 5:15 pm: **Design and fabrication technique development of 3D high-contrast metastructure cage waveguides (Invited Paper)**, Weimin Zhou, Gerard Dang, Monica Taysing-Lara, U.S. Army Research Lab. (USA); Tianbo Sun, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-8]

Wednesday 5 February

SESSION 3

Location: Room 112 (Exhibit Level) . Wed 8:30 am to 10:00 am

VCSELS and Resonators I

Session Chair: **Tien-Chang Lu**, National Chiao Tung Univ. (Taiwan)

- 8:30 am: **1550-nm wavelength-tunable HCG VCSELS (Invited Paper)**, Christopher Chase, Yi Rao, Michael Huang, Bandwidth10 (USA); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-17]
- 9:00 am: **Investigation on the angular dependent reflectance of coupled high-contrast gratings**, Stefanie Kroker, Thomas Käsebieber, Friedrich-Schiller-Univ. Jena (Germany); Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [8995-10]
- 9:15 am: **Impact of structural imperfections and absorption on a performance of GaAs/AlO_x and Si/SiO₂ sub-wavelength HCG mirrors for 980-nm VCSELS**, Marcin Gebbski, Maciej Dems, Technical Univ. of Lodz (Poland); Jian Chen, Wang Qijie, Dao Hua Zhang, Nanyang Technological Univ. (Singapore); Tomasz Czyszanowski, Technical Univ. of Lodz (Poland) . [8995-11]
- 9:30 am: **High-contrast gratings for long-wavelength laser integration on silicon (Invited Paper)**, Corrado Sciancalepore, Ecole Centrale de Lyon (France); Badhise Ben-Bakir, CEA-LETI-Minatec (France); Sylvie Menezo, CEA-LETI (France); Pierre Viktorovitch, Ecole Centrale de Lyon (France) [8995-12]
- Coffee Break Wed 10:00 am to 10:30 am

SESSION 4

Location: Room 112 (Exhibit Level) Wed 10:30 am to 11:45 am

VCSELS and Resonators II

Session Chair: **Fumio Koyama**, Tokyo Institute of Technology (Japan)

- 10:30 am: **High-contrast grating GaN-based surface emitting lasers (Invited Paper)**, Tien-Chang Lu, Shing-Chung Wang, Tzeng-Tsong Wu, Shu-Hsien Wu, Yu-Cheng Syu, National Chiao Tung Univ. (Taiwan) [8995-13]
- 11:00 am: **Fano resonance membrane reflector surface-emitters and filters on silicon (Invited Paper)**, Weidong Zhou, The Univ. of Texas at Arlington (USA); Zhenqiang Ma, Univ. of Wisconsin-Madison (USA) [8995-15]
- 11:30 am: **High-contrast silicon grating built on fiber tip for acoustic detection**, Tao Ling, Cheng Zhang, L. Jay Guo, Univ. of Michigan (USA) [8995-16]
- Lunch/Exhibition Break Wed 11:45 am to 1:30 pm

SESSION 5

Location: Room 112 (Exhibit Level) . . Wed 1:30 pm to 3:00 pm

VCSELS and Resonators III

Session Chair: **Weidong Zhou**, The Univ. of Texas at Arlington (USA)

- 1:30 pm: **Engineering of angular dependence of high-contrast grating mirror for transverse mode control of VCSELS**, Fumio Koyama, Tokyo Institute of Technology (Japan) [8995-9]
- 2:00 pm: **Subwavelength grating reflectors in MEMS-tunable Fabry-Perot infrared filters with large aperture**, Steffen Kurth, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Karla Hiller, Technische Univ. Chemnitz (Germany); Marco Meinig, Jan Besser, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Mario Seifert, Martin Ebermann, Norbert Neumann, InfraTec GmbH (Germany); Florian Schlachter, AMO GmbH (Germany); Thomas Gessner, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) . [8995-18]
- 2:15 pm: **130-nm tunable grating-mirror VCSEL (Invited Paper)**, Il-Sug Chung, Jesper Mørk, Technical Univ. of Denmark (Denmark) [8995-19]
- 2:45 pm: **Transmission filtering capabilities of a suspended silicon grating**, Justin M. Foley, Steven M. Young, Jamie D. Phillips, Univ. of Michigan (USA) [8995-20]
- Coffee Break Wed 3:00 pm to 3:30 pm

SESSION 6

Location: Room 112 (Exhibit Level) . . Wed 3:30 pm to 5:00 pm

Grating Lens

Session Chair: **Pierre Viktorovitch**, Ecole Centrale de Lyon (France)

3:30 pm: **High numerical aperture focusing with high-contrast gratings** (*Invited Paper*), Annett B. Klemm, Daan Stellinga, The Univ. of York (United Kingdom); Emiliano R. Martins, Univ. of St. Andrews (United Kingdom); Liam Lewis, Guillaume Huyet, Tyndall National Institute (Ireland); Liam O’Faolain, Univ. of St. Andrews (United Kingdom); Thomas F. Krauss, The Univ. of York (United Kingdom) and Univ. of St. Andrews (United Kingdom) [8995-21]

4:00 pm: **A polychromatic approach to far-field superlensing** (*Invited Paper*), Geoffroy Lerosey, Fabrice Lemoult, Mathias Fink, Institut Langevin (France) [8995-22]

4:30 pm: **The aberrations of flat lenses and design for aplanatic metasurfaces**, Francesco Aieta, Patrice Genevet, Mikhail A. Kats, Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . [8995-23]

4:45 pm: **A single GMR grating lens focusing two orthogonally-polarized beams into opposite directions**, Seok-Ho Song, Junhyung Lee, Hanyang Univ. (Korea, Republic of) [8995-24]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Giant field enhancement in structured dielectrics film, Vito Mocella, Silvia Romano, Istituto per la Microelettronica e Microsistemi (Italy) [8995-14]

Thursday 6 February

SESSION 7

Location: Room 112 (Exhibit Level) . . Thu 8:30 am to 10:00 am

Novel Devices

Session Chair: **Pavel Cheben**, National Research Council Canada (Canada)

8:30 am: **Optomechanics with high-contrast gratings** (*Invited Paper*), John R. Lawall, Utku Kemiktarak, Corey Stambaugh, Mathieu Durand, Haitan Xu, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA) [8995-25]

9:00 am: **High-contrast grating MEMS optical phase-shifters for two-dimensional free-space beam steering** (*Invited Paper*), Mischa Megens, Univ. of California, Davis (USA); Byung-Wook Yoo, Univ. of California, Berkeley (USA); Trevor K. Chan, Univ. of California, Davis (USA); Weijian Yang, Tianbo Sun, Connie J. Chang-Hasnain, Ming C. Wu, Univ. of California, Berkeley (USA); David A. Horsley, Univ. of California, Davis (USA) [8995-26]

9:30 am: **High pixel density optical holographic array based on high-contrast metastructures**, Li Zhu, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-27]

9:45 am: **Output beam profile control of slow-light Bragg reflector waveguide deflector with high-contrast sub-wavelength grating**, Xiaodong Gu, Fumio Koyama, Tokyo Institute of Technology (Japan) . . [8995-28]
Coffee Break Thu 10:00 am to 10:30 am

SESSION 8

Location: Room 112 (Exhibit Level) . Thu 10:30 am to 12:00 pm

Integrated Optics II

Session Chair: **Il-Sug Chung**, Technical Univ. of Denmark (Denmark)

10:30 am: **Transmissive high-contrast grating for efficient optical mode conversion**, David Fattal, Sonny Vo, Wayne V. Sorin, Hewlett-Packard Labs. (USA) [8995-29]

11:00 am: **Subwavelength metastructures for dispersion engineering in planar waveguide devices** (*Invited Paper*), Robert Halir, Alejandro Ortega-Moñux, Univ. de Málaga (Spain); Pavel Cheben, National Research Council Canada (Canada); Alejandro Maese-Novo, Diego Pérez-Galacho, Iñigo Molina-Fernández, Juan Gonzalo Wangüemert-Pérez, Univ. de Málaga (Spain); Jens Schmid, Dan-Xia Xu, Siegfried Janz, National Research Council Canada (Canada) [8995-30]

11:30 am: **Grating-based guided-mode resonance devices and degradation of their performance in real-life conditions**, Aliaksandra Ivinskaya, René Bergmann, Jan R. Kafka, Mogens H. Jakobsen, Technical Univ. of Denmark (Denmark) [8995-31]

11:45 am: **High-performance second-order surface-normal vertical to in-plane optical coupler**, Arvinder S. Chadha, Yichen Shuai, Weidong Zhou, The Univ. of Texas at Arlington (USA) [8995-32]

Lunch/Exhibition Break Thu 12:00 pm to 1:30 pm

SESSION 9

Location: Room 112 (Exhibit Level) . . . Thu 1:30 pm to 3:00 pm

Metastructures

Session Chair: **Karl Leo**, Fraunhofer-Einrichtung für Organik, Materialien und Elektronische Bauelemente COMEDD (Germany)

1:30 pm: **Resonant semiconductor nanostructures for optoelectronic devices** (*Invited Paper*), Mark Brongersma, Geballe Lab. for Advanced Materials (GLAM) (USA) [8995-33]

2:00 pm: **spectrum splitting using multi-layer sub-wavelength high-index-contrast grating (HCG) for improved solar energy harvesting efficiency**, Yuhang Yao, He Liu, Shujin Huang, Wei Wu, The Univ. of Southern California (USA) [8995-34]

2:15 pm: **Transmission matrix analysis for multi-layer high-contrast grating**, Weijian Yang, Fanglu Lu, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-35]

2:30 pm: **High-efficiency reflective metasurfaces for anomalous reflection and metahologram**, Wei Ting Chen, National Taiwan Univ. (Taiwan); Kuang-Yu Yang, Academia Sinica (Taiwan); Chih-Ming Wang, National Dong Hwa Univ. (Taiwan); Shulin Sun, Fudan Univ. (China); Ta-Ko Juan, National Dong Hwa Univ. (Taiwan); Yao-Wei Huang, Chun Yen Liao, Hao Tsun Lin, National Taiwan Univ. (Taiwan); Qiong He, Shiyi Xiao, Lei Zhou, Fudan Univ. (China); Greg Sun, Univ. of Massachusetts Boston (USA); Ai Qun Liu, Nanyang Technological Univ. (Singapore); Din Ping Tsai, National Taiwan Univ. (Taiwan) [8995-36]

2:45 pm: **A Fabry-Perot model of subwavelength high-contrast grating**, Fanglu Lu, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8995-37]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 10

Location: Room 112 (Exhibit Level) . . . Thu 3:30 pm to 5:15 pm

Engineering and Physics of Metastructures

Session Chair: **John R. Lawall**, National Institute of Standards and Technology (USA)

3:30 pm: **Engineering of refractive index metastructures in silicon photonic circuits** (*Invited Paper*), Pavel Cheben, Jens Schmid, Dan-Xia Xu, Jean Lapointe, Siegfried Janz, Martin Vachon, National Research Council Canada (Canada); Carlos A. Alonso Ramos, Robert Halir, Alejandro Ortega-Moñux, Juan Gonzalo Wangüemert-Pérez, Iñigo Molina-Fernández, Univ. de Málaga (Spain); Aitor V. Velasco, María L. Calvo Padilla, Univ. Complutense de Madrid (Spain); Daniel Benedikovic, Milan Dado, Jarmila Müllerová, Univ. of Žilina (Slovakia) [8995-38]

4:00 pm: **Positive and negative roles of surface-plasmons in Fano-type resonance at metallic nanostructures**, Seok-Ho Song, Hanyang Univ. (Korea, Republic of); Jae Woong Yoon, Univ. of Texas at Arlington (USA) [8995-39]

4:15 pm: **Photon management in thin-film organic devices: OLED and solar cells** (*Invited Paper*), Karl Leo, Technische Univ. Dresden (Germany) . . [8995-40]

4:45 pm: **Epitaxial thin films for hyperbolic metamaterials**, Daniel B. Fullager, Michael A. Fiddy, Hossein Alisafaei, Raphael Tsu, The Univ. of North Carolina at Charlotte (USA) [8995-41]

5:00 pm: **Unidirectional optical coupling for plasmonic waveguide based on metallic-dielectric high-contrast gratings**, Fan Lu, Kun Li, Dalin Liu, Zhijun He, Anshi Xu, Peking Univ. (China) [8995-42]

OPTO

Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI

Conference Chairs: **Diana L. Huffaker**, Univ. of California, Los Angeles (USA); **Frank Szmulowicz**, Univ. of Dayton Research Institute (USA); **Holger Eisele**, Technische Univ. Berlin (Germany)

Program Committee: **Alberto Bramati**, Univ. Pierre et Marie Curie (France); **Massimo De Vittorio**, Univ. del Salento (Italy); **Axel Hoffmann**, Technische Univ. Berlin (Germany); **Minjoo L. Lee**, Yale Univ. (USA); **Hui-Yun Liu**, Univ. College London (United Kingdom); **Vinod M. Menon**, Queen's College (USA); **Zetian Mi**, McGill Univ. (Canada); **Jeffrey C. Owrutsky**, U.S. Naval Research Lab. (USA); **Gregory J. Salamo**, Univ. of Arkansas (USA); **Jonathan Spanier**, Drexel Univ. (USA)

Monday 3 February

SESSION 1

Location: Room 274 (Mezzanine) . . . Mon 8:00 am to 10:00 am

Integrated Nanostructures

Session Chair: **Holger Eisele**, Technische Univ. Berlin (Germany)

8:00 am: **Molecular beam epitaxial growth and characterization of intrinsic and p-type InN nanowires** (*Invited Paper*), Zetian Mi, Songrui Zhao, McGill Univ. (Canada) [8996-1]

8:30 am: **Advances on MBE selective area growth of III-nitride nanostructures: from nanoLEDs to pseudo substrates** (*Invited Paper*), Enrique Calleja, A. Bengoechea-Encabo, Steven Albert, Miguel A. Sanchez-Garcia, F. Barbagini, D. Lopez-Romero, Univ. Politécnic de Madrid (Spain); Achim Trampert, Uwe Jahn, Paul-Drude-Institut für Festkörperelektronik (Germany) [8996-2]

9:00 am: **Integrated nanopillar devices: 3D engineering of optoelectronics from the bottom up**, Adam Scofield, Diana L. Huffaker, California NanoSystems Institute (USA) and Univ. of California, Los Angeles (USA) [8996-3]

9:20 am: **Directed emission of spontaneous emission into guided modes of photonic crystal nanostructures**, Thorsten Reichert, Stefan Lichtmanecker, Martin Zeitlmair, Günther Reithmaier, Max Bichler, Kai Müller, Michael Kaniber, Jonathan J. Finley, Technische Univ. München (Germany) [8996-4]

9:40 am: **Epitaxial growth of quantum dots on InP for device applications operating at the 1.55 µm wavelength range**, Elizaveta S. Semenova, Irina V. Kulkova, Shima Kadkhodazadeh, Kresten Yvind, Technical Univ. of Denmark (Denmark) [8996-5]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 274 (Mezzanine) . . Mon 10:30 am to 12:00 pm

Nanowire Epitaxy and Theory

Session Chair: **Diana L. Huffaker**, Univ. of California, Los Angeles (USA)

10:30 am: **Nanowires on demand: in-situ control of nanowire properties** (*Invited Paper*), Silvija Gradecak, Massachusetts Institute of Technology (USA) [8996-6]

11:00 am: **Nonplanar nanoselective area growth of InGaAs/InP**, Nadezda Kuznetsova, Elizaveta S. Semenova, Shima Kadkhodazadeh, Sara Ek, Weiqi Xue, Pierre Colman, Technical Univ. of Denmark (Denmark); Martin Schubert, Technical Univ. of Denmark (Denmark) and Univ. Konstanz (Germany); Kresten Yvind, Technical Univ. of Denmark (Denmark) [8996-7]

11:20 am: **Atomic scale characterization of semiconductor quantum dots for novel**, Holger Eisele, Technische Univ. Berlin (Germany) [8996-40]

11:40 am: **Optical and electrical properties of individual CdSe quantum nanowires**, Aina Reich, Dennis Franz, Sebastian Schäfer, Christian Strelow, Tobias Kipp, Alf B. Mews, Univ. Hamburg (Germany) [8996-8]

Lunch Break Mon 12:00 pm to 1:30 pm

SESSION 3

Location: Room 274 (Mezzanine) Mon 1:30 pm to 2:50 pm

Nanowire Devices

Session Chair: **Zetian Mi**, McGill Univ. (Canada)

1:30 pm: **New designs for spectral control in nanowire lasers** (*Invited Paper*), Anthony Fu, Peidong Yang, Univ. of California, Berkeley (USA) [8996-38]

2:00 pm: **Green- to red-emitting InGaN-based nanocolumn LEDs with regularly-arranged triangular lattice nanocolumn arrays** (*Invited Paper*), Katsumi Kishino, Ai Yanagihara, Atsushi Takahashi, Yusuke Igawa, Hiroaki Hayashi, Kouji Yamano, Shunsuke Ishizawa, Sophia Univ. (Japan) [8996-9]

2:30 pm: **Polarization-induced nanowire light-emitting diodes with deep ultraviolet emission**, Thomas F. Kent, Santino D. Carnevale, A.T.M. Golam Sarwar, Roberto C. Myers, The Ohio State Univ. (USA) [8996-10]

Coffee Break Mon 2:50 pm to 3:30 pm

SESSION 4

Location: Room 274 (Mezzanine) Mon 3:30 pm to 5:10 pm

Nanostructure Characterization

Session Chair: **Adam Scofield**, Univ. of California, Los Angeles (USA)

3:30 pm: **Electrical characterization of semiconductor nanowires by scanning tunneling microscopy** (*Invited Paper*), Bruno Grandidier, IEMN-CNRS (France) and ISEN Lille (France) [8996-11]

4:00 pm: **Semiconductor nanowires: emitting and receiving nanoantennas** (*Invited Paper*), Jaime Gomez Rivas, Grzegorz Grzela, FOM Institute for Atomic and Molecular Physics (Netherlands); Ramon Paniagua-Dominguez, Jose A. Sanchez-Gil, Instituto de Estructura de la Materia (Spain) and Consejo Superior de Investigaciones Científicas (Spain) [8996-12]

4:30 pm: **Optical and electrical characterization of surface passivation of GaAs nanosheets**, Shermin Arab, Chun-Yung Chi, Jesse Theiss, P. Daniel Dapkus, Stephen B. Cronin, The Univ. of Southern California (USA) [8996-13]

4:50 pm: **Semiconductor single-photon emitters with geometry-controlled polarization**, Chu-Hsiang Teng, Lei Zhang, Tyler Hill, Brandon J. Demory, Hui Deng, Pei-Cheng Ku, Univ. of Michigan (USA) [8996-14]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 274 (Mezzanine) . . . Tue 10:30 am to 12:20 pm

Quantum Dot Emission

Session Chair: **Alexander Govorov**, Ohio Univ. (USA)

10:30 am: **How small can one shrink a semiconductor laser and is it worth it?** (*Invited Paper*), Jacob B. Khurgin, Johns Hopkins Univ. (USA) [8996-15]

11:00 am: **Plasmonic enhancement of the radiative emission rate in size and site controlled InGaN quantum dots**, Tyler Hill, Brandon J. Demory, Lei Zhang, Chu-Hsiang Teng, Pei-Cheng Ku, Hui Deng, Univ. of Michigan (USA) . . . [8996-16]

11:20 am: **Fast single-photon emission from InGaN quantum dots**, Brandon J. Demory, Tyler Hill, Chu-Hsiang Teng, Lei Zhang, Hui Deng, Pei-Cheng Ku, Univ. of Michigan (USA) [8996-17]

11:40 am: **Efficient Auger-assisted upconversion in PbSe/CdSe core/shell colloidal quantum dots**, Nikolay S. Makarov, Qianglu Lin, Kirill A. Velizhanin, Victor I. Klimov, Los Alamos National Lab. (USA) [8996-18]

12:00 pm: **Plasmon-enhanced ultrathin bulk heterojunction: interplay between optical and thermal responses of AuNPs**, Shiva Shahin, Palash Gangopadhyay, Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA) [8996-41]

Lunch/Exhibition Break Tue 12:20 pm to 1:50 pm

SESSION 6

Location: Room 274 (Mezzanine) Tue 1:50 pm to 3:30 pm

Quantum Dot Devices

Session Chair: **Enrique Calleja**, Univ. Politécnica de Madrid (Spain)

1:50 pm: **Quantum dots in optical nanocavities: from quantum optics to applications** (*Invited Paper*), Jelena Vuckovic, Stanford Univ. (USA) . . . [8996-19]

2:20 pm: **Advanced colloidal heterostructures with tailored optical properties** (*Invited Paper*), Gabriele Rainò, Thilo Stöferle, IBM Zürich Research Lab. (Switzerland); Iwan Moreels, Istituto Italiano di Tecnologia (Italy); Zeger Hens, Univ. Gent (Belgium); Rainer F. Mahrt, IBM Zürich Research Lab. (Switzerland) [8996-20]

2:50 pm: **Investigation of quantum efficiency in mid-wave infrared (MWIR) InAs/GaSb Type-II strained layer superlattice (T2SL) detectors**, Lilian K. Acosta, Brianna Klein, Elena Plis, Stephen A. Myers, The Univ. of New Mexico (USA); Nutan Gautam, Univ. of California, Santa Barbara (USA); Theodore Schuler-Sandy, Zhaobing Tian, Sanjay Krishna, The Univ. of New Mexico (USA) [8996-21]

3:10 pm: **A hybrid nanostructure with GaSb quantum dots coupled to an InGaAs quantum well for solar cell applications**, Baolai L. Liang, Ramesh Babu Laghumavarapu, Meng Sun, Paul J. Simmonds, Diana L. Huffaker, California NanoSystems Institute (USA) and Univ. of California, Los Angeles (USA) [8996-22]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 7

Location: Room 274 (Mezzanine) Tue 4:00 pm to 6:00 pm

Nanomaterials

Session Chair: **Frank Szmulowicz**, Univ. of Dayton Research Institute (USA)

4:00 pm: **Optically-active hybrid nanostructures: Exciton-plasmon interaction and injection of hot plasmonic electrons** (*Invited Paper*), Alexander Govorov, Ohio Univ. (USA) [8996-23]

4:30 pm: **Optical constants of solution-deposited RuO₂ transparent conducting nanoskins** (*Invited Paper*), Jeffrey C. Owrutsky, James P. Long, Christopher N. Chervin, Konrad M. Bussmann, Debra R. Rolison, U.S. Naval Research Lab. (USA) [8996-24]

5:00 pm: **Investigation of luminescent origin of pristine graphene quantum dots and graphene oxide quantum dots**, Min Ho Jang, Fei Liu, Hyun Dong Ha, Je-Hyung Kim, Tae Seok Seo, Yong-Hoon Cho, KAIST (Korea, Republic of) [8996-25]

5:20 pm: **One- versus two-photon photoluminescence excitation spectra of colloidal CdTe quantum dots**, Diogo B. Almeida, André A. de Thomaz, Vitor B. Pelegati, Hernandes F. Carvalho, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8996-26]

5:40 pm: **Properties of ErAs nanoparticle-InAs quantum dot complexes as a function of spacing**, Kurt G. Eyink, Krishnamurthy Mahalingam, Air Force Research Lab. (USA); Lawrence Grazulis, Univ. of Dayton Research Institute (USA); Elizabeth H. Steenbergen, David Esposito, Andrew Aronow, Jeremy A. Massengale, Murray Hill, Air Force Research Lab. (USA); Frank Szmulowicz, Univ. of Dayton Research Institute (USA); Luke J. Bissell, Vitaliy N. Pustovit, Air Force Research Lab. (USA) [8996-27]

Wednesday 5 February

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Near-field analysis of nanopatterned glass, Jin-Myoung Mok, Yonsei Univ. (Korea, Republic of) and Univ. Bordeaux I (France); Yannick G. Petit, Univ. Bordeaux I (France); Eung Jang Lee, Yonsei Univ. (Korea, Republic of); Seung-Han Park, Yonsei Univ. (Korea, Republic of) [8996-28]

Material parameter dependence of quantum-dot G factors, Craig E. Pryor, The Univ. of Iowa (USA) [8996-29]

Structural and optical characterization of fresh water diatoms (Achnanthes sp.): nature's nanoporous silica manufacturing plant, Nirmal Mazumder, National Yang-Ming Univ. (Taiwan); Ankur Gogoi, Kaziranga Univ. (India); Alak K. Buragohain, Gaz A. Ahmed, Amariyoti Choudhury, Tezpur Univ. (India) [8996-30]

Ferroelectric device using lead zirconate titanate (PZT) nanoparticles, Younghun Paik, Hossein Shokri Kojori, Sung Jin Kim, Univ. of Miami (USA) [8996-31]

The role of stress in the confinement levels of CdTe quantum-dot-doped glasses, André A. de Thomaz, Diogo B. Almeida, Vitor B. Pelegati, Hernandes F. Carvalho, Luiz C. Barbosa, Carlos Lenz Cesar, Univ. Estadual de Campinas (Brazil) [8996-32]

Two- and three-photon upconversion luminescence switching in Tm³⁺/Yb³⁺ co-doped NaNbO₃ nanophosphor, Kagola Upendra Kumar, Wagner Ferreira da Silva, Univ. Federal de Alagoas (Brazil); Venkata Krishnaiah Kummara, Jayasankar C. K., Sri Venkateswara Univ. (India); Carlos Jacinto da Silva, Univ. Federal de Alagoas (Brazil) [8996-33]

Substrate-induced effects on the plasmonic properties of strongly coupled silver nanocubes, Daniel Prezgot, Anatoli I. Ianoul, Carleton Univ. (Canada) [8996-34]

Plasmonic properties of silver nanocube monolayers deposited on thin metal films, Adam Bottomley, Anatoli I. Ianoul, Carleton Univ. (Canada) [8996-35]

Determination of the orientation of a single nano-emitter by polarisation analysis, Lethiec Clotilde, Institut des NanoSciences de Paris (France); Julien Laverdant, Lab. de Physique de la Matière Condensée et Nanostructures (France); Clémentine Javaux, Benoit Dubertret, Ecole Supérieure de Physique et de Chimie Industrielles (France); Catherine Schwob, Laurent Coolen, Agnès Maître, Institut des NanoSciences de Paris (France) [8996-37]

Optimisation study of the synthesis of vanadium oxide nanostructures using pulsed laser deposition, Bathusile Nelisiwe Masina, CSIR National Laser Ctr. (South Africa) and Univ. of Kwazulu-Natal (South Africa); Slimane Lafane, Ctr. de Développement des Technologies Avancées (Algeria); Lorinda Wu, CSIR National Laser Ctr. (South Africa); Tahar Kerdja, Samira Abdelli-Messaci, Ctr. de Développement des Technologies Avancées (Algeria); Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Univ. of KwaZulu-Natal (South Africa) [8996-39]

OPTO

Advances in Photonics of Quantum Computing, Memory, and Communication VII

Conference Chairs: **Zameer UI Hasan**, Temple Univ. (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA); **Hwang Lee**, Louisiana State Univ. (USA); **Charles M. Santori**, Hewlett-Packard Labs. (USA)

Program Committee: **Dmitry Budker**, Univ. of California, Berkeley (USA); **Alan E. Craig**, Montana State Univ. (USA); **Jonathan P. Dowling**, Louisiana State Univ. (USA); **Gurudev Dutt**, Univ. of Pittsburgh (USA); **James D. Franson**, Univ. of Maryland, Baltimore County (USA); **Kai-Mei C. Fu**, Univ. of Washington (USA); **David H. Hughes**, Air Force Research Lab. (USA); **Fedor Jelezko**, Univ. Stuttgart (Germany); **Seth Lloyd**, Massachusetts Institute of Technology (USA); **Marko Loncar**, Harvard Univ. (USA); **Hideo Mabuchi**, Stanford Univ. (USA); **Alan L. Migdall**, National Institute of Standards and Technology (USA); **Aleksander K. Rebane**, Montana State Univ. (USA); **Matthew J. Sellars**, The Australian National Univ. (Australia); **Selim M. Shahriar**, Northwestern Univ. (USA); **Alan Eli Willner**, The Univ. of Southern California (USA); **Jörg Wrachtrup**, Univ. Stuttgart (Germany); **Horace P. Yuen**, Northwestern Univ. (USA); **M. Suhail Zubairy**, Texas A&M Univ. (USA)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 1

Location: Room 307 (Esplanade) . . . Tue 10:30 am to 12:00 pm

Diamond Nanophotonics I

Joint Session with Conferences 8994 and 8997

Session Chair: **Ali Adibi**, Georgia Institute of Technology (USA)

- 10:30 am: **ICP-etched diamond microstructures for photonics and lasers (Invited Paper)**, Erdan Gu, H. Liu, Jennifer E. Hastie, Alan J. Kemp, Martin David Dawson, Univ. of Strathclyde (United Kingdom) [8994-18]
- 11:00 am: **Prospects of diamond defect centers as quantum light sources (Invited Paper)**, Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [8994-17]
- 11:30 am: **Photonic and phononic crystal cavities in diamond (Invited Paper)**, Janine Riedrich-Möller, Laura Kipfstuhl, Felix Guldner, Christoph Becher, Univ. des Saarlandes (Germany) [8994-19]
- Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 2

Location: Room 307 (Esplanade) Tue 1:30 pm to 3:20 pm

Diamond Nanophotonics II

Joint Session with Conferences 8994 and 8997

Session Chair: **Dirk R. Englund**, Massachusetts Institute of Technology (USA)

- 1:30 pm: **Diamond nanostructures for optomechanics and quantum optics (Invited Paper)**, Paul Barclay, Univ. of Calgary (Canada) [8994-20]
- 2:00 pm: **Diamond photonic devices for quantum-optical networks (Invited Paper)**, Zhihong Huang, Charles Santori, Victor Acosta, Hewlett-Packard Labs. (USA); Andrei Faraon, California Institute of Technology (USA); Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8994-21]

2:30 pm: **Diamond photonics and applications: frequency combs, cavity QED, and optomechanics (Invited Paper)**, Marko Loncar, Harvard School of Engineering and Applied Sciences (USA) [8994-22]

3:00 pm: **Fabrication of GaP disk resonator arrays coupled to nitrogen-vacancy centers in diamond**, Nicole Thomas, Russell Barbour, Univ. of Washington (USA); Yuncheng Song, Minjoo L. Lee, Yale Univ. (USA); Kai-Mei C. Fu, Univ. of Washington (USA) [8997-1]

Coffee Break Tue 3:20 pm to 3:40 pm

SESSION 3

Location: Room 305 (Esplanade) Tue 3:40 pm to 6:00 pm

Nonbleaching and Ultrasmall Fluorescent Tags

Joint Session with Conferences 8956 and 8997

Session Chairs: **Ramesh Raghavachari**, U.S. Food and Drug Administration (USA); **Philip R. Hemmer**, Texas A&M Univ. (USA)

3:40 pm: **Targeted decoration of axonal membranes with ND particles for luminescent and ODMR neural synapse imaging (Invited Paper)**, Miloš Nesladek, IMEC (Belgium); Elena Gjorgievska, Univ. Hasselt (Belgium); Silvy M. Ojovan, The Hebrew Univ. of Jerusalem (Israel); Julia Micova, Jan Stursa, Mirek Ledvina, Academy of Sciences of the Czech Republic (Czech Republic); Micha Spira, The Hebrew Univ. of Jerusalem (Israel) [8997-2]

4:10 pm: **Nanoscale nuclear magnetic resonance with a nitrogen-vacancy spin sensor (Invited Paper)**, H. Jonathon Mamin, Moonhee Kim, Mark H. Sherwood, Charles T. Rettner, IBM Almaden Research Ctr. (USA); Kenichi Ohno, David D. Awschalom, Univ. of California, Santa Barbara (USA); Daniel Rugar, IBM Almaden Research Ctr. (USA) [8997-3]

4:40 pm: **Use of upconversion fluorescent nanoparticles for imaging and detection (Invited Paper)**, Yong Zhang, Muthu Kumara G. Jayakumar, Kai Huang, National Univ. of Singapore (Singapore) [8997-4]

5:10 pm: **Ultrabright and bleaching-resistant hybrid gold nanoparticles for confocal and two-photon fluorescence imaging**, Patrice L. Baldeck, Univ. Joseph Fourier (France) [8956-27]

5:30 pm: **Cell apoptosis induced by upconversion UV emission from rare-earth doped nanoparticles (Invited Paper)**, Gengxu Chen, East China Normal Univ. (China) and State Key Lab. of Precision Spectroscopy (China) and Univ. Stuttgart (Germany); Roman L. Kolesov, Kangwei Xia, Andrea Zappe, Rolf Reuter, Univ. Stuttgart (Germany); E. Wu, Heping Zeng, East China Normal Univ. (China) and State Key Lab. of Precision Spectroscopy (China); Jörg Wrachtrup, Univ. Stuttgart (Germany) [8997-5]

Wednesday 5 February

SESSION 4

Location: Room 308 (Esplanade) . . . Wed 8:10 am to 10:10 am

Quantum Communication and Quantum Computing with Photons I

Session Chair: **Geoff J. Pryde**, Griffith Univ. (Australia)

8:10 am: **A photon-pair-emitting laser diode**, Fabien Boitier, Adeline Orioux, Claire Autebert, Univ. Paris 7-Denis Diderot (France); Aristide Lemaître, Elisabeth Galopin, Lab. de Photonique et de Nanostructures (France); Christophe Manquest, Carlo Sirtori, Ivan Favero, Giuseppe Leo, Sara Ducci, Univ. Paris 7-Denis Diderot (France) [8997-34]

8:30 am: **Evaluation of the phase correlation between the optical pulses for transmission in quantum key distribution**, Toshiya Kobayashi, Akihisa Tomita, Atsushi Okamoto, Hokkaido Univ. (Japan) [8997-6]

8:50 am: **Quantum nonlinear optics: Implications for quantum information** (*Invited Paper*), Robert W. Boyd, Univ. of Ottawa (Canada) [8997-7]

9:20 am: **High-speed bridge circuit for InGaAs avalanche photodiode single-photon detector**, Hirofumi Hashimoto, Akihisa Tomita, Atsushi Okamoto, Hokkaido Univ. (Japan) [8997-8]

9:40 am: **QEYSSAT: a mission proposal for a quantum receiver in space** (*Invited Paper*), Thomas D. Jennewein, Univ. of Waterloo (Canada) [8997-9]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 5

Location: Room 308 (Esplanade) . . Wed 10:40 am to 12:00 pm

Quantum Communication and Quantum Computing with Photons II

Session Chair: **Olivier Pfister**, Univ. of Virginia (USA)

10:40 am: **Long-distance two-way continuous variable quantum key distribution over optical fiber with Gaussian modulation**, Laszlo Gyongyosi, Budapest Univ. of Technology and Economics (Hungary) and Hungarian Academy of Sciences (Hungary); Sandor Imre, Budapest Univ. of Technology and Economics (Hungary) [8997-10]

11:00 am: **Photonic entanglement sharing: fundamental questions and practical application** (*Invited Paper*), Geoff J. Pryde, Griffith Univ. (Australia) [8997-11]

11:30 am: **The merits of photon-number resolution in nonorthogonal state discrimination** (*Invited Paper*), Alan L. Migdall, National Institute of Standards and Technology (USA) and Univ. of Maryland (USA) and Joint Quantum Institute (USA); Francisco E. Becerra-Chavez, Univ. of New Mexico (USA); Jingyun Fan, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA) and Univ. of Maryland (USA) [8997-12]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

SESSION 6

Location: Room 308 (Esplanade) Wed 1:30 pm to 3:20 pm

Quantum Communication and Quantum Computing with Photons III

Session Chair: **John C. Howell**, Univ. of Rochester (USA)

1:30 pm: **Two-photon Bessel interference patterns shape control in frequency domain by nonlocal dispersion management**, Batiste Galmes, Jean-Pierre Decurey, Luca Furfaro, FEMTO-ST (France); Kien Phan Huy, Laurent Larger, John M. Dudley, Univ. de Franche-Comté (France); Jean-Marc L. Merolla, FEMTO-ST (France) [8997-13]

1:50 pm: **Sampling interferometric photon coincidence to measure immanants** (*Invited Paper*), Si-Hui Tan, Singapore Univ. of Technology & Design (Singapore); Hubert de Guise, Isaac P. Poulin, Lakehead Univ. (Canada); Yvonne Y. Gao, Yale Univ. (USA); Barry C. Sanders, Univ. of Calgary (Canada) [8997-14]

2:20 pm: **Weaving hypercubic cluster-entangled states in the quantum optical frequency comb** (*Invited Paper*), Olivier Pfister, Univ. of Virginia (USA); Moran Chen, Pei Wang, Univ. of Virginia (USA); Nicolas C. Menicucci, The Univ. of Sydney (Australia) [8997-15]

2:50 pm: **Nonmonotonic quantum-to-classical transition in multiparticle interference** (*Invited Paper*), Young-Sik Ra, Pohang Univ. of Science and Technology (Korea, Republic of); Maite Tichy, Albert-Ludwigs-Univ. Freiburg (Germany); Hyang-Tag Lim, Osung Kwon, Pohang Univ. of Science and Technology (Korea, Republic of); Florian Mintert, Albert-Ludwigs-Univ. Freiburg (Germany) and Max-Planck-Gesellschaft (Germany); Andreas Buchleitner, Albert-Ludwigs-Univ. Freiburg (Germany); Yoon-Ho Kim, Pohang Univ. of Science and Technology (Korea, Republic of) [8997-16]

Coffee Break Wed 3:20 pm to 3:50 pm

SESSION 7

Location: Room 308 (Esplanade) Wed 3:50 pm to 5:20 pm

Quantum Imaging and Metrology

Session Chair: **Alan L. Migdall**,

National Institute of Standards and Technology (USA)

3:50 pm: **An entanglement-enhanced microscope** (*Invited Paper*), Shigeki Takeuchi, Hokkaido Univ. (Japan) and Osaka Univ. (Japan) . . . [8997-17]

4:20 pm: **New results in remote quantum sensing** (*Invited Paper*), Gerald N. Gilbert, The MITRE Corp. (USA) [8997-18]

4:50 pm: **High-dimensional entanglement characterization via compressive sensing** (*Invited Paper*), John C. Howell, Daniel Lum, Greg A. Howland, Univ. of Rochester (USA) [8997-19]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Time-bin entangled photon pairs on demand, Marijn A. M. Versteegh, Michael E. Reimer, Aafke A. van den Berg, Kavli Institute of Nanoscience Delft (Netherlands); Gediminas Juska, Emanuele Pelucchi, Tyndall National Institute (Ireland); Valery Zwiller, Kavli Institute of Nanoscience Delft (Netherlands) [8997-33]

Thursday 6 February

SESSION 8

Location: Room 308 (Esplanade) Thu 8:20 am to 10:00 am

Quantum Nonlinear Optics with Integrated Devices

Session Chair: **Kartik Srinivasan**,

National Institute of Standards and Technology (USA)

8:20 am: **Hybrid integration for spatially-multiplexed single-photon generation**, Thomas D. Meany, Macquarie Univ. (Australia); Lutfi A. Ngah, Lab. de Physique de la Matière Condensée (France); Matthew J. Collins, Alex S. Clark, The Univ. of Sydney (Australia); Robert J. Williams, Macquarie Univ. (Australia); Benjamin J. Eggleton, The Univ. of Sydney (Australia); Michael Steel, Michael Withford, Macquarie Univ. (Australia); Olivier Alibert, Sébastien Tanzilli, Lab. de Physique de la Matière Condensée (France) [8997-35]

8:40 am: **Quantum nanophotonic circuits for ultralow-power classical information processing** (*Invited Paper*), Jason S. Pelc, Ranojoy Bose, Kelley Rivoire, Charles Santori, Raymond G. Beausoleil, Hewlett-Packard Labs. (USA) [8997-20]

9:10 am: **Integrated cavity electro- and opto-mechanics** (*Invited Paper*), Oskar J. Painter, California Institute of Technology (USA) [8997-21]

9:40 am: **Highly mode-selective quantum frequency conversion in a slab waveguide**, Michael Vasilyev, Young B. Kwon, The Univ. of Texas at Arlington (USA); Yu-Ping Huang, Northwestern Univ. (USA) [8997-22]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 9

Location: Room 308 (Esplanade) . . . Thu 10:30 am to 12:00 pm

Few-Photon Nonlinear Optics

Session Chair: **Jason S. Pelc**, Stanford Univ. (USA)

10:30 am: **Single-photon sources without quantum emitters** (*Invited Paper*), Dario Gerace, Univ. degli Studi di Pavia (Italy) [8997-23]

11:00 am: **Quantum nonlinear optics using cold atomic ensembles** (*Invited Paper*), Thibault Peyronel, Massachusetts Institute of Technology (USA); Ofer Firstenberg, Harvard Univ. (USA) and Technion-Israel Institute of Technology (Israel); Qi-Yu Liang, Massachusetts Institute of Technology (USA); Alexey Gorshkov, California Institute of Technology (USA); Mikhail D. Lukin, Harvard Univ. (USA); Vladan Vuletic, Massachusetts Institute of Technology (USA) [8997-24]

11:30 am: **Optical nonlinearity with few-photon pulses in a quantum dot/pillar cavity device** (*Invited Paper*), Loïc Lanco, Lab. de Photonique et de Nanostructures (France) [8997-25]

Lunch/Exhibition Break Thu 12:00 pm to 1:30 pm

OPTO

Conference 8997 · Location: Room 308 (Esplanade)

SESSION 10

Location: Room 308 (Esplanade) Thu 1:30 pm to 3:00 pm

Exciton-Polariton Logic

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs. (USA)

1:30 pm: **Polariton devices and quantum fluids** (*Invited Paper*), Dario Ballarini, Milena L. De Giorgi, Istituto Italiano di Tecnologia (Italy); Emiliano Cancellieri, Ecole Normale Supérieure (France); Alberto Bramati, Ecole Normale Supérieure (France) and Univ. Pierre et Marie Curie (France); Giuseppe Gigli, Istituto Italiano di Tecnologia (Italy) and Univ. del Salento (Italy) and Univ. degli Studi di Lecce (Italy); Fabrice P. Laussy, Univ. Autónoma de Madrid (Spain); Daniele Sanvitto, Istituto Italiano di Tecnologia (Italy) and National Nanotechnology Lab. (Italy) [8997-26]

2:00 pm: **The exciton-polariton microcavity as an optical transistor** (*Invited Paper*), Mark D. Steger, Chitra Gautham, Bryan L. Nelsen, David W. Snoke, Univ. of Pittsburgh (USA); Loren N. Pfeiffer, Kenneth W. West, Princeton Univ. (USA) [8997-27]

2:30 pm: **Nonlinear polariton resonant tunneling diode** (*Invited Paper*), Hai Son Nguyen, Lab. de Photonique et de Nanostructures (France) and Ctr. National de la Recherche Scientifique (France); Dmitry Vishnevsky, Clermont Univ. Blaise Pascal (France) and Institute Pascal (France); Felix Marsault, Chris Sturm, Dmitrii Tanese, Lab. de Photonique et de Nanostructures (France) and Ctr. National de la Recherche Scientifique (France); Dimitry Solnyshkov, Univ. Blaise Pascal (France) and Institute Pascal (France); Elisabeth Galopin, Aristide Lemaître, Isabelle Sagnes, Alberto Amo, Lab. de Photonique et de Nanostructures (France) and Ctr. National de la Recherche Scientifique (France); Guillaume Malpuech, Univ. Blaise Pascal (France) and Institute Pascal (France); Jacqueline I. Bloch, Lab. de Photonique et de Nanostructures (France) and Ctr. National de la Recherche Scientifique (France) [8997-28]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 11

Location: Room 308 (Esplanade) Thu 3:30 pm to 5:10 pm

Quantum Communication with Integrated Optics

Session Chair: **Charles M. Santori**, Hewlett-Packard Labs. (USA)

3:30 pm: **Quantum dot spin-photon entanglement and photon-to-spin teleportation** (*Invited Paper*), WeiBo Gao, Parisa Fallahi, ETH Zurich (Switzerland); Emre Togan, ETH Zurich (Switzerland) and Harvard Univ. (USA); Aymeric Delteil, Y. S. Chin, Javier Miguel Sanchez, Atac Imamoglu, ETH Zurich (Switzerland) [8997-29]

4:00 pm: **Frequency conversion interfaces for photonic quantum systems** (*Invited Paper*), Kartik Srinivasan, National Institute of Standards and Technology (USA) [8997-30]

4:30 pm: **A variable plasmonic beam splitter tested with single photons**, Alexander Huck, Shailesh Kumar, Niels I. Kristiansen, Jonas S. Neergaard-Nielsen, Ulrik L. Andersen, Technical Univ. of Denmark (Denmark) [8997-31]

4:50 pm: **Plasmonic Hong-Ou-Mandel interference**, James Fakonas, Hyunseok Lee, California Institute of Technology (USA); Yousif A. Kelaita, Stanford Univ. (USA); Harry A. Atwater, California Institute of Technology (USA) [8997-32]

Advances in Slow and Fast Light VII

Conference Chairs: **Selim M. Shahriar**, Northwestern Univ. (USA); **Frank A. Narducci**, Naval Air Systems Command (USA)

Program Committee: **Tony Abi-Salloum**, Widener Univ. (USA); **Shanhui Fan**, Stanford Univ. (USA); **Daniel Joseph Gauthier**, Duke Univ. (USA); **Kohzo Hakuta**, The Univ. of Electro-Communications (Japan); **Ortwin Hess**, Imperial College London (United Kingdom); **John C. Howell**, Univ. of Rochester (USA); **Jacob B. Khurgin**, Johns Hopkins Univ. (USA); **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel); **Gour S. Pati**, Delaware State Univ. (USA); **Jacob Scheuer**, Tel Aviv Univ. (Israel); **Irina Novikova**, The College of William & Mary (USA); **David D. Smith**, NASA Marshall Space Flight Ctr. (USA); **Yanhong Xiao**, Fudan Univ. (China); **Yuri Rostovtsev**, Univ. of North Texas (USA)

Sunday 2 February

SESSION 1

Location: Room 272 (Mezzanine) Sun 8:00 am to 9:55 am

Slow and Fast Light Plasmonics and Photonic Crystal I

Session Chair: **Uriel Levy**, The Hebrew Univ. of Jerusalem (Israel)

8:00 am: **Using slow light to reduce losses in plasmonics and metamaterials** (*Invited Paper*), Jacob B. Khurgin, Johns Hopkins Univ. (USA) [8998-1]

8:25 am: **Stopped-light plasmonic nanolasing** (*Invited Paper*), Ortwin Hess, Imperial College London (United Kingdom) [8998-2]

8:50 am: **Plasmonic light matter Fano interactions in hot atomic vapors**, Liron Stern, Meir Grajower, Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) [8998-3]

9:05 am: **Slow-light plasmonic-enhanced emitters and detectors for on-chip interconnects** (*Invited Paper*), Meir Orenstein, Technion-Israel Institute of Technology (Israel) [8998-4]

9:30 am: **Plasmonics: nonlocal response and light-matter interactions** (*Invited Paper*), Niels Asger Mortensen, DTU Fotonik (Denmark) [8998-5]

Coffee Break Sun 9:55 am to 10:25 am

SESSION 2

Location: Room 272 (Mezzanine) . . . Sun 10:25 am to 12:10 pm

Slow and Fast Light Plasmonics and Photonic Crystal II

Session Chair: **Robert W. Boyd**, Univ. of Ottawa (Canada)

10:25 am: **Nanophotonics, nanoplasmonics, and vapors-on-a-chip for slow-light applications** (*Invited Paper*), Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) [8998-6]

10:50 am: **Slow-light transmission in the metal-dielectric structure based on plasmon-induced transparency**, Yundong Zhang, Harbin Institute of Technology (China) [8998-7]

11:05 am: **Tuning the transmission lineshape and time delay of a photonic-crystal slab guided resonance mode by polarization control** (*Invited Paper*), Ningfeng Huang, The Univ. of Southern California (USA); Luis Javier Martinez Rodriguez, The Univ. of Southern California (Uruguay); Michelle L. Povinelli, The Univ. of Southern California (USA) [8998-8]

11:30 am: **Photonic integrated circuits with slow light** (*Invited Paper*), Toshihiko Baba, Yokohama National Univ. (Japan) [8998-9]

11:55 am: **Slow-light enhanced dark and bright soliton propagation in SOI photonic crystal channel waveguides**, Swati Rawal, Ravindra K. Sinha, Delhi Technological Univ. (India) [8998-10]

Lunch Break Sun 12:10 pm to 1:40 pm

SESSION 3

Location: Room 272 (Mezzanine) Sun 1:40 pm to 3:25 pm

Slow and Fast Light Sensors I

Session Chair: **Jacob B. Khurgin**, Johns Hopkins Univ. (USA)

1:40 pm: **Image rotation and optical forces based on slow and fast light** (*Invited Paper*), Robert W. Boyd, Univ. of Ottawa (Canada) [8998-11]

2:05 pm: **Dual cavity superluminal laser for precision metrology**, Joshua Yablon, Zifan Zhou, Shih Tseng, Devin Hilleman, Selim M. Shahriar, Northwestern Univ. (USA) [8998-12]

2:20 pm: **Dispersion amplification** (*Invited Paper*), John C. Howell, Univ. of Rochester (USA) [8998-13]

2:45 pm: **Investigation on gain tuning fast-light effect of optical waveguide gyroscope**, Hao Zhang, Zhisong Xiao, BeiHang Univ. (China) [8998-14]

3:00 pm: **Optimization of CROW gyroscopes** (*Invited Paper*), Michel J. F. Digonnet, Kiarash Zamani Aghale, Stanford Univ. (USA) [8998-15]

Coffee Break Sun 3:25 pm to 3:55 pm

SESSION 4

Location: Room 272 (Mezzanine) Sun 3:55 pm to 5:25 pm

Quantum Optics in Slow and Fast Light I

Session Chair: **Michel J. Digonnet**, Stanford Univ. (USA)

3:55 pm: **Multimode quantum state tomography of slow light in rubidium vapor** (*Invited Paper*), Andrew M. Dawes, Pacific Univ. (USA) [8998-16]

4:20 pm: **Quantum noise limits in fast-light-enhanced gravitational wave detectors**, Minchuan Zhou, Northwestern Univ. (USA); Jacob Scheuer, Tel Aviv Univ. (Israel); Joshua Yablon, Selim M. Shahriar, Northwestern Univ. (USA) [8998-17]

4:35 pm: **Quantum memories for light based on Raman scattering: noise and efficiency** (*Invited Paper*), Joshua Nunn, Univ. of Oxford (United Kingdom) [8998-18]

5:00 pm: **Quantum mutual information of an entangled state propagating through slow- and fast-light media** (*Invited Paper*), Ryan Glasser, Harris Corp. (USA); Paul D. Lett, National Institute of Standards and Technology (USA) [8998-19]

Monday 3 February

SESSION 5

Location: Room 272 (Mezzanine) . . . Mon 8:00 am to 10:00 am

Tutorial and Slow and Fast Light in Vapor

Session Chair: **John C. Howell**, Univ. of Rochester (USA)

8:00 am: **A comparison of different slow-light schemes** (*Invited Paper*), Jacob B. Khurgin, Johns Hopkins Univ. (USA) [8998-20]

8:30 am: **Ultraslow light in a hot Rubidium vapor using an independent control light** (*Invited Paper*), Byoung Seung Ham, Gwangju Institute of Science and Technology (Korea, Republic of) [8998-21]

8:55 am: **Theoretical modeling of a DPAL-based superluminal laser and comparison with experiment**, Zifan Zhou, Joshua Yablon, Ye Wang, Devin Hilleman, Shih Tseng, Selim M. Shahriar, Northwestern Univ. (USA) [8998-22]

9:10 am: **Rb in photonic bandgap fibers** (*Invited Paper*), Alexander L. Gaeta, Cornell Univ. (USA) [8998-23]

9:35 am: **Slow and fast light in a phase sensitive system** (*Invited Paper*), Yanhong Xiao, Fudan Univ. (China) [8998-24]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 6

Location: Room 272 (Mezzanine) . . Mon 10:30 am to 12:15 pm

Slow and Fast Light Sensors II

Session Chair: **Byoung S. Ham**, Gwangju Institute of Science and Technology (Korea, Republic of)

10:30 am: **Detection of rotation using slow light with angular momentum** (*Invited Paper*), Yuri Rostovtsev, Univ. of North Texas (USA) [8998-25]

10:55 am: **An eye-like ring resonator for highly-sensitive temperature sensing**, XiaoQi Liu, Yundong Zhang, Ping Yuan, Harbin Institute of Technology (China) [8998-26]

11:10 am: **Fast-light enhancement in the response of coupled cavities** (*Invited Paper*), David D. Smith, NASA Marshall Space Flight Ctr. (USA) . [8998-27]

11:35 am: **Superluminal laser using dual peak Raman gain**, Ye Wang, Zifan Zhou, Joshua Yablon, Shih Tseng, Selim M. Shahriar, Northwestern Univ. (USA) [8998-28]

11:50 am: **Interferometric measurements by using slow light in liquid crystal media** (*Invited Paper*), Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France) [8998-29]

Lunch Break Mon 12:15 pm to 1:45 pm

SESSION 7

Location: Room 272 (Mezzanine) Mon 1:45 pm to 3:25 pm

Slow and Fast Light with Stimulated Brillouin Scattering

Session Chair: **David D. Smith**, NASA Marshall Space Flight Ctr. (USA)

1:45 pm: **Superluminal propagation and signal conversion via stimulated Brillouin scattering in optical fibers** (*Invited Paper*), Li Zhan, Shanghai Jiao Tong Univ. (China) [8998-30]

2:10 pm: **Variable delay of Gbit/s data using coded Brillouin dynamic gratings** (*Invited Paper*), Yair Antman, Avinoam Zadok, Bar-Ilan Univ. (Israel); Lior Yaron, Tomi Langer, Moshe Tur, Tel Aviv Univ. (Israel) [8998-31]

2:35 pm: **Broadening free SBS-based slow and fast light in optical fibers** (*Invited Paper*), Thomas Schneider, Hochschule für Telekommunikation Leipzig (Germany) [8998-32]

3:00 pm: **Slowing light with acoustic phonons in silicon photonics** (*Invited Paper*), Zheng Wang, The Univ. of Texas at Austin (USA) [8998-33]

Coffee Break Mon 3:25 pm to 3:55 pm

SESSION 8

Location: Room 272 (Mezzanine) Mon 3:55 pm to 5:35 pm

Quantum Optics in Slow and Fast Light II

Session Chair: **Stefania Residori**, Institut Non Linéaire de Nice Sophia Antipolis (France)

3:55 pm: **Quantum-enhanced measurements with atomic vapor** (*Invited Paper*), Eugeny E Mikhailov, The College of William & Mary (USA) [8998-34]

4:20 pm: **Observation of robustness in topological edge states of light** (*Invited Paper*), Mohammad Hafezi, Joint Quantum Institute (USA) [8998-35]

4:45 pm: **Electrically-tuned quantum light generation in silicon photonics: the role of slow light** (*Invited Paper*), Shayan Mookherjea, Univ. of California, San Diego (USA) [8998-36]

5:10 pm: **Highly-efficient photon-atom quantum interface based on electromagnetically-induced transparency** (*Invited Paper*), Shengwang Du, Hong Kong Univ. of Science and Technology (Hong Kong, China) [8998-37]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics** (*Plenary*), Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers** (*Plenary*), Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 9

Location: Room 272 (Mezzanine) . . . Tue 10:30 am to 12:15 pm

Slow and Fast Light in Cavities, Resonators, and Waveguides I

Session Chair: **Jacob Scheuer**, Tel Aviv Univ. (Israel)

10:30 am: **Effects of polarization mode coupling and superposition in a whispering-gallery microresonator** (*Invited Paper*), Albert T. Rosenberger, Oklahoma State Univ. (USA) [8998-38]

10:55 am: **Observation of EIT-like spectrum in the nested fiber ring resonator**, Yundong Zhang, Changqiu Yu, Kaiyang Wang, Harbin Institute of Technology (China) [8998-39]

11:10 am: **Slow light in high-contrast grating hollow-core waveguide** (*Invited Paper*), Tianbo Sun, Weijian Yang, Univ. of California, Berkeley (USA); Weimin Zhou, U.S. Army Research Lab. (USA); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [8998-40]

11:35 am: **Ultra-fast repeated frequency conversion of light trapped in a microcavity**, Emre Yüce, Georgios Ctistis, Univ. Twente (Netherlands); Julien Claudon, Emmanuel Dupuy, Commissariat à l'Énergie Atomique (France); Allard P. Mosk, Univ. Twente (Netherlands); Jean-Michel Gérard, Commissariat à l'Énergie Atomique (France); Willem L. Vos, Univ. Twente (Netherlands) . [8998-41]

11:50 am: **Management of slow light dispersion in complex microresonator devices** (*Invited Paper*), Misha Sumetsky, Aston Institute for Photonics Technologies (United Kingdom) [8998-42]

Lunch/Exhibition Break Tue 12:15 pm to 1:45 pm

SESSION 10

Location: Room 272 (Mezzanine) Tue 1:45 pm to 3:15 pm

Slow and Fast Light in Cavities, Resonators, and Waveguides II

Session Chair: **Thomas F. Krauss**, The Univ. of York (United Kingdom)

1:45 pm: **Experimental observations of the transition from fast light to slow light in a side-coupled ring resonator** (*Invited Paper*), Yundong Zhang, Harbin Institute of Technology (China) [8998-43]

2:10 pm: **Dynamical behavior of optomechanical-induced transparency in a silica microresonator**, Chunhua Dong, Chang-Ling Zou, Guang-Can Guo, Univ. of Science and Technology of China (China) [8998-44]

2:25 pm: **Slow-light optical amplifiers: opportunities and fundamental limitations** (*Invited Paper*), Per Lunnemann Hansen, Jesper Mørk, Technical Univ. of Denmark (Denmark) [8998-45]

2:50 pm: **Perfect absorption and reflection in slow-light waveguides** (*Invited Paper*), Andrey A. Sukhorukov, The Australian National Univ. (Australia); Nadav Gutman, Y. D. Chong, C. Martijn de Sterke, The Univ. of Sydney (Australia) [8998-46]

Coffee Break Tue 3:15 pm to 3:45 pm

SESSION 11

Location: Room 272 (Mezzanine) Tue 3:45 pm to 5:30 pm

Slow and Fast Light Data Buffering and Non-linear Optics

Session Chair: **Sean M. Spillane**, Los Gatos Research, Inc. (USA)

- 3:45 pm: **2D and WDM correlators using tunable optical delays** (*Invited Paper*), Alan E. Willner, The Univ. of Southern California (USA) . . [8998-47]
- 4:10 pm: **Coupled microrings data buffer using fast light** (*Invited Paper*), Jacob Scheuer, Tel Aviv Univ. (Israel); Selim M. Shahriar, Northwestern Univ. (USA) [8998-48]
- 4:35 pm: **Slow light and optical information processing due to an intramolecular coherence**, Igor V. Melnikov, Svetlana V. Nazarenko, Anastasia A. Vinogradova, Georgy L. Alfimov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . [8998-49]
- 4:50 pm: **Photonic crystal slow-light waveguides: useful disorder and applications in integrated quantum circuits** (*Invited Paper*), Thomas F. Krauss, The Univ. of York (United Kingdom) [8998-50]
- 5:15 pm: **Resonant four-wave mixing in a ring cavity**, Gleb Romanov, Eugeni E Mikhailov, Irina Novikova, The College of William & Mary (USA) [8998-51]

Wednesday 5 February

SESSION 12

Location: Room 272 (Mezzanine) Wed 8:00 am to 9:45 am

Slow and Fast Lasers

Session Chair: **Gour S. Pati**, Delaware State Univ. (USA)

- 8:00 am: **Rotational sensitivity enhancement in a ring laser gyroscope using Raman gain** (*Invited Paper*), Sean M. Spillane, Los Gatos Research, Inc. (USA); Selim M. Shahriar, Northwestern Univ. (USA) [8998-52]
- 8:25 am: **Optical loss effect on fast-light enhanced integrated on-chip laser gyroscope based on slot-waveguide structure**, Long Zhao, Zhisong Xiao, BeiHang Univ. (China) [8998-53]
- 8:40 am: **Theoretical design of a superluminal ring laser gyroscope using novel coupled passive resonators** (*Invited Paper*), Tianliang Qu, National Univ. of Defense Technology (China) [8998-54]
- 9:05 am: **A subluminal ring laser: modeling, stability, and applications**, Zifan Zhou, Joshua Yablon, Minchuan Zhou, Selim M. Shahriar, Northwestern Univ. (USA) [8998-55]
- 9:20 am: **Performance assessment of a solid-state ring laser gyro** (*Invited Paper*), Sylvain Schwartz, Gilles A. Feugnet, François Gutty, Jean-Paul Pocholle, Thales Research & Technology (France); Thomas Lauprêtre, Univ. Paris Sud 11 (France); Fabienne Goldfarb, Fabien Bretenaker, Lab. Aimé Cotton (France); Rupamanjari Ghosh, Jawaharlal Nehru Univ. (India); Iacopo Carusotto, Univ. degli Studi di Trento (Italy) [8998-56]
- Coffee Break Wed 9:45 am to 10:15 am

SESSION 13

Location: Room 272 (Mezzanine) . . Wed 10:15 am to 12:20 pm

Effects and Applications Related to Slow and Fast Light

Session Chair: **Sylvain Schwartz**, Thales Research & Technology (France)

- 10:15 am: **Investigations of AC stark shift in pulsed Raman-Ramsey interaction for vapor-cell clock development** (*Invited Paper*), Gour S. Pati, Delaware State Univ. (USA) [8998-57]
- 10:40 am: **Resonance fluorescence from a single atom and slow light** (*Invited Paper*), Frank A. Narducci, Naval Air Systems Command (USA); Jon P. Davis, Naval Air Warfare Ctr. Aircraft Div. (USA) [8998-58]
- 11:05 am: **Atomic polarization decoherence of Zeeman levels in rubidium filled hollow-core photonic crystal fiber** (*Invited Paper*), Fetah A. Benabid, Univ. of Bath (United Kingdom); Ekaterina Ilinova, XLIM Institut de Recherche (France) [8998-59]
- 11:30 am: **Electromagnetically-induced transparency with diamond photonic devices** (*Invited Paper*), Victor A. Acosta, Hewlett-Packard Labs. (USA) . [8998-60]
- 11:55 am: **High-storage efficiency EIT-based optical memory** (*Invited Paper*), Ite A. Yu, National Tsing Hua Univ. (Taiwan) [8998-61]

Complex Light and Optical Forces VIII

Conference Chairs: David L. Andrews, Univ. of East Anglia (United Kingdom); Enrique J. Galvez, Colgate Univ. (USA); Jesper Glückstad, Technical Univ. of Denmark (Denmark)

Conference Co-Chair: Marat S. Soskin, Institute of Physics (Ukraine)

Program Committee: Robert R. Alfano, The City College of New York (USA); Shu-Chun Chu, National Cheng Kung Univ. (Taiwan); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Wolfgang A. Ertmer, Leibniz Univ. Hannover (Germany); Andrew Forbes, CSIR National Laser Ctr. (South Africa); David G. Grier, New York Univ. (USA); Rüdiger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Jandir Miguel Hickmann, Univ. Federal de Alagoas (Brazil); Thomas R. Huser, Univ. of California, Davis (USA); Miles J. Padgett, Univ. of Glasgow (United Kingdom); Darwin Palima, Technical Univ. of Denmark (Denmark); Monika Ritsch-Marte, Innsbruck Medical Univ. (Austria); Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia); Grover A. Swartzlander Jr., Rochester Institute of Technology (USA); Juan P. Torres, ICFO - Institut de Ciències Fotòniques (Spain); Nirmal K. Viswanathan, Univ. of Hyderabad (India)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : David L. Andrews, Univ. of East Anglia Norwich (United Kingdom); Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

SESSION 1

Location: Room 110 (Exhibit Level) . . . Tue 1:40 pm to 3:10 pm

Optical Binding and Manipulation I

Session Chair: David L. Andrews, Univ. of East Anglia (United Kingdom)

- 1:40 pm: **Optical action at mesoscales (Invited Paper)**, Aristide C. Dogariu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [8999-1]
- 2:10 pm: **Negative optical radiation forces and singular optics**, Davit Hakobyan, Etienne Brasselet, Univ. Bordeaux 1 (France) [8999-2]
- 2:30 pm: **Single-beam trapping at low numerical apertures**, Martin Siler, Oto Brzobohatý, Petr Ják, Vitezslav Karasek, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) [8999-3]
- 2:50 pm: **Near-field waveguide trapping and tracking of particles using fluorescence imaging**, Balpreet S. Ahluwalia, Petter Brox, Øystein Helle, Jean-Claude Tinguely, Olav G. Hellesø, Univ. of Tromsø (Norway) [8999-4]
- Coffee Break Tue 3:10 pm to 3:40 pm

SESSION 2

Location: Room 110 (Exhibit Level) . . . Tue 3:40 pm to 5:30 pm

Optical Binding and Manipulation II

Session Chair: Jesper Glückstad, Technical Univ. of Denmark (Denmark)

- 3:40 pm: **Attractive optical forces from blackbody radiation (Invited Paper)**, Monika Ritsch-Marte, Matthias Sonnleitner, Innsbruck Medical Univ. (Austria); Helmut Ritsch, Univ. Innsbruck (Austria) [8999-5]
- 4:10 pm: **Clustering of aerosols in a single potential-well trap**, Jeremy Moore, Univ. of Michigan (USA); Leopoldo L. Martin, Univ. de La Laguna (Spain); Kyu Hyun Kim, Hengky Chandralalim, Univ. of Michigan (USA); Matt Eichenfield, Sandia National Labs. (USA); Inocencio J. Martin, Univ. de La Laguna (Spain); Tal E. Carmon, Univ. of Michigan (USA) [8999-6]

4:30 pm: **Optical binding in anisotropic colloids**, Simon Hanna, Stephen H. Simpson, Univ. of Bristol (United Kingdom); Philip H. Jones, Univ. College London (United Kingdom); Onofrio M. Maragó, Istituto per i Processi Chimico-Fisici (Italy) [8999-7]

4:50 pm: **Optical trapping of non-spherical plasmonic nanoparticles**, Oto Brzobohatý, Martin Siler, Lukas Chvatal, Vitezslav Karasek, Pavel Zemánek, Institute of Scientific Instruments of the ASCR, v.v.i. (Czech Republic) . . [8999-8]

5:10 pm: **Highly-focused structured light beams for optical trapping**, Alexander B. Stilgoe, Daryl C. Preece, Timo A. Nieminen, Halina H. Rubinsztein-Dunlop, The Univ. of Queensland (Australia) [8999-9]

Wednesday 5 February

SESSION 3

Location: Room 110 (Exhibit Level) . Wed 8:00 am to 10:20 am

Structured Optical Modes

Session Chair: Enrique J. Galvez, Colgate Univ. (USA)

- 8:00 am: **Angular momentum radio (Invited Paper)**, Bo Thidé, Swedish Institute of Space Physics (Sweden) and Univ. degli Studi di Padova (Italy) [8999-10]
- 8:30 am: **Generation, manipulation, and applications of Airy plasmons (Invited Paper)**, Dragomir N. Neshev, The Australian National Univ. (Australia) [8999-11]
- 9:00 am: **Tuning vector vortex in spatially coherent supercontinuum multicolored optical beam using q-plate**, Yisa Rumala Jr., Sebastião Prata Vieira, Giovanni Milione, Thien An Nguyen, Zabir Hossain, The City Univ. of New York (USA); Daniel A. Nolan, Corning Incorporated (USA); Ebrahim Karimi, Sergei Slussarenko, Lorenzo Marrucci, Univ. degli Studi di Napoli Federico II (Italy); Robert R. Alfano, The City Univ. of New York (USA) [8999-12]
- 9:20 am: **Unveiling orbital angular momentum of light of order up to twenty through diffraction by a square aperture**, Alcenisio J. de Jesus Silva, Univ. Federal de Alagoas (Brazil); Juarez G. Silva, Univ. Federal de Alagoas (Brazil); Márcio A. R. C. Alencar, Univ. Federal de Sergipe (Brazil); Jandir M. Hickmann, Univ. Federal do Rio Grande do Sul (Brazil) and Univ. Federal de Sergipe (Brazil); Eduardo J. da Silva Fonseca, Univ. Federal de Alagoas (Brazil) [8999-13]
- 9:40 am: **Short-link capacity increase powered by the orbital angular momentum of light**, Mario A. Usuga Castaneda, Idelfonso Tafur-Monroy, DTU Fotonik (Denmark) [8999-14]
- 10:00 am: **Propagation and wavefront ambiguity of linear nondiffracting beams**, Rüdiger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martin Bock, Max-Born-Institute for Nonlinear Optics and Short-Pulse Spectroscopy (Germany) [8999-15]
- Coffee Break Wed 10:20 am to 10:50 am

SESSION 4

Location: Room 110 (Exhibit Level) Wed 10:50 am to 12:20 pm

Polarization Structures I

Session Chair: **Robert R. Alfano**, The City College of New York (USA)

- 10:50 am: **From q-plates to the photonic gear: tailoring the rotational properties of light** (*Invited Paper*), Lorenzo Marrucci, Univ. degli Studi di Napoli Federico II (Italy); Fabio Sciarino, Univ. degli Studi di Roma La Sapienza (Italy)[8999-16]
- 11:20 am: **Mapping of all polarization-singularity C-point morphologies**, Enrique J. Galvez, Xinru Cheng, Kory Beach, Colgate Univ. (USA)[8999-17]
- 11:40 am: **Vector light beams propagation and scattering in turbid medium**, Igor V. Meglinski, Alexander Doronin, Univ. of Otago (New Zealand); Giovanni Milione, Robert R. Alfano, The City College of New York (USA)[8999-18]
- 12:00 pm: **Generating and measuring non-diffracting vector Bessel beams**, Angela Dudley, CSIR National Laser Ctr (South Africa); Yanming Li, North Carolina State Univ. (USA); Thandeka I. Mhlanga, CSIR National Laser Ctr. (South Africa); Michael J. Escuti, North Carolina State Univ. (USA); Andrew Forbes, CSIR National Laser Ctr. (South Africa)[8999-19]
- Lunch/Exhibition Break Wed 12:20 pm to 1:40 pm

SESSION 5

Location: Room 110 (Exhibit Level) . . Wed 1:40 pm to 3:30 pm

Polarization Structures II

Session Chair: **Andrew Forbes**, CSIR National Laser Ctr. (South Africa)

- 1:40 pm: **Field tracing for simulation of locally-polarized light fields and fs pulses** (*Invited Paper*), Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany)[8999-20]
- 2:10 pm: **Topological aspects of polarization structured beams**, Nirmal K. Viswanathan, Vijay Kumar, Univ. of Hyderabad (India)[8999-21]
- 2:30 pm: **Encoding information with vector vortex beams**, Giovanni Milione, Thien An Nguyen, The City College of New York (USA) and New York State Ctr. for Complex Light (USA); Daniel A. Nolan, Corning Incorporated (USA) and New York State Ctr. for Complex Light (USA); Robert R. Alfano, The City College of New York (USA) and New York State Ctr. for Complex Light (USA)[8999-22]
- 2:50 pm: **Polarization and coherence Stokes parameters in diffraction and interference**, Ari T. Friberg, Tero Setälä, Jani Tervo, Jari Turunen, Univ. of Eastern Finland (Finland)[8999-23]
- 3:10 pm: **Incoherent polarized white-light optical vortex from a q-plate**, Thien An Nguyen, The City College of New York (USA) and New York Ctr. for Complex Light (USA); Giovanni Milione, The City College of New York (USA) and Graduate Ctr. of the City Univ. of New York (USA) and New York Ctr. for Complex Light (USA); Yisa Rumala Jr., The City College of New York (USA) and New York Ctr. for Complex Light (USA); Daniel A. Nolan, Corning Incorporated (USA) and New York Ctr. for Complex Light (USA); Ebrahim Karimi, Sergei Slussarenko, Univ. degli Studi di Napoli Federico II (Italy) and CNR-SPIN (Italy); Lorenzo Marrucci, Univ. degli Studi di Napoli Federico II (Italy) and CNR-SPIN (Italy) and New York Ctr. for Complex Light (USA); Robert R. Alfano, The City College of New York (USA) and The City Univ. of New York (USA) and New York Ctr. for Complex Light (USA)[8999-24]
- Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 6

Location: Room 110 (Exhibit Level) . . Wed 4:00 pm to 6:00 pm

Optical Vortices I

Session Chair: **Rüdiger Grunwald**, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)

- 4:00 pm: **Laguerre-Gaussian mode generation by nanoarrays with a tailored geometry**, Mathew D. Williams, Matt M. Coles, David S. Bradshaw, David L. Andrews, Univ. of East Anglia (United Kingdom)[8999-25]
- 4:20 pm: **Controlling light in multimode waveguides: new challenges**, Martin Ploschner, Univ. of Dundee (United Kingdom); Tomas Tyc, Masaryk Univ. (Czech Republic); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Tomáš Cizmar, Univ. of Dundee (United Kingdom)[8999-26]
- 4:40 pm: **Spin-controlled optical radiation pressure**, Georgiy V. Tkachenko, Etienne Brasselet, Univ. Bordeaux 1 (France)[8999-27]
- 5:00 pm: **Vitality of optical vortices**, Filippus S. Roux, CSIR National Laser Ctr. (South Africa)[8999-28]

5:20 pm: **Density of optical degrees of freedom: intensity, linear, and angular momentum**, Michael Mazilu, Univ. of St. Andrews (United Kingdom)[8999-29]

5:40 pm: **The role of vortices in the generation of optical lift**, Simon Hanna, Stephen H. Simpson, Univ. of Bristol (United Kingdom); Grover A. Swartzlander Jr., Rochester Institute of Technology (USA)[8999-30]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Scaling law with random electromagnetic fields, Tero Setälä, Timo Hassinen, Jani Tervo, Jari Turunen, Ari T. Friberg, Univ. of Eastern Finland (Finland)[8999-52]

Encoding mutually-unbiased bases in orbital angular momentum for quantum key distribution, Angela Dudley, CSIR National Laser Ctr. (South Africa); Mhlambululi Mafu, Sandeep K. Goyal, Univ. of KwaZulu-Natal (South Africa); Daniel Giovannini, Univ. of Glasgow (United Kingdom); Melanie G. McLaren, CSIR National Laser Ctr. (South Africa); Thomas Konrad, Univ. of KwaZulu-Natal (South Africa); Miles J. Padgett, Univ. of Glasgow (United Kingdom); Francesco Petruccione, Univ. of KwaZulu-Natal (South Africa); Norbert Lütkenhaus, Univ. of Waterloo (Canada); Andrew Forbes, CSIR National Laser Ctr. (South Africa)[8999-53]

Spatial superpositions of Gaussian beams, Darryl Naidoo, Council for Scientific and Industrial Research (South Africa); Thomas Godin, FEMTO-ST (France); Michael Fromager, Kamel Ait-Ameur, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Andrew Forbes, CSIR National Laser Ctr. (South Africa)[8999-54]

Application of geometric phase to wavefront sensing for astronomical adaptive optics, Eric E. Bloemhof, National Science Foundation (USA) .[8999-55]

Thursday 6 February

SESSION 7

Location: Room 110 (Exhibit Level) . . Thu 8:00 am to 10:10 am

Optical Vortices II

Session Chair: **Halina H. Rubinsztein-Dunlop**, The Univ. of Queensland (Australia)

8:00 am: **Ultrafast and ultra-broadband optical-vortex pulse generation and characterization** (*Invited Paper*), Ryuji Morita, Keisaku Yamane, Hokkaido Univ. (Japan) and JST CREST (Japan); Zhili Yang, Hokkaido Univ. (Japan); Yasunori Toda, Hokkaido Univ. (Japan) and JST CREST (Japan)[8999-31]

8:30 am: **Optical vortices in a six-wave mixing mechanism**, Matt M. Coles, Mathew D. Williams, David L. Andrews, Univ. of East Anglia (United Kingdom)[8999-32]

8:50 am: **Propagation of an LP₁₁ mode in a few mode elliptical core optical fiber**, Giovanni Milione, Thien An Nguyen, The City College of New York (USA) and New York State Ctr. for Complex Light (USA); Daniel A. Nolan, Corning Incorporated (USA) and New York State Ctr. for Complex Light (USA); Robert R. Alfano, The City College of New York (USA) and New York State Ctr. for Complex Light (USA)[8999-33]

9:10 am: **Controlling the acceleration of rotating Bessel beams**, Andrew Forbes, Angela Dudley, CSIR National Laser Ctr. (South Africa); Christian Schulze, Friedrich-Schiller-Univ. Jena (Germany); Filippus S. Roux, CSIR National Laser Ctr. (South Africa); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany)[8999-34]

9:30 am: **Bandwidth analysis of the principal states superimposed from vortex modes propagating in an optical fiber**, Daniel A. Nolan, Corning Incorporated (USA); Giovanni Milione, Robert R. Alfano, The City College of New York (USA)[8999-35]

9:50 am: **Theory of interference with multiple OAM states in a spiral phase plate etalon: thick-plate and thin-plate approximation**, Yisa Rumala Jr., The City College of New York (USA) and The City Univ. of New York (USA) and New York State Ctr. for Complex Light (USA)[8999-36]

Coffee Break Thu 10:10 am to 10:40 am

Conference 8999 · Location: Room 110 (Exhibit Level)

SESSION 8

Location: Room 110 (Exhibit Level) · Thu 10:40 am to 12:10 pm

Near-Field and Evanescent Interactions

Session Chair: **Enrique J. Galvez**, Colgate Univ. (USA)

10:40 am: **Shaping electromagnetic fields for THz plasmonics** (*Invited Paper*), André Edelmann, Stefan F. Helfert, Jürgen Jahns, FernUniv. Hagen (Germany) [8999-37]

11:10 am: **The shot noise limit of light control through random nanophotonic media**, Hasan Yilmaz, Willem L. Vos, Allard P. Mosk, Univ. Twente (Netherlands) [8999-38]

11:30 am: **Ultrasensitive force detection of photonic phenomena with tuning-fork-based frequency modulation**, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Hesham Taha, Andrey Ignatov, Alina Stinkovski, Ori Avayu, Patricia Hamra, Nanonics Imaging Ltd. (Israel) [8999-39]

11:50 am: **Combining focusing properties of a single diatom valve with optical eigenmodes in ultra-shrinking of light**, Edoardo De Tommasi, Istituto per la Microelettronica e Microsistemi (Italy); Anna C. De Luca, Consiglio Nazionale delle Ricerche (Italy); Luigi Lavanga, Principia Dardano, Istituto per la Microelettronica e Microsistemi (Italy); Mario De Stefano, Univ. degli Studi di Napoli Federico II (Italy); Luca De Stefano, Ivo Rendina, Istituto per la Microelettronica e Microsistemi (Italy); Kishan Dholakia, Michael Mazilu, Univ. of St. Andrews (United Kingdom) [8999-40]

Lunch/Exhibition Break Thu 12:10 pm to 1:30 pm

SESSION 9

Location: Room 110 (Exhibit Level) . . . Thu 1:30 pm to 3:00 pm

Quantum Features

Session Chair: **David L. Andrews**, Univ. of East Anglia (United Kingdom)

1:30 pm: **Weak measurements with non-integer orbital angular momentum states** (*Invited Paper*), Jörg B. Götte, Max-Planck-Institut für Physik komplexer Systeme (Germany) [8999-41]

2:00 pm: **Recovery of quantum-entanglement after encountering an obstruction**, Melanie G. McLaren, CSIR National Laser Ctr. (South Africa) and Stellenbosch Univ. (South Africa); Mary Jacqueline Romero, Univ. of Glasgow (United Kingdom); Thandeka Mahlangu, Filippus S. Roux, CSIR National Laser Ctr. (South Africa); Miles J. Padgett, Univ. of Glasgow (United Kingdom); Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Stellenbosch Univ. (South Africa) [8999-43]

2:20 pm: **The evolution of OAM-entanglement between two qutrits in turbulence**, Alpha Hamadou Ibrahim, Council for Scientific and Industrial Research (South Africa); Filippus S. Roux, CSIR National Laser Ctr. (South Africa); Melanie G. McLaren, Council for Scientific and Industrial Research (South Africa); Sandeep K. Goyal, Thomas Konrad, Univ. of KwaZulu-Natal (South Africa); Andrew Forbes, CSIR National Laser Ctr. (South Africa) [8999-44]

2:40 pm: **Classical entanglement: the implementation of quantum walks using classical light**, Thomas Konrad, Sandeep K. Goyal, Univ. of KwaZulu-Natal (South Africa); Filippus S. Roux, Andrew Forbes, CSIR National Laser Ctr. (South Africa) [8999-45]

Coffee Break Thu 3:00 pm to 3:30 pm

SESSION 10

Location: Room 110 (Exhibit Level) . . . Thu 3:30 pm to 5:30 pm

Optical Tweezers and Trapping

Session Chair: **Monika Ritsch-Martel**, Innsbruck Medical Univ. (Austria)

3:30 pm: **State characterization and proof of entanglement in clouds of ultracold atoms**, Wolfgang A. Ertmer, Carsten Klempt, Jan Peise, Frank Deuretzbacher, Luis Santos, Leibniz Univ. Hannover (Germany); Augusto Smerzi, Luca Pezze, European Lab. for Non-linear Spectroscopy (Italy); Philipp Hyllus, Géza Tóth, Univ. del País Vasco (Spain) [8999-46]

3:50 pm: **Optical trapping of 100nm nanoparticle on extended slow Bloch mode cavity**, Laurent Milord, Institut National des Sciences Appliquées de Lyon (France); Emmanuel Gerelli, Cécile Jamois, Abdelmounaim Harouri, Céline Chevalier, Christian Seassal, Pierre Viktorovitch, Taha Benyattou, Univ. de Lyon (France) and Institut des Nanotechnologies de Lyon (France) and Institut National des Sciences Appliquées de Lyon (France) [8999-47]

4:10 pm: **Nanostructured fibre tip for trapping of nanoparticles**, Jean-Claude Tinguely, Univ. of Tromsø (Norway); Ming Ding, Gilberto Brambilla, Univ. of Southampton (United Kingdom); Andreas Hohenau, Joachim R. Krenn, Karl-Franzens-Univ. Graz (Austria); Olav G. Hellesø, Univ. of Tromsø (Norway) [8999-48]

4:30 pm: **Influence of multiple particles in optical tweezers on the trapping efficiency**, Thomas Weigel, Reza Ghadiri, Cemal Esen, Gustav Schweiger, Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [8999-49]

4:50 pm: **Holographically-addressed wave-guided optical waveguide**, Mark Jayson M. Villangca, Andrew Rafael M. Bañas, Darwin Palima, Jesper Glückstad, Technical Univ. of Denmark (Denmark) [8999-50]

5:10 pm: **Rotation-induced cooling of an optically-trapped micro-gyroscope in vacuum**, Yoshihiko Arita, Michael Mazilu, Kishan Dholakia, Univ. of St. Andrews (United Kingdom) [8999-51]

Laser Refrigeration of Solids VII

Conference Chairs: **Richard I. Epstein**, The Univ. of New Mexico (USA); **Denis V. Seletskiy**, Univ. Konstanz (Germany); **Mansoor Sheik-Bahae**, The Univ. of New Mexico (USA)

Program Committee: **Daniel A. Bender**, Sandia National Labs. (USA); **Steven R. Bowman**, U.S. Naval Research Lab. (USA); **Tal Eliezer Carmon**, Univ. of Michigan (USA); **Joaquín Fernández**, Univ. del País Vasco (Spain); **Zameer Ul Hasan**, Temple Univ. (USA); **Raman Kashyap**, Ecole Polytechnique de Montréal (Canada); **Mauro Tonelli**, Univ. di Pisa (Italy); **Qihua Xiong**, Nanyang Technological Univ. (Singapore); **Paul D. LeVan**, Air Force Research Lab. (USA)

Wednesday 5 February

SESSION 1

Location: Room 272 (Mezzanine) Wed 1:30 pm to 3:10 pm

Cryogenic Refrigeration in Rare-Earth-doped Systems

Session Chair: **Raman Kashyap**, Ecole Polytechnique de Montréal (Canada)

1:30 pm: **Device applications of cryogenic optical refrigeration**, Seth D. Melgaard, Air Force Research Lab. (USA) and The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Dana Sills, Richard I. Epstein, Thermodynamic Films (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [9000-1]

1:50 pm: **Effect of impurities on cooling efficiency in fluoride crystals** (*Invited Paper*), Alberto Di Lieto, Alberto Sottile, Azzurra Volpi, Zhonghan Zhang, Mauro Tonelli, Univ. di Pisa (Italy) [9000-2]

2:20 pm: **Preparation of high-purity LiF, YF₃, and YbF₃ for laser refrigeration** (*Invited Paper*), Markus P. Hehlen, William L. Boncher, Steven P. Love, Los Alamos National Lab. (USA) [9000-3]

2:50 pm: **Intracavity optical refrigeration to 130K using high-power vertical external-cavity surface-emitting lasers (VECSELs)**, Mohammadreza Ghasemkhani, Alexander R. Albrecht, The Univ. of New Mexico (USA); Seth D. Melgaard, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Denis V. Seletskiy, The Univ. of New Mexico (USA) and Univ. Konstanz (Germany); Jeffrey G. Cedeberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [9000-4]

Coffee Break Wed 3:10 pm to 3:40 pm

SESSION 2

Location: Room 272 (Mezzanine) Wed 3:40 pm to 5:40 pm

Novel Cooling Concepts

Session Chair: **Qihua Xiong**, Nanyang Technological Univ. (Singapore)

3:40 pm: **p × n-Type transverse thermoelectrics: an alternative Peltier refrigerator with cryogenic promise** (*Invited Paper*), Chuanle Zhou, Matthew Grayson, Northwestern Univ. (USA); Stefan Birner, Technische Univ. München (Germany) and nextnano GmbH (Germany); Yang Tang, Karen Heinselman, Northwestern Univ. (USA) [9000-5]

4:10 pm: **Electro-luminescent cooling in the deep sub-bandgap bias regime**, Parthiban Santhanam, Massachusetts Institute of Technology (USA) [9000-6]

4:30 pm: **Near-infrared up-conversion for photovoltaics: progress and challenges** (*Invited Paper*), Bryce S. Richards, Sean K. W. MacDougall, Aruna Ivaturi, Jose Marques-Hueso, Heriot-Watt Univ. (United Kingdom); Karl W. Krämer, Univ. Bern (Switzerland); Jonathon A. S. Morton, Georgios E. Arnaoutakis, Eliyas D. Mammo, Heriot-Watt Univ. (United Kingdom) [9000-7]

5:00 pm: **Spontaneous Raman cooling of solids**, Matthew R. Tomes, Tal E. Carmon, Univ. of Michigan (USA) [9000-8]

5:20 pm: **Laser cooling of dense atomic gases by collisional redistribution of radiation**, Anne Sass, Ralf Forge, Katharina Knicker, Peter Moroshkin, Martin Weitz, Stavros Christopoulos, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) [9000-9]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Spectroscopic evaluation of Tm-doped potassium lead halides for 2µm laser-cooling applications, Eric Kumi-Barimah, Uwe H. Hömmerich, EiEi Brown, Hampton Univ. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA) [9000-23]

Light-up conversion versus light-down conversion in radiative cooling of semiconductors, Volodymyr K. Malyutenko, V. Lashkaryov Institute of Semiconductor Physics (Ukraine) [9000-24]

Thermal study of laser cooling in rhodamine dye using a Bragg grating, Sébastien Loranger, Ecole Polytechnique de Montréal (Canada); Elton Soares de Lima Filho, Bibl. UdeM - École Polytechnique de Montréal (Canada); Galina A. Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . [9000-25]

Thursday 6 February

SESSION 3

Location: Room 272 (Mezzanine) Thu 8:00 am to 10:10 am

Laser Cooling in Semiconductors

Session Chair: **Daniel A. Bender**, Sandia National Labs. (USA)

8:00 am: **Can we laser cool a semiconductor single crystal?** (*Invited Paper*), Qihua Xiong, Jun Zhang, Chiyuan Zhang, Nanyang Technological Univ. (Singapore) [9000-10]

8:30 am: **Laser cooling of CdS nanobelts: thickness matters**, Dehui Li, Jun Zhang, Qihua Xiong, Nanyang Technological Univ. (Singapore) [9000-11]

8:50 am: **Laser cooling based on nitride structures** (*Invited Paper*), Yujie J. Ding, Lehigh Univ. (USA) [9000-12]

9:20 am: **Wide band gap semiconductors for optical refrigeration: an overlook**, Jacob B. Khurgin, Johns Hopkins Univ. (USA) [9000-13]

9:40 am: **High-performance cavity end mirrors based on substrate-transferred compound semiconductor heterostructures** (*Invited Paper*), Garrett D. Cole, Vienna Ctr. for Quantum Science and Technology, Univ. of Vienna (Austria) and Crystalline Mirror Solutions GmbH (Austria); Wei Zhang, Michael J. Martin, JILA (USA); Johannes Pohl, Ferdinand-Braun-Institut (Germany); Moritz Nagel, Evgeny V. Kovalchuk, Humboldt-Univ. zu Berlin (Germany); Alexei L. Alexandrovski, Stanford Photo-Thermal Solutions (USA); Markus Weyers, Ferdinand-Braun-Institut (Germany); Achim Peters, Ferdinand-Braun-Institut (Germany) and Humboldt-Univ. zu Berlin (Germany); Jun Ye, JILA (USA); Markus Aspelmeyer, Vienna Ctr. for Quantum Science and Technology, Univ. of Vienna (Austria) [9000-14]

Coffee Break Thu 10:10 am to 10:40 am

OPTO

Conference 9000 · Location: Room 272 (Mezzanine)

SESSION 4

Location: Room 272 (Mezzanine) . . . Thu 10:40 am to 11:50 am

Novel Rare-Earth-doped Systems

Session Chair: **Markus P. Hehlen**, Los Alamos National Lab. (USA)

10:40 am: **Optical refrigeration in multi-level systems** (*Invited Paper*), Steven R. Bowman, U.S. Naval Research Lab. (USA); Christopher G. Brown, Sotera Defense Solutions (USA); Joseph Ganem, Loyola Univ. Maryland (USA) [9000-15]

11:10 am: **Temperature dynamics of laser cooling of solids with Yb³⁺ ions**, Galina A. Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [9000-16]

11:30 am: **Direct measurement of laser cooling of Yb:YAG crystal at atmospheric pressure using a fiber Bragg grating**, Elton Soares de Lima Filho, Bibl. UdeM - École Polytechnique de Montréal (Canada); Galina A. Nemova, Sébastien Loranger, Raman Kashyap, École Polytechnique de Montréal (Canada) [9000-17]

Lunch/Exhibition Break Thu 11:50 am to 1:20 pm

SESSION 5

Location: Room 272 (Mezzanine) Thu 1:20 pm to 3:10 pm

Applications and Device Concepts

Session Chair: **Steven R. Bowman**, U.S. Naval Research Lab. (USA)

1:20 pm: **Next generation optical refrigerators** (*Invited Paper*), Richard I. Epstein, The Univ. of New Mexico (USA) and ThermoDynamic Films (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [9000-18]

1:50 pm: **All-optical photon-waste recycling in laser cooling of solids**, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) [9000-19]

2:10 pm: **Progress in optical cooling using integrated all-fiber Tm-doped glass fibers and Tm-doped fiber lasers**, Dan T. Nguyen, Rajesh Thapa, Jie Zong, Dan L. Rhonehouse, NP Photonics, Inc. (USA); Nai-Hang Kwong, College of Optical Sciences, The Univ. of Arizona (USA); Rolf Binder, College of Optical Sciences, The Univ. of Arizona (USA) and College of Optical Sciences, The Univ. of Arizona (USA); Arturo Chavez-Pirson, NP Photonics, Inc. (USA) [9000-20]

2:30 pm: **Exploiting Coulomb interaction in piezoelectric quantum wells to achieve laser cooling**, Iman Hassani Nia, Hooman Mohseni, Northwestern Univ. (USA) [9000-26]

2:50 pm: **Temperature gradient driven lasing and stimulated cooling**, K. Sandner, Helmut Ritsch, Univ. of Innsbruck (Austria) [9000-27]

Vertical-Cavity Surface-Emitting Lasers XVIII

Conference Chairs: **James K. Guenter**, Finisar Corp. (USA); **Chun Lei**, EMCORE Corp. (USA)

Program Committee: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign (USA); **Aaron J. Danner**, National Univ. of Singapore (Singapore); **Kent M. Geib**, Sandia National Labs. (USA); **Martin Grabherr**, Philips Technologie GmbH U-L-M Photonics (Germany); **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Anders Larsson**, Chalmers Univ. of Technology (Sweden); **Kevin L. Lear**, Colorado State Univ. (USA); **James A. Lott**, Technische Univ. Berlin (Germany); **M. V. Ramana Murty**, Avago Technologies Ltd. (USA); **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium); **Jean-Francois Seurin**, Princeton Optronics, Inc. (USA); **Noriyuki Yokouchi**, Furukawa Electric Co., Ltd. (Japan)

Wednesday 5 February

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) .. Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Chaos synchronization and encrypted communication systems as an application of VCSELs, Masanori Hisatomi, Wakao Sasaki, Doshisha Univ. (Japan)[9001-20]

Thursday 6 February

SESSION 1

Location: Room 236 (Mezzanine) Thu 8:00 am to 10:00 am

High-Speed VCSELs

Session Chair: **James K. Guenter**, Finisar Corp. (USA)

8:00 am: **28-Gbps 850-nm oxide VCSEL development and manufacturing progress at Avago** (*Invited Paper*), Thomas R. Fanning, Avago Technologies Ltd. (Singapore); Jingyi Wang, Avago Technologies Ltd. (USA); Zheng-Wen Feng, Avago Technologies Ltd. (Singapore); Mark R. Keever, Avago Technologies Ltd. (USA); Chen C. Chu, Aaditya Sridhara, Avago Technologies Ltd. (Singapore); Cesare F. Rigo, Avago Technologies Srl (Italy); Hairong Yaun, Terry E. Sale, Avago Technologies Ltd. (Singapore); Laura Giovane, Avago Technologies Ltd. (USA)[9001-1]

8:30 am: **Energy-efficient oxide-confined high-speed VCSELs for optical interconnects** (*Invited Paper*), Philip Moser, Philip Wolf, Gunter Larisch, Hui Li, James A. Lott, Technische Univ. Berlin (Germany); Dieter H. Bimberg, Technische Univ. Berlin (Germany) and King Abdulaziz Univ. (Saudi Arabia)[9001-2]

9:00 am: **1060nm 28-Gbps VCSEL developed at Furukawa**, Toshihito Suzuki, Masaki Funabashi, Hitoshi Shimizu, Shinichi Kamiya, Kazuya Nagashima, Akihiko Kasukawa, Furukawa Electric Co., Ltd. (Japan)[9001-3]

9:20 am: **VCSEL arrays for high-aggregate bandwidth of up to 1.34 Tbps**, Martin Grabherr, Roger King, Steffan Intemann, Stefan Wabra, Roland Jäger, Michael Riedl, Philipp Gerlach, Philips Technologie GmbH U-L-M Photonics (Germany)[9001-4]

9:40 am: **Ultrafast direct modulation of transverse-mode coupled-cavity VCSELs far beyond the relaxation oscillation frequency**, Hamed Dalir, Fumio Koyama, Tokyo Institute of Technology (Japan)[9001-5]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 2

Location: Room 236 (Mezzanine) ... Thu 10:30 am to 12:10 pm

Novel VCSEL Structures

Session Chair: **Chun Lei**, EMCORE Corp. (USA)

10:30 am: **Tunable MEMS-VCSEL with >140-nm tuning range using SiO/SiC-based MEMS-DBR**, Christian Gierl, Karolina Zogal, Sujoy Paul, Franko Küppers, Technische Univ. Darmstadt (Germany)[9001-6]

10:50 am: **In-plane integration of VCSEL with photo-detector by using laterally coupled cavities**, Hamed Dalir, Fumio Koyama, Tokyo Institute of Technology (Japan)[9001-7]

11:10 am: **Heterogeneously-bonded VCSEL arrays and electro-thermal modeling**, Kent D. Choquette, Hyejin Jeong, Univ. of Illinois at Urbana-Champaign (USA)[9001-8]

11:30 am: **Triggering of guiding and antiguiding effects in GaN-based VCSELs**, Seyed Ehsan Hashemi, Jörgen Bengtsson, Johan S. Gustavsson, Martin Stättin, Chalmers Univ. of Technology (Sweden); Gatien Cosendey, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Marco Calciati, Michele Goano, Politecnico di Torino (Italy); Åsa Haglund, Chalmers Univ. of Technology (Sweden)[9001-9]

11:50 am: **Optimizing the energy efficiency, bit rate, and modal properties of VCSELs for very-short-to-medium-reach optical interconnects**, Hui Li, Philip Moser, Vladimir Kalosha, Philip Wolf, Technische Univ. Berlin (Germany); Alexey S. Payusov, Ioffe Physico-Technical Institute (Russian Federation); Gunter Larisch, James A. Lott, Technische Univ. Berlin (Germany); Dieter H. Bimberg, Technische Univ. Berlin (Germany) and King Abdulaziz Univ. (Saudi Arabia)[9001-10]

Lunch/Exhibition Break Thu 12:10 pm to 1:40 pm

SESSION 3

Location: Room 236 (Mezzanine) Thu 1:40 pm to 3:10 pm

Commercial VCSEL Development

Session Chair: **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign (USA)

1:40 pm: **Evolution of VCSELs** (*Invited Paper*), Jim A. Tatum, Finisar Corp. (USA)[9001-11]

2:10 pm: **Progress towards commercialization of 25-Gb/s VCSELs**, Li Wang, Xuan Xie, Neinyi Li, Shenghong Huang, Sumitomo Electric Device Innovations, U.S.A., Inc. (USA)[9001-12]

2:30 pm: **Progress on vertical-cavity surface-emitting laser arrays for infrared illumination applications**, Delai Zhou, Jean-Francois Seurin, Guoyang Xu, Alexander Miglo, Chien-Yao Lu, Daizong Li, Qing Wang, Mukta Sundaresh, Sam Wilton, Joe Matheussen, Chuni Ghosh, Princeton Optronics, Inc. (USA)[9001-13]

2:50 pm: **Optimized VCSELs for high-power arrays**, Holger Moench, Johanna S. Kolb, Philips Technologie GmbH (Germany); Andreas P. Engelhardt, Univ. Kassel (Germany); Philipp Gerlach, Roland Jaeger, Ulrich Weichmann, Philips Technologie GmbH (Germany); Bernd Witzigmann, Univ. Kassel (Germany)[9001-14]

Coffee Break Thu 3:10 pm to 3:40 pm

SESSION 4

Location: Room 236 (Mezzanine) Thu 3:40 pm to 5:00 pm

VCSEL Characterization and Applications

Session Chair: **Martin Grabherr**, Philips Technologie GmbH U-L-M Photonics (Germany)

3:40 pm: **Coherent switching of polarization oscillations in spin-polarized vertical-cavity surface-emitting lasers**, Henning Höpfner, Markus Lindemann, Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) ...[9001-15]

4:00 pm: **Spatial mode discrimination in anti-guided arrays of long-wavelength VCSELs**, Tomasz Czynszanowski, Maciej Dems, Technical Univ. of Lodz (Poland); Vladimir Iakovlev, Nicolas Volet, Elyahou Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland)[9001-16]

4:20 pm: **Resonance detuning in coherently-coupled vertical-cavity surface-emitting laser arrays**, Kent D. Choquette, Matthew T. Johnson, Dominic F. Siriani, Univ. of Illinois at Urbana-Champaign (USA)[9001-17]

4:40 pm: **Numerical analysis on current and optical confinement of III-nitride vertical-cavity surface-emitting lasers**, Ying-Yu Lai, Tien-Chang Lu, Tsung-Lin Ho, Shen-Che Huang, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan)[9001-19]

Novel In-Plane Semiconductor Lasers XIII

Conference Chairs: **Alexey A. Belyanin**, Texas A&M Univ. (USA); **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

Program Committee: **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan); **Dan Botez**, Univ. of Wisconsin-Madison (USA); **Federico Capasso**, Harvard School of Engineering and Applied Sciences (USA); **Gary A. Evans**, Southern Methodist Univ. (USA); **Claire F. Gmachl**, Princeton Univ. (USA); **Michael Kneissl**, Technische Univ. Berlin (Germany); **Luke F. Lester**, The Univ. of New Mexico (USA); **Hui Chun Liu**, Shanghai Jiao Tong Univ. (China); **Luke J. Mawst**, Univ. of Wisconsin-Madison (USA); **Jerry R. Meyer**, U.S. Naval Research Lab. (USA); **Richard V. Penty**, Univ. of Cambridge (United Kingdom); **Johann Peter Reithmaier**, Univ. Kassel (Germany); **Haisheng Rong**, Intel Corp. (USA); **Nelson Tansu**, Lehigh Univ. (USA); **Shinji Tsuji**, Hitachi, Ltd. (Japan); **Kresten Yvind**, Technical Univ. of Denmark (Denmark)

Monday 3 February

SESSION 1

Location: Room 250 (Mezzanine) . . . Mon 8:00 am to 10:00 am

Quantum Dots

Session Chair: **Luke F. Lester**,
Virginia Polytechnic Institute and State Univ. (USA)

8:00 am: **Engineering opto-electronic properties of molecular beam epitaxy grown quantum dot structures**, Abdul Majid Mohammed, Hala Alhashim, King Abdullah Univ. of Science and Technology (Saudi Arabia); Maxime Hugues, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); David T. D. Childs, The Univ. of Sheffield (United Kingdom); Dalaver H. Anjum, Dongkyu Cha, Boon S. Ooi, King Abdullah Univ. of Science and Technology (Saudi Arabia); Richard A. Hogg, The Univ. of Sheffield (United Kingdom).[9002-1]

8:20 am: **Fabrication and optical properties of GaN quantum dots for coherent control** (*Invited Paper*), Yasuhiko Arakawa, Mark Holmes, Kihyun Choi, Munetaka Arita, Satoshi Kako, The Univ. of Tokyo (Japan)[9002-2]

8:50 am: **Development of broad spectral bandwidth hybrid QW/QD structures from 1000-1400 nm**, Negin Peyvast, Siming Chen, Keija J. Zhou, Nasser Babazadeh, Amilia Ahmed Khozim, Ziyang Zhang, David T. D. Childs, Osamu Wada, Richard A. Hogg, The Univ. of Sheffield (United Kingdom); Takeo Kageyama, Kenichi Nishi, Keizo Takemasa, Mitsuru Sugawara, QD Laser, Inc. (Japan).[9002-3]

9:10 am: **Wavelength tunable quantum dot laser operating at 1550-nm band**, Kouichi Akahane, Naokatsu Yamamoto, Atsushi Kanno, Toshimasa Umezawa, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Atsushi Kanemori, Hiroshi Takai, Tokyo Denki Univ. (Japan).[9002-4]

9:30 am: **Colloidal II-VI compound quantum dot lasers: spanning the red, green, and blue by single material** (*Invited Paper*), Arto V. Nurmikko, Kwangdong Roh, Joonhee Lee, Brown Univ. (USA); Cuong H. Dang, Nanyang Technological Univ. (Singapore)[9002-5]

Coffee Break Mon 10:00 am to 10:30 am

SESSION 2

Location: Room 250 (Mezzanine) . . Mon 10:30 am to 12:20 pm

New Materials and Grating Controlled

Session Chair: **Luke Mawst**, Univ. of Wisconsin-Madison (USA)

10:30 am: **GaAsBi/GaAs semiconductor lasers: initial laser characteristics and future prospects**, Stephen J. Sweeney, Igor P. Marko, Shirong Jin, Konstanze Hild, Zahida Batool, Univ. of Surrey (United Kingdom); Peter Ludewig, Wolfgang Stolz, Kerstin Volz, Philipps-Univ. Marburg (Germany).[9002-6]

10:50 am: **Red-emitting monolithic dual-wavelength DBR diode lasers for shifted excitation Raman spectroscopy**, Bernd Sumpf, Martin Maiwald, André Müller, Frank Bugge, Jörg Fricke, Peter Ressel, Johannes Pohl, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany)[9002-7]

11:10 am: **Bragg-grating-stabilised external cavity lasers in optical fibre and integrated planar silica-on-silicon circuits**, James C. Gates, Univ. of Southampton (United Kingdom); Fei Chen, Cranfield Univ. (United Kingdom); Christopher H. Holmes, Univ. of Southampton (United Kingdom); Stephen Staines, Cranfield Univ. (United Kingdom); Stephen Lynch, Univ. of Southampton (United Kingdom); Jane Hodgkinson, Cranfield Univ. (United Kingdom); Peter G. R. Smith, Univ. of Southampton (United Kingdom); Ralph P. Tatam, Cranfield Univ. (United Kingdom)[9002-8]

11:30 am: **Properties of 62x nm red-emitting single-mode diode lasers**, Katrin Paschke, Johannes Pohl, David Feise, Gunnar Blume, Götz Erbert, Ferdinand-Braun-Institut (Germany)[9002-9]

11:50 am: **LED-pumped organic semiconductor lasers** (*Invited Paper*), Yue Wang, Emiliano Rezende Martins, Georgios Tsiminis, Univ. of St. Andrews (United Kingdom); Alexander Kanibolotsky, Peter Skabara, Univ. of Strathclyde (United Kingdom); Ifor D. W. Samuel, Graham A. Turnbull, Univ. of St. Andrews (United Kingdom).[9002-10]

Lunch Break Mon 12:20 pm to 1:30 pm

SESSION 3

Location: Room 250 (Mezzanine) . . . Mon 1:30 pm to 3:20 pm

Mode Locked

Session Chair: **Johann Peter Reithmaier**, Univ. Kassel (Germany)

1:30 pm: **Mode-locked InAs/InP quantum-dash-based DBR laser with monolithically-integrated SOA** (*Invited Paper*), Siddharth Joshi, Nicolas Chimot, Sophie Barbet, Alain Accard, François Lelarge, III-V Lab. (France)[9002-11]

2:00 pm: **Femtosecond semiconductor laser system with arbitrary intracavity phase and amplitude manipulation**, Jan C. Balzer, Benjamin Döpke, Ruhr-Universität Bochum (Germany); Andreas Klehr, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany); Martin R. Hofmann, Ruhr-Universität Bochum (Germany)[9002-12]

2:20 pm: **Femtosecond pulse generation from a two-section mode-locked quantum-dot laser using random population**, Patrick Finch, Tyndall National Institute (Ireland); Peter Blood, Peter M. Smowton, Angela Sobiesierski, Cardiff Univ. (United Kingdom); Russell M. Gwilliam, Univ. of Surrey (United Kingdom); Ian O'Driscoll, Tyndall National Institute (Ireland)[9002-13]

2:40 pm: **Second harmonic pico-second pulse generation with mode-locked 1064nm DBR laser diodes**, Andreas Klehr, Thomas Prziwarka, Daniel Jedrzejczyk, Olaf Brox, Frank Bugge, Hans Wenzel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany)[9002-14]

3:00 pm: **Dynamics in green GaN-based laser diodes**, Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Albert-Ludwigs-Universität Freiburg (Germany); Thomas Weig, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Thomas Hager, Georg Brüderl, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany)[9002-15]

Coffee Break Mon 3:20 pm to 3:50 pm

SESSION 4

Location: Room 250 (Mezzanine) . . . Mon 3:50 pm to 5:30 pm

Nitrides

Session Chair: **Michael Kneissl**, Technische Univ. Berlin (Germany)

3:50 pm: **Optically-pumped deep-ultraviolet AlGaIn multi-quantum-well lasers grown by metalorganic chemical vapor deposition** (*Invited Paper*), Russell D. Dupuis, Yuh-Shiuan Liu, Tsung-Ting Kao, Zachary Lochner, Xiaohang Li, Mahbub Satter, Shyh-Chiang Shen, P. Douglas Yoder, Theeradetch Detchprohm, Georgia Institute of Technology (USA); Yong Wei, Hongen Xie, Alec Fischer, Fernando Ponce, Arizona State Univ. (USA)[9002-16]

4:20 pm: **Influence of surface roughness on the optical mode profile in GaN-based violet ridge waveguide laser diodes**, Katarzyna Holc, Annik Jakob, Thomas Weig, Klaus Köhler, Joachim Wagner, Oliver Ambacher, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Albert-Ludwigs-Universität Freiburg (Germany)[9002-17]

4:40 pm: **Reliability of InGaIn laser diodes** (*Invited Paper*), Piotr Perlin, Lucja Marona, Institute of High Pressure Physics (Poland)[9002-18]

5:10 pm: **Absorption at large reverse bias in monolithic GaN-based multi-section laser diodes**, Thomas Weig, Gerrit Lükens, Katarzyna Holc, Klaus Köhler, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Ulrich T. Schwarz, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) and Albert-Ludwigs-Universität Freiburg (Germany)[9002-19]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 250 (Mezzanine) . . . Tue 10:30 am to 12:20 pm

Mid-Infrared QCLs I

Session Chair: **Alexey A. Belyanin**, Texas A&M Univ. (USA)

10:30 am: **Quantum cascade lasers comb spectrometers (Keynote Presentation)**, Jérôme Faist, Andreas Hugi, Gustavo F. Villares, Mattias Beck, ETH Zurich (Switzerland); Stéphane Blaser, Alpes Lasers SA (Switzerland); Hui Chun Liu, Shanghai Jiao Tong Univ. (China); Markus Roesch, ETH Zurich (Switzerland); Giacomo Scarlari, Alpes Lasers SA (Switzerland) and ETH Zurich (Switzerland) [9002-20]

11:10 am: **Noise properties of a mid-infrared quantum cascade laser frequency comb**, Gustavo F. Villares, Andreas Hugi, ETH Zurich (Switzerland); Stéphane Blaser, Alpes Lasers SA (Switzerland); Hui Chun Liu, Shanghai Jiao Tong Univ. (China); Jérôme Faist, ETH Zurich (Switzerland) [9002-21]

11:30 am: **Three-mirror cavity quantum cascade lasers for single-mode operation**, Romain Blanchard, Harvard School of Engineering and Applied Sciences (USA); Tobias S. Mansuripur, Harvard Univ. (USA); Pauline Metivier, Harvard School of Engineering and Applied Sciences (USA); Yongrui Wang, Aleksander K. Wojcik, Alexey A. Belyanin, Texas A&M Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . [9002-22]

11:50 am: **Ring cascade lasers with integrated pi phase shifts (Invited Paper)**, Rolf Szedlak, Clemens Schwarzer, Tobias Zederbauer, Hermann Detz, Aaron M. Andrews, Werner Schrenk, Gottfried Strasser, Technische Univ. Wien (Austria) [9002-23]

Lunch/Exhibition Break Tue 12:20 pm to 1:20 pm

SESSION 6

Location: Room 250 (Mezzanine) Tue 1:20 pm to 3:30 pm

Terahertz QCLs

Session Chair: **Jerome Faist**, ETH Zurich (Switzerland)

1:20 pm: **Novel THz quantum cascade laser active materials and designs (Invited Paper)**, Christoph Deutsch, Martin Brandstetter, Michael Krall, Tobias Zederbauer, Gottfried Strasser, Karl Unterrainer, Technische Univ. Wien (Austria) [9002-24]

1:50 pm: **Broadly-tunable room-temperature THz quantum cascade laser sources (Invited Paper)**, Mikhail A. Belkin, Yifan Jiang, Karun Vijayaraghavan, Seungyong Jung, The Univ. of Texas at Austin (USA); Frederic Demmerle, Gerhard Böhm, Markus-Christian Amann, Walter Schottky Institut (Germany) [9002-25]

2:20 pm: **Towards an octave spanning CW THz quantum cascade laser**, Markus Roesch, Giacomo Scarlari, Mattias Beck, Jérôme Faist, ETH Zurich (Switzerland) [9002-26]

2:40 pm: **Simulations of laser seeding dynamics with few-cycle pulses**, Joshua R. Freeman, Univ. of Leeds (United Kingdom) and Ecole Normale Supérieure (France); Jean Maysonnave, Ecole Normale Supérieure (France); Suraj Khanna, Edmund Linfield, Giles Davies, Univ. of Leeds (United Kingdom); Sukhdeep S. Dhillon, Jerome Tignon, Ecole Normale Supérieure (France) [9002-27]

3:00 pm: **Surface-emitting THz quantum cascade lasers based on graded photonic heterostructures: towards phased arrays for high-power operation (Invited Paper)**, Raffaele Colombelli, Institut d'Électronique Fondamentale (France) [9002-28]

Coffee Break Tue 3:30 pm to 4:00 pm

SESSION 7

Location: Room 250 (Mezzanine) Tue 4:00 pm to 5:50 pm

Lasers on Silicon

Session Chair: **Haisheng Rong**, Intel Corp. (USA)

4:00 pm: **Heterogeneously-integrated lasers on silicon (Invited Paper)**, Brian R. Koch, Aurion, Inc. (USA) [9002-29]

4:30 pm: **Monolithic integration of III-V quantum-dot lasers on silicon substrate**, Qi Jiang, Andrew D. Lee, Mingchu Tang, Jiang Wu, Alwyn J. Seed, Huiyun Liu, Univ. College London (United Kingdom) [9002-30]

4:50 pm: **Analysis of band structure characteristics of Ga(NAsP)/(BGa)(AsP)-quantum well heterostructures for monolithically-integrated lasers on (001) Si-substrate (Invited Paper)**, Wolfgang Stolz, Philipps-Univ. Marburg (Germany) [9002-31]

5:20 pm: **Hybrid III-V on silicon lasers for photonic integrated circuits on silicon (Invited Paper)**, Guang-Hua Duan, III-V Lab. (France) [9002-32]

Wednesday 5 February

SESSION 8

Location: Room 250 (Mezzanine) . . . Wed 8:00 am to 10:10 am

Photonic Bandgap and Microcavity

Session Chair: **Kresten Yvind**, Technical Univ. of Denmark (Denmark)

8:00 am: **Self-frequency conversion in photonic crystal nanocavity quantum dot lasers (Invited Paper)**, Yasutomo Ota, Katsuyuki Watanabe, Satoshi Iwamoto, Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [9002-33]

8:30 am: **Photonic crystal surface-emitting lasers as pumping light source for second harmonic generation**, Akiyoshi Watanabe, Kazuyoshi Hirose, Yoshitaka Kurosaka, Takahiro Sugiyama, Hamamatsu Photonics K.K. (Japan); Yong Liang, Susumu Noda, Kyoto Univ. (Japan) [9002-34]

8:50 am: **Room temperature lasing from individual GaAs-AlGaAs core-shell nanowires**, Benedikt Mayer, Daniel Rudolph, Joscha Schnell, Julia Winnerl, Stefanie Morkoetter, Julian Treu, Technische Univ. München (Germany); Gerhard Abstreiter, Gregor Koblmüller, Jonathan J. Finley, Walter Schottky Institut (Germany) [9002-35]

9:10 am: **Directly-modulated photonic crystal lasers for computercom applications (Invited Paper)**, Shinji Matsuo, NTT Photonics Labs. (Japan) [9002-36]

9:40 am: **Electrically-driven nanobeam photonic crystal laser (Invited Paper)**, Hong-Gyu Park, Kwang-Yong Jeong, Korea Univ. (Korea, Republic of); Min-Kyo Seo, Yong-Hee Lee, KAIST (Korea, Republic of) [9002-37]

Coffee Break Wed 10:10 am to 10:40 am

SESSION 9

Location: Room 250 (Mezzanine) . . Wed 10:40 am to 12:40 pm

Mid-Infrared Lasers: Sb-based

Session Chair: **Oana Malis**, Purdue Univ. (USA)

10:40 am: **Cascade pumping of GaSb-based type-I quantum well diode lasers (Invited Paper)**, Leon Shterengas, Rui Liang, Gela Kipshidze, Takashi Hosoda, Sergey Suchalkin, Gregory Belenky, Stony Brook Univ. (USA) . [9002-38]

11:10 am: **Ultra-low input power long-wavelength GaSb type-I laser diodes at 2.7-3.0 μm**, Augustinas Vizbaras, Mindaugas Greibus, Edgaras Dvinelis, Augustinas Trinkunas, Deividas Kovalenkovas, Ieva Šimonyte, Kristijonas Vizbaras, Brolis Semiconductors UAB (Lithuania) [9002-39]

11:30 am: **InGaAsSb/AlGaAsSb laterally-coupled index-grating distributed feedback lasers for HF gas sensing at 2475 nm**, James A. Gupta, Andrew Bezinger, Pedro J. Barrios, Jean Lapointe, Daniel Poitras, Geof C. Aers, National Research Council Canada (Canada) [9002-40]

11:50 am: **2-micron GaSb-based metamorphic laser grown on GaAs (Invited Paper)**, Paveen Apiratikul, Lei He, Richard P. Leavitt, Nathan P. Siwak, Joseph Duperre, Christopher J. K. Richardson, Univ. of Maryland, College Park (USA) [9002-41]

OPTO

Conference 9002 · Location: Room 250 (Mezzanine)

12:20 pm: **Generation of high-peak power from a 4.55 μm optically-pumped semiconductor laser**, Andrew P. Ongstad, Air Force Research Lab. (USA); Michael Tilton, Boeing-SVS, Inc. (USA); Ron Kaspi, Air Force Research Lab. (USA)[9002-42]

Lunch/Exhibition Break Wed 12:40 pm to 2:10 pm

SESSION 10

Location: Room 250 (Mezzanine) Wed 2:10 pm to 3:30 pm

Mid-Infrared QCLs II

Session Chair: **Jerry R. Meyer**, U.S. Naval Research Lab. (USA)

2:10 pm: **High-power high-brightness single-mode master oscillator power amplifier and tapered QCLs for stand-off detection** (*Invited Paper*), Romain Blanchard, Patrick Rauter, Guy-Mael J. De Naurois, Harvard School of Engineering and Applied Sciences (USA); Tobias S. Mansuripur, Harvard Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA)[9002-43]

2:40 pm: **Quantum cascade laser in a master oscillator power amplifier configuration**, Borislav Hinkov, Mattias Beck, Emilio Gini, Jérôme Faist, ETH Zurich (Switzerland)[9002-44]

3:00 pm: **AlAs/InAlAs-InGaAs QCLs grown by gas-source molecular-beam epitaxy** (*Invited Paper*), William T. Masselink, Mykhaylo P. Semtsiv, Yuri V. Flores, Mikaela Elagin, Grygorii Monastyrskiy, Jan F. Kischkat, Sergii S. Kurlov, Anna Aleksandrova, Humboldt-Univ. zu Berlin (Germany)[9002-45]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 11

Location: Room 250 (Mezzanine) Wed 4:00 pm to 5:40 pm

Mid-Infrared Lasers II

Session Chair: **William T. Masselink**,
Humboldt-Univ. zu Berlin (Germany)

4:00 pm: **Interband cascade lasers for the mid-infrared spectral region** (*Invited Paper*), Sven Höfling, Robert Weih, Matthias Dallner, Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany)[9002-46]

4:30 pm: **High-power high-brightness tapered-ridge interband cascade lasers operating in CW mode**, William W. Bewley, Chadwick L. Canedy, Chul S. Kim, Charles D. Merritt, Joshua Abell, Igor Vurgaftman, Jerry R. Meyer, U.S. Naval Research Lab. (USA); Mijin Kim, Sotera Defense Solutions (USA)[9002-47]

4:50 pm: **Quantum band engineering of nitride semiconductors for infrared lasers** (*Invited Paper*), Oana Malis, D. Li, C. Edmunds, Mohammed I. Hossain, L. Tang, J. Shao, Purdue Univ. (USA); A. Grier, Univ. of Leeds (United Kingdom); G. Gardner, Purdue Univ. (USA); Zoran Ikonik, Paul Harrison, Univ. of Leeds (United Kingdom); M. J. Manfra, Purdue Univ. (USA)[9002-48]

5:20 pm: **High-performance InP-based InAs triangular quantum well lasers beyond 2 μm** , Yi Gu, Yong-Gang Zhang, Yuanqing Cao, Xingyou Chen, Haosibaiyin Li, Li Zhou, Shanghai Institute of Microsystem And Information Technology (China)[9002-49]

Thursday 6 February

SESSION 12

Location: Room 250 (Mezzanine) Thu 8:00 am to 10:00 am

High Brightness/High Efficiency

Session Chair: **Gary A. Evans**, Southern Methodist Univ. (USA)

8:00 am: **High-power and high-efficiency broad-area diode laser emitting at 1.5 μm** (*Invited Paper*), Toby J. Garrod, Don Olson, Michael Klaus, Chris J. Zenner, Christian Galstad, Francois Brunet, Compound Photonics (USA); Luke J. Mawst, Dan Botez, Univ. of Wisconsin-Madison (USA)[9002-50]

8:30 am: **Very high-power broad area laser diode with internal wavelength stabilization at 975 nm for Yb fibre laser pumping**, Michel Krakowski, Patrick Resneau, Michaël Maria, Marco Lamponi, Michel Lecomte, Yannick Robert, Eric Vinet, Michel Garcia, Olivier Parillaud, III-V Lab. (France)[9002-51]

8:50 am: **Defect temperature kinetics during catastrophic optical damage in high-power diode lasers**, Martin Hempel, Jens W. Tomm, Thomas Elsässer, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany)[9002-52]

9:10 am: **Cryogenic ultra-high-power infrared diode laser bars** (*Invited Paper*), Paul Crump, Carlo F. Frevert, H. Höslér, Frank Bugge, Steffen Knigge, Wolfgang Pittroff, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany)[9002-53]

9:40 am: **Realization of high-power narrow beam divergence in photonic-crystal surface-emitting laser**, Kazuyoshi Hirose, Yoshitaka Kurosaka, Akiyoshi Watanabe, Takahiro Sugiyama, Hamamatsu Photonics K.K. (Japan); Yong Liang, Susumu Noda, Kyoto Univ. (Japan)[9002-54]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 13

Location: Room 250 (Mezzanine) . . . Thu 10:30 am to 12:20 pm

QCL Arrays/Tunable QCLs

Session Chair: **Qijie Wang**, Nanyang Technological Univ. (Singapore)

10:30 am: **Monolithic wavelength tuning of quantum cascade lasers** (*Invited Paper*), Christian J. Pflügl, Mark F. Witinski, Laurent Diehl, EOS Photonics (USA)[9002-55]

11:00 am: **Design optimization of metal-semiconductor grating-coupled substrate-emitting quantum cascade lasers for CW operation in the mid-infrared**, Luke J. Mawst, Chris A. Sigler, Jeremy Kirch, Toby J. Garrod, Xiaodong Wang, Colin Boyle, Dan Botez, Univ. of Wisconsin-Madison (USA); Thomas Earles, Intraband, LLC (USA)[9002-56]

11:20 am: **Distributed Bragg reflector THz quantum cascade light sources with tuning range of ~300 GHz**, Seungyong Jung, Aiting Jiang, Yifan Jiang, The Univ. of Texas at Austin (USA); Xiaojun Wang, Mariano Troccoli, AdTech Optics, Inc. (USA); Mikhail A. Belkin, The Univ. of Texas at Austin (USA)[9002-57]

11:40 am: **Integrated widely-tunable quantum cascade lasers with super-structure gratings**, Dingkai Guo, Univ. of Maryland, Baltimore County (USA); Jiun-Yun Li, National Taiwan Univ. (Taiwan); Terrance Worchesky, Fow-Sen Choa, Univ. of Maryland, Baltimore County (USA)[9002-58]

12:00 pm: **InGaAs/InP-based echelle mirror multiplexer using dual Rowland circle gratings for DFB QCL arrays in the mid-long infrared range**, Luis Jorge Orbe Nava, Carlos Gordon, Guillermo Carpintero del Barrio, Univ. Carlos III de Madrid (Spain); Grégory Maisons, Mathieu Carras, III-V Lab. (France) . .[9002-59]

Lunch/Exhibition Break Thu 12:20 pm to 1:50 pm

SESSION 14

Location: Room 250 (Mezzanine) Thu 1:50 pm to 3:50 pm

Mid-Infrared QCLs III

Session Chair: **Christian J. Pflügl**, EOS Photonics (USA)

1:50 pm: **Photonic engineering of quantum cascade lasers** (*Invited Paper*), Qijie Wang, Guozhen Liang, Nanyang Technological Univ. (Singapore); Houkun Liang, Ying Zhang, A*STAR Singapore Institute of Manufacturing Technology (Singapore)[9002-60]

2:20 pm: **Low-power-consumption (P<1W) distributed feedback quantum cascade lasers for portable device applications**, Mariano Troccoli, Jenyu Fan, Xiaojun Wang, AdTech Optics, Inc. (USA)[9002-61]

2:40 pm: **The role of electron temperature in the leakage current in QCLs and its impact on the quantum efficiency**, Yuri V. Flores, Sergii S. Kurlov, Mikaela Elagin, Mykhaylo P. Semtsiv, William T. Masselink, Humboldt-Univ. zu Berlin (Germany)[9002-62]

3:00 pm: **Current spreading in shallow-ridge ion-implanted quantum cascade lasers**, Loan T. Le, Princeton Univ. (USA); Vadim Tokranov, Serge Oktyabrsky, Univ. at Albany (USA); Igor E. Trofimov, PTAC, Inc. (USA); Claire F. Gmachl, Princeton Univ. (USA)[9002-63]

3:20 pm: **Non-resonant optical modulation of quantum cascade laser and its potential in communication and spectroscopy** (*Invited Paper*), Rainer Martini, Stevens Institute of Technology (USA)[9002-64]

Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII

Conference Chairs: **Klaus P. Streubel**, OSRAM AG (Germany); **Heonsu Jeon**, Seoul National Univ. (Korea, Republic of); **Li-Wei Tu**, National Sun Yat-Sen Univ. (Taiwan)

Conference Co-Chair: **Martin Strassburg**, OSRAM Opto Semiconductors GmbH (Germany)

Program Committee: **Gerd Bacher**, Univ. Duisburg-Essen (Germany); **Ray-Hua Horng**, National Chung Hsing Univ. (Taiwan); **Mitch M. C. Chou**, National Sun Yat-Sen Univ. (Taiwan); **Michael Heuken**, AIXTRON SE (Germany); **Satoshi Kamiyama**, Meijo Univ. (Japan); **Jong Kyu Kim**, Pohang Univ. of Science and Technology (Korea, Republic of); **Markus Klein**, OSRAM Opto Semiconductors GmbH (Germany); **Mike Krames**, Soraa, Inc. (USA); **Hao-Chung Kuo**, National Chiao Tung Univ. (Taiwan); **Kei May Lau**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Kurt J. Linden**, Spire Corp. (USA); **Hans Nikol**, Philips Lighting B.V. (Netherlands); **Joongseo Park**, LG Electronics Inc. (Korea, Republic of); **E. Fred Schubert**, Rensselaer Polytechnic Institute (USA); **Ross P. Stanley**, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 1

Location: Room 123 (Exhibit Level) . Tue 10:30 am to 12:00 pm

Solid State Lighting I

Session Chair: **Hans Nikol**, Philips Lighting B.V. (Netherlands)

- 10:30 am: **Quality of light of LED lighting: accurately rendering whites and colors (Invited Paper)**, Aurelien David, Michael R. Krames, Soraa, Inc. (USA) [9003-1]
- 11:00 am: **Metric for the evaluation of color uniformity in the far field of LED-spot lights (Invited Paper)**, Anne Teupner, Univ. Politécnica de Madrid (Spain); Krister Bergeneck, Ralph Wirth, OSRAM Opto Semiconductors GmbH (Germany); Pablo Benitez, Juan Carlos Miñano, Univ. Politécnica de Madrid (Spain) . [9003-2]
- 11:30 am: **Dual phosphors-converted white LEDs modeling by using near-field chromatic luminance data**, Bing Q. Chen, Hugo J. Cornelissen, Philips Research Nederland B.V. (Netherlands); Neng-Chung Hu, National Taiwan Univ. of Science and Technology (Taiwan) [9003-3]
- 11:45 am: **Advances in optical and thermal management of phosphor-converted LEDs**, Madis Raukas, John Kelso, Alan Lenef, OSRAM SYLVANIA Inc. (USA); Alexander Linkov, OSRAM Opto Semiconductors GmbH (Germany); Maxim Tchoul, OSRAM SYLVANIA Inc. (USA) [9003-4]
- Lunch/Exhibition Break Tue 12:00 pm to 1:30 pm

SESSION 2

Location: Room 123 (Exhibit Level) . . . Tue 1:30 pm to 3:00 pm

Nanotechnologies for LEDs I

Session Chair: **Michael R. Krames**, Soraa, Inc. (USA)

- 1:30 pm: **Phosphor-free InGaN/GaN/AlGaIn core-shell dot-in-a-wire white light-emitting diodes (Invited Paper)**, Zetian Mi, Hieu P. Nguyen, Shaofei Zhang, Ashfiqua Connie, Md Kibria, Qi Wang, Ishiang Shih, McGill Univ. (Canada) [9003-5]
- 2:00 pm: **DERI method: Possible approach to green, red, and IR light emitters based on nitride semiconductors (Invited Paper)**, Yasushi Nanishi, Ritsumeikan Univ. (Japan); Tomohiro Yamaguchi, Kogakuin Univ. (Japan); Tsutomu Araki, Ritsumeikan Univ. (Japan); Euijoon Yoon, Seoul National Univ. (Korea, Republic of) [9003-6]
- 2:30 pm: **Low-cost nanofabrication of nanorod InGaN/GaN multiple-quantum-wells light-emitting diodes**, Min-Huan Wang, Han Li, Yi-Kai Huang, Wei-Chi Lai, Jinn-Kong Sheu, Yun-Chong Chang, National Cheng Kung Univ. (Taiwan) [9003-8]
- 2:45 pm: **Implementation of graphene electrodes in nanoparticle light-emitting devices**, Svenja Wolff, Simon Sanders, Gerd Bacher, Ekaterina Nannen, Univ. Duisburg-Essen (Germany) [9003-9]
- Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 3

Location: Room 123 (Exhibit Level) . . . Tue 3:30 pm to 5:15 pm

High-Current LED Performance

- Session Chair: **E. Fred Schubert**, Rensselaer Polytechnic Institute (USA)
- 3:30 pm: **A critical review of III-Nitride LED efficiency droop models**, Joachim Piprek, NUSOD Institute LLC (USA) [9003-10]
- 3:45 pm: **Modeling the temperature dependence of efficiency versus current density in InGaIn light-emitting diodes**, Weng W. Chow, Sandia National Labs. (USA) [9003-11]
- 4:00 pm: **Analyzing the correlation between nanoscale indium fluctuation in multiple quantum wells and efficiency droop behavior for InGaIn-based light-emitting diodes grown on GaN substrate and sapphire**, Da-Wei Lin, National Chiao Tung Univ. (Taiwan); Yuh-Renn Wu, National Taiwan Univ. (Taiwan); Yu-Ting Kang, National Chiao Tung Univ. (Taiwan); Shu-ting Yeh, National Taiwan Univ. (Taiwan); Yu-Lin Tsai, Gou-Chung Chi, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) [9003-12]
- 4:15 pm: **Comprehensive study of internal quantum efficiency of high-brightness GaN-based light-emitting diodes by temperature-dependent electroluminescence method**, Yaqi Wang, Mengshu Pan, Ting Li, Lightera Corp. (USA) [9003-13]
- 4:30 pm: **Reduction of efficiency droop in InGaIn light-emitting diodes on low dislocation density GaN substrate**, Kouhei Yamashita, Nagoya Univ. (Japan); Tomohiko Sugiyama, Makoto Iwai, NGK Insulators, Ltd. (Japan); Yoshio Honda, Nagoya Univ. (Japan); Takashi Yoshino, NGK Insulators, Ltd. (Japan); Hiroshi Amano, Nagoya Univ. (Japan) [9003-14]



Conference 9003 · Location: Room 123 (Exhibit Level)

4:45 pm: **Efficiency droop improvement in InGaN/GaN light-emitting diodes by thinner quantum well with different location**, Sheng-Wen Wang, Da-Wei Lin, Chia-Yu Lee, Chien-Chung Lin, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan)[9003-15]

5:00 pm: **Identifying the cause of the efficiency droop in GaInN light-emitting diodes by correlating the onset of high injection with the onset of the efficiency droop**, David S. Meyaard, Guan-Bo Lin, Rensselaer Polytechnic Institute (USA); Jaehee Cho, Chonbuk National Univ. (Korea, Republic of) and Rensselaer Polytechnic Institute (USA); E. Fred Schubert, Rensselaer Polytechnic Institute (USA); Hyunwook Shim, Sang-Heon Han, Min-Ho Kim, Cheolsoo Sone, Young Sun Kim, Samsung Electro-Mechanics (Korea, Republic of)[9003-16]

Wednesday 5 February

SESSION 4

Location: Room 123 (Exhibit Level) . . Wed 8:30 am to 10:00 am

Nanotechnologies for LEDs II

Session Chair: **Gerd Bacher**, Univ. Duisburg-Essen (Germany)

8:30 am: **Long wavelength nanowire light-emitting diodes** (*Invited Paper*), Pallab Bhattacharya, Shafat Jahangir, Ethan Stark, Univ. of Michigan (USA); Martin Mandl, Tilman Schimpke, Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany)[9003-17]

9:00 am: **Nanorod-structured flip-chip GaN-based white light-emitting diodes** (*Invited Paper*), Ching-Ting Lee, Hsin-Ying Lee, Yu-Ting Su, National Cheng Kung Univ. (Taiwan)[9003-18]

9:30 am: **Nanoscale characterization of nitride nanostructures using helium temperature scanning electron microscopy cathodoluminescence** (*Invited Paper*), Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany)[9003-19]

Coffee Break Wed 10:00 am to 10:30 am

SESSION 5

Location: Room 123 (Exhibit Level) Wed 10:30 am to 12:00 pm

LED Fabrication

Session Chair: **Mitch M. C. Chou**, National Sun Yat-Sen Univ. (Taiwan)

10:30 am: **Highly-reliable Ag-based reflector for vertical-geometry GaN-based light-emitting diodes: Electrode design to improve the thermal stability** (*Invited Paper*), Tae-Yeon Seong, Tae-Wook Kang, Korea Univ. (Korea, Republic of)[9003-20]

11:00 am: **New developments on high-efficiency infrared and InGaAlP light-emitting diodes at OSRAM OS**, Markus Broell, Wolfgang Schmid, Petrus Sundgren, Andreas Rudolph, Anton Vogl, Martin Behringer, OSRAM Opto Semiconductors GmbH (Germany)[9003-21]

11:15 am: **Advanced packaging methodes for high-power LED modules**, Rafael C. Jordan, Constanze Weber, Christian Ehrhardt, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)[9003-22]

11:30 am: **Two-dimensional patterned sapphire substrate for full-wafer photoelectrochemical liftoff**, Chieh Hsieh, Chun-Han Lin, National Taiwan Univ. (Taiwan); Zhan Hui Liu, National Taiwan Univ. (Taiwan) and Nanjing Univ. of Information Science & Technology (China); Chih-Chung Yang, National Taiwan Univ. (Taiwan)[9003-23]

11:45 am: **Performance of vertical GaN light-emitting diodes using an embedded finger-type contact**, Ray-Hua Horng, Kun-Ching Shen, National Chung Hsing Univ. (Taiwan); Chao-Yu Pai, National Cheng Kung Univ. (Taiwan); Dong-Sing Wu, National Chung Hsing Univ. (Taiwan)[9003-24]

Lunch/Exhibition Break Wed 12:00 pm to 1:30 pm

SESSION 6

Location: Room 123 (Exhibit Level) . . Wed 1:30 pm to 3:30 pm

UV LEDs

Session Chair: **Satoshi Kamiyama**, Meijo Univ. (Japan)

1:30 pm: **UV-LEDs: the long road towards shorter wavelengths** (*Invited Paper*), Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany); Frank Mehnke, Christian Kuhn, Christoph Reich, Martin Guttman, Tim Kolbe, Jens Rass, Tim Wernicke, Technische Univ. Berlin (Germany); Arne Knauer, Viola Kueller, Carsten Netzel, Ute Zeimer, Mickael Lapeyrade, Sven Einfeldt, Markus Weyers, Ferdinand-Braun-Institut (Germany)[9003-25]

2:00 pm: **p⁺-InAlN layer and ZnO-related TCOs for UV-LED applications** (*Invited Paper*), Dong-Sing Wu, National Chung Hsing Univ. (Taiwan) and Da-Yeh Univ. (Taiwan); Kun-Ching Shen, Ching-Ho Tien, Chiung-Yi Huang, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan)[9003-26]

2:30 pm: **Enhanced light extraction and electrical properties of deep-ultraviolet light-emitting diodes by reflective contacts on selective-area-grown GaN** (*Invited Paper*), Dong-Yeong Kim, Jong Won Lee, Sunyong Hwang, Jun Hyuk Park, Jong Kyu Kim, Pohang Univ. of Science and Technology (Korea, Republic of)[9003-27]

3:00 pm: **Enhancing carrier injection in the active region of a 280nm emission wavelength LED using graded hole and electron blocking layers**, Bilal Janjua, Tien Khee Ng, Boon S. Ooi, King Abdullah Univ. of Science and Technology (Saudi Arabia)[9003-28]

3:15 pm: **High-power UV LEDs in the 290-nm to 330-nm wavelength range**, Tim Wernicke, Frank Mehnke, Technische Univ. Berlin (Germany); Johannes Glaab, Mickael Lapeyrade, Sven Einfeldt, Ferdinand-Braun-Institut (Germany); Christian Kuhn, Christoph Reich, Nikolay Ldentsov Jr., Jens Rass, Technische Univ. Berlin (Germany); Tim Kolbe, Ferdinand-Braun-Institut (Germany); Neysha Lobo, Technische Univ. Berlin (Germany); Christoph Stölmacker, Arne Knauer, Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany)[9003-29]

Coffee Break Wed 3:30 pm to 4:00 pm

SESSION 7

Location: Room 123 (Exhibit Level) . . Wed 4:00 pm to 5:45 pm

Novel LED Technologies

Session Chair: **Jong Kyu Kim**,

Pohang Univ. of Science and Technology (Korea, Republic of)

4:00 pm: **Surface plasmon coupled light-emitting diodes** (*Invited Paper*), Horng-Shyang Chen, Chia-Feng Chen, Chung-Hui Chen, Pei-Ying Shih, Chieh Hsieh, Che-Hao Liao, Wang-Hsien Chou, Chih-Yen Chen, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan)[9003-30]

4:30 pm: **Optically functional structures on GaN-based light-emitting diodes for emission pattern control** (*Invited Paper*), Jaehee Cho, Chonbuk National Univ. (Korea, Republic of); Ming Ma, E. Fred Schubert, Rensselaer Polytechnic Institute (USA); Gi Bum Kim, SAMSUNG Electronics Co., Ltd. (Korea, Republic of)[9003-31]

5:00 pm: **High-efficiency light-emitting diodes based on InGaN-ZnGeN₂ type-II quantum wells**, Hongping Zhao, Kathleen Kash, Case Western Reserve Univ. (USA)[9003-32]

5:15 pm: **Strain-engineered green-to-orange-emitting (wavelength < 600 nm) GaInN quantum wells grown on metamorphic graded GaInN buffer layers with an in-plane lattice parameter larger than that of GaN**, Juergen Daeubler, Rolf Aidam, Klaus Köhler, Thorsten Passow, Luz Kirste, Michael Kunzer, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany)[9003-33]

5:30 pm: **Effective light extraction in surface-grating vertical light-emitting diodes fabricated with photoelectrochemical etching**, Chun-Han Lin, Charn-Gan Tu, Chieh Hsieh, Horng-Shyang Chen, Yean-Woei Chen, Chih-Chung Yang, National Taiwan Univ. (Taiwan)[9003-34]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

High-extraction-efficiency GaInN light-emitting diodes with controllable emission patterns enabled by micro-patterned graded-refractive-index coatings, Ming Ma, Jaehee Cho, E. Fred Schubert, Rensselaer Polytechnic Institute (USA); Gi Bum Kim, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [9003-49]

Enhancement of light extraction on the vertical light-emitting diodes with SiO₂ nano-extractor, Sang-Mook Kim, Korea Photonics Technology Institute (Korea, Republic of); Hyokun Son, Chonnam National Univ. (Korea, Republic of) [9003-50]

Compact remote water disinfection device using solar-powered deep-UV LEDs, Brad Butterfield, Quantel USA (USA) [9003-51]

A NO_x and SO₂ gas analyzer using deep-UV and violet light-emitting diodes for continuous emissions monitoring systems, Ryoichi Higashi, Yu Taniguchi, Kozo Akao, Kazuhiro Koizumi, Noritomo Hirayama, Fuji Electric Co., Ltd. (Japan); Yoshiaki Nakano, The Univ. of Tokyo (Japan) [9003-52]

Novel samarium/erbium and samarium/terbium codoped glass phosphor for application in warm white light-emitting-diode, Cosmo M. Silva Jr., Artur S. Gouveia-Neto, Luciano A. Bueno, Univ. Federal Rural de Pernambuco (Brazil) [9003-53]

Enhancement of light extraction efficiency with triangular-shaped GaN-based light-emitting diodes, Ja-Yeon Kim, Korea Photonics Technology Institute (Korea, Republic of); Yong-Jin Kang, Jong-Hyun Jeon, Chosun Univ. (Korea, Republic of); Jong Hyeob Baek, Korea Photonics Technology Institute (Korea, Republic of); Min-Ki Kwon, Chosun Univ. (Korea, Republic of); Dae Woo Jeon, Korea Photonics Technology Institute (Korea, Republic of) [9003-55]

Analysis on the luminous efficiency of phosphor-conversion white light-emitting diodes, Geun-Hwan Ryu, Hyun-Joong Kim, Sang-Ho Lee, Won-Bo Yang, Han-Youl Ryu, Inha Univ. (Korea, Republic of) [9003-56]

Study of grating layer location of a GaN nano-grated LED for improvement of transmission efficiency, Ashli Behilla, Gabriela Alemana, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA); Xiang-Ning Kang, Guo-yi Zhang, Peking Univ. (China) [9003-57]

High-color rendering indices performance of glass based phosphor-converted white light-emitting diodes for solid state lighting, Chun-Chin Tsai, Far East Univ. (Taiwan); Wei-Chih Cheng, National Sun Yat-Sen Univ. (Taiwan); Chen-Guan Hao, Far East Univ. (Taiwan); Wood-Hi Cheng, National Sun Yat-Sen Univ. (Taiwan) [9003-58]

Thermal stability behavior in reduced graphene oxide embedded LEDs by temperature-dependent current-voltage measurement, Nam Han, Chang-Hee Hong, Chonbuk National Univ. (Korea, Republic of) [9003-59]

Silver nanowire network for high-performance and transparent conducting electrode of GaN-based light-emitting diodes, Ja-Yeon Kim, Korea Photonics Technology Institute (Korea, Republic of); Pan-Ju Choi, Yong-Jin Kang, Jong-Hyun Jeon, Seung-Jong Oh, Min-Ki Kwon, Chosun Univ. (Korea, Republic of) [9003-60]

Multicolor upconversion luminescence of rare-earth doped Y₂CaZnO₅ nanophosphors for white lighting-emitting diodes, Ramireddy Rajeswari, Sri Venkateswara Univ. (India); S. Surendra Babu, Research Ctr. Imarat (India); C. K. Jayasankar, Sri Venkateswara Univ. (India) [9003-61]

Grade evaluation of tobaccos using multi-wavelength light-emitting-diode-induced fluorescence spectroscopy, Weijia Zhong, Yongjiag Dong, Hongze Lin, Xuan Liu, Zhejiang Univ. (China); Liang Mei, Lund Univ. (Sweden) and Zhejiang Univ. (China) [9003-62]

Real-time monitoring of sulfur dioxide using ultraviolet light-emitting diode, Weijia Zhong, Hongze Lin, Zhejiang Univ. (China); Xiutao Lou, Zhejiang Univ. (China) and Harbin Institute of Technology (China); Liang Mei, Lund Univ. (Sweden) and Zhejiang Univ. (China) [9003-63]

Monolithically-integrated full-color nano-LED arrays, Chu-Hsiang Teng, Hui Deng, Pei-Cheng Ku, Univ. of Michigan (USA) [9003-64]

Estimation of carrier overflow in InGaN lighting-emitting diodes from photocurrent measurements, Shopan D. Hafiz, Fan Zhang, Morteza Monavarian, Serdal Okur, Vitaliy Avrutin, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [9003-65]

Microscope investigation and electrical conductivity of Si-doped n-type Al_{0.45}Ga_{0.55}N layer grown on AlGaN/AlN superlattices, Seong-Ran Jeon, Korea Photonics Technology Institute (Korea, Republic of); Sung Jin Son, LG Innotek (Korea, Republic of); Si-Hyun Park, Yeungnam Univ. (Korea, Republic of) [9003-66]

On electrical efficiency and droop in MQW LEDs, Volodymyr K. Maluytenko, V. Lashkaryov Institute of Semiconductor Physics (Ukraine) [9003-67]

Portable fluorescence spectroscopy platform for Huanglongbing (HLB) citrus disease in situ detection, Tiago Ortega, Univ. de São Paulo (Brazil) and AgriOS (Brazil); Alessandro Damiani Mota, Giuliano Rossi, Guilherme Castro, AgriOS (Brazil); Paulino Villas Boas, Debora Milori, Embrapa Instrumentação Agropecuária (Brazil); Jarbas Castro Neto, Univ. de São Paulo (Brazil) . . [9003-68]

Electrical and photometrical performance of LED lighting for ship accommodation quarters, Hong-Shik Lee, Hui-seok Jeong, Miso Noh, Meeryoung Cho, Korea Institute of Lighting Technology (Korea, Republic of) [9003-69]

Preference and brightness differences for LED lighting: Korean and Westerners, Jae-Kyu Ko, Min-Jin Lee, Ju-Hyun Kim, Mee-Ryoung Cho, Korea Institute of Lighting Technology (Korea, Republic of) [9003-70]

Thursday 6 February

SESSION 8

Location: Room 123 (Exhibit Level) . . Thu 8:30 am to 10:00 am

LED Efficiency Droop I

Joint Session with Conferences 8986 and 9003

Session Chair: **Joachim Piprek**, NUSOD Institute LLC (USA)

8:30 am: **Auger carrier leakage in III-nitride LEDs** (*Invited Paper*), Friedhard Römer, Christian Range, Marcus Deppner, Bernd Witzigmann, Univ. Kassel (Germany) [8986-61]

9:00 am: **Measurement of Auger effect and droop in LEDs by energy analysis of electron emission in vacuum** (*Invited Paper*), Claude Weisbuch, Jim Speck, Justin Iveland, J. Perretti, L. Martinelli, M. Piccardo, Univ. of California, Santa Barbara (USA) [9003-35]

9:30 am: **Microscopic models of non-radiative and high-current effects in LEDs: state of the art and future developments** (*Invited Paper*), Enrico Bellotti, Boston Univ. (USA); Francesco Bertazzi, Marco Calciati, Xiangyu Zhou, Giovanni Ghione, Michele Goano, Politecnico di Torino (Italy) [9003-36]

Coffee Break Thu 10:00 am to 10:30 am

SESSION 9

Location: Room 123 (Exhibit Level) . . Thu 10:30 am to 12:00 pm

LED Efficiency Droop II

Joint Session with Conferences 8986 and 9003

Session Chair: **Klaus P. Streubel**, OSRAM AG (Germany)

10:30 am: **Microscopic many-body investigation of the efficiency droop in GaN-based light-emitting devices** (*Invited Paper*), Jorg Hader, Jerome V. Moloney, Nonlinear Control Strategies, Inc. (USA) and The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany) [9003-37]

11:00 am: **The efficiency droop in III-V semiconductor light-emitting diodes** (*Invited Paper*), E. Fred Schubert, Rensselaer Polytechnic Institute (USA) [9003-38]

11:30 am: **Low-temperature studies of the efficiency droop in InGaN-based light-emitting diodes** (*Invited Paper*), Jong-In Shim, Hyunsung Kim, Dong-Pyo Han, Dong-Soo Shin, Hanyang Univ. (Korea, Republic of); Kyu-Sang Kim, Sangji Univ. (Korea, Republic of) [8986-62]

Lunch/Exhibition Break Thu 12:00 pm to 1:30 pm



Conference 9003 · Location: Room 123 (Exhibit Level)

SESSION 10

Location: Room 123 (Exhibit Level) . . . Thu 1:30 pm to 3:30 pm

Novel Substrates for LEDs

Session Chair: **Kei May Lau**, Hong Kong Univ. of Science and Technology (Hong Kong, China)

1:30 pm: **Ammonothermal bulk GaN substrates for LEDs** (*Invited Paper*), Mark P. D'Evelyn, Dirk Ehrentraut, Wenkan Jiang, Derrick S. Kamber, Bradley C. Downey, Rajeev T. Pakalapati, Hakdo Yoo, Soraa, Inc. (USA) [9003-39]

2:00 pm: **GaN substrates grown by HVPE for LED applications** (*Invited Paper*), Ke Xu, Suzhou Institute of Nano-tech and Nano-bionics (China) [9003-40]

2:30 pm: **Ultra-high-efficiency GaN-on-GaN violet and white LED sources** (*Invited Paper*), Rafael I. Aldaz, Michael J. Cich, Christophe A. Hurni, Aurelien David, Arpan Chakraborty, Michael J. Grundmann, Troy A. Trottier, Bryan Ellis, Frank M. Steranka, Michael R. Krames, Soraa, Inc. (USA) [9003-41]

3:00 pm: **Extremely-high current density over 1000 A/cm² operation in M-GaN LEDs on bulk GaN substrates with low-efficiency droop** (*Invited Paper*), Toshiya Yokogawa, Panasonic Corp. (Japan) [9003-42]

Coffee Break Thu 3:30 pm to 4:00 pm

SESSION 11

Location: Room 123 (Exhibit Level) . . . Thu 4:00 pm to 5:15 pm

Solid State Lighting II

Session Chair: **Ross P. Stanley**,

Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland)

4:00 pm: **Adjustable spectrum LED solar simulator**, Kurt J. Linden, William R. Neal, Harvey B. Serreze, Spire Corp. (USA) [9003-43]

4:15 pm: **Spectral behavior and coherence length of GaN- and AlGaInP-based light-emitting diodes**, Reinhold Hetzel, Günther Leising, Technische Univ. Graz (Austria) [9003-45]

4:30 pm: **Permanent transparent color glazes for dimmable and non-dimmable LED bulbs**, Jan-Marie Spanard, Albany Mural Ltd. (USA) . . . [9003-46]

4:45 pm: **Interplay between multiple scattering, emission, and absorption of light in the phosphor of a white light-emitting diode**, Vanessa Y. Leung, Ad Lagendijk, Allard P. Mosk, Univ. Twente (Netherlands); Teus W. Tukker, Wilbert L. IJzerman, Philips Lighting B.V. (Netherlands); Willem L. Vos, Univ. Twente (Netherlands) [9003-47]

5:00 pm: **Thermal, optical, and electrical engineering of an innovative tunable white LED light engine**, Nicola Trivellin, LightCube (Italy) and Univ. degli Studi di Padova (Italy); Matteo Meneghini, Marco Ferretti, Diego Barbian, Matteo Dal Lago, Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy) [9003-48]

Emerging Liquid Crystal Technologies IX

Conference Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

Conference Co-Chairs: **Antonio M. Figueiredo Neto**, Univ. de São Paulo (Brazil); **Kristiaan Neyts**, Univ. Gent (Belgium); **Masanori Ozaki**, Osaka Univ. (Japan)

Program Committee: **Dick J. Broer**, Technische Univ. Eindhoven (Netherlands); **Vladimir G. Chigrinov**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Harry J. Coles**, Univ. of Cambridge (United Kingdom); **Gregory Philip Crawford**, Univ. of Notre Dame (USA); **Andy Ying-Guey Fuh**, National Cheng Kung Univ. (Taiwan); **Wolfgang Haase**, Technische Univ. Darmstadt (Germany); **Jun-ichi Hanna**, Tokyo Institute of Technology (Japan); **Hirotsugu Kikuchi**, Kyushu Univ. (Japan); **Heinz S. Kitzerow**, Univ. Paderborn (Germany); **Shunsuke Kobayashi**, Tokyo Univ. of Science (Japan); **Seung Hee Lee**, Chonbuk National Univ. (Korea, Republic of); **Yi-Hsin Lin**, National Chiao Tung Univ. (Taiwan); **Yan-Qing Lu**, Nanjing Univ. (China); **Ci-Ling Pan**, National Tsing Hua Univ. (Taiwan); **Ryo Sakurai**, Bridgestone Corp. (Japan); **Ivan I. Smalyukh**, Univ. of Colorado at Boulder (USA); **Richard L. Sutherland**, Mount Vernon Nazarene Univ. (USA); **Nelson V. Tabiryan**, BEAM Engineering for Advanced Measurements Co. (USA); **Ming Hsien Wu**, Hamamatsu Corp. (USA); **Shin-Tson Wu**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Hiroshi Yokoyama**, Kent State Univ. (USA); **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of); **Yanlei Yu**, Fudan Univ. (China)

Wednesday 5 February

SESSION 1

Location: Room 274 (Mezzanine) . . . Wed 8:00 am to 10:00 am

Flexoelectric, Ferroelectric, and Cholesteric Materials

Session Chair: **Helen F. Gleeson**,
The Univ. of Manchester (United Kingdom)

8:00 am: **The past, present, and future of hockey-stick-shaped liquid crystals** (*Invited Paper*), E-Joon Choi, Kumoh National Institute of Technology (Korea, Republic of) [9004-1]

8:30 am: **Electro-optic response of the homeotropic SmC* attached on the slippery interfaces: drastic reduction of threshold for the in-plane electric field** (*Invited Paper*), Jun Yamamoto, Kyoto Univ. (Japan); Isa Nishiyama, Dainippon Ink and Chemicals, Inc. (Japan) [9004-2]

9:00 am: **Grayscale memory effect and flexoelectric property of highly-kinked bent-core liquid crystals** (*Invited Paper*), Ji-Hoon Lee, Chonbuk National Univ. (Korea, Republic of); Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of); E-Joon Choi, Kumoh National Institute of Technology (Korea, Republic of) [9004-3]

9:30 am: **Electro-optic color tuning in cholesteric liquid crystals** (*Invited Paper*), Timothy J. White, Kyung Min Lee, Vincent P. Tondiglia, Michael E. McConney, Timothy J. Bunning, Air Force Research Lab. (USA) [9004-4]

Coffee Break Wed 10:00 am to 10:20 am

SESSION 2

Location: Room 274 (Mezzanine) . . Wed 10:20 am to 12:20 pm

Lasing and Photonic Materials

Session Chair: **Miha Ravnik**, Univ. of Ljubljana (Slovenia)

10:20 am: **Twisting and tweezing liquid crystals with lasers** (*Invited Paper*), Helen F. Gleeson, Mark R. Dickinson, The Univ. of Manchester (United Kingdom) [9004-5]

10:50 am: **Modeling lasing and gain in nematic liquid crystals for in-plane and out-of-plane configurations** (*Invited Paper*), Jeroen Beeckman, Caspar Schreuer, Lieven Penninck, Inge Nys, Kristiaan Neyts, Univ. Gent (Belgium) [9004-6]

11:20 am: **Miscibility and phase separation in LC semiconductor blends** (*Invited Paper*), Yo Shimizu, Yukimasa Matsuda, National Institute of Advanced Industrial Science and Technology (Japan); Takaya Nakao, National Institute of Advanced Industrial Science and Technology (Japan) and Ryukoku Univ. (Japan); Lydia Sosa-Vargas, Minokazu Takahashi, National Institute of Advanced Industrial Science and Technology (Japan); Hiroyuki Yoshida, Akihiko Fujii, Masanori Ozaki, Osaka Univ. (Japan) [9004-7]

11:50 am: **Liquid crystal polymer colloids as confined self-organised systems with responsive optical properties** (*Invited Paper*), Verena Görtz, Lancaster Univ. (United Kingdom); Kirsty L. Holdsworth, The Univ. of York (United Kingdom) [9004-33]

Lunch/Exhibition Break Wed 12:20 pm to 1:20 pm

SESSION 3

Location: Room 274 (Mezzanine) . . . Wed 1:20 pm to 3:40 pm

Photoalignment, Photopatterning, and Phototuning

Session Chair: **Tae-Hoon Yoon**,
Pusan National Univ. (Korea, Republic of)

1:20 pm: **Liquid crystal devices based on photoalignment and photopatterning materials** (*Invited Paper*), Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China) [9004-8]

1:50 pm: **Surface-induced bistable switching liquid crystal mode and its electro-optic applications** (*Invited Paper*), Hak-Rin Kim, Min-Kyu Park, Kyung-Woo Park, Seong-Woo Oh, Ho Jun Lee, Ji-Sub Park, Cheolho Lee, Mu-Geon Kim, Kyungpook National Univ. (Korea, Republic of) [9004-9]

2:20 pm: **Nematic colloidal tilings as photonic materials** (*Invited Paper*), Miha Ravnik, Univ. of Ljubljana (Slovenia); Jayasri Dontabhaktuni, Univ. of Hyderabad (India); Miha Cancula, Slobodan ?umer, Univ. of Ljubljana (Slovenia) [9004-10]

2:50 pm: **In-situ calibration of spatial light modulators in femtosecond pulse shapers**, Benjamin Döpke, Jan C. Balzer, Martin R. Hofmann, Ruhr-Universität Bochum (Germany) [9004-11]

3:10 pm: **Microcharacterization of cholesteric liquid crystals in interdigitated electrode-based cells** (*Invited Paper*), Mariacristina Rumi, Vincent P. Tondiglia, Lalgudi V. Natarajan, Timothy J. White, Timothy J. Bunning, Air Force Research Lab. (USA) [9004-24]

Coffee Break Wed 3:40 pm to 4:00 pm

SESSION 4

Location: Room 274 (Mezzanine) . . . Wed 4:00 pm to 6:10 pm

Display and Holographically-formed Materials

Session Chair: **Vladimir G. Chigrinov**,
Hong Kong Univ. of Science and Technology (Hong Kong, China)

4:00 pm: **Long-pitch cholesteric liquid crystals for display applications** (*Invited Paper*), Tae-Hoon Yoon, Jae-Won Huh, Byeong-Hun Yu, Pusan National Univ. (Korea, Republic of) [9004-12]

4:30 pm: **The novel method of designing zero-birefringence pressure sensitive adhesives for liquid-crystal displays**, Wataru Fujimori, Akihiro Tagaya, Keio Univ. (Japan); Sumihisa Oda, Saiden Chemical Industry Co. (Japan); Yasuhiro Koike, Keio Univ. (Japan) [9004-13]

4:50 pm: **Switchable liquid crystal contact lenses: dynamic vision for the ageing eye**, Harry E. Milton, Sarabjot Kaur, Philip B. Morgan, The Univ. of Manchester (United Kingdom); John Clamp, UltraVision (United Kingdom); Helen F. Gleeson, The Univ. of Manchester (United Kingdom) [9004-14]

5:10 pm: **High-definition and high-contrast liquid crystal display with surface diffusing system using scattering film and directional backlight**, Yusuke Fujii, Daisuke Sekine, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) . . . [9004-15]

5:30 pm: **Voltage-controlled adaptive holographic interferometer using liquid crystals**, Arnaud Peigné, Thales Underwater Systems (France); Umberto Bortolozzo, Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France); Stéphanie Molin, Daniel Dolfi, Thales Research & Technology (France) [9004-16]

Conference 9004 · Location: Room 274 (Mezzanine)

5:50 pm: **Polarization-selective Bragg diffractive wavelengths in holographic structures composed of liquid crystal and polymer phases**, Hiroshi Kakiuchida, Kazuki Yoshimura, Masato Tazawa, National Institute of Advanced Industrial Science and Technology (Japan); Akifumi Ogiwara, Kobe City College of Technology (Japan)[9004-17]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

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Design of a cholesteric liquid crystal cell for a high-transmittance light shutter, Byeong-Hun Yu, Jae-Won Huh, Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of)[9004-18]

Formation of holographic memory for optically-reconfigurable gate array by angle-multiplexing recording of multi-circuit information in liquid-crystal composites, Akifumi Ogiwara, Hikaru Maekawa, Kobe City College of Technology (Japan); Minoru Watanabe, Retsu Moriwaki, Shizuoka Univ. (Japan)[9004-19]

Design of a zero-zero-birefringence polymer in a system containing N-substituted maleimide for liquid-crystal displays, Shotaro Beppu, Shuhei Iwasaki, Houran Shafiee, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan)[9004-20]

Fabrication of photo responsive multi-bilayered film consisting of azobenzene containing copolymers and polyvinyl alcohol, Ryohei Yagi, Yutaka Kuwahara, Hiroyuki Iwamoto, Sun-Nam Kim, Tomonari Ogata, Kumamoto Univ. (Japan); Seiji Kurihara, Kumamoto Univ. (Japan) and Japan Science and Technology Agency (Japan)[9004-21]

Manipulation of small objects in liquid crystals by dynamical disorganizing effect of push-pull-azobenzene-dye, Seiji Kurihara, Kumamoto Univ. (Japan) and Japan Science and Technology Agency (Japan); Takahiro Oda, Ryo Izumi, Yutaka Kuwahara, Tomonari Ogata, Sun-Nam Kim, Kumamoto Univ. (Japan)[9004-22]

Thermo-driven light controller by using thermal modulation of diffraction wavelength in holographic polymer dispersed liquid crystal grating, Akifumi Ogiwara, Kobe City College of Technology (Japan); Hiroshi Kakiuchida, National Institute of Advanced Industrial Science and Technology (Japan)[9004-23]

Anisotropic surface plasmon shift at the interface of gold nanoparticle and nematic liquid crystal, Amit Choudhary, Univ. of Missouri-St. Louis (USA); Guoqiang Li, The Ohio State Univ. (USA) and Univ. of Missouri-St. Louis (USA)[9004-25]

Light scattering from liquid crystal director fluctuations in steady magnetic fields up to 25 tesla, Pavan Kumar Challa, Kent State Univ. (USA)[9004-28]

Confinement-sensitive optical response of cholesteric liquid crystals, Giusy Scalia, Seoul National Univ. (Korea, Republic of); Eva Enz, Martin-Luther-Univ. Halle-Wittenberg (Germany); Vera La Ferrara, ENEA (Italy)[9004-29]

Molecular wires from discotic liquid crystals, Ji Hyun Park, Seoul National Univ. (Korea, Republic of); Massimiliano Labardi, Univ. di Pisa (Italy); Giusy Scalia, Seoul National Univ. (Korea, Republic of)[9004-30]

Aligned carbon nanotube by a lyotropic liquid crystal with very low surfactant concentration, Hye Ran Jo, Seoul National Univ. (Korea, Republic of); Jun Yamamoto, Kyoto Univ. (Japan); Jan P. Lagerwall, Giusy Scalia, Seoul National Univ. (Korea, Republic of)[9004-31]

Size distribution and liquid crystal phase behavior of graphene oxide flakes in aqueous environment, Kieup Lee, Ji Hyun Park, Hye Ran Jo, Seoul National Univ. (Korea, Republic of); Vincent Derycke, Arianna Floramo, Stéphane Campidelli, CEA-IRAMIS (France); Giusy Scalia, Seoul National Univ. (Korea, Republic of)[9004-32]

Advances in Display Technologies IV

Conference Chairs: **Liang-Chy Chien**, Kent State Univ. (USA); **Sin-Doo Lee**, Seoul National Univ. (Korea, Republic of); **Ming Hsien Wu**, Hamamatsu Corp. (USA)

Program Committee: **Karlheinz Blankenbach**, Pforzheim Univ. (Germany); **Pierre M. Boher**, ELDIM (France); **Cheng-Huan Chen**, National Tsing Hua Univ. (Taiwan); **Chin Hsin Chen**, National Chiao Tung Univ. (Taiwan); **Janglin Chen**, Industrial Technology Research Institute (Taiwan); **Jurgen H. Daniel**, Palo Alto Research Center, Inc. (USA); **Paul S. Drzaic**, Apple Inc. (USA); **Mark Fihn**, Veritas et Visus (USA); **Norbert Fruehauf**, Univ. Stuttgart (Germany); **Nobuyuki Hashimoto**, Citizen Holdings Co., Ltd. (Japan); **Klaus Hecker**, Verband Deutscher Maschinen-und Anlagenbau e. V. (Germany); **Jason C. Heikenfeld**, Univ. of Cincinnati (USA); **Alex Henzen**, IRX-Innovations B.V. (Netherlands); **Yi-Pai Huang**, National Chiao Tung Univ. (Taiwan); **Koichi Kanzaki**, Consultant (Japan); **Takashi Kitamura**, Chiba Univ. (Japan); **Lachezar Komitov**, Univ. of Gothenburg (Sweden); **ByoungHo Lee**, Seoul National Univ. (Korea, Republic of); **Kars-Michiel H. Lenssen**, Philips Research Nederland B.V. (Netherlands); **Akihiro Mochizuki**, i-CORE Technology, LLC (USA); **Keith Rollins**, DuPont Teijin Films U.K. Ltd. (United Kingdom); **Ryo Sakurai**, Bridgestone Corp. (Japan); **Robert A. Sprague**, SiPix Imaging Inc. (USA); **Andrew J. Steckl**, Univ. of Cincinnati (USA); **Qiong-Hua Wang**, Sichuan Univ. (China); **Christopher Williams**, Logystyx UK Ltd. (United Kingdom); **Michael Wittek**, Merck KGaA (Germany); **Pochi Yeh**, Univ. of California, Santa Barbara (USA); **Tae-Hoon Yoon**, Pusan National Univ. (Korea, Republic of)

Wednesday 5 February

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) .. Wed 6:00 pm to 8:00 pm

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New red phosphorescent iridium(III) complex with various main ligand, Bona Yang, Dongmyung Shin, Hongik Univ. (Korea, Republic of)[9005-18]

Optical modeling of OLED with random nanostructure using finite difference time domain (FDTD) simulation, Jun-Whee Kim, Ji-Hyang Jang, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of)[9005-19]

Thursday 6 February

SESSION 1

Location: Room 274 (Mezzanine) Thu 8:00 am to 10:00 am

3D, Projection, and Other Displays

Session Chair: **Ming Hsien Wu**, Hamamatsu Corp. (USA)

8:00 am: **Brightness increase using dual parabolic recycling collar and RGBW LEDs for pico-projector applications** (Invited Paper), Kenneth K. Li, Wavien, Inc. (USA).....[9005-1]

8:30 am: **Fast-response liquid-crystal lens for 3D displays** (Invited Paper), Yifan Liu, Hongwen Ren, Su Xu, Yan Li, Shin-Tson Wu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA).....[9005-2]

9:00 am: **Optical characterization of auto-stereoscopic 3D displays: interest of the resolution and comparison to human eye properties**, Pierre M. Boher, Thierry Leroux, Thibault Bignon, Véronique Collomb-Patton, ELDIM (France)[9005-3]

9:20 am: **Pixel-level tunable liquid crystal lenses for auto-stereoscopic display**, Kun Li, Brian Robertson, Daping Chu, Univ. of Cambridge (United Kingdom); Jiong Zhou, Huawei Technologies Co., Ltd. (China)[9005-4]

9:40 am: **All-CMOS night vision viewer with integrated microdisplay**, Marius E. Goosen, INSiAVA (Pty) Ltd. (South Africa) and Univ. of Pretoria (South Africa); Petrus J. Venter, Monuko du Plessis, Univ. of Pretoria (South Africa) and INSiAVA (Pty) Ltd. (South Africa); Nicolaas M. Faure, Christo Janse van Rensburg, INSiAVA (Pty) Ltd. (South Africa) and Univ. of Pretoria (South Africa); Pieter Rademeyer, INSiAVA (Pty) Ltd. (South Africa).....[9005-5]

Coffee Break Thu 10:00 am to 10:20 am

SESSION 2

Location: Room 274 (Mezzanine) . . . Thu 10:20 am to 12:20 pm

Emerging Technologies

Session Chair: **Liang-Chy Chien**, Kent State Univ. (USA)

10:20 am: **High-power laser phosphor light source with liquid cooling for digital cinema applications** (Invited Paper), Kenneth K. Li, Wavien, Inc. (USA)[9005-6]

10:50 am: **The outlook for blue-phase LCDs** (Invited Paper), Yuan Chen, Shin-Tson Wu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)[9005-7]

11:20 am: **Full-color reflective display based on high-contrast dielectric grating**, He Liu, Wei Wu, Yuhang Yao, Shujin Huang, The Univ. of Southern California (USA)[9005-8]

11:40 am: **Emerging applications of ferroelectric nanoparticles in display technologies**, Anatoliy V. Glushchenko, Yuriy Garbovskiy, Olena Zribi, Univ. of Colorado at Colorado Springs (USA)[9005-9]

12:00 pm: **Biocomposite polymer embedded with light-sensitive molecules for plastic displays**, Gurumurthy Hegde, A. R. Yuvaraj, Siti Aisyah Mustapha, Mashitah M. Yusoff, Univ. Malaysia Pahang (Malaysia); Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China)[9005-20]

Lunch/Exhibition Break Thu 12:20 pm to 1:50 pm

SESSION 3

Location: Room 274 (Mezzanine) Thu 1:50 pm to 3:20 pm

Display Components

Session Chair: **Ming Hsien Wu**, Hamamatsu Corp. (USA)

1:50 pm: **Robust coatable chromonic liquid crystalline polarizer** (Invited Paper), Kwang-Un Jeong, Chonbuk National Univ. (Korea, Republic of) .[9005-11]

2:20 pm: **Investigation of the effects of deposition parameters on indium-free transparent amorphous oxide semiconductor thin-film transistors fabricated at low temperatures for flexible electronic applications**, Robert Alston, North Carolina A&T State Univ. (USA); Jay S. Lewis, Garry B. Cunningham, RTI International (USA)[9005-12]

2:40 pm: **Viewing-angle-enhanced integral imaging system using multi-directional projections and elemental image resizing method**, Md. Ashraf Al Alam, Nam Kim, Chungbuk National Univ. (Korea, Republic of).....[9005-13]

3:00 pm: **A compact multiple laser beam scanning module for high-resolution pico-projector applications using a fiber bundle combiner**, Masafumi Ide, Shinpei Fukaya, Kaoru Yoda, Masaya Suzuki, Citizen Holdings Co., Ltd. (Japan)[9005-14]

Coffee Break Thu 3:20 pm to 3:50 pm

SESSION 4

Location: Room 274 (Mezzanine) Thu 3:50 pm to 4:40 pm

Emissive Displays

Session Chair: **Ming Hsien Wu**, Hamamatsu Corp. (USA)

3:50 pm: **Prospects of quantum-dots-based liquid-crystal displays** (Invited Paper), Zhenyue Luo, Yuan Chen, Su Xu, Yifan Liu, Shin-Tson Wu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)[9005-15]

4:20 pm: **Development of flying spot illumination system for stage lighting**, Hisashi Asakawa, Katsunori Ishii, Hikari Koshiro, Junko Baba, Marumo Electric Co., Ltd. (Japan); Moriaki Wakaki, Tokai Univ. (Japan).....[9005-17]



Practical Holography XXVIII: Materials and Applications

Conference Chairs: Hans I. Bjelkhagen, Glyndwr Univ. (United Kingdom), Hansholo Consulting Ltd. (United Kingdom); V. Michael Bove Jr., MIT Media Lab. (USA)

Program Committee: Frank C. Fan, Shenzhen AFC Technology Co., Ltd. (China); Gerald L. Heidt, Wasatch Photonics, Inc. (USA); Toshio Honda, Toppan Printing Co., Ltd. (Japan); Fujio Iwata, Toppan Printing Co., Ltd. (Japan); Tung H. Jeong, Lake Forest College (USA); Michael A. Klug, Zebra Imaging, Inc. (USA); Martina L. Mrongovius, RMIT Univ. (Australia), Ctr. for the Holographic Arts (United States), Academy of Media Arts, Cologne KHM (Germany); Martin J. Richardson, De Montfort Univ. (United Kingdom); Hiroshi Yoshikawa, Nihon Univ. (Japan)

Monday 3 February

SESSION 1

Location: Room 228 (Mezzanine) . . . Mon 8:00 am to 10:20 am

Materials and Processes I

Session Chair: **Hans I. Bjelkhagen**,
Hansholo Consulting Ltd. (United Kingdom)

8:00 am: **Bayfol® HX photopolymer for full-color volume Bragg gratings** (*Invited Paper*), Friedrich-Karl Bruder, Horst Berneth, Thomas Fäcke, Bayer MaterialScience AG (Germany); David Jurbergs, Bayer MaterialScience LLC (USA); Rainer Hagen, Dennis Hoenele, Thomas Rölle, Günther Walze, Bayer MaterialScience AG (Germany)[9006-1]

8:30 am: **Ultra-realistic imaging: a new beginning for display holography**, Hans I. Bjelkhagen, Hansholo Consulting Ltd. (United Kingdom); David Brotherton-Ratcliffe, Geola Technologies Ltd. (United Kingdom)[9006-2]

9:00 am: **Evaluation of Slavich PFG-03C plates in recording and reconstructing color Denisjuk holograms using the ZZZyclops™ transportable color holography camera and the HoLoFos™ LED hologram reconstruction lighting devices**, Andreas Sarakinos, Alkiviadis Lembessis, Nikos Zevos, The Hellenic Institute of Holography (Greece)[9006-3]

9:20 am: **Master-holograms recorded with pulsed laser on photoresist**, Stanislovas J. Zacharovas, Geola Digital uab (Lithuania) and Kaunas Univ. of Technology (Lithuania); Diana Adliene, Kaunas Univ. of Technology (Lithuania); Ramunas J. Bakanas, Geola Digital uab (Lithuania) and Kaunas Univ. of Technology (Lithuania); Pranas Narmontas, Rimas Šepers, Kaunas Univ. of Technology (Lithuania)[9006-4]

9:40 am: **Diffracting holographic lenses created on azo-polymer films**, Ribal G. Sabat, Royal Military College of Canada (Canada)[9006-5]

10:00 am: **An effective phase modulation in collinear holographic storage**, Xiao Lin, Xue Xiao, An'an Wu, Xiaodi Tan, Beijing Institute of Technology (China)[9006-6]

Coffee Break Mon 10:20 am to 10:50 am

SESSION 2

Location: Room 228 (Mezzanine) . . Mon 10:50 am to 12:10 pm

Materials and Processes II

Session Chair: **Stanislovas J. Zacharovas**, Geola Digital uab (Lithuania)

10:50 am: **Carbon allotropes as photosensitizers in photorefractive organic materials**, Prathan Buranasiri, Thanawat Bamrunghai, Suwan Plaipichit, King Mongkut's Institute of Technology Ladkrabang (Thailand)[9006-7]

11:10 am: **Photosensitive polymers undergoing photo-Fries reaction for volume holography: understanding the mechanism of refractive index modulation**, Andrea Bianco, Alessio Zanutta, INAF - Osservatorio Astronomico di Brera (Italy); Letizia Colella, Istituto Italiano di Tecnologia (Italy); Chiara Bertarelli, Politecnico di Milano (Italy)[9006-8]

11:30 am: **Mechanism of the photoanisotropy induction in polarization-sensitive materials based on azo dyes**, Barbara N. Kilosanidze, George Kakauridze, Irakli Chaganava, Institute of Cybernetics (Georgia) .[9006-9]

11:50 am: **High-speed reconfigurable holography in InGaAs/InGaAsP quantum-well microcavities**, Hao Sun, David Nolte, Purdue Univ. (USA); James Hyland, Eric Harmon, LightSpin Technologies, Inc. (USA)[9006-10]

Lunch Break Mon 12:10 pm to 1:40 pm

SESSION 3

Location: Room 228 (Mezzanine) Mon 1:40 pm to 3:30 pm

Applications I

Session Chair: **Gerald L. Heidt**, Wasatch Photonics, Inc. (USA)

1:40 pm: **Holographic data storage: rebirthing a commercialization effort** (*Invited Paper*), Ken Anderson, Akonia Holographics (USA)[9006-11]

2:10 pm: **Environmental testing of a membrane diffractive optic for space-based solar imaging**, Olga Asmolova, Geoff P. Andersen, Hua, Inc. (USA)[9006-12]

2:30 pm: **High-speed deformation measurement using spatially phase-shifted speckle interferometry**, Tobias Beckmann, Markus Fratz, Alexander Bertz, Daniel Carl, Fraunhofer-Institut für Physikalische Messtechnik (Germany)[9006-13]

2:50 pm: **Color optical biopsy**, Ardeshir Osanlou, Glyndwr Innovation Ltd. (United Kingdom); Hans I. Bjelkhagen, Glyndwr Univ. (United Kingdom) .[9006-14]

3:10 pm: **Use of GPU and FPGA in reproduced signal processing in holographic data storage**, Nobuhiro Kinoshita, Tetsuhiko Muroi, Norihiko Ishii, Koji Kamijo, Hiroshi Kikuchi, NHK Science & Technical Research Labs. (Japan)[9006-15]

Coffee Break Mon 3:30 pm to 4:00 pm

SESSION 4

Location: Room 228 (Mezzanine) Mon 4:00 pm to 5:40 pm

Applications II

Session Chair: **Hiroshi Yoshikawa**, Nihon Univ. (Japan)

4:00 pm: **Defects detection in pipes and laminated structures by means of holographically recorded strain solitons**, Irina V. Semenova, Galina V. Dreiden, Alexander M. Samsonov, Ioffe Physico-Technical Institute (Russian Federation)[9006-17]

4:20 pm: **Addressing the inverse problem of imaging: A noniterative exact solution for phase in imaging based on microHolography**, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Danielle Honigstein, Jacques Weinroth, Nanonics Imaging Ltd. (Israel); Michael Werman, The Hebrew Univ. of Jerusalem (Israel)[9006-16]

4:40 pm: **Parametric studies of adaptive optics by self-interference incoherent digital holography**, Jisoo Hong, Myung K. Kim, Univ. of South Florida (USA)[9006-18]

5:00 pm: **Volume calculations from multi-wavelength digital holographic surface topography**, Partha P. Banerjee, Logan Williams, Univ. of Dayton (USA)[9006-19]

5:20 pm: **Special non-diffractive beams generation using holographic techniques**, Marcos R. R. Gesualdi, Tarcio A. Vieira, UFABC (Brazil); Michel Zamboni-Rached, Univ. Estadual de Campinas (Brazil)[9006-20]

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:30 am

SESSION 5

Location: Room 228 (Mezzanine) . . . Tue 10:30 am to 12:10 pm

Holography, Perception, and Art

Session Chair: **Martin J. Richardson**,
De Montfort Univ. (United Kingdom)

- 10:30 am: **Hidden images: wavefront reconstruction of abnormalities within pulsed holographic recording**, Martin J. Richardson, De Montfort Univ. (United Kingdom) [9006-21]
- 10:50 am: **The place for performance in the digital holographic space**, Maria Isabel Azevedo, Martin J. Richardson, Elizabeth Sandford-Richardson, De Montfort Univ. (United Kingdom); Luis Miguel Bernardo, Helder Crespo, Univ. do Porto (Portugal) [9006-22]
- 11:10 am: **Time stands still**, Yin-Ren Chang, Martin J. Richardson, Robert Chen, De Montfort Univ. (United Kingdom) [9006-23]
- 11:30 am: **Innovative re-creation of realities in a holographic digital form**, Shuo Wang, Ardeshir Osanlou, Glyndwr Innovation Ltd. (United Kingdom); Peter Excell, Sonia Di Gennaro, Lishen Shi, Glyndwr Univ. (United Kingdom) [9006-24]
- 11:50 am: **Creative display of museum objects with their cultural context**, Shuo Wang, Ardeshir Osanlou, Glyndwr Innovation Ltd. (United Kingdom); Peter Excell, Glyndwr Univ. (United Kingdom) [9006-25]
- Lunch/Exhibition Break Tue 12:10 pm to 1:20 pm

SESSION 6

Location: Room 228 (Mezzanine) Tue 1:20 pm to 3:00 pm

Digital Holography I

Session Chair: **V. Michael Bove Jr.**, MIT Media Lab. (USA)

- 1:20 pm: **Numerical inversion and assessment of 2D Laplace transforms using the Brancik algorithm and its use in 3D holography**, Monish R. Chatterjee, Le Feng, Univ. of Dayton (USA) [9006-58]
- 1:40 pm: **Improvements of simplified generation technique for holographic stereograms from multi-view images**, Kyohei Ikeda, Yasuhiro Takaki, Tokyo Univ. of Agriculture and Technology (Japan) [9006-26]
- 2:00 pm: **Computer-generated hologram of actual objects from arbitrary viewpoints with range sensors and digital cameras**, Keigo Tai, Tsubasa Ichikawa, Yuji Sakamoto, Hokkaido Univ. (Japan) [9006-27]
- 2:20 pm: **Fast calculation with point-based method to make computer-generated holograms of the polygon model**, Yuki Ogihara, Tsubasa Ichikawa, Yuji Sakamoto, Hokkaido Univ. (Japan) [9006-28]
- 2:40 pm: **The fast scheme for mixed-3D scenes by polygon-based computer-generated holography (CGH)**, Yanling Piao, Nam Kim, Chungbuk National Univ. (Korea, Republic of); Jong-Rae Jeong, Suwon Science College (Korea, Republic of) [9006-29]
- Coffee Break Tue 3:00 pm to 3:30 pm

SESSION 7

Location: Room 228 (Mezzanine) Tue 3:30 pm to 6:10 pm

Digital Holography II

Session Chair: **V. Michael Bove Jr.**, MIT Media Lab. (USA)

- 3:30 pm: **Computational architecture for full-color holographic displays based on anisotropic leaky-mode modulators**, Sundeep Jolly, Daniel Smalley, James Barabas, V. Michael Bove Jr., MIT Media Lab. (USA) [9006-30]
- 3:50 pm: **Three-dimensional computer-generated holograms with shading and occlusion using computer graphics**, Hao Zhang, Yan Zhao, Zheng Wang, Liangcai Cao, Guofan Jin, Tsinghua Univ. (China) [9006-31]
- 4:10 pm: **Evaluation of digital holographic reconstruction using compressive sensing**, Partha P. Banerjee, Haipeng Liu, Logan Williams, Univ. of Dayton (USA) [9006-32]
- 4:30 pm: **Viewing-zone-angle expansion of tiled color electronic holography reconstruction system**, Takanori Senoh, Koki Wakunami, National Institute of Information and Communications Technology (Japan); Yasuyuki Ichihashi, National Institute of Information and Communications Technology (Japan); Hisayuki Sasaki, National Institute of Information and Communications Technology (Japan); Kenji Yamamoto, National Institute of Information and Communications Technology (Japan) [9006-33]
- 4:50 pm: **Focus detection in digital holography by cross-sectional images of propagating waves**, Meriç Özcan, Sabanci Univ. (Turkey) [9006-34]
- 5:10 pm: **Static responses of accommodation and convergence to holographic images and real objects**, Ryuichi Ohara, Takuo Yoneyama, Masanobu Kurita, Yuji Sakamoto, Hokkaido Univ. (Japan); Fumio Okuyama, Suzuka Univ. of Medical Science (Japan) [9006-35]
- 5:30 pm: **Fast hologram generation of long-depth object using multiple wavefront recording planes**, Anh-Hoang Phan, Chungbuk National Univ. (Korea, Republic of); Seok-Hee Jeon, Univ. of Incheon (Korea, Republic of); Nam Kim, Chungbuk National Univ. (Korea, Republic of) [9006-36]
- 5:50 pm: **Large field-of-view synthetic aperture holography using rotation stages**, Sungmin Kim, Yeonsu Im, Joonku Hahn, Kyungpook National Univ. (Korea, Republic of) [9006-37]

TECHNICAL GROUP

Room: InterContinental Hotel, Ballroom B .7:30 to 9:00 pm

Holography

Session Chairs: **Hans I. Bjelkhagen**, Glyndwr Univ. (United Kingdom) and Hansholo Consulting Ltd. (United Kingdom)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNNT), computer-generated holography (CGH), electro and digital holography, holographic microscopy, and holographic data storage (HDS).

This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

Wednesday 5 February

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPosterGuidelines>.

Holograms with random distribution, Arturo Olivares-Pérez D.D.S., Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Santa Toxqui-Lopez, Benemérita Univ. Autónoma de Puebla (Mexico); Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Mauricio Ortiz-Gutiérrez, Rosa Elena Orozco-Muñoz, Univ. Michoacana de San Nicolás de Hidalgo (Mexico) [9006-38]

Reduction of phase temporal fluctuations caused by digital voltage addressing in LC SLM "HoloEye PLUTO VIS" for holographic applications, Nikolay N. Evtikhiev, Pavel A. Cheremkhin, Vitaly V. Krasnov, Vladislav G. Rodin, Sergey N. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation) [9006-40]

Holograms writing on glass, Arturo Olivares-Pérez D.D.S., Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Santa Toxqui-Lopez, Benemérita Univ. Autónoma de Puebla (Mexico) [9006-41]

Semi-portable full-color electro-holographic display with small size, Takuo Yoneyama, Tsubasa Ichikawa, Yuji Sakamoto, Hokkaido Univ. (Japan) [9006-42]

Albumin holograms with iron ions, Manuel Jorge Ordóñez-Padilla, Arturo Olivares-Pérez D.D.S., Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Mauricio Ortiz-Gutiérrez, Julio César Juárez-Ramírez, Univ. Michoacana de San Nicolás de Hidalgo (Mexico) [9006-43]

Fluorescent holograms with albumin-acrylamide, Manuel Jorge Ordóñez-Padilla, Arturo Olivares-Pérez D.D.S., Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9006-44]

Betacyanins pigments as photosensitizing agents for holographic recording medium, Santa Toxqui-Lopez, Edgar Hernández-Hernández, Claudia Santacruz-Vázquez, Benemérita Univ. Autónoma de Puebla (Mexico); Arturo Olivares-Pérez D.D.S., Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Veronica Santacruz-Vazquez, Benemérita Univ. Autónoma de Puebla (Mexico) . . [9006-45]

Holographic films from carotenoid pigments, Santa Toxqui-Lopez, Francisco Lecona-Sánchez, Benemérita Univ. Autónoma de Puebla (Mexico); Arturo Olivares-Pérez D.D.S., Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Claudia Santacruz-Vázquez, Benemérita Univ. Autónoma de Puebla (Mexico); Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9006-46]

Floating full-color image with computer-generated alcove rainbow hologram, Takeshi Yamaguchi, Hiroshi Yoshikawa, Ryosuke Wada, Nihon Univ. (Japan) [9006-47]

Holographic data storage system combining shift-multiplexing with peristrophic-multiplexing, Kengo Yoshikawa, Yu Tsukamoto, Kaito Okubo, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [9006-48]

Examination of systematization of the holographic data storage, Yuta Nagao, Hiroyuki Kurata, Syuhei Yoshida, Manabu Yamamoto, Tokyo Univ. of Science (Japan) [9006-49]

A wavefront printer using phase-only spatial light modulator for producing computer-generated volume holograms, Wataru Nishii, Kyoji Matsushima, Kansai Univ. (Japan) [9006-50]

Techniques for applying rigorous light-shielding to high-definition computer holography, Sachio Masuda, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) [9006-51]

Occlusion-removed cylindrical computer generated hologram using 3D point clouds, Yu Zhao, Nam Kim, Chungbuk National Univ. (Korea, Republic of) [9006-52]

Development of high-efficiency holographic optical element for LED display, Meilan Piao, Nam Kim, Chungbuk National Univ. (Korea, Republic of) . . [9006-53]

Birefringence measurement of the cellophane film, Julio César Juárez-Ramírez, Mauricio Ortiz-Gutiérrez, Marco Antonio Salgado-Verduzco, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Mario Pérez-Cortés, Univ. Autónoma de Yucatán (Mexico); Arturo Olivares-Pérez D.D.S., Manuel Jorge Ordóñez-Padilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9006-54]

Fish gelatin[®] and ammonium dichromate as photosensitive film, Rosa Elena Orozco-Muñoz, Mauricio Ortiz-Gutiérrez, Marco Antonio Salgado-Verduzco, Univ. Michoacana de San Nicolás de Hidalgo (Mexico); Juan Carlos Ibarra-Torres, Univ. de Guadalajara (Mexico); Arturo Olivares-Pérez D.D.S., Santa Toxqui-López, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) [9006-55]

Fast generation of CGH of 3D video images by using block-based motion compensation techniques, Seung-Cheol Kim, Xiao-Bin Dong, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [9006-56]

Efficient digital hologram computation using difference between frames and compensated principal fringe patterns, Seung-Cheol Kim, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) [9006-57]

Broadband Access Communication Technologies VIII

Conference Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Katsutoshi Tsukamoto**, Osaka Institute of Technology (Japan)

Program Committee: **David W. Faulkner**, British Telecom Research Labs. (United Kingdom); **Klaus-Dieter Langer**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Mohsen Kavehrad**, The Pennsylvania State Univ. (USA); **Rangaraj Madabhushi**, Madabhushi Consultants, LLC (USA); **Nicholas Madamopoulos**, The City College of New York (USA); **Spiros Mikroulis**, Athens Information Technology (Greece), Technological Educational Institute of Athens (Greece); **Ken-ichi Sato**, Nagoya Univ. (Japan); **Chakchai So-In**, Khon Kaen Univ. (Thailand); **Atul K. Srivastava**, NEL America, Inc. (USA); **Peter Van Daele**, Univ. Gent (Belgium)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:25 am

SESSION 1

Location: Room 200 (Mezzanine) . . . Tue 10:25 am to 12:25 pm

Optical Communications Plenary Session

Joint Session with Conferences 9007, 9008, and 9010

Session Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Atul K. Srivastava**, NEL America, Inc. (USA)

- 10:25 am: **Optics for large-scale data centers: key metrics and trends (Invited Paper)**, Hong Liu, Ryohei Urata, Chris J. Johnson, Google (USA) [9010-1]
- 10:55 am: **Data center networks and network architectures (Invited Paper)**, Hiroshi Esaki, The Univ. of Tokyo (Japan) [9010-2]
- 11:25 am: **Light fidelity (Li-Fi): towards all-optical networking (Invited Paper)**, Dobroslav Tsonev, Stefan Videv, Harald Haas, The Univ. of Edinburgh (United Kingdom) [9007-1]
- 11:55 am: **Photonic networks that exploit digital coherent technologies (Invited Paper)**, Yojiro Mori, Ken-ichi Sato, Nagoya Univ. (Japan) [9008-1]
- Lunch/Exhibition Break Tue 12:25 pm to 1:20 pm

SESSION 2

Location: Room 200 (Mezzanine) Tue 1:20 pm to 3:20 pm

Toward 100G/400G Flexible Systems for Advanced Access and Data Center Networks

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Werner Weiershausen**, Deutsche Telekom AG (Germany)

- 1:20 pm: **Dual-mode ultraflow access networks: a hybrid solution for the access bottleneck (Invited Paper)**, Leonid G. Kazovsky, Thomas Shunrong Shen, Ahmad R Dhaini, Shuang Yin, Marc De Leenheer, Benjamin A Detwiler, Stanford Univ. (USA) [9007-2]
- 1:50 pm: **Universal transmitter for wireless and optical access converged networks (Invited Paper)**, Quang Trung Le, Franko Küppers, Technische Univ. Darmstadt (Germany) [9008-2]

- 2:20 pm: **Sub-band wavelength conversion for terabit superchannel CO-OFDM networks**, Shanhong You, Soochow Univ. (China); Chao Li, Qi Yang, Wuhan Research Institute of Posts and Telecommunications (China); Ming Luo, Wuhan Research Institute of Posts and Telecommunications (China); Ying Qiu, Xiao Xiao, Shaohua Yu, Wuhan Research Institute of Posts and Telecommunications (China) [9009-1]
- 2:35 pm: **A global standardization trend for high-speed client and line side transceivers (Invited Paper)**, Hideki Isono, Fujitsu Ltd. (Japan) [9010-3]
- 3:05 pm: **Comparison of discrete multi-tone and pulse amplitude modulation for beyond 100 Gbps short-reach application**, Masato Nishihara, Yutaka Kai, Toshiaki Tanaka, Tomoo Takahara, Fujitsu Labs., Ltd. (Japan); Lei Li, Weizhen Yan, Fujitsu Research and Development Center Co., Ltd. (China); Bo Liu, Fujitsu Labs., Ltd. (China); Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan) [9008-3]
- Coffee Break Tue 3:20 pm to 3:35 pm

SESSION 3

Location: Room 200 (Mezzanine) Tue 3:35 pm to 6:05 pm

Next-Generation Integrated Photonics Devices

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Atul K. Srivastava**, NEL America, Inc. (USA); **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA)

- 3:35 pm: **Scaling hybrid-integration of silicon photonics in freescale 130nm to TSMC 40nm-CMOS VLSI drivers for low-power communications links (Invited Paper)**, John E. Cunningham, Oracle (USA) [9010-4]
- 4:05 pm: **High-density optical interconnects by using silicon photonics (Invited Paper)**, Yutaka Urino, Tatsuya Usuki, Junichi Fujikata, Masashige Ishizaka, Koji Yamada, Photonics Electronics Technology Research Association (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [9010-5]
- 4:35 pm: **Microring resonators: the road to practical implementations**, Joyce K. S. Poon, Wesley D. Sacher, Jared C. Mikkelsen, Hasitha Jayatilaka, Univ. of Toronto (Canada) [9007-3]
- 4:50 pm: **Compact optical devices for high-speed digital coherent link (Invited Paper)**, Shin Kamei, NTT Photonics Labs. (Japan) [9008-4]
- 5:20 pm: **PLC-based mode multi/demultiplexer for MDM transmission (Invited Paper)**, Nobutomo Hanzawa, Nippon Telegraph and Telephone Corp. (Japan); Kunimasa Saitoh, Hokkaido Univ. (Japan); Taiji Sakamoto, Takashi Matsui, Kyouzou Tsujikawa, Nippon Telegraph and Telephone Corp. (Japan); Masanori Koshiba, Hokkaido Univ. (Japan); Fumihiko Yamamoto, Nippon Telegraph and Telephone Corp. (Japan) [9009-2]
- 5:50 pm: **Optical XOR circuit using combined technology of photonics and electronics**, Koichi Takiguchi, Ritsumeikan Univ. (Japan) [9009-3]



Conference 9007 · Location: Room 200 (Mezzanine)

Wednesday 5 February

SESSION 4

Location: Room 200 (Mezzanine) . . . Wed 8:00 am to 10:00 am

Next-Generation Access Network and Advanced Components

Session Chairs: **Katsutoshi Tsukamoto**, Osaka Institute of Technology (Japan); **Harald Haas**, The Univ. of Edinburgh (United Kingdom)

8:00 am: **Wireless and wired convergence towards next-generation access networks** (*Invited Paper*), Katsumi Iwatsuki, Tohoku Univ. (Japan); Katsutoshi Tsukamoto, Osaka Institute of Technology (Japan)[9007-4]

8:30 am: **Faster than fiber: demonstration of over 100 Gb/s signal delivery at W-band** (*Invited Paper*), Xinying Li, Jianjun Yu, Fudan Univ. (China)[9007-5]

9:00 am: **Optical fiber-wireless components and system for broadband access applications** (*Invited Paper*), Idelfonso Tafur Monroy, DTU Fotonik (Denmark)[9007-7]

9:30 am: **Asymmetric MQW semiconductor optical amplifier with low-polarization sensitivity of over 90-nm bandwidth**, Julie E. Nkanta, Ramon Maldonado-Basilio, Sawsan Abdul-Majid, Univ. of Ottawa (Canada); Jessica Zhang, Canadian Microelectronics Corp. (Canada); Trevor J. Hall, Univ. of Ottawa (Canada)[9007-8]

9:45 am: **Multi-wavelength and multiband RE-doped optical fiber source array for WDM-GPON applications**, Gethell G. Perez-Sanchez, Tecnológico de Estudios Superiores de Coacalco (Mexico) and Ctr. de Investigación e Innovación Tecnológica (Mexico); Indayara B. Martins, Philippe Gallion, Christophe Gosset, Télécom ParisTech (France); Jose A. Alvarez-Chávez, Ctr. de Investigación e Innovación Tecnológica (Mexico)[9007-9]

Coffee Break Wed 10:00 am to 10:15 am

SESSION 5

Location: Room 200 (Mezzanine) . . Wed 10:15 am to 12:15 pm

Radio-Over Fiber Systems and Optical Fiber Technology for MIMO

Joint Session with Conferences 9007 and 9009

Session Chair: **Dominic C. O'Brien**, Univ. of Oxford (United Kingdom)

10:15 am: **Recent standardization activities on radio on fiber (RoF)** (*Invited Paper*), Hiroyo Ogawa, Association of Radio Industries and Businesses (Japan); Toshiaki Kuri, Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan).[9007-10]

10:45 am: **Small cell configurations and capacity in RoF-DAS over WDM-PON system**, Katsutoshi Tsukamoto, Osaka Institute of Technology (Japan); Tatsuhiko Iwakuni, Kenji Miyamoto, Takayoshi Tashiro, Yoichi Fukada, Shigeru Kuwano, Jun-Ichi Kani, Jun Terada, Naoto Yoshimoto, NTT Access Network Service Systems Labs. (Japan)[9007-11]

11:00 am: **Opto-electrical predistortion method using nonlinearity of schottky diode for radio-over-fiber systems**, Byung-Hee Son, Kwangjin Kim, Ye Li, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of)[9007-12]

11:15 am: **Characterization of multi-mode fibers and devices for MIMO communications** (*Invited Paper*), Nicolas Fontaine, Alcatel-Lucent Bell Labs. (USA)[9009-9]

11:45 am: **Few mode fibers with low DMD slope realizing zero-DMD in wide wavelength range for MIMO processing** (*Invited Paper*), Ryo Maruyama, Nobuo Kuwaki, Shoichiro Matsuo, Fujikura Ltd. (Japan); Masaharu Ohashi, Osaka Prefecture Univ. (Japan).[9009-10]

Lunch/Exhibition Break Wed 12:15 pm to 1:30 pm

SESSION 6

Location: Room 200 (Mezzanine) Wed 1:30 pm to 3:15 pm

Emerging Optical Wireless and Passive Optical Networks

Session Chairs: **Mohsen Kavehrad**, The Pennsylvania State Univ. (USA); **Katsumi Iwatsuki**, Tohoku Univ. (Japan)

1:30 pm: **Gigabit-class optical wireless indoor communication** (*Invited Paper*), Frank Deicke, Fraunhofer-Institut für Photonische Mikrosysteme (Germany)[9007-13]

2:00 pm: **High speed infrared optical wireless for home access networks** (*Invited Paper*), Dominic C. O'Brien, Univ. of Oxford (United Kingdom) . .[9007-14]

2:30 pm: **Next generation 3-D OFDM based optical access networks using FEC under various system impairments**, Pravindra Kumar, Anand Srivastava, Indian Institute of Technology Mandi (India)[9007-15]

2:45 pm: **Experimental demonstration of NG-PONs power budget enhancement techniques**, Ali Emsia, Technische Univ. Darmstadt (Germany) and The Univ. of Arizona (USA); Mohammadreza Malekizandi, Dieter Briggmann, Quang T. Le, Technische Univ. Darmstadt (Germany); Ivan B. Djordjevic, The Univ. of Arizona (USA); Franko Küppers, Technische Univ. Darmstadt (Germany)[9007-16]

3:00 pm: **Power budget extension for higher-order modulation formats in PONs**, Mohammadreza Malekizandi, Ali Emsia, Dieter Briggmann, Quang Trung Le, Technische Univ. Darmstadt (Germany); Ivan B. Djordjevic, The Univ. of Arizona (United States); Franko Küppers, Technische Univ. Darmstadt (Germany)[9007-17]

Coffee Break Wed 3:15 pm to 3:30 pm

SESSION 7

Location: Room 200 (Mezzanine) Wed 3:30 pm to 5:00 pm

Novel Optical Communications Systems and Optical Wireless Applications

Session Chairs: **Klaus-Dieter Langer**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Katsutoshi Tsukamoto**, Osaka Institute of Technology (Japan)

3:30 pm: **Multi-band multi-service sensing: metamaterials myth and reality** (*Invited Paper*), Mohsen Kavehrad, The Pennsylvania State Univ. (USA) .[9007-18]

4:15 pm: **4-channel CWDM system design for multi-Gbit/s data communication via SI-POF**, Mladen Joncic, Matthias Haupt, Ulrich H. P. Fischer, Hochschule Harz (Germany)[9007-20]

4:30 pm: **Gaussian mixture sigma-point particle filter for optical indoor navigation system**, Weizhi Zhang, Wenjun Gu, The Pennsylvania State Univ. (USA); Chunyi Chen, Changchun Univ. of Science and Technology (China); M. I. Sakib Chowdhury, Mohsen Kavehrad, The Pennsylvania State Univ. (USA)[9007-21]

4:45 pm: **Visible light indoor positioning system based on gain difference between tilted multiple optical receivers**, Se-Hoon Yang, Eun-Mi Jeong, Hyun-Seung Kim, Yong-Hwan Son, Sang-Kook Han, Yonsei Univ. (Korea, Republic of)[9007-22]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Broadband transceiver design of distributed amplify-and-forward MIMO relays in correlated channels, Chia-Chang Hu, Kang-Tsao Tang, National Chung Cheng Univ. (Taiwan).[9007-26]

Thursday 6 February

SESSION 8

Location: Room 200 (Mezzanine) Thu 8:00 am to 10:15 am

Advanced Passive and Active Devices for Coherent Communications

Joint Session with Conferences 9007 and 9009

Session Chair: **Frank Deicke,**

Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

8:00 am: **All-fibre mode multiplexers** (*Invited Paper*), Tim A. Birks, Stephanos Yerolatsitis, Itandehui Gris-Sánchez, Univ. of Bath (United Kingdom) . . . [9009-20]

8:30 am: **Multicore EDFA for long-distance transmission** (*Invited Paper*), Makoto Yamada, Osaka Prefecture Univ. (Japan); Hirotaka Ono, NTT Photonics Labs. (Japan); Shoichiro Matsuo, Fujikura Ltd. (Japan) [9009-21]

9:00 am: **Bandwidth and dynamic range of a pulsed local oscillator coherent optical receiver: application to the linear optical sampling**, Philippe Gallion, Xin You, Christophe Gosset, Frédéric Grillot, Télécom ParisTech (France) and Ctr. National de la Recherche Scientifique (France) [9009-22]

9:15 am: **Tunable optical delay line based on nonlinear effects in a polarization-maintaining fiber Bragg grating**, Mingming Sun, Han Chen, Xiaohan Sun, Southeast Univ. (China). [9009-23]

9:30 am: **Experimental validation of a delay-line interferometer based in-band OSNR monitor using a multivariable control system**, Ahmed S. Almaiman, Mohamed R. Chitgarha, Wajih A. Daab, Morteza Ziyadi, Amirhossein M. Ariaei, The Univ. of Southern California (USA); Wendy X. Zhao, Vijay Vusirikala, Google (USA); Alan Willner, The Univ. of Southern California (USA). . . . [9007-23]

9:45 am: **Linearized broadband optical detector: study and implementation of optical phase-locked loop**, Janusz A. Murakowski, Garrett J. Schneider, Univ. of Delaware (USA); Christopher A. Schuetz, Univ. of Delaware (USA) and Phase Sensitive Innovations (USA); Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA) [9007-24]

10:00 am: **Low-frequency analog signal distribution on digital photonic networks by optical delta-sigma modulation**, Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan). [9007-25]

Optical Metro Networks and Short-Haul Systems VI

Conference Chairs: **Werner Weiershausen**, Deutsche Telekom AG (Germany); **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Achyut K. Dutta**, Banpil Photonics, Inc. (USA); **Atul K. Srivastava**, NEL America, Inc. (USA)

Program Committee: **Youichi Akasaka**, Fujitsu Network Communications Inc. (USA); **Júlio César R. F. de Oliveira**, Fundacao Cpqd (Brazil); **Ivan B. Djordjevic**, The Univ. of Arizona (USA); **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Kiyo Ishii**, National Institute of Advanced Industrial Science and Technology (Japan); **Franko Küppers**, Technische Univ. Darmstadt (Germany); **Bishnu P. Pal**, Indian Institute of Technology Delhi (India); **Takashi Saida**, NTT Photonics Labs. (Japan); **Krishna Swaminathan**, Intel Corp. (USA); **Idelfonso Tafur-Monroy**, DTU Fotonik (Denmark); **Toshiki Tanaka**, Fujitsu Labs., Ltd. (Japan); **Jianjun Yu**, ZTE USA (USA)

Tuesday 4 February

OPTO PLENARY SESSION
Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**,
 Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:25 am

SESSION 1

Location: Room 200 (Mezzanine) . . . Tue 10:25 am to 12:25 pm
Optical Communications Plenary Session

Joint Session with Conferences 9007, 9008, and 9010

Session Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA);
Atul K. Srivastava, NEL America, Inc. (USA)

10:25 am: **Optics for large-scale data centers: key metrics and trends (Invited Paper)**, Hong Liu, Ryohei Urata, Chris J. Johnson, Google (USA) .[9010-1]

10:55 am: **Data center networks and network architectures (Invited Paper)**, Hiroshi Esaki, The Univ. of Tokyo (Japan)[9010-2]

11:25 am: **Light fidelity (Li-Fi): towards all-optical networking (Invited Paper)**, Dobroslav Tsonev, Stefan Videv, Harald Haas, The Univ. of Edinburgh (United Kingdom)[9007-1]

11:55 am: **Photonic networks that exploit digital coherent technologies (Invited Paper)**, Yojiro Mori, Ken-ichi Sato, Nagoya Univ. (Japan)[9008-1]

Lunch/Exhibition Break Tue 12:25 pm to 1:20 pm

SESSION 2

Location: Room 200 (Mezzanine) Tue 1:20 pm to 3:20 pm
Toward 100G/400G Flexible Systems for Advanced Access and Data Center Networks

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA);
Werner Weiershausen, Deutsche Telekom AG (Germany)

1:20 pm: **Dual-mode ultraflow access networks: a hybrid solution for the access bottleneck (Invited Paper)**, Leonid G. Kazovsky, Thomas Shunrong Shen, Ahmad R Dhaini, Shuang Yin, Marc De Leenheer, Benjamin A Detwiler, Stanford Univ. (USA)[9007-2]

1:50 pm: **Universal transmitter for wireless and optical access converged networks (Invited Paper)**, Quang Trung Le, Franko Küppers, Technische Univ. Darmstadt (Germany)[9008-2]

2:20 pm: **Sub-band wavelength conversion for terabit superchannel CO-OFDM networks**, Shanhong You, Soochow Univ. (China); Chao Li, Qi Yang, Wuhan Research Institute of Posts and Telecommunications (China); Ming Luo, Wuhan Research Institute of Posts and Telecommunications (China); Ying Qiu, Xiao Xiao, Shaohua Yu, Wuhan Research Institute of Posts and Telecommunications (China)[9009-1]

2:35 pm: **A global standardization trend for high-speed client and line side transceivers (Invited Paper)**, Hideki Isono, Fujitsu Ltd. (Japan)[9010-3]

3:05 pm: **Comparison of discrete multi-tone and pulse amplitude modulation for beyond 100 Gbps short-reach application**, Masato Nishihara, Yutaka Kai, Toshiki Tanaka, Tomoo Takahara, Fujitsu Labs., Ltd. (Japan); Lei Li, Weizhen Yan, Fujitsu Research and Development Center Co., Ltd. (China); Bo Liu, Fujitsu Labs., Ltd. (China); Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan)[9008-3]

Coffee Break Tue 3:20 pm to 3:35 pm

SESSION 3

Location: Room 200 (Mezzanine) Tue 3:35 pm to 6:05 pm
Next-Generation Integrated Photonics Devices

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Atul K. Srivastava**, NEL America, Inc. (USA);
Benjamin B. Dingel, Nasfine Photonics, Inc. (USA)

3:35 pm: **Scaling hybrid-integration of silicon photonics in freescale 130nm to TSMC 40nm-CMOS VLSI drivers for low-power communications links (Invited Paper)**, John E. Cunningham, Oracle (USA)[9010-4]

4:05 pm: **High-density optical interconnects by using silicon photonics (Invited Paper)**, Yutaka Urino, Tatsuya Usuki, Junichi Fujikata, Masashige Ishizaka, Koji Yamada, Photonics Electronics Technology Research Association (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan)[9010-5]

4:35 pm: **Microring resonators: the road to practical implementations**, Joyce K. S. Poon, Wesley D. Sacher, Jared C. Mikkelsen, Hasitha Jayatilaka, Univ. of Toronto (Canada)[9007-3]

4:50 pm: **Compact optical devices for high-speed digital coherent link (Invited Paper)**, Shin Kamei, NTT Photonics Labs. (Japan)[9008-4]

5:20 pm: **PLC-based mode multi/demultiplexer for MDM transmission (Invited Paper)**, Nobutomo Hanzawa, Nippon Telegraph and Telephone Corp. (Japan); Kunimasa Saitoh, Hokkaido Univ. (Japan); Taiji Sakamoto, Takashi Matsui, Kyouzou Tsujikawa, Nippon Telegraph and Telephone Corp. (Japan); Masanori Koshiba, Hokkaido Univ. (Japan); Fumihiko Yamamoto, Nippon Telegraph and Telephone Corp. (Japan)[9009-2]

5:50 pm: **Optical XOR circuit using combined technology of photonics and electronics**, Koichi Takiguchi, Ritsumeikan Univ. (Japan)[9009-3]

Wednesday 5 February

SESSION 4

Location: Room 238 (Mezzanine) . . Wed 10:15 am to 12:00 pm

**Optical Interconnects and Devices
for Short-Reach Networks**

Joint Session with Conferences 9008 and 9010

Session Chairs: **Hideki Isono**, Fujitsu Ltd. (Japan);
Ivan Shubin, Oracle (USA)

10:15 am: **Silicon photonics integrated circuits for high-speed data center interconnects** (*Invited Paper*), Saeed Fatholouloumi, Dazeng Feng, Hong Liang, Wei Qian, Roshanak Shafiiha, Pegah Seddighian, Bhavin Bijlani, Daniel C. Lee, Zhi Li, Joe Zhou, Aaron J. Zilkie, Shashank Jatar, B. Jonathan Luff, Mehdi Asghari, Kotura, Inc. (USA) [9010-11]

10:45 am: **25-Gb/s 100-m multi-mode fiber optical link based on 1.3µm lens-integrated surface-emitting laser and CMOS receiver** (*Invited Paper*), Takashi Takemoto, Hiroki Yamashita, Yasunobu Matsuoka, Koichiro Adachi, Yong Lee, Hitachi, Ltd. (Japan) [9010-12]

11:15 am: **Analysis and characterization of semiconductor optical amplifiers for application in photonic switching networks**, Phillip RudgeBarbosa, Decio Maia Jr., Edson Moschim, Univ. Estadual de Campinas (Brazil) . . . [9008-5]

11:30 am: **The first Brazilian integrated 100G QPSK transmitter and coherent receiver on a 5 x 5 mm silicon photonic chip** (*Invited Paper*), Júlio César R. F. de Oliveira, Bernardo B. C. Kyotoku, Felipe G. Peternella, Alexandre P. Freitas, Neil Guerrero Gonzalez, CpqD (Brazil) [9010-13]

Lunch/Exhibition Break Wed 12:00 pm to 1:00 pm

SESSION 5

Location: Room 238 (Mezzanine) Wed 1:00 pm to 3:30 pm

Advanced Components for Short-Haul Systems

Joint Session with Conferences 9008 and 9010

Session Chairs: **Krishna Swaminathan**, Intel Corp. (USA);
Achyut K. Dutta, Banpil Photonics, Inc. (USA)

1:00 pm: **Silicon photonic Bragg-grating couplers for optical communications** (*Invited Paper*), Wei Shi, Univ. Laval (Canada); Venkatakrisnan Veerasubramanian, David V. Plant, McGill Univ. (Canada); Nicolas A. F. Jaeger, Lukas Chrostowski, The Univ. of British Columbia (Canada) [9010-15]

1:30 pm: **Tunable 1550nm VCSELs using high-contrast grating for next-generation networks** (*Invited Paper*), Christopher Chase, Yi Rao, Michael Huang, Bandwidth10 (USA); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) [9008-6]

2:00 pm: **Monolithic silicon waveguides in bulk silicon wafers** (*Invited Paper*), Chia-Ming Chang, Olav Solgaard, Stanford Univ. (USA) [9010-16]

2:30 pm: **Monolithically-integrated Ge CMOS laser** (*Invited Paper*), Rodolfo E. Camacho-Aguilera, Massachusetts Institute of Technology (USA) [9010-17]

3:00 pm: **Nanoplasmonic waveguides and modulators for advanced optical interconnects** (*Invited Paper*), Zhaolin Lu, Kaifeng Shi, Riaz R. Haque, Rochester Institute of Technology (USA) [9010-14]

Coffee Break Wed 3:30 pm to 3:50 pm

SESSION 6

Location: Room 238 (Mezzanine) Wed 3:50 pm to 5:35 pm

Photonic Switching, Routing, and WDM Devices

Joint Session with Conferences 9008 and 9010

Session Chairs: **Kiyo Ishii**, National Institute of Advanced Industrial Science and Technology (Japan);
Idelfonso Tafur Monroy, DTU Fotonik (Denmark)

3:50 pm: **Germanium light-emitting diodes on silicon for very-short-reach interconnect** (*Invited Paper*), Misuzu Sagawa, Katsuya Oda, Kazuki Tani, Yuji Suwa, Jun-ichi Kasai, Tadashi Okumura, Shin-ichi Saito, Tatemi Ido, Photonics Electronics Technology Research Association (Japan) and Photonics-Electronics Convergence System Technology (Japan) and Hitachi, Ltd. (Japan) [9010-18]

4:20 pm: **A hybrid optical switch architecture to integrate IP into optical networks to provide flexible and intelligent bandwidth on demand for cloud computing**, Wei Yang, Trevor J. Hall, Univ. of Ottawa (Canada) [9008-7]

4:35 pm: **A design for an internet router with a digital optical data plane** (*Invited Paper*), Joe Touch, The Univ. of Southern California (USA); Joseph Bannister, The Aerospace Corp. (USA); Stephen Suryaputra, Alan E. Willner, The Univ. of Southern California (USA) [9008-8]

5:05 pm: **Advances in silicon photonics WDM devices** (*Invited Paper*), Philippe Absil, IMEC (Belgium) [9010-19]

Thursday 6 February

SESSION 7

Location: Room 202 (Mezzanine) Thu 8:00 am to 10:15 am

Modulation Formats and High-Efficiency Transmission I

Session Chairs: **Toshiki Tanaka**, Fujitsu Labs., Ltd. (Japan);
Ivan B. Djordjevic, The Univ. of Arizona (USA)

8:00 am: **High-performance transmission in analog photonic links** (*Invited Paper*), Zhiyu Chen, Lianshan Yan, Hengyun Jiang, Jia Ye, Wei Pan, Bin Luo, Xihua Zou, Southwest Jiaotong Univ. (China) [9008-9]

8:30 am: **Green photonics realized by optical complex systems**, Hiroto Nanri, Wakao Sasaki, Doshisha Univ. (Japan) [9008-10]

8:45 am: **Latency causes and reduction in optical metro networks** (*Invited Paper*), Vjaceslavs Bobrovs, Sandis Spolitis, Girts Ivanovs, Riga Technical Univ. (Latvia) [9008-11]

9:15 am: **Optimization in spectrum-sliced optical networks** (*Invited Paper*), Karcus Day Rosario Assis, Federal Univ. do Recôncavo of Bahia (Brazil); Alex Ferreira dos Santos, Univ. Estadual de Campinas (Brazil); Raul C. Almeida Jr., Univ. Federal de Pernambuco (Brazil) [9008-12]

9:45 am: **Distributed optical multiplexing with precise frequency allocation using fiber frequency conversion** (*Invited Paper*), Tomoyuki Kato, Ryo Okabe, Shigeiki Watanabe, Fujitsu Labs., Ltd. (Japan) [9008-13]

Coffee Break Thu 10:15 am to 10:30 am

SESSION 8

Location: Room 202 (Mezzanine) Thu 10:30 am to 12:15 pm

Modulation Formats and High-Efficiency Transmission II

Session Chairs: **Youichi Akasaka**, Fujitsu Network Communications Inc. (USA); **Jianjun Yu**, ZTE USA (USA)

10:30 am: **Multidimensional SPC-based bit-interleaved coded-modulation for spectrally-efficient optical transmission systems** (*Invited Paper*), Hussam G. Batshon, Hongbin Zhang, Tyco Electronics Subsea Communications (USA) [9008-14]

11:00 am: **Digital signal processing for high spectral efficiency optical networks** (*Invited Paper*), Junwen Zhang, Jianjun Yu, ZTE USA (USA) and Fudan Univ. (China); Nan Chi, Fudan Univ. (China) [9008-15]

11:30 am: **Blocking analysis of dynamic routing, wavelength assignment, and spectrum allocation in flexible grid WDM networks**, Ankitkumar N. Patel, Philip N. Ji, NEC Labs. America, Inc. (USA); Jigarkumar S. Patel, Jason P. Jue, The Univ. of Texas at Dallas (USA); Ting Wang, NEC Labs. America, Inc. (USA) [9008-16]

11:45 am: **Toward ultra-broadband elastic optical networks: reconfigurable quasi-Nyquist transmitter for metro- and long-haul scenarios** (*Invited Paper*), Neil Guerrero Gonzalez, Carolina Franciscangelis, Luis H. H. de Carvalho, Edson P. da Silva, Júlio C. M. Diniz, Júlio César R. F. de Oliveira, CpqD (Brazil) [9008-17]

Lunch/Exhibition Break Thu 12:15 pm to 1:15 pm



Conference 9008 · Location: Room 202 (Mezzanine)

SESSION 9

Location: Room 202 (Mezzanine) Thu 1:15 pm to 3:00 pm

Short-Reach Metro and Access Networks and Related Components I

Session Chairs: **Takashi Saida**, NTT Photonics Labs. (Japan);
Júlio César R. F. de Oliveira, Fundacao CpqD (Brazil)

1:15 pm: **Specialty optical fibers for mid-IR photonics** (*Invited Paper*), Bishnu P. Pal, Ajanta Barh, Somnath Ghosh, Ravendra K. Varshney, Indian Institute of Technology Delhi (India) [9008-18]

1:45 pm: **Parametric spectro-temporal analyzer (PASTA) for ultrafast optical performance monitoring** (*Invited Paper*), Chi Zhang, University of Hong Kong (Hong Kong, China); Kenneth K. Y. Wong, The Univ. of Hong Kong (Hong Kong, China) [9008-19]

2:15 pm: **Flat amplification over C-band by quasi phase-matched fiber optical parametric amplifier using pump-phase shifers** (*Invited Paper*), Shigehiro Takasaka, Furukawa Electric Co., Ltd. (Japan). [9008-20]

2:45 pm: **Optical beat interference noise reduction in OFDMA optical access link using self-homodyne balanced detection**, Sang-Min Jung, Yong-Yuk Won, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) [9008-21]

Coffee Break Thu 3:00 pm to 3:20 pm

SESSION 10

Location: Room 202 (Mezzanine) Thu 3:20 pm to 4:35 pm

Short-Reach Metro and Access Networks and Related Components II

Session Chairs: **Atul K. Srivastava**, NEL America, Inc. (USA);
Werner Weiershausen, Deutsche Telekom AG (Germany)

3:20 pm: **Low-cost 10G optical line terminal of WDM-PON for mobile backhaul application**, Do-Won Kim, Jeong-in Kim, Jae Ho Song, Hee Yeal Rhy, Sang Jin Yoo, Gwang yong Yi, Ericsson-LG (Korea, Republic of) [9008-22]

3:35 pm: **Optical OFDM transmission for long-haul, metro/access, and data center applications** (*Invited Paper*), Anand Srivastava, Indian Institute of Technology Mandi (India) [9008-23]

4:05 pm: **Fibre-to-the-telescope: MeerKAT, the South African precursor to square kilometre telescope array (SKA)** (*Invited Paper*), T. B. Gibbon, E. K. Rotich, H. Y. S. Kourouma, R. R. G. Gamatham, A. W. R. Leitch, Nelson Mandela Metropolitan Univ. (South Africa); R. Siebrits, R. Julie, S. Malan, W. Rust, F. Kapp, T. L. Venkatasubramani, B. Wallace, A. Peens-Hough, P. Herselman, Square Kilometre Array (South Africa) [9008-24]

Next-Generation Optical Communication: Components, Sub-Systems, and Systems III

Conference Chair: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

Program Committee: **Yi Cai**, ZTE USA (USA); **Gabriella Cincotti**, Univ. degli Studi di Roma Tre (Italy); **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **John D. Downie**, Corning Incorporated (USA); **Ronald Freund**, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Shoichiro Matsuo**, Fujikura Ltd. (Japan); **Masataka Nakazawa**, Tohoku Univ. (Japan); **Ioannis Roudas**, Univ. of Patras (Greece); **Kunimasa Saitoh**, Hokkaido Univ. (Japan); **Mark Shtaif**, Tel Aviv Univ. (Israel); **Atul K. Srivastava**, NEL America, Inc. (USA); **Fatih Yaman**, NEC Labs. America, Inc. (USA); **Xiang Zhou**, AT&T Labs. Research (USA)

Tuesday 4 February

OPTO PLENARY SESSION

Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

- 8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)
- 8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)
- 8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)
- 9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:25 am

SESSION 1

Location: Room 200 (Mezzanine) . . . Tue 10:25 am to 12:25 pm

Optical Communications Plenary Session

Joint Session with Conferences 9007, 9008, and 9010

Session Chairs: **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA); **Atul K. Srivastava**, NEL America, Inc. (USA)

- 10:25 am: **Optics for large-scale data centers: key metrics and trends (Invited Paper)**, Hong Liu, Ryohei Urata, Chris J. Johnson, Google (USA) .[9010-1]
- 10:55 am: **Data center networks and network architectures (Invited Paper)**, Hiroshi Esaki, The Univ. of Tokyo (Japan) [9010-2]
- 11:25 am: **Light fidelity (Li-Fi): towards all-optical networking (Invited Paper)**, Dobroslav Tsonev, Stefan Videv, Harald Haas, The Univ. of Edinburgh (United Kingdom) [9007-1]
- 11:55 am: **Photonic networks that exploit digital coherent technologies (Invited Paper)**, Yojiro Mori, Ken-ichi Sato, Nagoya Univ. (Japan) [9008-1]
- Lunch/Exhibition Break Tue 12:25 pm to 1:20 pm

SESSION 2

Location: Room 200 (Mezzanine) Tue 1:20 pm to 3:20 pm

Toward 100G/400G Flexible Systems for Advanced Access and Data Center Networks

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Werner Weiershausen**, Deutsche Telekom AG (Germany)

- 1:20 pm: **Dual-mode ultraflow access networks: a hybrid solution for the access bottleneck (Invited Paper)**, Leonid G. Kazovsky, Thomas Shunrong Shen, Ahmad R Dhaini, Shuang Yin, Marc De Leenheer, Benjamin A Detwiler, Stanford Univ. (USA) [9007-2]

1:50 pm: **Universal transmitter for wireless and optical access converged networks (Invited Paper)**, Quang Trung Le, Franko Küppers, Technische Univ. Darmstadt (Germany) [9008-2]

2:20 pm: **Sub-band wavelength conversion for terabit superchannel CO-OFDM networks**, Shanhong You, Soochow Univ. (China); Chao Li, Qi Yang, Wuhan Research Institute of Posts and Telecommunications (China); Ming Luo, Wuhan Research Institute of Posts and Telecommunications (China); Ying Qiu, Xiao Xiao, Shaohua Yu, Wuhan Research Institute of Posts and Telecommunications (China) [9009-1]

2:35 pm: **A global standardization trend for high-speed client and line side transceivers (Invited Paper)**, Hideki Isono, Fujitsu Ltd. (Japan) [9010-3]

3:05 pm: **Comparison of discrete multi-tone and pulse amplitude modulation for beyond 100 Gbps short-reach application**, Masato Nishihara, Yutaka Kai, Toshiki Tanaka, Tomoo Takahara, Fujitsu Labs., Ltd. (Japan); Lei Li, Weizhen Yan, Fujitsu Research and Development Center Co., Ltd. (China); Bo Liu, Fujitsu Labs., Ltd. (China); Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan) [9008-3]

Coffee Break Tue 3:20 pm to 3:35 pm

SESSION 3

Location: Room 200 (Mezzanine) Tue 3:35 pm to 6:05 pm

Next-Generation Integrated Photonics Devices

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Atul K. Srivastava**, NEL America, Inc. (USA); **Benjamin B. Dingel**, Nasfine Photonics, Inc. (USA)

- 3:35 pm: **Scaling hybrid-integration of silicon photonics in freescale 130nm to TSMC 40nm-CMOS VLSI drivers for low-power communications links (Invited Paper)**, John E. Cunningham, Oracle (USA) [9010-4]
- 4:05 pm: **High-density optical interconnects by using silicon photonics (Invited Paper)**, Yutaka Urino, Tatsuya Usuki, Junichi Fujikata, Masashige Ishizaka, Koji Yamada, Photonics Electronics Technology Research Association (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan) [9010-5]
- 4:35 pm: **Microring resonators: the road to practical implementations**, Joyce K. S. Poon, Wesley D. Sacher, Jared C. Mikkelsen, Hasitha Jayatileka, Univ. of Toronto (Canada) [9007-3]
- 4:50 pm: **Compact optical devices for high-speed digital coherent link (Invited Paper)**, Shin Kamei, NTT Photonics Labs. (Japan) [9008-4]
- 5:20 pm: **PLC-based mode multi/demultiplexer for MDM transmission (Invited Paper)**, Nobutomo Hanzawa, Nippon Telegraph and Telephone Corp. (Japan); Kunimasa Saitoh, Hokkaido Univ. (Japan); Taiji Sakamoto, Takashi Matsui, Kyouzou Tsujikawa, Nippon Telegraph and Telephone Corp. (Japan); Masanori Koshiba, Hokkaido Univ. (Japan); Fumihiko Yamamoto, Nippon Telegraph and Telephone Corp. (Japan) [9009-2]
- 5:50 pm: **Optical XOR circuit using combined technology of photonics and electronics**, Koichi Takiguchi, Ritsumeikan Univ. (Japan) [9009-3]



Wednesday 5 February

SESSION 4

Location: Room 202 (Mezzanine) Wed 8:00 am to 9:45 am

Signal Processing in Coherent Communication System (DSP)

Session Chair: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

- 8:00 am: **Blind SNR estimation for QAM constellations based on the signal magnitude statistics**, Stefanos Dris, Christos Spatharakis, Paraskevas Bakopoulos, Ioannis Lazarou, Hercules Avramopoulos, National Technical Univ. of Athens (Greece)[9009-4]
- 8:15 am: **Hardware efficient frequency domain equalization in few-mode fiber coherent transmission systems** (*Invited Paper*), Zhongqi Pan, Xuan He, Yi Weng, Univ. of Louisiana at Lafayette (USA)[9009-5]
- 8:45 am: **Frequency, phase, and polarization-tracking algorithms for arbitrary four-dimensional signal constellations**, Hadrien Louchet, VPIphotonics GmbH (Germany); Konstantin G. Kuzmin, VPIphotonics GmbH (Belarus); Andre Richter, VPIphotonics GmbH (Germany)[9009-6]
- 9:00 am: **All-optical 2R regenerator of 16-QAM signals**, Lu Li, Michael Vasilyev, The Univ. of Texas at Arlington (USA)[9009-7]
- 9:15 am: **Pulse-shaping for spectrally-efficient coherent optical networks: OFDM, Nyquist signaling, and DFT-spread OFDM** (*Invited Paper*), Rene M. Schmogrow, Philipp C. Schindler, Christian Koos, Wolfgang Freude, Karlsruher Institut für Technologie (Germany); Juerg Leuthold, ETH Zurich (Switzerland)[9009-8]
- Coffee Break Wed 9:45 am to 10:15 am

SESSION 5

Location: Room 200 (Mezzanine) . . Wed 10:15 am to 12:15 pm

Radio-Over Fiber Systems and Optical Fiber Technology for MIMO

Joint Session with Conferences 9007 and 9009

Session Chair: **Dominic C. O'Brien**, Univ. of Oxford (United Kingdom)

- 10:15 am: **Recent standardization activities on radio on fiber (RoF)** (*Invited Paper*), Hiroyo Ogawa, Association of Radio Industries and Businesses (Japan); Toshiaki Kuri, Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan)[9007-10]
- 10:45 am: **Small cell configurations and capacity in RoF-DAS over WDM-PON system**, Katsutoshi Tsukamoto, Osaka Institute of Technology (Japan); Tatsuhiko Iwakuni, Kenji Miyamoto, Takayoshi Tashiro, Yoichi Fukada, Shigeru Kuwano, Jun-Ichi Kani, Jun Terada, Naoto Yoshimoto, NTT Access Network Service Systems Labs. (Japan)[9007-11]
- 11:00 am: **Opto-electrical predistortion method using nonlinearity of schottky diode for radio-over-fiber systems**, Byung-Hee Son, Kwangjin Kim, Ye Li, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of)[9007-12]
- 11:15 am: **Characterization of multi-mode fibers and devices for MIMO communications** (*Invited Paper*), Nicolas Fontaine, Alcatel-Lucent Bell Labs. (USA)[9009-9]
- 11:45 am: **Few mode fibers with low DMD slope realizing zero-DMD in wide wavelength range for MIMO processing** (*Invited Paper*), Ryo Maruyama, Nobuo Kuwaki, Shoichiro Matsuo, Fujikura Ltd. (Japan); Masaharu Ohashi, Osaka Prefecture Univ. (Japan)[9009-10]
- Lunch/Exhibition Break Wed 12:15 pm to 1:30 pm

SESSION 6

Location: Room 202 (Mezzanine) Wed 1:30 pm to 3:30 pm

Advances on Optical Fiber Technologies

Session Chair: **Zhongqi Pan**, Univ. of Louisiana at Lafayette (USA)

- 1:30 pm: **Multi-element fiber for space-division multiplexing** (*Invited Paper*), Jayanta K. Sahu, Saurabh Jain, Victor Fernandez, Timothy C. May-Smith, Andrew S. Webb, Periklis Petropoulos, David J. Richardson, Univ. of Southampton (United Kingdom)[9009-11]
- 2:00 pm: **Low crosstalk, bending loss reduced and SSMF compatible single mode multicore fibre for telecommunication applications**, Michal Szymanski, Michal Murawski, Zbigniew Holdynski, Tadeusz Tenderenda, Lukasz Ostrowski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Anna Zioliowicz, Military Univ of Technology (Poland) and InPhoTech Ltd. (Poland); Pawel Mergo, Univ. of Maria Curie-Sklodowska (Poland); Krzysztof Poturaj, Krzysztof Skorupski, Univ. of Maria Curie-Sklodowska (Poland) and InPhoTech Ltd. (Poland); Marek Napierala, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland); Pawel Marc, Leszek R. Jaroszewicz, Military Univ. of Technology (Poland); Tomasz Nasilowski, Military Univ. of Technology (Poland) and InPhoTech Ltd. (Poland)[9009-12]
- 2:15 pm: **Nonlinear propagation in multi-mode fibers** (*Invited Paper*), Georg Rademacher, Stefan Warm, Klaus Petermann, Technische Univ. Berlin (Germany)[9009-13]
- 2:45 pm: **Fabrication and characterization of all-fiber 90-degree optical hybrids using a 4x4 coupler for signal analysis**, Wendy-Julie Madore, Mikael Leduc, Ecole Polytechnique de Montréal (Canada); Stephane Couture, Sylvain O'Reilly, ITF Labs. (Canada); Suzanne Lacroix, Nicolas Godbout, Ecole Polytechnique de Montréal (Canada)[9009-14]
- 3:00 pm: **Coupling mechanisms in multimode fibers** (*Invited Paper*), Luca Palmieri, Univ. degli Studi di Padova (Italy)[9009-15]
- Coffee Break Wed 3:30 pm to 3:45 pm

SESSION 7

Location: Room 202 (Mezzanine) Wed 3:45 pm to 5:45 pm

Systems and Networking

Session Chair: **Jayanta K. Sahu**, Univ. of Southampton (United Kingdom)

- 3:45 pm: **Spatial-spectral flexible optical networking: enabling switching solutions for a simplified and efficient SDM network platform** (*Invited Paper*), Ioannis Tomkos, Panagiotis Zakynthinos, Dimitrios Klonidis, Athens Information Technology (Greece); Dan Marom, The Hebrew Univ. of Jerusalem (Israel); Stylianos Sygletos, Andrew Ellis, Aston Univ. (United Kingdom); Elio Salvadori, Domenico Siracusa, CREATE-NET (Italy); Marianna Angelou, George Papastergiou, Optronics Technologies S.A. (Greece); Nicholas Psaila, Optoscribe Ltd. (United Kingdom); Jordi F. Ferran, W-onesys S.L. (Spain); Shalva Ben-Ezra, Finisar Israel Ltd. (Israel); Felipe Jimenez, Juan Pedro Fernández-Palacios, Telefónica Investigación y Desarrollo S.A. (Spain) .[9009-16]
- 4:15 pm: **Experimental demonstration of high spectral-efficiency transmission with a novel non-interferometric vector modulator and custom DSP algorithms for coherent PON architectures**, Ioannis Lazarou, Christos Spatharakis, Vasilis Katopodis, Stefanos Dris, Paraskevas Bakopoulos, National Technical Univ. of Athens (Greece); Bernhard Schrenk, Austrian Institute of Technology (Austria); Hercules Avramopoulos, National Technical Univ. of Athens (Greece)[9009-17]
- 4:30 pm: **Super-Nyquist shaping and processing technologies for high-spectral-efficiency optical systems** (*Invited Paper*), Zhensheng Jia, Hung-Chang Chien, Junwen Zhang, Ze Dong, Yi Cai, Jianjun Yu, ZTE USA (USA)[9009-18]
- 5:00 pm: **Hybrid MDM/OCDFM system with mode and code multi-/demultiplexers** (*Invited Paper*), Takahiro Kodama, Tomoki Isoda, Koji Morita, Akihiro Maruta, Osaka Univ. (Japan); Ryo Maruyama, Nobuo Kuwaki, Shoichiro Matsuo, Fujikura Ltd. (Japan); Naoya Wada, National Institute of Information and Communications Technology (Japan); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Ken-ichi Kitayama, Osaka Univ. (Japan)[9009-19]
- 5:30 pm: **All-optical tunable multilevel amplitude regeneration using coherent nonlinear wave mixing**, Zahra Bakhtiari, Robert W. Hellwarth, The Univ. of Southern California (USA)[9009-27]

POSTERS-WEDNESDAY

Location: Room 103 (Exhibit Level) . . Wed 6:00 pm to 8:00 pm

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>.

Compressed data for the movie industry, Bradley S. Tice, Advanced Human Design (USA)[9009-24]

Simulation of reconfigurable multifunctional continuous logic devices as advanced components of the next generation high-performance MIMO-systems for the processing and interconnection, Vladimir G. Krasilenko, Vinnitsa Social Economy Institute (Ukraine); Aleksandr Nikolsky, Vinnitsa National Technical Univ. (Ukraine); Alexander Lazarev, Vinnitsa National Technical Univ. (Ukraine)[9009-25]

Metrology for QKD: an industrial quantum optical communication technology, Anas Al Natsheh, Kajaanin Ammattikorkeakoulu (Finland) .[9009-26]

Thursday 6 February

SESSION 8

Location: Room 200 (Mezzanine) Thu 8:00 am to 10:15 am

Advanced Passive and Active Devices for Coherent Communications

Joint Session with Conferences 9007 and 9009

Session Chair: **Frank Deicke**, Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

8:00 am: **All-fibre mode multiplexers** (*Invited Paper*), Tim A. Birks, Stephanos Yerolatsitis, Itandehui Gris-Sánchez, Univ. of Bath (United Kingdom) . . .[9009-20]

8:30 am: **Multicore EDFA for long-distance transmission** (*Invited Paper*), Makoto Yamada, Osaka Prefecture Univ. (Japan); Hirotaka Ono, NTT Photonics Labs. (Japan); Shoichiro Matsuo, Fujikura Ltd. (Japan)[9009-21]

9:00 am: **Bandwidth and dynamic range of a pulsed local oscillator coherent optical receiver: application to the linear optical sampling**, Philippe Gallion, Xin You, Christophe Gosset, Frédéric Grillot, Télécom ParisTech (France) and Ctr. National de la Recherche Scientifique (France)[9009-22]

9:15 am: **Tunable optical delay line based on nonlinear effects in a polarization-maintaining fiber Bragg grating**, Mingming Sun, Han Chen, Xiaohan Sun, Southeast Univ. (China)[9009-23]

9:30 am: **Experimental validation of a delay-line interferometer based in-band OSNR monitor using a multivariable control system**, Ahmed S. Almainan, Mohamed R. Chitgarha, Wajih A. Daab, Morteza Ziyadi, Amirhossein M. Ariaei, The Univ. of Southern California (USA); Wendy X. Zhao, Vijay Vusirikala, Google (USA); Alan Willner, The Univ. of Southern California (USA)[9007-23]

9:45 am: **Linearized broadband optical detector: study and implementation of optical phase-locked loop**, Janusz A. Murakowski, Garrett J. Schneider, Univ. of Delaware (USA); Christopher A. Schuetz, Univ. of Delaware (USA) and Phase Sensitive Innovations (USA); Shouyuan Shi, Dennis W. Prather, Univ. of Delaware (USA)[9007-24]

10:00 am: **Low-frequency analog signal distribution on digital photonic networks by optical delta-sigma modulation**, Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan)[9007-25]

Next-Generation Optical Networks for Data Centers and Short-Reach Links

Conference Chair: **Atul K. Srivastava**, NEL America, Inc. (USA)

Program Committee: **Philippe Absil**, IMEC (Belgium); **Júlio César R. F. de Oliveira**, Fundacao CpqD (Brazil); **Mitchell H. Fields**, Avago Technologies (USA); **Hideki Isono**, Fujitsu Optical Components, Ltd. (Japan); **Takashi Saida**, NTT Photonics Labs. (Japan); **Ivan Shubin**, Oracle (USA); **Takashi Takemoto**, Hitachi, Ltd. (Japan)

Tuesday 4 February

OPTO PLENARY SESSION
Location: Room 134 (Exhibit Level) . . 8:30 am to 10:00 am

Session Chairs : David L. Andrews,
 Univ. of East Anglia Norwich (United Kingdom);
Alexei L. Glebov, OptiGrate Corp. (USA)

8:30 am: **Welcome and Opening Remarks**, Alexei L. Glebov, OptiGrate Corp. (USA)

8:35 am: **Announcement of the Green Photonics Awards**, Stephen J. Eglash, Energy and Environment Affiliates Program, Stanford Univ. (USA)

8:40 am: **Pushing the boundaries of silicon photonics (Plenary)**, Michal F. Lipson, Cornell Univ. (USA)

9:20 am: **The previously unbelievable performance of ultrafast thin disk lasers (Plenary)**, Ursula Keller, ETH Zurich (Switzerland)

Coffee Break Tue 10:00 am to 10:25 am

SESSION 1

Location: Room 200 (Mezzanine) . . . Tue 10:25 am to 12:25 pm
Optical Communications Plenary Session

Joint Session with Conferences 9007, 9008, and 9010

Session Chairs: **Benjamin B. Dingel**, Nasfina Photonics, Inc. (USA);
Atul K. Srivastava, NEL America, Inc. (USA)

10:25 am: **Optics for large-scale data centers: key metrics and trends (Invited Paper)**, Hong Liu, Ryohei Urata, Chris J. Johnson, Google (USA) .[9010-1]

10:55 am: **Data center networks and network architectures (Invited Paper)**, Hiroshi Esaki, The Univ. of Tokyo (Japan)[9010-2]

11:25 am: **Light fidelity (Li-Fi): towards all-optical networking (Invited Paper)**, Dobroslav Tsonev, Stefan Videv, Harald Haas, The Univ. of Edinburgh (United Kingdom)[9007-1]

11:55 am: **Photonic networks that exploit digital coherent technologies (Invited Paper)**, Yojiro Mori, Ken-ichi Sato, Nagoya Univ. (Japan)[9008-1]

Lunch/Exhibition Break Tue 12:25 pm to 1:20 pm

SESSION 2

Location: Room 200 (Mezzanine) Tue 1:20 pm to 3:20 pm
Toward 100G/400G Flexible Systems for Advanced Access and Data Center Networks

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Guifang Li**, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA);
Werner Weiershausen, Deutsche Telekom AG (Germany)

1:20 pm: **Dual-mode ultraflow access networks: a hybrid solution for the access bottleneck (Invited Paper)**, Leonid G. Kazovsky, Thomas Shunrong Shen, Ahmad R Dhaini, Shuang Yin, Marc De Leenheer, Benjamin A Detwiler, Stanford Univ. (USA)[9007-2]

1:50 pm: **Universal transmitter for wireless and optical access converged networks (Invited Paper)**, Quang Trung Le, Franko Küppers, Technische Univ. Darmstadt (Germany)[9008-2]

2:20 pm: **Sub-band wavelength conversion for terabit superchannel CO-OFDM networks**, Shanhong You, Soochow Univ. (China); Chao Li, Qi Yang, Wuhan Research Institute of Posts and Telecommunications (China); Ming Luo, Wuhan Research Institute of Posts and Telecommunications (China); Ying Qiu, Xiao Xiao, Shaohua Yu, Wuhan Research Institute of Posts and Telecommunications (China)[9009-1]

2:35 pm: **A global standardization trend for high-speed client and line side transceivers (Invited Paper)**, Hideki Isono, Fujitsu Ltd. (Japan)[9010-3]

3:05 pm: **Comparison of discrete multi-tone and pulse amplitude modulation for beyond 100 Gbps short-reach application**, Masato Nishihara, Yutaka Kai, Toshiaki Tanaka, Tomoo Takahara, Fujitsu Labs., Ltd. (Japan); Lei Li, Weizhen Yan, Fujitsu Research and Development Center Co., Ltd. (China); Bo Liu, Fujitsu Labs., Ltd. (China); Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan)[9008-3]

Coffee Break Tue 3:20 pm to 3:35 pm

SESSION 3

Location: Room 200 (Mezzanine) Tue 3:35 pm to 6:05 pm
Next-Generation Integrated Photonics Devices

Joint Session with Conferences 9007, 9008, 9009, and 9010

Session Chairs: **Atul K. Srivastava**, NEL America, Inc. (USA);
Benjamin B. Dingel, Nasfina Photonics, Inc. (USA)

3:35 pm: **Scaling hybrid-integration of silicon photonics in freescale 130nm to TSMC 40nm-CMOS VLSI drivers for low-power communications links (Invited Paper)**, John E. Cunningham, Oracle (USA)[9010-4]

4:05 pm: **High-density optical interconnects by using silicon photonics (Invited Paper)**, Yutaka Urino, Tatsuya Usuki, Junichi Fujikata, Masashige Ishizaka, Koji Yamada, Photonics Electronics Technology Research Association (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan)[9010-5]

4:35 pm: **Microring resonators: the road to practical implementations**, Joyce K. S. Poon, Wesley D. Sacher, Jared C. Mikkelsen, Hasitha Jayatilleka, Univ. of Toronto (Canada)[9007-3]

4:50 pm: **Compact optical devices for high-speed digital coherent link (Invited Paper)**, Shin Kamei, NTT Photonics Labs. (Japan)[9008-4]

5:20 pm: **PLC-based mode multi/demultiplexer for MDM transmission (Invited Paper)**, Nobutomo Hanzawa, Nippon Telegraph and Telephone Corp. (Japan); Kunimasa Saitoh, Hokkaido Univ. (Japan); Taiji Sakamoto, Takashi Matsui, Kyouzou Tsujikawa, Nippon Telegraph and Telephone Corp. (Japan); Masanori Koshiba, Hokkaido Univ. (Japan); Fumihiko Yamamoto, Nippon Telegraph and Telephone Corp. (Japan)[9009-2]

5:50 pm: **Optical XOR circuit using combined technology of photonics and electronics**, Koichi Takiguchi, Ritsumeikan Univ. (Japan)[9009-3]

Wednesday 5 February

SESSION 4

Location: Room 238 (Mezzanine) Wed 8:15 am to 9:45 am

Short-Reach and Datacenter Networks

Session Chairs: **Takashi Takemoto**, Hitachi, Ltd. (Japan);
Philippe Absil, IMEC (Belgium)

- 8:15 am: **High-speed low-power short-reach optical interconnects for high-performance computing and servers** (*Invited Paper*), Daniel M. Kuchta, IBM Thomas J. Watson Research Ctr. (USA)[9010-6]
- 8:45 am: **Burst switching without guard interval in all-optical software-define star intra-data center network**, Philip N. Ji, Ting Wang, NEC Labs. America, Inc. (USA).[9010-7]
- 9:00 am: **Optimization of spectral band utilization in gridless WDM optical network**, Indayara B. Martins, Télécom ParisTech (France); Ivan A. Aldaya-Garde, Tecnológico de Monterrey (Mexico); Grethell G. Perez-Sanchez, Ctr. de Investigación e Innovación Tecnológica (Mexico); Phillipe Gallion, Télécom ParisTech (France).[9010-8]
- 9:15 am: **Combined CATV and very-high-speed data transmission over a 1550-nm wavelength indoor optical wireless link**, M. I. Sakib Chowdhury, Mohsen Kavehrad, The Pennsylvania State Univ. (USA); Weizhi Zhang, Ctr. for Information & Communications Technology Research (USA); Peng Deng, The Pennsylvania State Univ. (USA).[9010-9]
- 9:30 am: **Dynamic optical circuit switching**, Noam Sapiens, The Hebrew Univ. of Jerusalem (Israel); Larry Rudolph, Massachusetts Institute of Technology (USA); Aharon J. Agranat, The Hebrew Univ. of Jerusalem (Israel).[9010-10]
- Coffee Break Wed 9:45 am to 10:15 am

SESSION 5

Location: Room 238 (Mezzanine) . . Wed 10:15 am to 12:00 pm

Optical Interconnects and Devices for Short-Reach Networks

Joint Session with Conferences 9008 and 9010

Session Chairs: **Hideki Isono**, Fujitsu Ltd. (Japan);
Ivan Shubin, Oracle (USA)

- 10:15 am: **Silicon photonics integrated circuits for high-speed data center interconnects** (*Invited Paper*), Saeed Fatholouloumi, Dazeng Feng, Hong Liang, Wei Qian, Roshanak Shafiiha, Pegah Seddighian, Bhavin Bijlani, Daniel C. Lee, Zhi Li, Joe Zhou, Aaron J. Zilkie, Shashank Jatar, B. Jonathan Luff, Mehdi Asghari, Kotura, Inc. (USA)[9010-11]
- 10:45 am: **25-Gb/s 100-m multi-mode fiber optical link based on 1.3 μm lens-integrated surface-emitting laser and CMOS receiver** (*Invited Paper*), Takashi Takemoto, Hiroki Yamashita, Yasunobu Matsuoka, Koichiro Adachi, Yong Lee, Hitachi, Ltd. (Japan)[9010-12]
- 11:15 am: **Analysis and characterization of semiconductor optical amplifiers for application in photonic switching networks**, Phillip RudgeBarbosa, Decio Maia Jr., Edson Moschim, Univ. Estadual de Campinas (Brazil)[9008-5]
- 11:30 am: **The first Brazilian integrated 100G QPSK transmitter and coherent receiver on a 5 x 5 mm silicon photonic chip** (*Invited Paper*), Júlio César R. F. de Oliveira, Bernardo B. C. Kyotoku, Felipe G. Peternella, Alexandre P. Freitas, Neil Guerrero Gonzalez, CpqD (Brazil)[9010-13]
- Lunch/Exhibition Break Wed 12:00 pm to 1:00 pm

SESSION 6

Location: Room 238 (Mezzanine) Wed 1:00 pm to 3:30 pm

Advanced Components for Short-Haul Systems

Joint Session with Conferences 9008 and 9010

Session Chairs: **Krishna Swaminathan**, Intel Corp. (USA);
Achyut K. Dutta, Banpil Photonics, Inc. (USA)

- 1:00 pm: **Silicon photonic Bragg-grating couplers for optical communications** (*Invited Paper*), Wei Shi, Univ. Laval (Canada); Venkatakrishnan Veerasubramanian, David V. Plant, McGill Univ. (Canada); Nicolas A. F. Jaeger, Lukas Chrostowski, The Univ. of British Columbia (Canada)[9010-15]
- 1:30 pm: **Tunable 1550nm VCSELs using high-contrast grating for next-generation networks** (*Invited Paper*), Christopher Chase, Yi Rao, Michael Huang, Bandwidth10 (USA); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA).[9008-6]
- 2:00 pm: **Monolithic silicon waveguides in bulk silicon wafers** (*Invited Paper*), Chia-Ming Chang, Olav Solgaard, Stanford Univ. (USA)[9010-16]
- 2:30 pm: **Monolithically-integrated Ge CMOS laser** (*Invited Paper*), Rodolfo E. Camacho-Aguilera, Massachusetts Institute of Technology (USA)[9010-17]
- 3:00 pm: **Nanoplasmonic waveguides and modulators for advanced optical interconnects** (*Invited Paper*), Zhaolin Lu, Kaifeng Shi, Riaz R. Haque, Rochester Institute of Technology (USA)[9010-14]
- Coffee Break Wed 3:30 pm to 3:50 pm

SESSION 7

Location: Room 238 (Mezzanine) Wed 3:50 pm to 5:35 pm

Photonic Switching, Routing, and WDM Devices

Joint Session with Conferences 9008 and 9010

Session Chairs: **Kiyo Ishii**, National Institute of Advanced Industrial Science and Technology (Japan);
Idelfonso Tafur Monroy, DTU Fotonik (Denmark)

- 3:50 pm: **Germanium light-emitting diodes on silicon for very-short-reach interconnect** (*Invited Paper*), Misuzu Sagawa, Katsuya Oda, Kazuki Tani, Yuji Suwa, Jun-ichi Kasai, Tadashi Okumura, Shin-ichi Saito, Tatemi Ido, Photonics Electronics Technology Research Association (Japan) and Photonics-Electronics Convergence System Technology (Japan) and Hitachi, Ltd. (Japan)[9010-18]
- 4:20 pm: **A hybrid optical switch architecture to integrate IP into optical networks to provide flexible and intelligent bandwidth on demand for cloud computing**, Wei Yang, Trevor J. Hall, Univ. of Ottawa (Canada)[9008-7]
- 4:35 pm: **A design for an internet router with a digital optical data plane** (*Invited Paper*), Joe Touch, The Univ. of Southern California (USA); Joseph Bannister, The Aerospace Corp. (USA); Stephen Suryaputra, Alan E. Willner, The Univ. of Southern California (USA)[9008-8]
- 5:05 pm: **Advances in silicon photonics WDM devices** (*Invited Paper*), Philippe Absil, IMEC (Belgium)[9010-19]





GREEN PHOTONICS

SPIE Photonics West

Symposium Chair



Stephen J. Eglash

Executive Director
Energy and Environment Affiliates Program,
Stanford Univ. (USA)

Highlighting the latest photonics and optoelectronics tools and materials that reduce power consumption and enable cleaner manufacturing and new energy generation.

Laser-assisted Manufacturing and Micro/Nano Fabrication

(ordered chronologically by session start time)

Sunday 2 February · 9:25 AM

Conference 8993: Quantum Sensing and Nanophotonic Devices XI
Session 1: New Laser Sources

Quantum dot mode locked lasers for coherent frequency comb generation

Paper 8993-9

Anthony Martinez, Lab. de Photonique et de Nanostructures (France), et al.

Sunday 2 February · 2:10 PM

Conference 8969: Synthesis and Photonics of Nanoscale Materials XI
Session 1: Laser-based Nanomaterials Synthesis and Real-Time Diagnostics

Laser-based synthesis of nanoparticles: role of laser parameters and background conditions

Paper 8969-4

Tatiana E. Itina, Lab. Hubert Curien (France), et al.

Monday 3 February · 10:30 AM

Conference 9002: Novel In-Plane Semiconductor Lasers XIII
Session 2: New Materials and Grating Controlled

GaAsBi/GaAs semiconductor lasers: initial laser characteristics and future prospects

Paper 9002-6

Stephen J. Sweeney, Univ. of Surrey (United Kingdom), et al.

Monday 3 February · 11:00 AM

Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 2: Laser-induced Modification and Patterning of Surfaces II:
Joint Session with Conferences 8967 and 8969

Laser-induced patterns on metals and polymers for biomimetic surface engineering

Paper 8967-4

Fang Liang, McGill Univ. (Canada), et al.

Monday 3 February · 2:00 PM

Conference 8965: High-Power Diode Laser Technology and Applications XII
Session 7: High Power Diode Laser Optics

Micro optics for laser diode beam shaping

Paper 8965-32

Manfred Jarczyński, LIMO Lissotschenko Mikrooptik GmbH (Germany), et al.

Monday 3 February · 2:40 PM

Conference 8961: Fiber Lasers XI: Technology, Systems, and Applications
Session 3: Applications

High-power fiber lasers in geothermal, oil and gas

Paper 8961-12

Mark S. Zediker, Foro Energy, Inc. (USA), et al.

Monday 3 February · 2:40 PM

Conference 8965: High-Power Diode Laser Technology and Applications XII
Session 7: High Power Diode Laser Optics

Highly efficient and compact free beam kW-diode laser modules

Paper 8965-34

Jens Meinschien, LIMO Lissotschenko Mikrooptik GmbH (Germany), et al.

Green Photonics Awards

Awards in each of the four areas will be presented at the OPTO Plenary Session on Tuesday morning, and the LASE Plenary Session on Wednesday morning.

Awards presented at the OPTO Plenary Session:

- Renewable Energy Generation:
Fusion and Photovoltaics
- Solid State Lighting and Displays
- Communications

Award presented at the LASE Plenary Session:

- Laser-assisted Manufacturing and
Micro/Nano Fabrication

Monday 3 February · 3:50 PM

Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
Session 4: Metal Nanocavities

Nanolasers with 3D Nanocavities

Paper 8980-14

Yeshiahu Fainman, Univ. of California, San Diego (USA), et al.

Monday 3 February · 4:00 PM

Conference 8992: Photonic Instrumentation Engineering
Session 6: Laser-based Photonic Instrumentation II

Spectroscopy-based photonic instrumentation for the manufacturing industry: contactless measurements of distances, temperatures, and chemical compositions

Paper 8992-26

Bertrand Noharet, Acreo Swedish ICT AB (Sweden), et al.

Monday 3 February · 4:25 PM

Conference 8993: Quantum Sensing and Nanophotonic Devices XI
Session 8: Integrated and Discrete Mid-IR Optoelectronics

DFB interband cascade lasers for tunable laser absorption spectroscopy from 3 to 6 μm

Paper 8993-44

Michael von Edlinger, nanoplus GmbH (Germany), et al.

Monday 3 February · 4:30 PM

Conference 8996: Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI
Session 4: Nanostructure Characterization

Optical and electrical characterization of surface passivation of GaAs nanosheets

Paper 8996-13

Shermin Arab, The Univ. of Southern California (USA), et al.

Tuesday 4 February · 10:30 AM

Conference 8996: Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI
Session 5: Quantum Dot Emission

How small can one shrink a semiconductor laser and is it worth it?

Paper 8996-15

Jacob B. Khurgin, Johns Hopkins Univ. (USA), et al.

Tuesday 4 February · 11:10 AM
 Conference 8963: High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III
 Session 2: Laser Surface Treatment

Characteristics of the heat resistant FBG sensor under laser cladding condition

Paper 8963-7
 Akihiko Nishimura, Japan Atomic Energy Agency (Japan), et al.

Tuesday 4 February · 3:50 PM
 Conference 8974: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII
 Session 7: 3D Printing: STED and SLM

Direct laser writing with a spatial light modulator

Paper 8974-22
 Min Gu, Swinburne Univ. of Technology (Australia), et al.

Tuesday 4 February · 4:00 PM
 Conference 8996: Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI
 Session 7: Nanomaterials

Optically-active hybrid nanostructures: Exciton-plasmon interaction and injection of hot plasmonic electrons

Paper 8996-23
 Alexander Govorov, Ohio Univ. (USA), et al.

Tuesday 4 February · 4:30 PM
 Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
 Session 8: Ultrashort Pulse Micromachining: Joint Session with Conferences 8967 and 8972

Influence of laser parameters on quality of microholes and process efficiency

Paper 8967-16
 Anne Feuer, Univ. Stuttgart (Germany), et al.

Tuesday 4 February · 4:40 PM
 Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
 Session 7: III-Nitride-based Optoelectronics

Numerical simulation of III-nitride lattice-matched structures for THz QC lasers

Paper 8980-28
 Sara Shishehchi, Boston Univ. (USA), et al.

Tuesday 4 February · 6:00 PM
 Conference 8962: High Energy/Average Power Lasers and Intense Beam Applications VIII
 Poster Session Tuesday

High contrast research in the Nd:glass laser system based on optical parametric amplification temporal cleaning device

Paper 8962-21
 Xiaoming Lu, Shanghai Institute of Optics and Fine Mechanics (China), et al.

Tuesday 4 February · 6:00 PM
 Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
 Poster Session Tuesday

Femtosecond laser production of mixed metal oxides for efficient water oxidation

Paper 8967-56
 Kasey C. Phillips, Harvard Univ. (USA), et al.

Tuesday 4 February · 6:00 PM
 Conference 8972: Frontiers in Ultrafast Optics: Biomedical, Scientific and Industrial Applications XIV
 Poster Session Tuesday

Three-dimensional nano-structuring of polymer materials by controlled avalanche using femtosecond laser pulses

Paper 8972-61
 Mangirdas Malinauskas, Vilnius Univ. (Lithuania), et al.

Wednesday 5 February · 8:10 AM
 Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
 Session 9: Materials for Energy Conservation

Development of high Tc superconducting coated conductors based on laser processing technologies

Paper 8967-17
 Takanobu Kiss, Kyushu Univ. (Japan), et al.

Wednesday 5 February · 9:30 AM
 Conference 8968: Laser-based Micro- and Nano-Processing VIII
 Session 1: Direct-write Processing and Surface Modification I

Fs-laser microstructuring of laser-printed LiMn₂O₄ electrodes for manufacturing of 3D microbatteries

Paper 8968-5
 Johannes Pröll, Karlsruhe Institut für Technologie (Germany), et al.

Wednesday 5 February · 9:40 AM
 Conference 8988: Integrated Optics: Devices, Materials, and Technologies XVII
 Session 8: Waveguide Engineering II

Precision dicing of optical materials

Paper 8988-38
 Lewis G. Carpenter, Univ. of Southampton (United Kingdom), et al.

Wednesday 5 February · 11:10 AM
 Conference 8974: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII
 Session 9: Diffractive Elements

Optomechanical cantilever device for displacement sensing and variable attenuator

Paper 8974-56
 Peter A. Cooper, Univ. of Southampton (United Kingdom), et al.

Wednesday 5 February · 1:30 PM
 Conference 8970: Laser 3D Manufacturing
 Session 2: Multi-photon Polymerization of 3D Micro- and Nanostructures I
3D two-photon lithography: an enabling technology for photonic wire bonding and multi-chip integration

Paper 8970-5
 Christian Koos, Karlsruhe Institut für Technologie (Germany), et al.

Wednesday 5 February · 2:00 PM
 Conference 8968: Laser-based Micro- and Nano-Processing VIII
 Session 2: Direct-write Processing and Surface Modification II

Laser surface micro-texturing to enhance the frictional behavior of lubricated steel

Paper 8968-6
 Antonio Ancona, CNR-IFN UOS Bari (Italy), et al.

Wednesday 5 February · 2:05 PM
 Conference 8993: Quantum Sensing and Nanophotonic Devices XI
 Session 14: QCL-based Bio-sensors

Latest improvements in field deployable compound specific isotope analyzer based on quantum cascade lasers and hollow waveguide

Paper 8993-69
 Sheng Wu, California Institute of Technology (USA), et al.

Wednesday 5 February · 2:30 PM
 Conference 8963: High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III
 Session 5: Special Laser Processes

Laser beam drilling of metal-based composites

Paper 8963-18
 Harald Riegel, Hochschule Aalen (Germany), et al.

Wednesday 5 February · 3:30 PM
 Conference 8993: Quantum Sensing and Nanophotonic Devices XI
 Session 15: Environmental Sensing

High-sensitivity QEPAS for environmental monitoring

Paper 8993-72
 Aurore Vicet, Univ. Montpellier 2 (France), et al.

Green Photonics Presentations

Wednesday 5 February · 3:40 PM
Conference 9000: Laser Refrigeration of Solids VII
Session 2: Novel Cooling Concepts

p x n-Type transverse thermoelectrics: an alternative Peltier refrigerator with cryogenic promise

Paper 9000-5
Chuanle Zhou, Northwestern Univ. (USA), et al.

Wednesday 5 February · 4:00 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 3: Laser Nano-structuring and Processing I

High speed surface functionalization using direct laser interference patterning, breaking the 1 m²/min barrier with sub- μ m resolution

Paper 8968-10
Andrés F. Lasagni, Fraunhofer IWS Dresden (Germany), et al.

Wednesday 5 February · 4:00 PM
Conference 9002: Novel In-Plane Semiconductor Lasers XIII
Session 11: Mid-Infrared Lasers II

Interband cascade lasers for the mid-infrared spectral region

Paper 9002-46
Sven Höfling, Julius-Maximilians-Univ. Würzburg (Germany), et al.

Wednesday 5 February · 4:10 PM
Conference 9000: Laser Refrigeration of Solids VII
Session 2: Novel Cooling Concepts

Electro-luminescent cooling in the deep sub-bandgap bias regime

Paper 9000-6
Parthiban Santhanam, Massachusetts Institute of Technology (USA), et al.

Wednesday 5 February · 4:30 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 3: Laser Nano-structuring and Processing I

Laser generated microstructures in tape cast electrodes for rapid electrolyte wetting: new technical approach for cost efficient battery manufacturing

Paper 8968-11
Wilhelm Pflöging, Karlsruhe Institute of Technology (Germany), et al.

Wednesday 5 February · 6:00 PM
Conference 8988: Integrated Optics: Devices, Materials, and Technologies XVIII
Poster Session Wednesday

Piezoforce and contact resonance microscopy correlated with Raman spectroscopy applied to a non-linear optical material and to a lithium battery material

Paper 8988-64
Rimma Dekhter, Nanonics Imaging Ltd. (Israel), et al.

Wednesday 5 February · 6:00 PM
Conference 8994: Photonic and Phononic Properties of Engineered Nanostructures IV
Poster Session Wednesday

High absorption and polarization-independent thin-film absorber with gold nanorod array

Paper 8994-75
Guangyao Su, Peking Univ. Shenzhen Graduate School (China), et al.

Thursday 6 February · 8:40 AM
Conference 8963: High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III
Session 7: Laser Cutting I

Cutting and drilling of carbon fiber reinforced plastics (CFRP) by 70W short pulse nanosecond laser

Paper 8963-27
Peter Jaeschke, Laser Zentrum Hannover e.V. (Germany), et al.

Thursday 6 February · 9:20 AM
Conference 9000: Laser Refrigeration of Solids VII
Session 3: Laser Cooling in Semiconductors

Wide band gap semiconductors for optical refrigeration: an overlook

Paper 9000-13
Jacob B. Khurgin, Johns Hopkins Univ. (USA), et al.

Thursday 6 February · 10:40 AM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 5: Batteries and Thin Film Structuring

Laser-printed/structured thick-film electrodes for Li-ion microbatteries

Paper 8968-21
Heungsoo Kim, U.S. Naval Research Lab. (USA), et al.

Thursday 6 February · 11:10 AM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 5: Batteries and Thin Film Structuring

Ultrafast laser microstructuring of LiFePO₄ cathode material

Paper 8968-22
Melanie Mangang, Karlsruher Institut für Technologie (Germany), et al.

Thursday 6 February · 1:20 PM
Conference 9000: Laser Refrigeration of Solids VII
Session 5: Applications and Device Concepts

Next generation optical refrigerators

Paper 9000-18
Richard I. Epstein, The Univ. of New Mexico (USA), et al.

Thursday 6 February · 1:50 PM
Conference 9000: Laser Refrigeration of Solids VII
Session 5: Applications and Device Concepts

All-optical photon-waste recycling in laser cooling of solids

Paper 9000-19
Mansoor Sheik-Bahae, The Univ. of New Mexico (USA), et al.

Thursday 6 February · 2:20 PM
Conference 8963: High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications III
Session 9: Laser Additive Manufacturing of Metal Structures: Joint Session with Conferences 8963 and 8970

Development of laser cladding system with process monitoring by x-ray imaging

Paper 8963-35
Takaya Terada, Japan Atomic Energy Agency (Japan), et al.

Thursday 6 February · 3:00 PM
Conference 9002: Novel In-Plane Semiconductor Lasers XIII
Session 14: Mid-Infrared QCLs III

Current spreading in shallow-ridge Ion-implanted quantum cascade lasers

Paper 9002-63
Loan T. Le, Princeton Univ. (USA), et al.

Thursday 6 February · 5:40 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 7: Photovoltaics and Energy Devices: Joint Session with Conferences 8967 and 8968

Study of a-Si crystallization dependence on power and irradiation time using a cw green laser

Paper 8968-33
Miguel Morales, Univ. Politécnica de Madrid (Spain), et al.

Renewable Energy Generation: Fusion and Photovoltaics

(ordered chronologically by session start time)

Sunday 2 February · 8:50 AM
Conference 8987: Oxide-based Materials and Devices V
Session 1: Transparent Conducting Oxides

TiO₂ anode materials for lithium-ion batteries with different morphology and additives

Paper 8987-68
Xiang Liu, The Univ. of Hong Kong (Hong Kong, China), et al.

Sunday 2 February · 5:10 PM
Conference 8976: Microfluidics, BioMEMS, and Medical Microsystems XII
Session 4: Applications I

Uniform algal growth in photo-bioreactors using surface scatterers

Paper 8976-18
Syed S. Ahsan, Cornell Univ. (USA), et al.

Sunday 2 February · 5:30 PM
Conference 8962: High Energy/Average Power Lasers and Intense Beam Applications VIII
Session 5: Other High Power Lasers and Applications

Focal zooming improvements to make fusion Ignition achievable

Paper 8962-18
Seth Pace, Central Carolina Community College (USA), et al.

Monday 3 February · 8:00 AM
Conference 8987: Oxide-based Materials and Devices V
Session 5: Highly-Correlated Oxides I

Atomic collision effect during PLD processes: nonstoichiometry control in transparent superconductors

Paper 8987-21
Taro Hitosugi, Tohoku Univ. (Japan), et al.

Monday 3 February · 8:10 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 1: Physics of Nano-Engineered Photovoltaics I

High-efficiency nanopillar solar cells employing wide-bandgap minority carrier recombination barriers

Paper 8981-50
Giacomo Mariani, Univ. of California, Los Angeles (USA), et al.

Monday 3 February · 9:00 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 1: Physics of Nano-Engineered Photovoltaics I

The effects of electric field on InGaAs quantum well i-region placement in InAlGaAs solar cells

Paper 8981-2
Christopher G. Bailey, U.S. Naval Research Lab. (USA), et al.

Monday 3 February · 9:40 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 1: Physics of Nano-Engineered Photovoltaics I

Absorption enhancement and dark current reduction in quantum-dot solar cells

Paper 8981-4
Seth M. Hubbard, Rochester Institute of Technology (USA), et al.

Monday 3 February · 10:30 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 2: Emerging Photovoltaic Materials

Preparation and study of artificial graphene-type semiconductor superlattices

Paper 8981-5
Daniel Vanmaekelbergh, Utrecht Univ. (Netherlands), et al.

Monday 3 February · 11:00 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 2: Emerging Photovoltaic Materials

Group IV clathrates: synthesis, optoelectronic properties, and photovoltaic applications

Paper 8981-6
Adele C. Tamboli, Colorado School of Mines (USA), et al.

Monday 3 February · 11:30 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 2: Emerging Photovoltaic Materials

New approaches for improving the photovoltaic performances of kesterite Cu₂ZnSn(S,Se)₄ thin film solar cells

Paper 8981-7
Giovanni Altamura, CEA Grenoble (France), et al.

Monday 3 February · 11:40 AM
Conference 8982: Optical Components and Materials XI
Session 2: Nanophotonics

Growth model of transparent conductive graphene

Paper 8982-10
Shih-Hao Chan, National Central Univ. (Taiwan), et al.

Monday 3 February · 11:50 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 2: Emerging Photovoltaic Materials

Micrometric characterization methods of thin-film solar cells using luminescence emissions

Paper 8981-8
Amaury Delamarre, Institut de Recherche et Développement sur l'Énergie Photovoltaïque (France), et al.

Monday 3 February · 1:30 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 3: Up-Conversion and Spectral Shaping

Upconverter materials and upconversion solar-cell devices: simulation and characterization regarding the broad solar spectrum

Paper 8981-9
Stefan Fischer, Fraunhofer-Institut für Solare Energiesysteme (Germany), et al.

Monday 3 February · 2:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 3: Up-Conversion and Spectral Shaping

Enhanced performance of up-conversion photovoltaic (UC-PV) devices via photonic crystals and plasmonic layers

Paper 8981-10
Bryce S. Richards, Heriot-Watt Univ. (United Kingdom), et al.

Monday 3 February · 2:20 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 3: Up-Conversion and Spectral Shaping

Cutoff wavelength optimization for high-efficiency split spectrum photovoltaics

Paper 8981-11
Chandler Downs, Tufts Univ. (USA), et al.

Monday 3 February · 2:40 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 3: Up-Conversion and Spectral Shaping

Interdependence of reabsorption and internal energy losses in luminescent solar concentrators

Paper 8981-12
Jennefir Digaum, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA), et al.

Green Photonics Presentations

Monday 3 February · 2:45 PM

Conference 8984: Ultrafast Phenomena and Nanophotonics XVIII
Session 6: Coherent Optical Phenomena I

Quantum coherence controls the charge separation in a prototypical artificial light-harvesting system

Paper 8984-23

Christoph Lienau, Carl von Ossietzky Univ. Oldenburg (Germany), et al.

Monday 3 February · 3:30 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 4: Advanced Photovoltaic Concepts: MEG and Hot Carrier Solar Cells

Ab-initio studies of nanoparticle photovoltaics: multiple-exciton generation, exotic core-phase nanoparticles, and complementary transport channels

Paper 8981-13

Gergely T. Zimányi, Univ. of California, Davis (USA), et al.

Monday 3 February · 3:45 PM

Conference 8984: Ultrafast Phenomena and Nanophotonics XVIII
Session 7: Coherent Optical Phenomena II

The role of coherence for light-trapping in thin-film silicon solar cells

Paper 8984-24

Martin Aeschlimann, Technische Univ. Kaiserslautern (Germany), et al.

Monday 3 February · 4:00 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 4: Advanced Photovoltaic Concepts: MEG and Hot Carrier Solar Cells

Phonon decay simulation for hot-carrier solar cells

Paper 8981-14

Hugo Levard, EDF Recherche & Développement (France), et al.

Monday 3 February · 4:00 PM

Conference 8982: Optical Components and Materials XI
Session 4: Metamaterials and Plasmonics

Ultrathin metals and nano-structuring for photonic applications

Paper 8982-17

Valerio Pruneri, ICFO - Institut de Ciències Fotòniques (Spain), et al.

Monday 3 February · 4:20 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 4: Advanced Photovoltaic Concepts: MEG and Hot Carrier Solar Cells

Hot-carrier solar cell spectral insensitivity: Why develop the hot carrier solar cell when we have multi-junction devices?

Paper 8981-15

Louise C. Hirst, U.S. Naval Research Lab. (USA), et al.

Monday 3 February · 4:30 PM

Conference 8982: Optical Components and Materials XI
Session 4: Metamaterials and Plasmonics

Metamaterial selective emitters for photodiodes

Paper 8982-18

Dante F. DeMeo, Tufts Univ. (USA), et al.

Monday 3 February · 4:40 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 4: Advanced Photovoltaic Concepts: MEG and Hot Carrier Solar Cells

Hot-carrier solar cell absorbers: materials, mechanisms, and nanostructures

Paper 8981-16

Gavin Conibeer, The Univ. of New South Wales (Australia), et al.

Monday 3 February · 5:50 PM

Conference 8987: Oxide-based Materials and Devices V
Session 8: Growth, Properties, and Applications of Nanostructures

Flexible binder free functionalized carbon nanotube electrodes for ultracapacitor

Paper 8987-89

Badekai Ramachandra Bhat, National Institute of Technology, Karnataka (India), et al.

Tuesday 4 February · 8:40 AM

Conference 8975: Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII

Session 3: Session 3

Combined dielectric spectroscopy and laser-induced photocurrent approach to study the degradation of organic solar cells

Paper 8975-15

Olena Kozlova, Johannes Kepler Univ. Linz (Austria), et al.

Tuesday 4 February · 10:30 AM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 5: Advances Toward Tandems with Active Silicon Subcells

Silicon tandem solar cells: The ultimate photovoltaic solution?

Paper 8981-18

Martin A. Green, The Univ. of New South Wales (Australia), et al.

Tuesday 4 February · 11:10 AM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 5: Advances Toward Tandems with Active Silicon Subcells

Optical requirements for >30% tandem solar cells built on crystalline silicon

Paper 8981-19

Niraj N. Lal, The Australian National Univ. (Australia), et al.

Tuesday 4 February · 11:30 AM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 5: Advances Toward Tandems with Active Silicon Subcells

Advances in III-V/active-silicon multijunction photovoltaics for high efficiency

Paper 8981-20

Steven A. Ringel, The Ohio State Univ. (USA), et al.

Tuesday 4 February · 11:40 AM

Conference 8996: Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI

Session 5: Quantum Dot Emission

Efficient Auger-assisted upconversion in PbSe/CdSe core/shell colloidal quantum dots

Paper 8996-18

Nikolay S. Makarov, Los Alamos National Lab. (USA), et al.

Tuesday 4 February · 1:30 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 6: Intermediate Band Solar Cells

Modeling intermediate band solar cells: a roadmap to high efficiency

Paper 8981-21

Jacob J. Krich, Univ. of Ottawa (Canada), et al.

Tuesday 4 February · 2:00 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 6: Intermediate Band Solar Cells

Simulation of an intermediate-band solar cell comprising superlattices of electronically-mismatched semiconductor alloys

Paper 8981-22

Alexandre Freundlich, Univ. of Houston (USA), et al.

Tuesday 4 February · 2:20 PM

Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III

Session 6: Intermediate Band Solar Cells

Imaging quasi fermi level splitting in intermediate-band solar cells

Paper 8981-23

Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France), et al.

Tuesday 4 February · 2:40 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 6: Intermediate Band Solar Cells
InAs/AlAsSb self-assembled quantum dots for next-generation solar cells
Paper 8981-24
Ramesh Babu Laghumavarapu, Univ. of California, Los Angeles (USA), et al.

Tuesday 4 February · 4:10 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 7: Space Photovoltaics and Radiation Effect
Increased radiation tolerance in thin IMM solar cells using back reflection
Paper 8981-26
Akhil Mehrotra, Univ. of Houston (USA), et al.

Tuesday 4 February · 6:00 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Poster Session Tuesday
Laser texturing glass substrates for light in-coupling in silicon thin-film solar cells
Paper 8967-50
Kambulakwao Chakanga, Next Energy (Germany), et al.

Wednesday 5 February · 8:00 AM
Conference 8987: Oxide-based Materials and Devices V
Session 12: Energy Harvesting Storage: Materials and Devices
Ferrite engineering for oxide spintronics and photonics
Paper 8987-32
Hitoshi Tabata, The Univ. of Tokyo (Japan), et al.

Wednesday 5 February · 8:30 AM
Conference 8974: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII
Session 8: Large Area Fabrication
One step lithography-less silicon nanomanufacturing for low cost, high-efficiency solar cell production
Paper 8974-49
Yi Chen, Univ. of Illinois at Urbana-Champaign (USA), et al.

Wednesday 5 February · 9:00 AM
Conference 8987: Oxide-based Materials and Devices V
Session 12: Energy Harvesting Storage: Materials and Devices
Ag nanowire-embedded ITO thin films as a near-infrared transparent and flexible anode for the flexible organic solar cells
Paper 8987-61
Han-Ki Kim, Kyung Hee Univ. (Korea, Republic of), et al.

Wednesday 5 February · 9:20 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 8: Advanced Designs for Concentrator Photovoltaics
Design of sub-wavelength dielectric antireflective grading for multijunction concentrator photovoltaics
Paper 8981-32
Wei Wang, Univ. of Houston (USA), et al.

Wednesday 5 February · 9:20 AM
Conference 8987: Oxide-based Materials and Devices V
Session 12: Energy Harvesting Storage: Materials and Devices
Light trapping considerations in self-assembled ZnO nanorod arrays for quantum-dot sensitized solar cells
Paper 8987-62
Juan A. Zapien, City Univ. of Hong Kong (Hong Kong, China), et al.

Wednesday 5 February · 9:30 AM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 8: Nanostructures and Devices II
MOCVD-grown dislocation-free InGaN nanowires with a 2.5 eV band gap for photovoltaics
Paper 8986-43
Hsun Chih Kuo, Univ. of Michigan (USA), et al.

Wednesday 5 February · 9:40 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 8: Advanced Designs for Concentrator Photovoltaics
Cu(In,Ga)Se₂ mesa microdiodes: study of edge recombination and behaviour under concentrated sunlight
Paper 8981-33
Myriam Paire, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France), et al.

Wednesday 5 February · 9:40 AM
Conference 8987: Oxide-based Materials and Devices V
Session 12: Energy Harvesting Storage: Materials and Devices
Oxides for sustainable photovoltaics with Earth-abundant materials
Paper 8987-63
Alexander Wagner, Technische Univ. Braunschweig (Germany), et al.

Wednesday 5 February · 10:00 AM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 8: Nanostructures and Devices II
Comprehensive and rigorous theoretical analyses of InGaN solar cells in whole composition range and a serious bottleneck when fabricating on bulk GaN substrate
Paper 8986-45
Akihiko Yoshikawa, Chiba Univ. (Japan), et al.

Wednesday 5 February · 10:00 AM
Conference 8987: Oxide-based Materials and Devices V
Session 12: Energy Harvesting Storage: Materials and Devices
Optical and photovoltaic properties of silicon wire solar cells with controlled ZnO nanorods antireflection coating
Paper 8987-64
Jae Hyun Kim, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of), et al.

Wednesday 5 February · 10:30 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 9: Advances in Organic Photovoltaics
Small molecule organic solar cells: from molecules to devices
Paper 8981-34
Karl Leo, Technische Univ. Dresden (Germany), et al.

Wednesday 5 February · 10:30 AM
Conference 8983: Organic Photonic Materials and Devices XVI
Session 9: OPV
Efficient small-molecule photovoltaic cells using nanostructured template
Paper 8983-37
Tetsuya Taima, Kanazawa Univ. (Japan), et al.

Wednesday 5 February · 11:40 AM
Conference 8983: Organic Photonic Materials and Devices XVI
Session 9: OPV
Patterning of photoelectrode for I₂-free solid-state dye-sensitized solar cells
Paper 8983-41
Byeongwan Kim, Yonsei Univ. (Korea, Republic of), et al.

Wednesday 5 February · 11:50 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 9: Advances in Organic Photovoltaics
Hybrid bulk heterojunction solar cells based on low-band-gap polymers and CdSe nanocrystals
Paper 8981-37
Sergey V. Dayneko, National Research Nuclear Univ. MEPhI (Russian Federation), et al.

Green Photonics Presentations

Wednesday 5 February · 11:50 AM
Conference 8987: Oxide-based Materials and Devices V
Session 13: Energy Harvesting Storage: Metal Oxides and Graphene

Energy generation and storage: combining ZnO piezogenerators and graphene-based ultracapacitors

Paper 8987-69
Vinod E. Sandana, Graphos (France), et al.

Wednesday 5 February · 12:10 PM
Conference 8987: Oxide-based Materials and Devices V
Session 13: Energy Harvesting Storage: Metal Oxides and Graphene

Engineering metal oxide structures for efficient photovoltaic devices

Paper 8987-70
Isabella Concina, Univ. degli Studi di Brescia (Italy), et al.

Wednesday 5 February · 1:40 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 10: Photovoltaics Modeling: Joint Session with Conferences 8980 and 8981

Analytical modeling of III-V solar cells close to the fundamental limit

Paper 8981-38
Matthew P. Lumb, U.S. Naval Research Lab. (USA), et al.

Wednesday 5 February · 2:10 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 10: Photovoltaics Modeling: Joint Session with Conferences 8980 and 8981

Electrical and optical modeling of an amorphous silicon solar cell with a graded intrinsic layer and a periodically corrugated metallic back reflector

Paper 8981-39
Tom H. Anderson, The Univ. of Edinburgh (United Kingdom), et al.

Wednesday 5 February · 2:30 PM
Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
Session 10: Photovoltaics Modeling: Joint Session with Conferences 8980 and 8981

Optimizing light absorption in a thin film p-i-n solar cell using a quasi-periodic grating

Paper 8980-38
Mahmoud Atalla, The Pennsylvania State Univ. (USA), et al.

Wednesday 5 February · 2:50 PM
Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
Session 10: Photovoltaics Modeling: Joint Session with Conferences 8980 and 8981

Theoretical investigation of “muffin” surface texture for light trapping in silicon solar cells

Paper 8980-39
Puqun Wang, National Univ. of Singapore (Singapore), et al.

Wednesday 5 February · 4:10 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 11: Advances in Multijunction Materials and Devices

Ga-rich Ga(x)In(1-x)P solar cells on Si with 2 eV bandgap for ideal III-V/Si photovoltaics

Paper 8981-41
Christopher Ratcliff, The Ohio State Univ. (USA), et al.

Wednesday 5 February · 4:30 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 11: Advances in Multijunction Materials and Devices

Detailed physics based modeling of triple-junction InGaP/GaAs/Ge solar cell

Paper 8981-42
Alexandre I. Fedoseyev, CFD Research Corp. (USA), et al.

Wednesday 5 February · 4:30 PM
Conference 9000: Laser Refrigeration of Solids VII
Session 2: Novel Cooling Concepts

Near-infrared up-conversion for photovoltaics: progress and challenges

Paper 9000-7
Bryce S. Richards, Heriot-Watt Univ. (United Kingdom), et al.

Wednesday 5 February · 5:40 PM
Conference 8970: Laser 3D Manufacturing
Session 3: Multi-photon Polymerization of 3D Micro- and Nanostructures II

Three-dimensional ceramic molding process based on microstereolithography for the production of piezoelectric energy harvesters

Paper 8970-14
Shoji Maruo, Yokohama National Univ. (Japan), et al.

Wednesday 5 February · 6:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Poster Session Wednesday

Design strategy for low emissivity windows with effective insulation

Paper 8981-53
Mike P. Watts, Impattern Solutions (USA), et al.

Wednesday 5 February · 6:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Poster Session Wednesday

Factors limiting the efficiency of laser power converters under low- and high-intensity illumination

Paper 8981-58
Jayanta Mukherjee, Univ. of Surrey (United Kingdom), et al.

Wednesday 5 February · 6:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Poster Session Wednesday

The optimization of textured a-Si:H solar cells with a fully three-dimensional simulation

Paper 8981-59
Chun-Yao Lee, National Taiwan Univ. (Taiwan), et al.

Wednesday 5 February · 6:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Poster Session Wednesday

Be implant activation and damage recovery study in N-type GaSb

Paper 8981-63
Nassim Rahimi, The Univ. of New Mexico (USA), et al.

Wednesday 5 February · 6:00 PM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Poster Session Wednesday

Cheap and efficient plasmonic solar cell

Paper 8981-65
Mohamed A. Swillam, The American Univ. in Cairo (Egypt), et al.

Wednesday 5 February · 6:00 PM
Conference 8983: Organic Photonic Materials and Devices XVI
Poster Session Wednesday

NIR-sensitive conductive polymers for transparent electrochromic photo-thermo-electric converters

Paper 8983-56
Byeongwan Kim, Yonsei Univ. (Korea, Republic of), et al.

Wednesday 5 February · 6:00 PM
Conference 8983: Organic Photonic Materials and Devices XVI
Poster Session Wednesday

Nanostructured conductive polymer/GaAs epilayer hybrid heterojunction solar cells

Paper 8983-57
Yi-Chun Lai, National Chiao Tung Univ. (Taiwan), et al.

Wednesday 5 February · 6:00 PM
Conference 8983: Organic Photonic Materials and Devices XVI
Poster Session Wednesday

Characteristics of periodic silicon nanorods arrays for conductive polymer/silicon heterojunction solar cells

Paper 8983-58
Yi-Chun Lai, National Chiao Tung Univ. (Taiwan), et al.

Wednesday 5 February · 6:00 PM
Conference 8987: Oxide-based Materials and Devices V
Poster Session Wednesday

Tailor-made ZnO@SnO₂ networks for high-efficiency photovoltaic devices

Paper 8987-82
Riccardo Milan, Univ. degli Studi di Brescia (Italy), et al.

Wednesday 5 February · 6:00 PM
Conference 8987: Oxide-based Materials and Devices V
Poster Session Wednesday

Nanostructured ZnO for energy-harvesting applications

Paper 8987-86
David J. Rogers, Nanovation (France), et al.

Thursday 6 February · 8:30 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 12: Advances in Light Trapping

Silicon solar-cell enhancement by plasmonic silver nanocubes

Paper 8981-44
Ryan J. Veenkamp, Carleton Univ. (Canada), et al.

Thursday 6 February · 9:10 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 12: Advances in Light Trapping

Optimum feature size of randomly textured glass substrates for maximum scattering inside thin-film silicon solar cells

Paper 8981-47
Nasim Sahraei, National Univ. of Singapore (Singapore), et al.

Thursday 6 February · 9:50 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 12: Advances in Light Trapping

Optical scattering by anodized aluminum oxide for light management in thin film photovoltaics

Paper 8981-49
Brian Roberts, Univ. of Michigan (USA), et al.

Thursday 6 February · 10:40 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 13: Physics of Nano-Engineered Photovoltaics II

InP-based nano solar cells

Paper 8981-51
Florian Proise, Institut de Recherche et Développement sur l'Énergie Photovoltaïque (France), et al.

Thursday 6 February · 11:10 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 13: Physics of Nano-Engineered Photovoltaics II

Dedicated nanoantenna element for vertical nanorods in plasmonic photovoltaics

Paper 8981-52
Hossein Alisafae, The Univ. of North Carolina at Charlotte (USA), et al.

Thursday 6 February · 11:30 AM
Conference 8981: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices III
Session 13: Physics of Nano-Engineered Photovoltaics II

Extending the operational wavelength of thermophotovoltaics through superlattice and barrier engineering

Paper 8981-64
Abigail S. Licht, Tufts Univ. (USA), et al.

Thursday 6 February · 2:00 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 14: Processing and Diagnostics of Photovoltaics

Rapid composition analysis of compound semiconductor thin film solar cell by laser-induced breakdown spectroscopy

Paper 8967-39
Sung Ho Jeong, Gwangju Institute of Science and Technology (Korea, Republic of), et al.

Thursday 6 February · 2:20 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 14: Processing and Diagnostics of Photovoltaics

Modeling of laser patterning of thin-film solar cells

Paper 8967-40
Thomas Peschel, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany), et al.

Thursday 6 February · 2:20 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 6: Additive Manufacturing and Advanced Deposition Processes

Tailoring liquid/solid interfacial energy transfer: fabrication and application of multiscale metallic surfaces with engineered heat transfer and electrolysis properties via femtosecond laser surface processing techniques

Paper 8968-27
Troy Anderson, Univ of Nebraska-Lincoln (USA), et al.

Thursday 6 February · 2:40 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 14: Processing and Diagnostics of Photovoltaics

Optimizing process time of laser drilling processes in solar cell manufacturing by coaxial camera control

Paper 8967-41
Volker Jetter, Fraunhofer-Institut für Physikalische Messtechnik (Germany), et al.

Thursday 6 February · 3:00 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 14: Processing and Diagnostics of Photovoltaics

Silver-free solar cell interconnection by laser spot welding of thin aluminum layers: analysis of process limits for ns- and μ s-lasers

Paper 8967-48
Henning Schulte-Huxel, The Institut für Solarenergieforschung Hameln (Germany), et al.

Thursday 6 February · 3:50 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 7: Photovoltaics and Energy Devices: Joint Session with Conferences 8967 and 8968

New strategies in laser processing of TCOs for light management in thin-film silicon solar cells

Paper 8968-30
Carlos Molpeceres, Univ. Politécnica de Madrid (Spain), et al.

Thursday 6 February · 4:00 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII

Adjustable spectrum LED solar simulator

Paper 9003-43
Kurt J. Linden, Spire Corp. (USA), et al.
Session 11: Solid State Lighting II

Thursday 6 February · 4:20 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 15: Photovoltaics and Energy Devices: Joint Session with Conferences 8967 and 8968

Optimized laser patterning for high performance Cu(In,Ga)Se₂ thin-film solar modules

Paper 8967-43
Andreas Burn, Berner Fachhochschule Technik und Informatik (Switzerland), et al.

Green Photonics Presentations

Thursday 6 February · 4:40 PM
Conference 8968: Laser-based Micro- and Nano-Processing VIII
Session 7: Photovoltaics and Energy Devices: Joint Session with Conferences 8967 and 8968

Quasi-simultaneous laser soldering for the interconnection of back-contact solar cells with composite foils

Paper 8968-31
Simon W. Britten, Fraunhofer-Institut für Lasertechnik (Germany), et al.

Thursday 6 February · 5:00 PM
Conference 8967: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX
Session 15: Photovoltaics and Energy Devices: Joint Session with Conferences 8967 and 8968

Investigations of laser ablation processes in thin-films for photovoltaic applications

Paper 8967-44
Paulius Gecys, Ctr. for Physical Sciences and Technology (Lithuania), et al.

Solid State Lighting and Displays

(ordered chronologically by session start time)

Sunday 2 February · 9:30 AM
Conference 8987: Oxide-based Materials and Devices V
Session 1: Transparent Conducting Oxides

Low-temperature aqueous solution deposition of ZnO based TCO films for optoelectronic applications

Paper 8987-34
Jacob J. Richardson, Solution Deposition Systems, Inc. (USA), et al.

Sunday 2 February · 10:15 AM
Conference 8987: Oxide-based Materials and Devices V
Session 2: Photon-induced Phenomena

Visible luminescence in bulk and nanostructured ZnO

Paper 8987-6
Matthew R. Phillips, Univ. of Technology, Sydney (Australia), et al.

Sunday 2 February · 11:55 AM
Conference 8987: Oxide-based Materials and Devices V
Session 2: Photon-induced Phenomena

Spatial mapping of exciton lifetimes in single ZnO nanowires

Paper 8987-11
Frank Güell, Univ. de Barcelona (Spain), et al.

Sunday 2 February · 2:50 PM
Conference 8987: Oxide-based Materials and Devices V
Session 3: Doping and Band Structure Studies of Oxides

Doping of Ga₂O₃ bulk crystals and nanowires by ion implantation

Paper 8987-16
Katharina Lorenz, Univ. Técnica de Lisboa (Portugal), et al.

Monday 3 February · 8:30 AM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 1: Growth I

Growth of bulk GaN crystal by Na flux method

Paper 8986-2
Yusuke Mori, Osaka Univ. (Japan), et al.

Monday 3 February · 1:15 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 3: Growth III

New directions in GaN material research: thinner and smaller

Paper 8986-11
Jung Han, Yale Univ. (USA), et al.

Monday 3 February · 2:00 PM
Conference 8996: Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XI
Session 3: Nanowire Devices

Green- to red-emitting InGaN-based nanocolumn LEDs with regularly-arranged triangular lattice nanocolumn arrays

Paper 8996-9
Katsumi Kishino, Sophia Univ. (Japan), et al.

Monday 3 February · 2:45 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 3: Growth III

Defect-assisted exfoliation of GaN/InGaN flexible nanomembranes for optoelectronic applications

Paper 8986-15
Rami T. ElAfandy, King Abdullah Univ. of Science and Technology (Saudi Arabia), et al.

Monday 3 February · 5:00 PM
Conference 8987: Oxide-based Materials and Devices V
Session 8: Growth, Properties, and Applications of Nanostructures

Effect of electrical field and atmosphere on the processing of nanocrystalline ZnO

Paper 8987-41
Benjamin Dargatz, Friedrich-Schiller-Univ. Jena (Germany), et al.

Tuesday 4 February · 10:30 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 1: Solid State Lighting I

Quality of light of LED lighting: accurately rendering whites and colors

Paper 9003-1
Aurelien David, Soraa, Inc. (USA), et al.

Tuesday 4 February · 11:30 AM
Conference 8984: Ultrafast Phenomena and Nanophotonics XVIII
Session 8: Nanophotonics

Principles of perfect and ultrathin anti-reflection with applications to transparent electrode

Paper 8984-30
Q-Han Park, Korea Univ. (Korea, Republic of), et al.

Tuesday 4 February · 11:45 AM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 5: Material Characterization II

Origin of non-radiative losses in thick InGaN/GaN QWs

Paper 8986-26
Felix Nippert, Technische Univ. Berlin (Germany), et al.

Tuesday 4 February · 1:30 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 2: Nanotechnologies for LEDs I

Phosphor-free InGaN/GaN/AlGaIn core-shell dot-in-a-wire white light-emitting diodes

Paper 9003-5
Zetian Mi, McGill Univ. (Canada), et al.

Tuesday 4 February · 2:00 PM
Conference 8983: Organic Photonic Materials and Devices XVI
Session 6: Pattern Formation

2D- and 3D-patterned organic-inorganic hybrid systems for photonic applications

Paper 8983-23
Kwang-Sup Lee, Hannam Univ. (Korea, Republic of), et al.

Tuesday 4 February · 2:30 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 6: Material Characterization III

Direct verification of commonly-used rate-equation model in III-nitride material by detailed analysis of photoluminescence decay curves

Paper 8986-30
Hitoshi Manabe, Kanazawa Institute of Technology (Japan), et al.

Tuesday 4 February · 2:45 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 2: Nanotechnologies for LEDs I

Implementation of graphene electrodes in nanoparticle light-emitting devices

Paper 9003-9
Svenja Wolff, Univ. Duisburg-Essen (Germany), et al.

Tuesday 4 February · 4:45 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 3: High-Current LED Performance

Efficiency droop improvement in InGaN/GaN light-emitting diodes by thinner quantum well with different location

Paper 9003-15
Sheng-Wen Wang, National Chiao Tung Univ. (Taiwan), et al.

Tuesday 4 February · 5:00 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 3: High-Current LED Performance

Identifying the cause of the efficiency droop in GaInN light-emitting diodes by correlating the onset of high injection with the onset of the efficiency droop

Paper 9003-16
David S. Meyaard, Rensselaer Polytechnic institute (USA), et al.

Tuesday 4 February · 5:05 PM
Conference 8987: Oxide-based Materials and Devices V
Session 11: Oxide-based Light Emitters

UV detectors and LEDs in different metal oxide nanostructures and the influence from the piezoelectric effect

Paper 8987-53
Magnus Willander, Linköping Univ. (Sweden), et al.

Tuesday 4 February · 6:00 PM
Conference 8965: High-Power Diode Laser Technology and Applications XII
Poster Session Tuesday

Laser technology in automotive lighting

Paper 8965-43
Ceren Altinogoz, Magneti Marelli Mako Elektrik Sanayi Ticaret A.S (Turkey), et al.

Wednesday 5 February · 9:00 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 4: Nanotechnologies for LEDs II

Nanorod-structured flip-chip GaN-based white light-emitting diodes

Paper 9003-18
Ching-Ting Lee, National Cheng Kung Univ. (Taiwan), et al.

Wednesday 5 February · 10:30 AM
Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
Session 9: Plasmonics

Plasmonic enhancement and losses in light-emitting quantum-well structures incorporating metallic gratings

Paper 8980-34
Toufik Sadi, Aalto Univ. (Finland), et al.

Wednesday 5 February · 10:30 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 5: LED Fabrication

Highly-reliable Ag-based reflector for vertical-geometry GaN-based light-emitting diodes: Electrode design to improve the thermal stability

Paper 9003-20
Tae-Yeon Seong, Korea Univ. (Korea, Republic of), et al.

Wednesday 5 February · 11:00 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 5: LED Fabrication

New developments on high-efficiency infrared and InGaAlP light-emitting diodes at OSRAM OS

Paper 9003-21
Markus Broell, OSRAM Opto Semiconductors GmbH (Germany), et al.

Wednesday 5 February · 11:20 AM
Conference 9004: Emerging Liquid Crystal Technologies IX
Session 2: Lasing and Photonic Materials

Miscibility and phase separation in LC semiconductor blends

Paper 9004-7
Yo Shimizu, National Institute of Advanced Industrial Science and Technology (Japan), et al.

Wednesday 5 February · 1:30 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 10: LED I

III-nitride tunnel junctions for efficient solid state lighting

Paper 8986-46
Siddharth Rajan, The Ohio State Univ. (USA), et al.

Wednesday 5 February · 1:50 PM
Conference 9004: Emerging Liquid Crystal Technologies IX
Session 3: Photoalignment, Photopatterning, and Phototuning

Surface-induced bistable switching liquid crystal mode and its electro-optic applications

Paper 9004-9
Hak-Rin Kim, Kyungpook National Univ. (Korea, Republic of), et al.

Wednesday 5 February · 2:30 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 6: UV LEDs

Enhanced light extraction and electrical properties of deep-ultraviolet light-emitting diodes by reflective contacts on selective-area-grown GaN

Paper 9003-27
Dong-Yeong Kim, Pohang Univ. of Science and Technology (Korea, Republic of), et al.

Wednesday 5 February · 3:30 PM
Conference 8979: Emerging Digital Micromirror Device Based Systems and Applications VI
Session 7: Advanced 3D Display

Design of a single projector multiview 3D display system

Paper 8979-13
Jason Geng, IEEE Intelligent Transportation Systems Society (USA), et al.

Wednesday 5 February · 4:30 PM
Conference 8979: Emerging Digital Micromirror Device Based Systems and Applications VI
Session 7: Advanced 3D Display

A scalable multi-DLP-pico-projector system for augmented and virtual reality

Paper 8979-16
Fernando Teubl Ferreira, Univ. de São Paulo (Brazil), et al.

Wednesday 5 February · 6:00 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Poster Session Wednesday

Internal and external quantum efficiencies of InGaN/GaN LEDs with short-period superlattice (SPSL)

Paper 8986-79
Ilya E. Titkov, Univ. of Dundee (United Kingdom), et al.

Wednesday 5 February · 6:00 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Poster Session Wednesday

Selective area growth for p-side down InGaN/GaN light-emitting diodes by metal-organic chemical vapor deposition

Paper 8986-86
Hsueh-Hsing Liu, National Central Univ. (Taiwan), et al.

Wednesday 5 February · 6:00 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Poster Session Wednesday

Compact remote water disinfection device using solar-powered deep-UV LEDs

Paper 9003-51
Brad Butterfield, Quantel USA (USA), et al.

Green Photonics Presentations

Wednesday 5 February · 6:00 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Poster Session Wednesday

Enhancement of light extraction efficiency with triangular-shaped GaN-based light-emitting diodes

Paper 9003-55
Ja-Yeon Kim, Korea Photonics Technology Institute (Korea, Republic of), et al.

Wednesday 5 February · 6:00 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Poster Session Wednesday

Silver nanowire network for high-performance and transparent conducting electrode of GaN-based light-emitting diodes

Paper 9003-60
Ja-Yeon Kim, Korea Photonics Technology Institute (Korea, Republic of), et al.

Thursday 6 February · 9:30 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 8: LED Efficiency Droop I: Joint Session with Conferences 8986 and 9003

Microscopic models of non-radiative and high-current effects in LEDs: state of the art and future developments

Paper 9003-36
Enrico Bellotti, Boston Univ. (USA), et al.

Thursday 6 February · 11:00 AM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 9: LED Efficiency Droop II: Joint Session with Conferences 8986 and 9003

The efficiency droop in III-V semiconductor light-emitting diodes

Paper 9003-38
E. Fred Schubert, Rensselaer Polytechnic Institute (USA), et al.

Thursday 6 February · 11:30 AM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 13: LED Efficiency Droop II: Joint Session with Conferences 8986 and 9003

Low-temperature studies of the efficiency droop in InGaN-based light-emitting diodes

Paper 8986-62
Jong-In Shim, Hanyang Univ. (Korea, Republic of), et al.

Thursday 6 February · 11:40 AM
Conference 9005: Advances in Display Technologies IV
Session 2: Emerging Technologies

Emerging applications of ferroelectric nanoparticles in display technologies

Paper 9005-9
Anatoliy V. Glushchenko, Univ. of Colorado at Colorado Springs (USA), et al.

Thursday 6 February · 1:00 PM
Conference 8986: Gallium Nitride Materials and Devices IX
Session 14: LED II

Recent progress of deep UV LEDs and potential applications

Paper 8986-63
Kyoung Hoon Kim, LG Innotek (Korea, Republic of), et al.

Thursday 6 February · 1:30 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 10: Novel Substrates for LEDs

Ammonothermal bulk GaN substrates for LEDs

Paper 9003-39
Mark P. D'Evelyn, Soraa, Inc. (USA), et al.

Thursday 6 February · 4:15 PM
Conference 9003: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XVIII
Session 11: Solid State Lighting II

Spectral behavior and coherence length of GaN- and AlGaInP-based light-emitting diodes

Paper 9003-45
Reinhold Hetzel, Technische Univ. Graz (Austria), et al.

364

Communications

(ordered chronologically by session start time)

Sunday 2 February · 4:50 PM
Conference 8959: Solid State Lasers XXIII: Technology and Devices
Session 5: Airborne and Space Qualified Lasers

Feasibility and performance study for a space-borne 1645 nm OPO for French-German satellite mission MERLIN

Paper 8959-17
Marie J. Livrozet, Fraunhofer-Institut für Lasertechnik (Germany), et al.

Monday 3 February · 10:50 AM
Conference 8991: Optical Interconnects XIV
Session 2: Nanophotonics for Optical Interconnects

10-40 GHz on-chip micro-optical links with all-integrated Si Av LED optical sources, waveguides, and SiGe detectors

Paper 8991-7
Kingsley A. Ogudo, Tshwane Univ. of Technology (South Africa), et al.

Monday 3 February · 11:10 AM
Conference 8990: Silicon Photonics IX
Session 2: Waveguides II

Tolerance analysis for efficient MMI devices in silicon photonics

Paper 8990-9
Carmen Vázquez García, Massachusetts Institute of Technology (USA), et al.

Monday 3 February · 3:10 PM
Conference 8990: Silicon Photonics IX
Session 3: Waveguides III

Ge quantum-well optical interconnects on bulk silicon

Paper 8990-17
Papichaya Chaisakul, Institut d'Électronique Fondamentale (France), et al.

Monday 3 February · 4:40 PM
Conference 8990: Silicon Photonics IX
Session 4: Sources

High-intensity 100-nW 5GHz silicon avalanche LED utilizing carrier energy and momentum engineering

Paper 8990-20
Lukas W. Snyman, Tshwane Univ. of Technology (South Africa), et al.

Tuesday 4 February · 10:55 AM
Conference 9010: Next-Generation Optical Networks for Data Centers and Short-Reach Links
Session 1: Optical Communication Plenary Session: Joint Session with Conferences 9007, 9008, and 9010

Data center networks and network architectures

Paper 9010-2
Hiroshi Esaki, The Univ. of Tokyo (Japan), et al.

Tuesday 4 February · 11:00 AM
Conference 8991: Optical Interconnects XIV
Session 5: Silicon Photonic Devices

Integrated DWDM silicon photonic transceiver with self-adaptive CMOS circuits for chip-to-chip optical interconnects

Paper 8991-19
Chin-Hui Chen, Hewlett-Packard Co. (USA), et al.

Tuesday 4 February · 11:25 AM
Conference 9007: Broadband Access Communication Technologies VIII
Session 1: Optical Communication Plenary Session: Joint Session with Conferences 9007, 9008, and 9010

Light fidelity (Li-Fi): towards all-optical networking

Paper 9007-1
Dobroslav Tsonev, The Univ. of Edinburgh (United Kingdom), et al.

Tuesday 4 February · 1:50 PM
Conference 8991: Optical Interconnects XIV
Session 6: Optical Interconnect Devices and Switches

A holistic way towards high-performance, low-energy and low-cost data centers and HPCs: PhoxTroT

Paper 8991-23
Tolga Tekin, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany), et al.

Tuesday 4 February · 4:30 PM
Conference 8990: Silicon Photonics IX
Session 7: Modulators

High contrast and accurate high-speed simulation of silicon-based modulators

Paper 8990-35
Ching Eng Png, A*STAR Institute of High Performance Computing (Singapore), et al.

Wednesday 5 February · 8:30 AM
Conference 8991: Optical Interconnects XIV
Session 8: Optical Interconnect Systems

Optical RAM-enabled cache memory and optical routing for chip multiprocessors: technologies and architectures

Paper 8991-33
Nikos Pleros, Ctr. for Research and Technology Hellas (Greece), et al.

Wednesday 5 February · 9:00 AM
Conference 9007: Broadband Access Communication Technologies VIII
Session 4: Next-Generation Access Network and Advanced Components

Optical fiber-wireless components and system for broadband access applications

Paper 9007-7
Idelfonso Tafur Monroy, DTU Fotonik (Denmark), et al.

Wednesday 5 February · 9:45 AM
Conference 9007: Broadband Access Communication Technologies VIII
Session 4: Next-Generation Access Network and Advanced Components

Multi-wavelength and multiband RE-doped optical fiber source array for WDM-GPON applications

Paper 9007-9
Grethell G. Perez-Sanchez, Tecnológico de Estudios Superiores de Coacalco (Mexico), et al.

Wednesday 5 February · 11:30 AM
Conference 8991: Optical Interconnects XIV
Session 9: Manufacturing Technologies

Optical connecting devices fabricated by self-written waveguide technology for smart optical interconnect

Paper 8991-39
Osamu Mikami, Tokai Univ. (Japan), et al.

Wednesday 5 February · 2:30 PM
Conference 9007: Broadband Access Communication Technologies VIII
Session 6: Emerging Optical Wireless and Passive Optical Networks

Next generation 3-D OFDM based optical access networks using FEC under various system impairments

Paper 9007-15
Pravindra Kumar, Indian Institute of Technology Mandi (India), et al.

Wednesday 5 February · 3:00 PM
Conference 9010: Next-Generation Optical Networks for Data Centers and Short-Reach Links
Session 6: Advanced Components for Short-Haul Systems: Joint Session with Conferences 9008 and 9010

Nanoplasmonic waveguides and modulators for advanced optical interconnects

Paper 9010-14
Zhaolin Lu, Rochester Institute of Technology (USA), et al.

Wednesday 5 February · 3:30 PM
Conference 9007: Broadband Access Communication Technologies VIII
Session 7: Novel Optical Communications Systems and Optical Wireless Applications

Multi-band multi-service sensing: metamaterials myth and reality

Paper 9007-18
Mohsen Kavehrad, The Pennsylvania State Univ. (USA), et al.

Wednesday 5 February · 4:20 PM
Conference 9008: Optical Metro Networks and Short-Haul Systems VI
Session 6: Photonic Switching, Routing, and WDM Devices: Joint Session with Conferences 9008 and 9010

A hybrid optical switch architecture to integrate IP into optical networks to provide flexible and intelligent bandwidth on demand for cloud computing

Paper 9008-7
Wei Yang, Univ. of Ottawa (Canada), et al.

Wednesday 5 February · 6:00 PM
Conference 8980: Physics and Simulation of Optoelectronic Devices XXII
Poster Session Wednesday

Analysis of quantum cascade lasers using an equivalent circuit model

Paper 8980-79
Saba Soltani, Islamic Azad Univ. of Tabriz (Iran, Islamic Republic of), et al.

Wednesday 5 February · 6:00 PM
Conference 8987: Oxide-based Materials and Devices V
Poster Session Wednesday

Lattice location of Hf and its interaction with other impurities in LiNbO₃: an integrated review

Paper 8987-73
Jose Gonçalves Marques, Univ. Técnica de Lisboa (Portugal), et al.

Wednesday 5 February · 6:00 PM
Conference 8988: Integrated Optics: Devices, Materials, and Technologies XVIII
Poster Session Wednesday

Plasmonic slot nano-waveguides with flattened Luneburg lens-based optical couplers

Paper 8988-57
Bayaner Arigong, Univ. of North Texas (USA), et al.

Thursday 6 February · 8:30 AM
Conference 9001: Vertical-Cavity Surface-Emitting Lasers XVIII
Session 1: High-Speed VCSELs

Energy-efficient oxide-confined high-speed VCSELs for optical interconnects

Paper 9001-2
Philip Moser, Technische Univ. Berlin (Germany), et al.

Thursday 6 February · 8:30 AM
Conference 9008: Optical Metro Networks and Short-Haul Systems VI
Session 7: Modulation Formats and High-Efficiency Transmission I

Green photonics realized by optical complex systems

Paper 9008-10
Hiroto Nanri, Doshisha Univ. (Japan), et al.

Thursday 6 February · 11:10 AM
Conference 9001: Vertical-Cavity Surface-Emitting Lasers XVIII
Session 2: Novel VCSEL Structures

Heterogeneously-bonded VCSEL arrays and electro-thermal modeling

Paper 9001-8
Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA), et al.

Thursday 6 February · 3:20 PM
Conference 9008: Optical Metro Networks and Short-Haul Systems VI
Session 10: Short-Reach Metro and Access Networks and Related Components II

Low-cost 10G optical line terminal of WDM-PON for mobile backhaul application

Paper 9008-22
Do-Won Kim, Ericsson-LG (Korea, Republic of), et al.

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

A

- Aalders, Maurice C. 8935 Program Committee, [8941-32] S9, [8947-8] S2
Aallos, Ville [8961-103] SPTue, [8961-37] S9
Aalto, Timo [8990-14] S3, [8990-2] S1, [8990-22] S4, [8990-3] S1, [8990-4] S1
A'Amar, Ousama M. [8926-127] S3, [8926-132] S4, [8926-134] S4
Aaron, Holly 8948 SPSun Session Chair
Aas, Mehdi [8960-40] S10
Abakumov, Artem [8987-71] SPWed
Abakumova, Tatyana [8941-39] SPMon
Abanshin, Nikolay P. [8982-69] SPWed
Abaslou, Siamak [8991-46] SPWed, [8991-9] S2
Abate, Adam R. [8955-70] S7
Abautret, Johan [8993-39] S7, [8993-40] S7
Abaya, Tanya Vanessa F. [8928-82] S15
Abbarchi, Marco [8984-32] S9
Abbas, Saleh [8949-45] S9
Abboud, Khalil A. [8983-29] S7
Abdel Salam, Moushira [8932-35] S7
Abdelalim, Mohamed A. [8961-120] SPTue
Abdell-Messaci, Samira [8996-39] SPWed
AbdelWahab, Khaled [8932-35] S7
Abdul-Majid, Sawsan [9007-8] S4
Abe, Hiroyuki [8928-47] S9
Abe, Ken [8937-37] SPSun
Abed, Farah Amer [8995-7] S2
Abedi, K. [8980-79] SPWed
Abedin, Kazi S. [8938-15] S3
Abelé, Nicolas [8977-22] S5
Abell, Joshua [8981-40] S11, [9002-47] S11
Abels, Peter [8963-24] S6, [8970-23] S6, [8970-23] S9
Aberle, Armin G. [8981-47] S12
Abeygunawardhana, Pradeep K. W. [8936-3] S1, [8951-35] SPMon, [8951-36] SPMon
Abeyasinghe, Don C. [8993-84] S17
Abid, Kamran [8990-44] S8
Abi-Salloum, Tony 8998 Program Committee
Abliz, Erkinay [8928-3] S1
Abolmaesumi, Purang [8943-183] SPMon
Abookasis, David 8928 Program Committee, 8928 S5 Session Chair, [8928-18] S5
Aboud, Zeinab [8946-22] S5, [8949-28] S6
Abouraddy, Ayman F. [8982-14] S3, [8982-77] SPWed, [8982-78] SPWed
Abraham, Alexander A. [8951-40] SPMon
Abraham, Edward H. [8932-1] S1
Abrahamse, Heidi [8932-10] S2, [8932-14] S3
Abramski, Krzysztof Marek [8959-52] S12, [8961-81] SPTue, [8964-23] S6, [8964-31] S7, [8964-65] SPTue, [8968-39] SPTue, [8968-9] S2, [8973-26] SPTue
Abshire, James B. [8988-8] S2
Absil, Philippe 9010 Program Committee, 9010 S4 Session Chair, [9010-19] S6, [9010-19] S7
Abstreiter, Gerhard [9002-35] S8
Abulikemu, Mutalifu [8987-65] S13
Abushkin, Ivan A. [8926-104] S21
Abutan, Alfred [8990-30] S6
Abu-Yousif, Adnan O. [8931-13] S3, [8956-3] S1
Accanto, Nicolò [8984-54] S14
Accard, Alain [8993-9] S1, [9002-11] S3
Accoccia, Giulia [8993-92] S18
Acerbi, Fabio [8993-89] S18
Aceves, Alejandro B. [8964-16] S4
Aceves-Mijares, Mariano [8980-65] SPWed
Acharya, Anusha [8926-5] S1
Acharya, Shashidhar [8929-2] S1
Acharya, Shiv [8974-9] S3
Achen, Zach [8976-45] S10
Achilefu, Samuel [8931-52] SPMon, [8936-25] S6, [8936-26] S6, [8940-41] SPTue, [8948-78] SPSun, [8949-56] SPMon, 8956 Conference Chair, 8956 S1 Session Chair, [8956-43] S4
Acik, Muge [8987-67] S13
Aciole, Joubert Mateus S. [8932-20] S4, [8932-38] SPSun
Ackert, Jason J. [8990-45] S9
Acosta, Lilian K. [8996-21] S6
Acosta, Victor M. [8994-21] S2, [8994-21] S6, [8998-60] S13
Acosta, Yassel [8944-13] S3
Acquaviva, Joseph T. [8944-24] SPMon, [8944-6] S2
Adachi, Koichiro [9010-12] S4, [9010-12] S5
Adam, Jean-Luc [8938-40] S8, 8982 Program Committee
Adamantidis, Antoine R. 8928 Program Committee, 8928 S18 Session Chair
Adamo, Gabriele [8990-40] S8, [8990-41] S8, [8990-43] S8
Adamopoulos, Othon [8987-71] SPWed
Adams, David C. [8927-41] S10, [8927-55] S13, [8927-56] S13, [8934-12] S2, [8934-57] S9
Adams, Jessica G. J. [8981-40] S11
Adato, Ronen [8993-64] S13
Adedbayo, Adedotun [8938-47] SPSun
Adhikari, Pratik [8951-27] S6, [8951-27] S6
Adibi, Ali [8957-13] S3, 8974 Track Chair, 8993 Track Chair, 8994 Conference Chair, 8994 S1 Session Chair, 8994 S5 Session Chair, 8994 Track Chair, 8995 Track Chair, 8996 Track Chair, 8997 S1 Session Chair
Adie, Steven [8934-42] S7, [8934-67] S10, [8935-48] S10, [8935-75] SPSun, [8946-27] S6
Adinolfi, Barbara [8956-29] S8
Adlam, David [8934-90] SPMon
Adler, Steffen [8966-27] S8
Adliene, Diana [9006-4] S1
Adriaenssens, Tom [8926-92] S19
Aeberhard, Urs [8981-1] S1
Aers, Geof C. [9002-40] S9
Aeschlimann, Martin [8984-24] S7
Affouda, Chaffra Awo [8981-27] S7
Afonyushkin, Andrei [8963-33] S8
Afzal, Robert S. [8961-62] S15
Agahi, Massoud H. 8993 S3 Session Chair
Agar, Nathalie Y.R. [8948-24] S4
Agarwal, Anuradha M. [8960-3] S1
Agarwal, Asha [8940-18] S4
Agaer, Semih [8952-34] S9
Agert, Carsten [8967-50] SPTue
Aggarwal, Ishwar D. [8959-58] S13, [8961-57] S13, [8968-35] SPTue, [8982-35] S7
Aggarwal, Neha [8931-1] S1
Aghvami, Seyedmohammadali [8944-13] S3
Aglyamov, Salavat [8930-3] S1, [8934-33] S5, [8946-15] S4, [8946-28] S6
Agnesi, Antonio [8959-41] S10
Agocs, Emil [8987-13] S2, [8987-88] SPWed
Agra, Lais C. [8947-84] S13
Agranat, Aharon J. [9010-10] S4
Agrawal, Aishwarya [8941-23] S6
Agrawal, Anant [8928-3] S1, [8930-43] S9, 8945 Program Committee
Agrawal, Govind P. [8940-34] S7
Agrez, Vid [8961-109] SPTue
Agrò, Diego [8990-40] S8, [8990-41] S8, [8990-43] S8
Aguilar, Marcio C. [8932-7] S1
Aguilar, Guillermo [8928-2] S1
Aguilar, Rodrigo [8928-6] S2
Aharon, Judith [8963-21] S6
Aharon, Oren [8963-21] S6
Aharonovich, Igor [8970-21] S5
Ahluwalia, Balpreet S. [8988-43] S9, [8999-4] S1
Ahmad, A. [8989-12] S5
Ahmad, Adeel [8934-67] S10, [8946-4] S2
Ahmad, Ahmad K. [8938-26] S5
Ahmad, Moiz [8943-125] SPSun
Ahmad, Muhammad [8977-34] SPTue
Ahmadi, Peyman [8961-91] SPTue
Ahmed Khozim, Amilia [9002-3] S1
Ahmed, Ahmed A. [8935-15] S4
Ahmed, Gaz A. [8996-30] SPWed
Ahmed, Osman S. [8982-19] S4, [8988-31] S7
Ahmed, Shahina [8928-90] S18
Ahmed, Shahina [8928-86] S16
Ahmed, Sohail 8950 Program Committee, [8950-52] S8
Ahn, Chang-geun [8935-70] SPSun
Ahn, G-One [8927-26] S6
Ahn, Hong-Gyu [8994-71] SPWed
Ahn, Hyo-Sung [8992-14] S3
Ahn, Hyung Jun [8938-24] S5
Ahn, Jin Chul [8926-121] S1, [8932-42] SPSun, [8938-19] S4
Ahn, Jinhyo [8927-26] S6, [8941-55] S11, [8947-29] S6, [8947-81] SPMon
Ahn, Jong-Hyun [8966-31] SPTue, [8966-5] S2
Ahn, Jung-Min [8926-88] S18
Ahn, Peter [8926-135] S5
Ahn, Seung Bin K. [8961-110] SPTue, [8985-47] S10
Ahn, Yeh-Chan [8926-150] SPSat
Ahrbeck, Christopher [8967-41] S14
Ahsan, Syed S. [8976-18] S4
Ahsen, Osman O. [8927-30] S7
Ahuja, Gurpreet S. [8926-143] S7, [8926-145] S7
Ahuja, Shelly [8929-17] S4
Ai, Ye [8976-23] S5
Aichele, Claudia [8982-27] S6
Aidam, Rolf [8966-27] S8, [8993-31] S6, [8993-57] S12, [9003-33] S7
Aieta, Francesco [8995-23] S6
Aiken, Michael W. [8945-1] S1
Aikens, David M. SC1017, SC700
Ait-Ameur, Kamel [8960-56] S15, [8999-54] SPWed
Aitchison, James Stewart [8957-33] S7
Aithal, Srivatsa [8935-65] SPSun
Ait-Kaci, Hocine [8993-39] S7
Aitken, Karen J. [8926-43] S9
Aizawa, Yutaka [8987-94] S11
Aizenberg, Joanna [8958-2] S1
Ajajero, Mathias I. [8928-100] S20, [8947-87] SPMon, [8954-7] S2
Ajayan, Pulket M. [8984-2] S1
Ajeti, Visar [8947-65] S14
Ajrouche, Hassan [8959-59] S14
Akhane, Kouichi [9002-4] S1
Aka, Kozo [9003-52] SPWed
Akasaka, Tetsuya [8986-12] S3
Akasaka, Youichi 9008 Program Committee, 9008 S8 Session Chair
Akasaki, Isamu [8986-35] S7, [8986-6] S1
Akbar, Jahan [8990-44] S8
Akbari, Najva [8947-13] S3, [8949-15] S4
Akbari, Reza [8960-47] S12
Akbulut, Mehmetcan [8961-68] SPTue
Akchurin, Garif Gazizovich [8982-69] SPWed
Akers, Walter J. [8936-25] S6, [8948-78] SPSun
Akgül, Tuba [8941-47] SPMon, [8941-48] SPMon
Akimov, Denis [8940-7] S2
Akino, Brian A. [8955-38] S8
Akioka, Maki [8971-28] S5
Akitsu, Tetsuya [8929-20] SPSun
Aki, Tony J. [8951-2] S1
Akopova, Irina [8950-4] S1
Akopova, Irina [8950-51] SPSun
Akosman, Ahmet Emin [8995-4] S2
Aksu, Serap [8993-64] S13
Akujay, Ailti [8977-13] S3, [8977-30] S7
Akyol, Fatih [8986-46] S10
Al Natseh, Anas [9009-26] SPWed
Alagic, Nermina [8931-6] S2
Alali, Sanaz [8926-43] S9, [8952-1] S1
Alam, Md. Asharful [9005-13] S3
Alam, Shaif-ul [8943-158] SPMon, [8961-33] S8
Al-Amin, Chowdhury G. [8985-4] S1
Alarcón Salazar, Jesús [8980-65] SPWed
Alarousi, Erkki [8987-65] S13
Alas, Gema [8955-38] S8
Alasaarela, Tapani [8982-23] S5
Alavi, Karim [8985-19] S4
Albadawi, Hassan [8934-59] S9
Albert, Steven [8996-2] S1
Alberti, Edoardo [8977-25] S6
Albrecht, Alexander R. [8966-2] S1, [8966-32] SPTue, [9000-4] S1
Albrecht, Michele [8993-56] S10
Aldaya-Garde, Ivan A. [8980-56] S14, [8980-71] SPWed, [9010-8] S4
Aldaz, Rafael I. [9003-41] S10
Aldeek, Fadi [8955-10] S3, [8955-5] S2
Al-Demerdash, Bassem M. [8977-24] S6
Aldén, Marcus [8964-52] SPTue
Aleksandrova, Anna [9002-45] S10
Alemana, Gabriela [9003-57] SPWed
Alencar, Márcio A. R. C. [8999-13] S3
Alesenkov, Aleksandr [8972-42] S9
Aleshkina, Svetlana S. [8961-29] S7
Alessi-Fox, Christi [8926-12] S3, [8926-13] S3
Alessio, Giulia [8955-68] SPSun
Alex, Aneesh [8934-15] S3, [8934-75] S11, [8953-16] S4
Alexander, Dennis [8968-12] S3, [8968-27] S6
Alexandrou, Antigoni 8955 Program Committee
Alexandrov, Alexander B. [8960-51] S13
Alexandrov, Sergey A. [8934-34] S5, [8943-2] S1
Alexandrovski, Alexei L. [9000-14] S3
Alexeev, Alexander [8976-10] S3
Alexoudi, Theonitis [8982-64] SPWed, [8990-22] S4, [8991-33] S8
Alfano, Robert R. 8926 Program Committee, [8926-109] S22, [8926-110] S22, [8926-116] S24, 8940 Conference Chair, [8940-11] S3, [8940-30] S6, [8940-32] S7, [8940-39] SPTue, [8940-40] SPTue, [8940-41] SPTue, [8940-42] SPTue, [8940-5] S1, 8999 Program Committee, 8999 S4 Session Chair, [8999-12] S3, [8999-18] S4, [8999-22] S5, [8999-24] S5, [8999-33] S7, [8999-35] S7
Alfieri, Domenico [8926-3] S1, [8926-73] S15
Alfieri, Vittorio [8963-4] S1
Alfimov, Georgy L. [8998-49] S11
Alfonso Garcia, Alba [8948-84] SPSun
Algar, W. Russ [8955-30] S7, [8955-31] S7
Algora del Valle, Carlos [8981-20] S5
Alharbi, Meshal [8961-16] S4, [8961-9] S3
Alhashim, Hala [9002-1] S1
Alhazime, Ali [8966-18] S5
Ali, Muhammad [8947-64] S14
Alibart, Olivier [8997-35] S8
Alimohammadian, Ehsan [8959-50] S12
Alimoradi-Jazi, Maryam [8986-9] S2
Alisafae, Hossein [8981-52] S13, [8994-50] S12, [8995-41] S10
Ali-Santosa, Melissa [8935-53] S11
Alivisatos, A. Paul [8955-15] S4
Al-Jabr, Ahmad [8986-15] S3
Al-Janabi, A. Hadi [8938-26] S5
Alkeskjold, Thomas T. 8961 Program Committee, 8961 S4 Session Chair, [8961-104] SPTue, [8961-14] S4, [8961-39] S9, [8961-96] SPTue
Allan, Thomas [8943-196] SPTues
Allegra Mascaro, Anna Letizia [8928-57] S12, [8948-16] S3
Allen, David W. 8936 Program Committee, 8945 Conference Chair, 8945 S1 Session Chair, 8945 S4 Session Chair
Allen, Heather C. [8947-10] S2
Allen, Jeffery W. [8985-36] S8
Allen, John Stacy [8943-197] SPTues
Allen, Monica S. [8985-36] S8
Allen, R. Steve [8938-4] S1
Allen, Thomas J. [8943-158] SPMon
Alles, Erwin J. [8943-195] SPTues
Allevi, R. [8955-68] SPSun
Alley, Michael WS1124, WS667, WS668
Alleyne, Andrew G. [8933-13] S4
Allier, Cédric P. [8939-13] S2, [8939-4] S1, [8947-53] S12
Allodi, Marco A. [8949-1] S1
Almainan, Ahmed S. [9007-23] S8
Almajidi, Rand Kasim M. [8945-3] S1
Al-Mansouri, Ibrahim [8981-20] S5
Almeida Camargo, Fabiola [8966-19] S6

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Almeida, Diogo Burigo [8948-100] SPSun, [8948-12] S2, [8948-48] S8, [8948-51] S8, [8948-55] S9, [8957-32] S7, [8996-26] S7, [8996-32] SPWed
 Almeida, Gustavo F. [8976-4] S1
 Almeida, Juliana M. P. [8964-50] SPTue, [8973-5] S1
 Almeida, Paulo 8961 Program Committee
 Almeida, Raul Camelo [9008-12] S7
Alonso Ramos, Carlos A. [8995-38] S10
 Alonso, Miguel A. [8949-34] S7
 Alonzo, Carlo-Amadeo C. [8948-11] S2
 Alouini, Mehdi [8966-20] S6
Alqasemi, Umar S. [8943-110] SPSun, [8943-150] SPMon, [8943-5] S1
 AlSalhi, Mohamad Saleh [8940-19] S4, [8940-31] S6
 Alston, Robert [9005-12] S3
 Altamura, Giovanni [8981-7] S2
 Altingoz, Ceren [8965-43] SPTue
 Altoe, Mirella L. [8935-50] S11
Altshuler, Gregory B. 8929 Program Committee
Altug, Hatice 8976 S9 Session Chair, [8976-30] S7, [8993-64] S13
Alù, Andrea 8994 Program Committee, 8994 S13 Session Chair, [8994-46] S12, [8994-61] S15
Álvarez, Jesús [8933-17] S5
 Alvarez, José [8981-51] S13
Álvarez-Chávez, José Alfredo [8941-28] S7, [8963-37] SPTue, 8968 Program Committee, [8980-42] S11, [9007-9] S4
 Alves, Eduardo [8987-16] S3
 Alves, Luis C. [8987-16] S3, [8987-39] S8
 Alves, Marco A. V. [8926-115] S24
 Alves, Mariana A. S. [8932-33] S7
 Alves-de-Souza, Francisca Diana [8929-4] S1
 Alzahrani, Abdullah [8936-15] S3
 Amaechi, Bennett T. 8926 Program Committee
 Amako, Jun [8968-7] S2
 Amann, Markus-Christian 8995 Program Committee, [9002-25] S6
 Amano, Hiroshi 8980 Program Committee, 8986 Program Committee, [8986-35] S7, [9003-14] S3
 Amarakoon, Sankha [8930-33] S7
 Ambacher, Oliver [9002-17] S4
 Ambade, Ashotosh [8985-24] S6
 Ambrose, Catherine [8926-139] S24
 Ambrosius, Huub P.M.M. [8988-21] S5
 Amediek, Axel [8959-20] S5
 Amelink, Arjen [8952-7] S2
 Amin, Muhammad Junaid [8930-10] S3, [8967-51] SPTue
 Aminpour, Hamed [8959-67] SPTue
 Amirkhaniyan, Varoujan D. [8976-38] S8
 Ammar, M. [8993-78] S16
 Arno, Alberto [8997-28] S10
 Amraoui, Mohammed El [8982-56] SPWed
 Amthor, Matthias [8993-7] S1
 An, Fangzhao A. [8934-101] SPMon
An, Haiyan [8965-27] S6, [8965-29] S6
 An, Jungkwun [8977-20] S5
 An, Lin [8934-50] S8, [8942-33] S8
An, Ran [8942-35] S9, [8952-23] S6
 An, Yu [8937-22] S4, [8941-22] S6
 Anand, Jyoti [8980-74] SPWed
 Anand, Sanjay [8931-39] S8
 Anand, Suman [8960-40] S10
 Anantachaisilp, Suranan [8987-6] S2
 Ananthamurthy, Sharath [8947-61] S13
 Anashkina, Elena A. [8961-56] S13
 Anastasio, Mark A. 8943 Program Committee, 8943 S13 Session Chair, 8943 S14 Session Chair, [8943-112] SPSun, [8943-18] S3, [8943-182] SPMon, [8943-215] SPTues, [8943-224] SPTues, [8943-86] S13, [8943-88] S13
Anavai Kandaswami, Jayanthi [8952-48] SPSun
 Anbil, Sriram R. [8931-13] S3, [8931-6] S2, [8956-3] S1
 Ancona, Antonio [8963-8] S2, [8968-6] S2
 Ancona, Mario G. [8955-31] S7
 Anders, Juanita 8932 Program Committee
Andersen, Geoff P. [9006-12] S3
Andersen, Peter E. 8934 Program Committee, [8964-5] S1, [8972-19] S5
 Andersen, Ulrik Lund [8997-31] S11
Anderson, Brian [8959-54] S12, [8961-67] SPTue, [8961-7] S2
 Anderson, Eric [8947-5] S1
 Anderson, Erik H. [8933-23] S6, [8949-20] S4, [8954-4] S1
 Anderson, Ken [9006-11] S3
Anderson, R. Rox Symposium Chair, [8926-20] SKey
Anderson, Sean P. [8990-37] S7
 Anderson, Tom H. [8981-39] S10
Anderson, Troy P. [8968-12] S3, [8968-27] S6
 Anderson, Wayne A. [8994-35] S9
 Andilla, Jordi [8978-10] S4
 Andkjær, Jacob [8980-6] S2
 Andò, A. [8990-41] S8
 Andonegui, Imanol [8988-50] S11
 Andrade, Camila G. [8955-62] SPSun
 Andraud, Chantal 8983 Program Committee, [8983-65] S11
 Andreadaki, Anastasia [8966-15] S5
 Andreati, Miguel V. [8961-123] SPTue
 Andrews, Aaron M. [9002-23] S5
Andrews, David L. Symposium Chair, 8980 SPlen Session Chair, 8981 SPlen Session Chair, 8982 SPlen Session Chair, 8983 SPlen Session Chair, 8984 SPlen Session Chair, 8985 SPlen Session Chair, 8986 SPlen Session Chair, 8987 SPlen Session Chair, 8988 SPlen Session Chair, 8990 SPlen Session Chair, 8991 SPlen Session Chair, 8993 SPlen Session Chair, 8994 SPlen Session Chair, 8995 SPlen Session Chair, 8996 SPlen Session Chair, 8997 SPlen Session Chair, 8998 SPlen Session Chair, 8999 Conference Chair, 8999 S1 Session Chair, 8999 S9 Session Chair, 8999 SPlen Session Chair, [8999-25] S6, [8999-32] S7, 9002 SPlen Session Chair, 9003 SPlen Session Chair, 9006 SPlen Session Chair, 9007 SPlen Session Chair, 9008 SPlen Session Chair, 9009 SPlen Session Chair, 9010 SPlen Session Chair
 Andrews, Lisa [8943-153] SPMon
 Andrews, Peter M. [8948-88] SPSun
 Andriana, Bibin Bintang [8938-39] S8, [8939-1] S1, [8951-24] S5, [8951-25] S5
 Andrianov, Alexey V. [8961-56] S13
 Andronico, Alessio [8993-6] SKey
 Androulidaki, Maria [8955-66] SPSun
 Angelakeris, Makis [8955-43] S9
 Angelastro, Andrea [8963-36] S6, [8963-36] S9, [8963-5] S1
 Angeloni, Silvia [8974-14] S4
 Angelou, Marianna [9009-16] S7
 Angrick, Veit [8959-25] S6
 Anis, Fatima [8943-112] SPSun, [8943-18] S3
 Anis, Hanan [8961-120] SPTue
 Anjum, Dalaver H. [9002-1] S1
 Ansari, Rafat R. 8930 Program Committee, 8930 S2 Session Chair
 Ansari, Rehman [8927-44] S11
 Anthony, Brian W. 8976 Program Committee, [8976-5] S1, [8976-7] S2
Antila, Jarkko E. [8977-27] S6, [8977-30] S7, [8992-10] S3
 Antilla, Tapani [8992-10] S3
 Antipenkov, Roman [8959-44] S10
 Antkowiak, Maciej K. [8946-30] S7, [8972-2] S1
 Antman, Yair [8998-31] S7
Antonacci, Giuseppe [8946-20] S5
 Antonczak, Arkadiusz J. [8968-39] SPTue, [8968-9] S2, [8973-26] SPTue
 Antoneeva, Inna [8941-39] SPMon
 Antoni, Frédéric [8967-29] S11
Antonopoulos, Georgios C. [8949-6] S2
 Antos, Roman [8954-21] S5
 Antosiewicz, Tomasz J. [8957-26] S6
 Antunes, Arainy S. [8932-24] S5, [8932-31] S6
Anvari, Bahman [8946-24] S5, [8956-30] S8
 Anwar, Shahzad [8928-39] S7, [8932-37] S7
 Anzai, Kenji [8967-18] S9, [8967-19] S9
 Aoki, Kazuo [8987-49] S11
 Aoki, Shingori [8991-16] S4
 Aoki, Taku [8956-4] S1
 Aoki, Tsuyoshi [8991-16] S4
 Aoyama, Mitsuaki [8967-18] S9, [8967-19] S9
 Apiratikul, Paveen [9002-41] S9
 Apkarian, Vartkess Ara [8948-33] S6
 Apostolopoulos, Dimitrios [8991-11] S3, [8991-23] S6
 Appavoo, Kannattassen [8969-20] S4, [8969-20] S6
 Appelfeldt, Michael [8978-3] S1
Appia, Vikram V. [8979-2] S3
Applegate, Brian E. [8926-131] S4, [8934-32] S5, [8934-39] S6, [8943-177] SPMon, [8943-207] SPTues, [8953-17] S4
 Applegate, Matthew B. [8927-36] S9, [8927-54] S13, [8927-55] S13, [8934-57] S9
 Appleton, Catherine [8943-188] SPTues
 Arab, Shermin [8996-13] S4
 Aragon, Andrew A. [8981-63] SPWed
 Arai, Toshiki [8982-81] SPWed
Arai, Tsunenori [8926-74] S15, [8941-15] S4, [8941-21] S5, [8941-30] S8, [8941-31] S8
 Arakaki, Lorilee S. L. [8945-12] S3
 Arakawa, Yasuhiko 8980 Conference Chair, 8980 S6 Session Chair, [8986-38] S7, 9002 Program Committee, [9002-2] S1, [9002-33] S8, [9010-5] S3
 Araki, Tsutomu [8948-41] S7, [8948-81] S2
 Araki, Tsutomu [9003-6] S2
 Arany, Praveen 8932 Conference Chair
 Araujo, João P. [8987-16] S3
 Arbab, M. Hassan [8941-52] S10
 Arbabi, Saman [8941-52] S10
 Arbel, Michal [8948-30] S5
Arce-Diego, José Luis [8941-12] S3
 Arce-Santana, Edgar [8947-14] S3
 Archambault, André [8948-31] S5, [8972-20] S5
 Ardeshirpour, Yasaman [8940-27] S5
 Ardizzone, Vincenzo [8984-32] S9
 Arehart, Aaron [8986-47] S9
 Arellano, Cristina [8980-61] SPWed
 Arens, Winfried [8976-1] S1
 Ariaei, Amirhossein Mohajerin [9007-23] S8
 Arias, Jorge L. [8970-23] S6, [8970-23] S9
 Arif, Khalid M. [8947-28] S5
Arifler, Dizem [8952-31] S8
 Arigong, Bayaner [8974-31] SPTue, [8985-29] S7, [8988-57] SPWed
 Arimoto, Keisuke [8964-47] SPTue
 Arissian, Ladan [8960-46] S12, [8964-15] S4, [8964-16] S4, [8964-62] SPTue
 Aristizabal, Jeydmer [8973-19] S4
 Arita, Munetaka [8986-38] S7, [9002-2] S1
 Arita, Yoshihiko [8946-30] S7, [8972-2] S1, [8999-51] S10
 Arjoca, Stelian [8987-49] S11
 Arju, Nihal [8957-11] S3
 Arkhipov, Mikhail V. [8984-27] S7
Arkhipov, Rostislav [8980-12] S3, [8984-27] S7
 Arkhipov, Sergey N. [8948-9] S1
Armani, Andrea M. [8933-10] S3, 8960 Program Committee, 8960 S5 Session Chair, [8960-14] S4, [8960-27] S6, [8960-28] S6, [8980-5] S2, [8982-2] S1, [8982-6] S1
 Armijo, Leisha M. [8955-18] S4
 Armstrong, Darrell J. 8964 Program Committee, 8964 S5 Session Chair, 8964 S6 Session Chair
 Arnal, Bastien [8934-29] S5, [8943-119] SPSun, [8943-156] SPMon, [8943-34] S5, [8946-6] S2
 Arnaoutakis, Georgios E. [8981-10] S3, [9000-7] S2
 Arnaud, Romain [8992-25] S6
 Arndt-Jovin, Donna J.
 Arndt-Staufenbiel, Norbert [8991-13] S3
 Arnold, Cord L. [8972-21] S6
Arnold, Craig B. 8967 Program Committee, 8968 Conference CoChair, 8968 S4 Session Chair, 8972 Program Committee, 8972 S9 Session Chair
 Arnold, Felix [8971-21] S4, [8971-30] S5
 Arnold, Martin [8961-108] SPTue
 Arnold, Nikita [8980-19] S5
 Arridge, Simon R. [8943-173] SPMon, [8943-77] S12
 Arrigoni, Marco F. [8948-18] S3
 Arrue, Jon [8983-16] S4
 Arshad, Hassan [8926-140] S6
 Arshavsky, Alec V. [8930-19] S5
 Arshavsky, Vadim Y. [8930-21] S5, [8952-35] S9
 Artal, Mariana C. [8948-100] SPSun
 Arthur, Stella N. [8943-153] SPMon
 Artundo, Iñigo [8989-4] S1
 Aruna, Prakasa Rao [8940-15] S3, [8940-2] S1, [8940-20] S4, [8955-63] SPSun
 Arya, Sandeep K. [8985-54] S11
 Asakawa, Hisashi [9005-17] S4
 Asano, Koji [8982-57] SPWed, [8982-71] SPWed
 Asbahr, Patrick [8965-47] SPTue
 Asbury, Cheryl G. 8975 Program Committee, 8975 S4 Session Chair
 Ascari, Alessandro [8963-9] S2
 Aschenbrenner, Timo [8986-19] S4
Aschke, Lutz 8960 Conference CoChair, 8960 S8 Session Chair, 8963 S4 Session Chair
 Aschwanden, Manuel [8982-34] S7
 Asel, T. J. [8993-32] S6
 Asghari, Mehdi [8990-18] S4, [9010-11] S4, [9010-11] S5
 Ashida, Hiroshi [8928-79] SPMon, [8938-52] SPSun, [8941-10] S3
 Ashida, Masaaki [8964-7] S2
 Ashkenazi, Shai [8931-16] S3, [8943-14] S3, [8943-164] SPMon, [8943-194] SPTues, [8983-32] S7
Ashok, Amit [8948-68] S11
 Ashok, Praveen C. [8935-55] S12, [8939-21] S4, [8939-6] S1
 Askebjær, Per [8977-21] S5
 Askenazi, Benjamin [8993-41] S7
 Askins, Charles G. [8961-71] SPTue
 Aslan, Ekin [8976-52] SPTue
 Aslan, Erdem [8975-21] S4, [8976-52] SPTue
 Asmolova, Olha V. [9006-12] S3
 Asokan, Sundararajan [8982-80] SPWed
 Aspelmeier, Markus [9000-14] S3
 Asplund, Karin M. [8945-12] S3
 Asselin, Jeremie [8954-8] S2
 Assia, Ehud I. [8930-38] S8
 Assunção, Bianca P. [8926-77] S15
 Astratov, Vasily N. [8960-11] S3, [8960-12] S3
 Asyikin, Nur [8982-62] SPWed
Atalla, Mahmoud [8980-38] S10
 Atia, Waïd [8934-122] SPMon, [8934-3] S1
 Atif, Muhammad [8940-19] S4
 Atkinson, E. Neely [8935-36] S8
 Atry, Farid [8934-126] SPMon
 Attias, André-Jean [8983-35] S8
 Atwater, Harry A. 8981 Program Committee, [8997-32] S11
 Au, David C. [8938-15] S3
Aubaily, Mathieu [8971-9] S1
 Aubé, Benoit [8948-27] S5
 Aubert, Cassandra [8961-69] SPTue
 Aubourg, Adrien [8959-9] S3
 Aubry, Nicolas [8959-57] S13, [8959-9] S3
 Audouard, Eric [8967-29] S11
 Aughenbaugh, Jessica [8939-18] S3
 Augsburg, Caroline [8948-52] S9
 Augustine, George J. 8928 Program Committee
 Aumann, Andreas [8972-39] S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Aus-der-Au, Juerg [8959-41] S10
Austin, Dane [8984-46] S12
Autebert, Claire [8997-34] S4
Auyeung, Raymond C. Y. [8970-3] S1
Auzelle, Thomas [8986-34] S7
Avanesyan, Sergey M. [8984-53] S14
Avayu, Ori [8999-39] S8
Avcı, Pinar [8932-32] S7, [8944-2] S1, [8944-3] S1
Aviel, Matitya [8963-41] S4, [8963-41] S8
Aviles-Espinosa, Rodrigo [8978-10] S4
Avouris, Phaedon [8994-25] S7
Avramescu, Adrian [8986-55] S11
Avramopoulos, Hercules [8982-7] S1, [8991-11] S3, [9009-17] S7, [9009-4] S4
Avrutin, Vitaliy [8986-20] S4, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed, [8986-83] SPWed, [9003-65] SPWed
Awaihana, Yuta [8967-26] S11
Awaji, Yoshinari [8983-42] S10
Awazu, Kunio [8926-48] S10, [8926-72] S14, [8929-7] S2
Awschalom, David D. [8997-3] S3, [8997-3] S7
Axt, Christoph [8965-33] S7
Ayad, Marina A. [8988-33] S7
Ayad, Tarek [8926-126] S3
Ayanam Parthasarathy, Vijaya Raghavan [8943-161] SPMon
Ayata, Cenk [8934-71] S11
Aybushev, Arseny [8969-22] S4, [8969-22] S6
Ayesheshim, Ayesheshim K. [8941-50] S10
Ayesta, Igor [8983-16] S4
Ayon, Arturo [8994-61] S15
Ayotte, Simon [8961-90] SPTue
Aytac-Kipergil, Esra [8943-190] SPTues, [8952-16] S4
Azar, Faris [8926-127] S3
Azar, Fred S. 8937 Conference Chair, 8937 S1 Session Chair
Azevedo, Maria Isabel [9006-22] S5
Azevedo, Paulo H. S. M. [8932-33] S7
Azevedo, Ricardo B. [8954-14] S4
Azimi, Sara [8980-39] S10
Azimipour, Mehdi [8941-26] S7
Azorin-Peris, Vicente [8936-15] S3, [8947-32] S6
Azucena, Oscar A. [8978-12] S4, [8978-15] S5
Azzazi, Abdulilah A. [8991-30] S7, [8994-31] S8
Azzini, Stefano [8980-18] S5

B

B. N., Shivananju [8982-80] SPWed
B. V., Nagesh [8947-61] S13
Baac, Hyoung Won [8934-97] SPMon, [8936-36] S8, [8938-22] S4, [8938-23] S5
Baade, Alexander [8941-17] S5
Baaske, Martin [8960-22] S5
Baba, Junko [9005-17] S4
Baba, Kazutaka [8988-56] SPWed
Baba, Toshihiko 8980 Program Committee, [8998-9] S2
Babaeva, Natalia Yu. [8962-12] S3
Babak, Kseniya V. [8948-8] S1
Babazadeh, Nasser [9002-3] S1
Babin, André [8961-90] SPTue
Babin, Sergey [8988-16] S4
Babin, Sergey A. [8961-86] SPTue
Babushkin, Ihar [8984-27] S7
Bacci, Stefano [8926-3] S1
Bachand, Karine [8948-99] SPSun
Bachawal, Sunitha [8943-30] S5
Bacher, Gerd [8980-21] S5, 9003 Program Committee, 9003 S4 Session Chair, [9003-9] S2
Bacher, Michael [8971-30] S5
Bächle, Andreas [8966-27] S8
Bachmann, Friedrich G. 8965 Program Committee, 8968 Program Committee
Backer, Adam S. [8950-19] S5
Backlund, Mikael P. [8950-19] S5
Backman, Vadim 8947 Program

Committee, [8947-41] S10, [8947-5] S1, 8952 Conference Chair, 8952 S3 Session Chair, 8952 S4 Session Chair, [8952-14] S4, [8952-33] S9, [8952-8] S3
Backus, Sterling John [8967-12] S11, [8967-12] S6
Bacskaı, Brian J. [8948-30] S5
Badhra, Narendra [8928-35] S7
Badhra, Niloy [8928-35] S7
Badiroostami, Majid [8956-2] S1
Badikov, Dmitrii V. [8964-11] S3
Badikov, Valery V. [8964-11] S3
Badreshkumar, Mehta Kalpesh [8928-21] S5
Bae, Sang-Kyu [8941-55] S11
Baehr-Jones, Tom W. [8990-1] S1
Baek, Hee Gyu [8949-60] SPMon
Baek, Jong Hyeob 8986 Program Committee, 8993 Program Committee, [9003-55] SPWed
Baek, Seong-Ho [8987-64] S12
Baek, Youngbin [8983-55] SPWed
Baer, Thomas M. [8953-14] S3
Baets, Roel G. [8989-24] S7, [8990-23] S4, [8993-42] S8
Baggett, Brenda [8935-1] S1, [8953-9] S2
Baghsiahi, Hadi [8988-3] S1, [8988-6] S1
Bagli, Darius J. [8926-43] S9
Bagnaninchi, Pierre O. 8942 Program Committee
Bagnato, Vanderlei Salvador [8926-22] S5, [8926-35] SPSun, [8927-48] S12, [8927-49] S12, [8930-53] SPSun, [8931-10] S2, [8931-22] S4, [8931-32] S6, [8931-41] SPMon, [8931-45] SPMon, [8931-49] SPMon, [8931-61] S2, [8934-129] SPMon, [8936-39] SPSun, [8941-42] SPMon, [8947-60] S13, [8947-86] SPMon, [8948-79] SPSun
Bagwell, Brett E. [8978-4] S1
Bagwell, Joel 8982 Program Committee
Bahavar, Cody F. [8944-7] S2
Baih, Young-Mi [8982-25] S5, [8984-57] SPWed, [8985-18] S4, [8985-56] SPWed
Bahl, Gaurav [8960-10] S3, [8976-33] S7
Bahmani, Baharak [8956-30] S8
Bahouka, Armel [8970-15] S12, [8970-15] S4
Bahrami, Farshid [8957-33] S7
Bahriz, Michael [8993-27] S5
Bai, John [8965-39] S8, [8965-46] S2
Bai, Rui [8991-19] S5
Bai, Shuang [8959-4] S1, [8972-16] S4
Bai, Wei [8938-21] S4
Bai, Xiaosong [8943-7] S2
Baiaid, Mohamad Diaa [8938-35] S7
Baida, Fadi I. [8988-35] S8
Baier, Grit [8942-12] S2
Baig, Sarfaraz [8991-25] S6
Bailey, Christopher G. [8981-2] S1, [8981-40] S11
Bailey, Elinor J. [8950-23] S6
Baili, Ghaya [8966-19] S6, [8966-20] S6
Bain, Angus J. [8950-23] S6
Baji, Zsofia [8987-88] SPWed
Bajorski, Peter SC1072
Bakaimi, Ioanna T. [8987-71] SPWed
Bakanas, Ramunas J. [9006-4] S1
Bakaraju, Ravi Chandra 8930 S3 Session Chair
Bake, Shameena [8953-12] S3
Baker, Evan C. [8935-74] SPSun, [8958-17] S4
Baker, Howard J. [8963-12] S3, [8963-12] S7
Baker, Scott [8982-76] SPWed
Bakhtiarı, Zahra [9009-27] S7
Bakin, Andrey [8987-63] S12
Bakopoulos, Paraskevas [8991-11] S3, [9009-17] S7, [9009-4] S4
Bakr, Mohamed H. [8982-19] S4, [8988-31] S7
Bakule, Pavel [8959-35] S8, [8959-44] S10, [8959-49] S11
Bakunov, Michael I. [8960-12] S3
Balakier, Katarzyna [8985-43] S9
Balakiereva, Irina V. [8960-4] S1

Balakrishnan, Ganesh [8949-20] S4, [8966-32] SPTue, [8981-63] SPWed, [8982-21] S4
Balasundaram, Karthik [8994-8] S2
Balciunas, Evaldas [8972-60] SPTue
Bald, Timothy [8981-42] S11
Balda, Rolindes 8982 Program Committee
Baldacchini, Tommaso [8948-36] S6
Baldeck, Patrice L. [8940-38] S7, [8956-27] S3, [8956-27] S7, [8968-4] S1
Balderas-Navarro, Raúl E. [8964-47] SPTue
Baldini, Francesco 8935 Program Committee, 8935 S7 Session Chair, [8935-30] S7, [8956-29] S8, [8976-24] S5, [8988-71] SPWed
Balduzzi, Donatella [8938-42] S8, [8947-46] S11
Baldwin, Christopher [8968-23] S5
Balembois, François [8959-21] S6, [8959-57] S13, [8959-9] S3
Balevicus, Zigmans [8970-9] S2
Baliyan, Anjli [8957-15] S4
Balland, Martial [8950-6] S2
Ballandras, Sylvain [8988-35] S8
Ballard, Matt [8976-10] S3
Ballarini, Dario [8997-26] S10
Ballato, John 8961 Program Committee, 8961 S7 Session Chair, [8961-42] S10, [8992-18] S4, [8994-72] SPWed
Balliu, Enkeleda [8959-38] S9
Baltrusch, Simone [8930-1] S1
Baltuck, Camille T. [8929-3] S1
Balu David, Munusamy [8940-15] S3, [8940-2] S1
Balu, Mihaela [8948-59] S10
Balzer, Frank [8983-22] S5
Balzer, Jan C. [9002-12] S3, [9004-11] S3
Bamber, Jeffrey C. [8943-195] SPTues, 8946 Program Committee
Bamrngthai, Thanawat [9006-7] S2
Ban, Ibrahim [8991-14] S4
Bañas, Andrew Rafael M. [8999-50] S10
Banasch, Michael [8974-15] S4
Banath, Judit [8944-1] S1
Bandi, Tobias [8975-17] S3, [8975-8] S2
Bandy, Venugopal [8956-14] S3
Bandyopadhyay, Somnath [8935-30] S7
Banerjee, Amrita [8991-9] S2
Banerjee, Bhaskar [8935-1] S1, [8948-14] S2
Banerjee, Partha P. [9006-19] S4, [9006-32] S7
Banerjee, Ranjoy [8971-7] S1
Bannister, Joseph [9008-8] S6, [9008-8] S7
Bansal, Akshaya [8955-36] S8
Bansal, Ashu K. [8983-47] S11
Banski, Mateusz [8955-60] SPSun
Bányász, István [8988-39] S8
Bao, Ling [8961-66] SPTue, [8965-12] S3, [8965-37] S8, [8965-39] S8, [8965-46] S2
Baptista, Ivany M. C. [8926-76] S15
Bar, Anna [8937-3] S1
Barabas, James [9006-30] S7
Barabino, Gabriele [8935-14] S4
Barajas, Eduardo [8973-16] S4
Barakat, Abdul I. [8976-49] S10
Barakel, Damien [8987-76] SPWed
Baran, Timothy M. [8931-19] S4
Baranov, Alexei N. [8993-27] S5
Baranowski, Lauryn L. [8981-6] S2
Baratti, Mariana O. [8948-100] SPSun, [8948-12] S2, [8948-48] S8
Barbagini, F. [8996-2] S1
Barbano, Emerson Cristiano [8964-46] SPTue
Barbastathis, George [8948-65] S11, [8949-25] S5
Barber, Paul R. [8949-12] S3
Barbet, Sophie [9002-11] S3
Barbisan, Diego [9003-48] S11
Barbosa, Artur F. S. [8932-7] S1
Barbosa, Luiz C. [8961-111] SPTue, [8961-119] SPTue, [8996-32] SPWed
Barbosa, M. B. [8987-16] S3

Barbour, Russell [8933-20] S6, [8997-1] S2, [8997-1] S6
Barchanski, Annette [8972-13] S3
Barcik, Peter [8941-12] S3
Barcikowski, Stephan [8941-49] S8, [8955-7] S2, [8955-9] S2, [8972-13] S3
Barclay, Paul [8994-20] S2, [8994-20] S6
Bar-David, Yossi [8939-11] S6
Bardi, Giuseppe [8955-1] S1
Barequet, Irina S. [8938-32] S7
Barh, Ajanta [9008-18] S9
Baribeau, François [8935-46] S10
Barioni, Marina B. [8947-83] SPMon
Barjas-Castro, Maria de Lurdes [8955-61] SPSun
Barkana, Yaniv [8930-38] S8
Barkauskas, Martynas [8972-42] S9
Barker, Roger A. [8957-3] S1
Barletta, Massimiliano [8970-28] S7
Barlow, Aaron M. [8937-8] S2
Barmashenko, Boris D. [8962-11] S3, [8962-8] S3
Barmenkov, Yuri O. [8961-123] SPTue
Barnabé, Janice M. C. [8928-72] SPMon
Barnes, William L. 8994 Program Committee
Barness, Dorrin [8964-2] S1
Barnett, Lauren M. [8956-34] S9, [8956-35] S9, [8983-28] S7
Barney, Emma [8938-28] S6, [8938-29] S6
Barnowski, Tobias [8965-27] S6
Barolet, Daniel 8932 Program Committee
Barreto, Emiliano [8947-84] S13
Barriga, Simon [8930-16] S4
Barrios, Pedro J. [9002-40] S9
Barritault, Pierre [8988-24] S6, [8988-26] S6
Barriuso, Sandra [8972-63] SPTue
Barroi, Alexander [8963-1] S1
Barron, Valerie [8954-11] S3, [8954-31] SPMon
Barroso, Margarida [8937-37] SPSun
Barry, Frank [8954-31] SPMon
Barry, Liam P. [8993-9] S1
Barsi, Christopher [8935-50] S11
Bartelt, Hartmut [8961-34] S8, [8982-44] S9, [8982-5] S1
Barton, Jennifer K. [8927-28] S7, 8935 Program Committee, [8936-8] S2, [8956-20] S5, [8956-22] S5
Bartsch, Carrie M. [8983-48] S11
Bartschat, Klaus [8962-12] S3
Barucci, Andrea [8960-7] S2, [8988-71] SPWed
Basan, Fabiola [8935-69] SPSun
Basavaraju, Neelima [8982-40] S8, [8987-93] SPWed
Basché, Thomas [8950-1] S1
Baselt, Tobias [8935-69] SPSun, [8961-106] SPTue, [8961-125] SPTue, [8963-39] SPTue, [8975-9] S2
Baskar, Dinesh [8983-14] S4
Bassi, Andrea [8972-22] S6, [8993-93] S18
Bastard, Lionel [8988-37] S8
Bastick, André [8963-30] S7
Bastick, Stefan [8963-27] S7
Bastos de Carvalho, Fabiola B. [8932-7] S1
Basutkar, Nitin [8985-24] S6
Batschinsky, Andriy [8927-39] S10
Batista, Ana [8930-28] S7, [8948-83] SPSun
Batool, Zahida [9002-6] S2
Batshon, Hussam G. [9008-14] S8
Batte, Thomas [8980-56] S14
Battiatto, Marco [8984-40] S11
Battiatto, Nadine [8963-9] S2
Battle, Philip R. [8964-4] S1
Batur, Aziz U. 8979 Program Committee, [8979-10] S6
Batyska, Frantisek [8959-44] S10
Baudin, Emmanuel [8984-32] S9
Baudoin, Romain [8964-51] SPTue
Baudot, Charles [8988-23] S5, [8990-36] S7
Bauer, Adam Q. [8943-94] S14
Bauer, Lara [8972-40] S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Bauer, Siegfried G. [8975-15] S3
 Bauer-Marschall, Ina [8931-40] S8
 Bauer-Marschallinger, Johannes [8943-148] SPSun, [8943-226] SPTues
 Baum, Olga I. [8942-23] S5
Baumann, Bernhard [8930-9] S2, [8934-21] S4, [8934-58] S9, [8934-80] S12
 Baumann, Heinz [8926-140] S6, [8931-46] SPMon
 Baumgartner, Ryan [8928-91] S18, [8941-26] S7
 Baumhoff, Peter [8928-42] S8
 Bauwelinck, Johan [8991-11] S3
 Bawendi, Moungi G. [8955-32] S7, [8955-54] S12
 Baxi, Jigesh [8930-43] S9
 Bay, Erwin [8943-57] S9
 Bayer, Andreas [8965-18] S4
Baylón Fuentes, Antonio [8989-19] S6
 Baylor, Martha-Elizabeth E. [8983-32] S7
Bayram, Can 8993 Program Committee
 Bayya, Shyam S. [8959-58] S13
Baz, Amr M. [8994-13] S4
 Bazhenov, Maxim [8928-50] S10
 Bazzanella, Nicola [8982-12] S3
 Beach, Kory [8999-17] S4
Bean, Nathaniel [8934-100] SPMon
 Beard, Paul C. [8938-2] S1, [8943] Program Committee, 8943 S14
 Session Chair, 8943 S2 Session Chair, [8943-101] S15, [8943-11] S2, [8943-129] SPSun, [8943-158] SPMon, [8943-184] SPMon, [8943-196] SPTues, [8943-21] S4, [8943-210] SPTues, [8943-225] SPTues, [8943-24] S4, [8943-25] S4, [8943-54] S8, [8943-61] S9, [8943-77] S12
 Beato, Pablo [8964-55] SPTue
 Beaudette, Kathy [8938-22] S4
 Beaudoin, Grégoire [8966-11] S8, [8990-46] S9
 Beaulieu-Ouellet, Emilie [8928-1] S1
 Beaurepaire, Emmanuel [8948-67] S11
 Beausoleil, Raymond G. [8991-19] S5, [8991-42] S10, [8991-42] S3, [8994-21] S2, [8994-21] S6, [8997-20] S8
 Beavers, Kelsey R. [8934-37] S6
 Bec, Julien [8926-85] S17, [8926-86] S17
 Becerra-Chavez, Francisco Elohim [8997-12] S5
 Becher, Christoph [8994-19] S1, [8994-19] S5
 Beck, Mattias [8984-13] S3, [8993-3] SKey, [9002-20] S5, [9002-26] S6, [9002-44] S10
 Becker, André [8992-20] S4
 Becker, Armin J. [8926-44] S9, [8926-49] S10
 Becker, Frank [8961-75] SPTue
 Becker, Holger Symposium Chair, 8976 Conference Chair, 8976 S7 Session Chair, [8976-22] S5, [8976-24] S5, [8976-37] S8
 Becker, Jacob [8981-45] S12
 Becker, Martin [8961-73] SPTue, [8982-44] S9
Becker, Michael F. [8979-7] S5
 Becker, Peter [8971-3] S1
 Becker, Simon F. [8984-16] S4
 Becker, Valentin [8927-17] S4
Becker, Wolfgang [8928-4] S1, 8948 Program Committee, [8948-45] S8, [8948-50] S8, [8948-54] S9
Beckers, Ingeborg E. [8949-35] S7
 Beckert, Erik [8978-1] S1
 Beckford, Garfield [8956-28] S8
 Beckhoff, Burkhard [8987-88] SPMon
Beckley, Amber M. [8928-15] S4, [8937-7] S2, [8937-9] S2, [8945-16] S4
 Beckmann, Tobias [9006-13] S3
 Bedford, Robert G. [8966-6] S2
 Bednar, Bohumil 8956 Program Committee
 Bednarska, Aleksandra [8983-20] S5
 Bedoni, Marzia [8939-15] S3, [8954-5] S2, [8955-68] SPSun, [8957-6] S2
 Beebe, David C. [8943-153] SPMon
 Beechem, Thomas E. [8994-45] S11
Beekman, Jeroen [9004-6] S2
 Beeler, Mark [8986-40] S8
 Beere, Harvey E. [8985-50] S11, [8985-51] S11, [8993-73] S15
 Beeson, Karl [8980-70] SPWed
 Beetz, Johannes [8993-17] S3, [8993-19] S3
 Beg, Mirza Faisal [8934-74] S11, [8934-91] SPMon
 Begin, Sylvie [8955-41] S9
 Beheregaray, Simone [8934-60] S9
 Behilla, Ashli [9003-57] SPWed
 Behl, Isha [8940-12] S3
 Behl, Marc [8955-19] S4
 Behm, Pascal [8935-3] S1
 Behnke, Thomas [8955-20] S5
 Behr, Barry [8953-14] S3
 Behr, Bradford B. [8982-76] SPWed
 Behringer, Martin [9003-21] S5
Beier, Brooke D. [8940-4] S1
 Beier, Franz [8961-31] S8
 Beier, Hope Thomas 8941 Program Committee, [8941-18] S5, [8941-57] S12, [8941-58] S12, [8955-49] S11
 Beigang, René [8985-23] S5
 Bek, Roman [8966-23] S7
 Belanger, Erik [8948-99] SPSun
 Bélanger, Samuel [8928-1] S1
 Belenky, Gregory [8993-51] S10, [9002-38] S9
 Belikov, Andrey V. [8929-9] S2
 Belke, Steffen [8961-75] SPTue
 Belkin, Avner [8930-38] S8, [8930-55] SPSun
 Belkin, Michael 8930 Program Committee, 8930 S4 Session Chair, [8930-14] S3, [8930-37] S8, [8930-38] S8, [8930-55] SPSun
Belkin, Mikhail A. [9002-25] S6, [9002-57] S13
 Bell, Tyler [8979-1] S3
 Bellefqih, Salima [8930-34] S8
 Bellessa, Joel [8980-18] S5
 Bellet-Amairic, Edith [8986-40] S8
 Bellieres, Laurent [8991-36] S8
 Bellinger Buckley, Stephanie [8956-8] S2
 Bellingham, Alyssa [8994-39] S10
 Bellini, Michela [8955-57] S12
 Bellini, Nicola [8939-21] S4, [8972-12] S3, [8976-21] S5
 Bellini, Tommaso [8970-7] S2
 Bellis, Hal 8979 Program Committee
 Bellnier, David A. [8926-140] S6
 Bellotti, Enrico 8980 S12 Session Chair, [8980-26] S7, [8980-28] S7, [9003-36] S12, [9003-36] S8
 Bellouard, Yves [8969-2] S1, [8972-35] S8, [8972-37] S8
 Belova, Anastasia S. [8956-36] S9
 Beltrão, Eduardo I.C. [8955-62] SPSun
Belyanin, Alexey A. [8980-46] S12, 9002 Conference Chair, 9002 S5 Session Chair, [9002-22] S5
 Ben Masaud, Taha M. [8989-12] S5
 Ben Slimane, Ahmed [8986-15] S3
 Benabid, Fetah A. [8961-16] S4, [8961-54] S13, [8994-9] S3, [8998-59] S13
 Benavides, Gabriel F. [8962-15] S4
 Benavides, Sebastian [8927-40] S10
 Ben-Bakir, Badhise [8995-12] S3, [8995-2] S1
 Benbouija, Fouzi [8926-123] S2
 Bender, Daniel A. [8967-27] S11, 9000 Program Committee, 9000 S3 Session Chair
 Bendib, Toufik [8982-37] S7
 Bendoym, Igor [8985-35] S8
 Benea, Cristina [8993-3] SKey
 Benecke, Wolfgang [8977-4] S2, [8977-5] S2
Benedikovic, Daniel [8995-38] S10
Benetti, Carolina [8926-115] S24
 Ben-Ezra, Shalva [9009-16] S7
 Bengochea-Encabo, A. [8996-2] S1
 Bengtsson, Jörgen [9001-9] S2
 Bengtsson, Magnus [8961-35] S9
 Benichou, Emmanuel [8983-7] S2, [8984-3] S1
Benitez, Pablo [9003-2] S1
 Benito, Francisco M. [8989-20] S6
 Benjamin, Shuki [8991-10] S3
 Benke, Dimitri [8968-10] S3
 Bennenhei, Christoph [8952-4] S1
 Bennet, David [8985-42] S9
 Bennett, Andrew M. [8959-28] S7
 Bennett, Charlotte R. [8961-3] S1
 Bennett, Corey V. [8985-37] S8
 Bennett, Kelly [8935-22] S5
 Benoit, Aurélien [8959-21] S6
 Benoit, Emilie [8943-23] S4
 Benselama, Attia [8966-29] S8
 Benson, Oliver [8993-86] S17, [8994-17] S1, [8994-17] S5
 Benson, Trevor Mark [8938-28] S6, [8938-29] S6
Bentley, Julie L. SC935
Ben-Yakar, Adela [8938-20] S4, [8948-92] SPSun, [8949-3] S1, [8972-8] S2
Benyattou, Taha [8999-47] S10
 Ben-Youssef, Jamal [8988-13] S3
 Benz, Alexander [8994-53] S13
 Beppe, Shotaro [9004-20] SPWed
 Bera, Arijit [8949-11] S3
 Berberoglu, Halil [8932-6] S1
 Bercu, Bogdan [8987-9] S2
 Berdichevsky, Yevgeny [8934-72] S11
 Berendt, Martin [8943-158] SPMon
 Berer, Thomas [8943-148] SPSun, [8943-226] SPTues, [8943-65] S10, [8943-90] S13
 Berezin, Ivan [8965-22] S5
Berezin, Mikhail V. [8940-23] S5, 8956 Program Committee, 8956 S9 Session Chair
 Berg, Joel H. [8929-3] S1
 Berg, Kristian [8928-10] S3
 Bergeneck, Krister [9003-2] S1
Berger, Andrew J. 8939 Program Committee, [8940-4] S1, [8952-30] S8
 Berger, Christoph [8986-80] SPWed
 Berger, Claire [8987-67] S13, [8993-83] S17
 Berger, Jill D. [8966-26] S8
 Berger, Michel [8937-25] SPSun, [8952-12] S3
 Berger, Perrine [8985-17] S4
 Bergeron, Alain [8985-35] S8
 Bergeron, Eric [8947-19] S4, [8972-7] S2
 Bergholt, Mads Sylvest [8939-22] S4, [8939-31] S6
 Berginc, Gérard [8994-57] S14
 Bergles, Dwight E. [8928-92] S18
 Berglund, Ken [8928-85] S16
 Bergmann, René [8995-31] S8
 Bergner, Klaus [8972-40] S9
 Bergner, Norbert [8928-5] S2
 Bergner, Ute [8992-20] S4
 Bergonzi, Giovanni [8974-14] S4
 Bergstrom, Andreas [8977-21] S5
 Berini, Pierre 8988 Conference CoChair, 8988 S7 Session Chair
 Berishev, Igor [8965-22] S5
 Berk, Yuri [8965-21] S5
 Berlin, Jacob M. [8955-8] S2
 Bernabei, Mario [8930-12] S3
 Bernal, Maria-Pilar [8988-35] S8
 Bernard, Benjamin [8960-48] S12
 Bernard, Gabriel [8927-20] S5, [8992-5] S2
 Bernardes, Leticia L. [8976-4] S1
 Bernardo, Luis Miguel [9006-22] S5
 Bernasconi, Arianna M. [8970-7] S2
 Bernatova, Silvie [8939-25] S5
 Berndt, Elizabeth S.L. [8943-12] S2
 Berneschi, Simone [8960-7] S2, [8976-24] S5, [8988-39] S8, [8988-71] SPMon
 Bernet, Stefan [8978-2] S1
 Berneth, Horst [9006-1] S1
 Bernini, Romeo [8976-24] S5, [8976-40] S9, [8988-41] S9
 Bernitzki, Helmut [8936-33] S8
Berns, Michael W. [8928-88] S17, [8932-45] SPSun, [8947-15] S3
 Bernstein, Elliot R. [8933-23] S6
 Bernstein, Liane [8928-32] SPSat
 Bernettoni, Chiara [8976-24] S5
 Berry, Christopher W. [8985-2] S1
 Berry, Patrick A. 8959 Program Committee, 8959 S3 Session Chair, 8959 S4 Session Chair
 Berstein, Liane [8928-9] S3
 Bertarelli, Chiara [9006-8] S2
 Bertazzi, Francesco [8980-26] S7, [9003-36] S12, [9003-36] S8
 Bertero, Alice [8955-1] S1
 Berthelot, Alice [8982-26] S8
 Berthold, Isabel [8967-53] SPTue
 Bertolotti, Jacopo [8978-18] S6
 Bertomeu, Joan [8968-30] S15, [8968-30] S7
 Bertram, Frank [8986-21] S4, [8986-28] S6, [8986-32] S6, [8986-73] S15, [8986-77] SPWed, [8986-80] SPWed, [8986-81] SPWed, [8986-82] SPWed
 Bertrand, Anthony [8961-85] SPTue
 Bertz, Alexander [9006-13] S3
 Besbes, Mondher [8957-28] S6
Besnard, Pascal [8980-43] S11
 Besner, Sebastien [8946-11] S3
 Bessani, Michel [8926-34] SPSun, [8937-33] SPSun
 Besser, Jan [8995-18] S5
 Bessiere, Aurelie [8982-40] S8, [8987-93] SPMon
 Best, Sara L. 8947 S7 Session Chair, 8979 Program Committee, 8979 S1 Session Chair
 Betcke, Marta [8943-77] S12
 Bett, Andreas W. [8981-15] S4
 Bettiati, Mauro A. [8965-2] S1
 Bettotti, Paolo [8954-28] S7
 Betz, Christian Stephan 8926 Program Committee, 8926 S4 Session Chair, 8926 S6 Session Chair, [8926-142] S7, [8926-146] S7, [8926-149] SPSun
 Betz, Markus 8984 Conference Chair, 8984 S1 Session Chair, 8984 S5 Session Chair, [8984-26] S7, [8984-43] S11, [8984-9] S2
 Beurskens, Robert [8934-7] S2
 Beutler, Marcus [8948-40] S7, [8964-11] S3
 Beuvon, Frédéric [8926-61] S12
 Bewington, Travis [8937-37] SPSun
 Bewley, William W. [9002-47] S11
 Beyer, Eckhard [8968-10] S3
 Beyer, Wolfgang [8926-50] S10, [8928-13] S4
 Bezerra, Hiram G. [8926-91] S18, [8926-96] S19
 Bezinger, Andrew [9002-40] S9
 Bhagroo, Stephen [8926-116] S24
 Bhaktha, K. [8993-8] S1
 Bhattachaj, Shivani [8987-74] SPWed
Bhargava, Rohit 8939 Program Committee, 8939 S3 Session Chair
 Bhaskar, Udaya [8930-7] S2
 Bhat, Aravinda L. S. [8987-89] S8
 Bhat, Badekai Ramachandra [8987-89] S8
 Bhat, Navakanta [8975-5] S4
 Bhat, Shivratsa P. [8988-21] S5
 Bhat, Udaya K. [8987-89] S8
 Bhattacharya, Dipanjan [8949-25] S5
 Bhattacharya, Pallab [8986-37] S7, [8986-74] S15, [9003-17] S4
 Bhattacharya, Sarbari [8947-61] S13
 Bhattarai, Samik [8928-86] S16, [8928-90] S18
 Bhujwalla, Zaver [8927-25] S6, [8948-13] S2, [8948-17] S3
 Bhuyan, Manoj Kumar [8967-37] S13
Bi, Lei [8980-36] S9, [8988-27] S6
 Bi, Renzhe [8928-33] SPSat, [8942-2] S1, [8952-11] S3
Bi, Xiaohong [8926-139] S24, [8939-27] S5
 Bian, Qiumei [8968-16] S4
 Bianco, Andrea [9006-8] S2
 Biadol, Giorgio [8993-41] S7
 Bichler, Max [8994-29] S8, [8994-40] S11, [8996-4] S1
 Bidault, Sebastien [8950-12] S3, [8955-23] S5, [8957-19] S4
 Bieda, Matthias [8968-10] S3
 Biedermann, Julius [8972-14] S4
 Biel, Merrill A. 8931 S5 Session Chair, [8931-16] S3, [8931-30] S6
Bienstman, Peter [8954-23] S6
 Bierden, Paul A. 8975 Program Committee
 Bierlich, Jörg [8961-74] SPTue
 Biermann, Klaus [8989-4] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Biermann, Tim [8970-24] S6, [8970-24] S9
- Biesenbach, Jens [8965-18] S4, [8965-38] S8, [8965-49] SPTue, [8965-5] S1
- Blessy, Kevin [8941-14] S4
- Biesty, David [8985-26] S6
- Bifano, Thomas G. Symposium Committee, 8978 Conference Chair, 8978 S1 Session Chair, 8978 S2 Session Chair
- Bifone, Angelo [8955-1] S1
- Bigelow, Alan [8947-2] S1
- Bigio, Irving J.** [8926-127] S3, [8926-132] S4, [8926-134] S4, 8940 Program Committee, [8951-4] S1, SPMon, 8952 Program Committee, 8952 S2 Session Chair
- Bignon, Thibault [9005-3] S1
- Bigot, Jean-Yves 8993 S9 Session Chair, [8993-56] S10
- Bigourd, Damien [8984-49] S13
- Bijlani, Bhavin J. [8990-18] S4, [9010-11] S4, [9010-11] S5
- Bikandi, Ifaki [8983-16] S4
- Billig, Ephraim [8969-21] S4, [8969-21] S6
- Billah, Muhammad R.** [8991-5] S1
- Billotte, Claire [8955-41] S9
- Bimberg, Dieter H. [8980-13] S4, [9001-10] S2, [9001-2] S1
- Bin Mohd Nasir, Mohd Narizee [8960-21] S5, [8960-43] S11
- Binder, Devin K. [8928-2] S1, [8928-43] S8, [8928-46] S9, [8928-50] S10
- Binder, Rudolf [8984-32] S9, [9000-20] S5
- Binet, Laurent [8982-40] S8
- Bingham, Chris [8982-18] S4
- Binhammer, Thomas [8972-21] S6
- Birch, David J. [8951-9] S2
- Birket, Susan E. [8927-45] S11, [8927-57] S13
- Birkmire, Robert [8988-5] S1
- Birks, Tim A. [9009-20] S8
- Birnbaum, Kevin [8971-20] S4, [8971-34] S5
- Birner, Stefan [9000-5] S2
- Birngruber, Reginald** [8930-36] S8, [8941-17] S5
- Bischof, Thomas S. [8955-32] S7, [8955-54] S12
- Bischoff, Christian [8967-24] S10
- Bischoff, Markus [8931-27] S5
- Bishop, John [8926-85] S17, [8926-86] S17
- Bismilla, Yusuf [8982-76] SPWed
- Bismuto, Alfredo [8985-13] S3
- Bispo, Jeyse A. [8951-43] SPMon
- Bisson, Scott E. [8961-38] S9
- Biswas, Abhijit [8971-18] S3, [8971-20] S4, [8971-31] S5, [8971-34] S5
- Biswas, Palas [8935-30] S7
- Bittel, Amy M.** [8950-26] S7
- Bitzoev, Vladimir D. [8939-36] S6
- Bixler, Joel N.** [8939-8] S2
- Bizheva, Kostadinka 8930 Program Committee, 8930 S5 Session Chair, [8930-25] S6, [8930-5] S1, 8934 Program Committee, [8934-68] S10
- Bjerkhagen, Hans I.** 9006 Conference Chair, 9006 S1 Session Chair, 9006 STech Session Chair, [9006-14] S3, [9006-2] S1
- Bjoermangen, Peter B. [8977-21] S5
- Bjorgan, Asgeir [8926-27] S7
- Black, Bryan** [8928-86] S16, [8928-90] S18
- Blackmon, Richard L.** [8926-52] S11, [8927-43] S1
- Blagojevic, Branimir [8959-19] S5
- Blain, Matthew G. [8989-20] S6
- Blair, Steve** [8928-82] S15
- Blais-Ouellette, Sébastien [8947-19] S4
- Blake, Geoffrey A. [8949-1] S1
- Blake, Thomas A. [8993-60] S12
- Blakey, Idriss [8939-9] S2
- Blanchard, Cédric [8993-22] S4
- Blanchard, Romain [9002-22] S5, [9002-43] S10
- Blanche, Pierre-Alexandre J. [8979-6] S5, [8991-26] S6
- Blankemeyer, Susanne [8967-48] S14
- Blankenbach, Karlheinz 9005 Program Committee
- Blaser, Stéphane [9002-20] S5, [9002-21] S5
- Blasi, Martin [8988-2] S1
- Blaszczak, Zuzanna [8958-6] S2
- Blatter, Cedric** [8934-26] S4
- Blattmann, Verena [8993-57] S12
- Blau, Werner J. 8983 Program Committee
- Blauvelt, David G. [8934-51] S8
- Blay, Alberto [8926-115] S24
- Blbas, Latef M. [8995-7] S2
- Bleeker, Sebastian [8926-124] S2, [8941-13] S4
- Bleh, Daniela [8977-6] S2
- Blause, Joël [8993-16] S3
- Bliedner, Katharina [8946-14] S4
- Blinne, Alexander [8972-14] S4
- Blivin, Christopher C. [8991-21] S5
- Bloch, Jacqueline I. [8984-32] S9, [8997-28] S10
- Block, Erica K. [8967-12] S11, [8967-12] S6, [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6
- Bloemhof, Eric E. [8999-55] SPWed
- Blom, Marko T. [8973-21] S5
- Blomqvist, Mats [8963-11] S3, [8963-11] S7
- Blomster, Ola I. [8963-11] S3, [8963-11] S7
- Blood, Peter [9002-13] S3
- Blubaugh, Bill 8991 Program Committee, 8991 S3 Session Chair
- Blug, Andreas [8967-41] S14
- Blum, Christian [8978-18] S6
- Blum, Mark [8982-34] S7
- Blume, Gunnar [8965-8] S2, [9002-9] S2
- Bo, Shuhui [8983-62] SPWed
- Boag, Amir [8994-42] S11
- Boas, David A.** [8928-34] SPSat, [8928-4] S1, [8934-49] S8, [8936-18] S7, [8952-37] S10
- Bobkov, Konstantin K. [8961-41] S10
- Bobrov, Vjaceslavs [9008-11] S7
- Boccarra, Claude** [8926-129] S4, [8926-24] S6, [8926-61] S12, [8928-63] S13, [8930-34] S8, [8934-69] S11, 8935 S9 Session Chair, [8935-41] S9, [8942-14] S4, 8943 Program Committee, 8943 S7 Session Chair, [8943-106] S16, [8943-185] SPMon, [8943-48] S7, 8946 Program Committee, 8946 S4 Session Chair, [8946-2] S1, 8957 Program Committee
- Boccarra, Martine [8942-14] S4
- Bochove, Erik J. [8961-95] SPTue
- Bock, Martin [8999-15] S3
- Bock, Wojtek J. [8938-1] SKey
- Bockenbauer, Samuel D. [8950-16] S4
- Bockowski, Michal 8986 S3 Session Chair, [8986-3] S1, [8986-4] S1
- Bockstaele, Ronny [8989-24] S7
- Bocsi, Jozsef [8947-30] S6, [8947-31] S6
- Boctor, Emad M.** [8943-149] SPMon, [8943-166] SPMon, [8943-198] SPTues, [8943-201] SPTues, [8943-216] SPTues, [8943-22] S4, [8943-6] S1
- Bodanese, Benito [8926-36] SPSun, [8935-77] SPSun
- Bodnar, Nathan [8959-45] S11
- Bodyfelt, Joshua [8980-40] S11
- Boesser, Benjamin [8967-15] S12, [8967-15] S7
- Boeuf, Frédéric [8988-23] S5, [8990-36] S7
- Bogaerts, Wim** [8989-24] S7
- Bogomolny, Evgeny [8933-1] S4, [8933-11] S4
- Bogy, David B. [8967-6] S3, [8967-6] S5
- Boher, Pierre M. 9005 Program Committee, [9005-3] S1
- Böhm, Gerhard [9002-25] S6
- Böhme, Steffen [8968-34] SPTue
- Bohn, Nadine [8955-44] S10
- Bohndiek, Sarah E.** [8943-17] S3, [8943-221] SPTues
- Boico, Alina [8935-23] S5, [8958-10] S3
- Böing, A. N. [8952-6] S2
- Boitier, Fabien [8997-34] S4
- Bojarska, Agata** [8986-56] S11, [8986-57] S11
- Bolis, Serena [8968-17] S4
- Boitasseva, Alexandra** [8980-23] S6, [8994-3] S1
- Bolzoni, Luca [8976-24] S5
- Bomfim, Fernando R C [8926-106] S21
- Bommaredi, Rami R.** [8982-49] SPWed
- Bonatti, Silvilena [8932-13] S3, [8932-30] S6
- Boncher, William L. [9000-3] S1
- Bonél, Harald M. [8952-5] S2
- Bonesi, Marco [8934-2] S1
- Bongiorno, Angelo [8987-67] S13
- Bonhoff, Tobias [8968-32] S15, [8968-32] S7, [8970-24] S6, [8970-24] S9
- Boni, Adriano [8955-1] S1
- Bonn, Mischa 8984 Program Committee
- Bonneville, Christophe [8992-16] S4
- Bonod, Nicolas [8950-12] S3
- Bonora, Stefano [8930-40] S9, [8934-25] S4, [8960-31] S4, [8960-31] S8
- Bonsendorf, Dennis [8965-34] S7
- Bonzon, Christopher B. [8993-3] SKey
- Bookey, Henry T. [8964-29] S7
- Boone, Bradley G.** [8971-2] S1
- Booth, Martin J.** [8948-1] SKey, 8949 Program Committee, 8949 S4 Session Chair, [8949-41] S9, [8967-13] S12, [8967-13] S7, [8968-3] S1, [8974-29] S7, 8978 Program Committee, 8978 S3 Session Chair, 8978 S4 Session Chair, [8978-14] S5
- Boppart, Marni D. [8926-25] S6, [8948-96] SPSun
- Boppart, Stephen A.** [8926-118] S1, [8926-119] S1, [8926-25] S6, 8934 Program Committee, 8934 S5 Session Chair, [8934-42] S7, [8934-65] S10, [8934-67] S10, 8935 Program Committee, 8935 S10 Session Chair, [8935-39] S8, [8935-48] S10, [8935-75] SPSun, [8942-28] S7, 8946 Program Committee, 8946 S2 Session Chair, [8946-1] S1, [8946-27] S6, [8946-4] S2, [8948-96] SPSun, 8952 Program Committee
- Boppel, Sebastian [8985-58] SPWed
- Bordatchev, Evgueni V. [8985-52] S11
- Bordel, Damien [8995-12] S3
- Borden, Mark A. [8943-199] SPTues, [8943-206] SPTues
- Borderie, Vincent [8930-34] S8
- Borejdo, Julian [8950-4] S1, [8950-51] SPSun
- Boreman, Glenn D.** SC156
- Borg, Thomas K. [8942-29] S7, [8948-105] SPSun
- Borglin, Johan [8948-92] SPSun
- Borile, Giulia [8926-73] S15
- Borio, Viviane G. [8941-38] SPMon
- Borja, David 8930 Program Committee, 8930 S5 Session Chair, 8930 S6 Session Chair
- Born, Benjamin P. 8941 Program Committee
- Börner, Joachim [8985-43] S9
- Bornhorst, Kirstin [8988-2] S1
- Bornitz, Matthias [8926-120] S1
- Bornschein, Marco [8936-33] S8
- Boroomband, Ameneh [8930-5] S1, [8934-68] S10
- Borson, Don M.** 8971 Conference Chair, 8971 S1 Session Chair, 8971 S3 Session Chair, 8971 S5 Session Chair, [8971-29] S5
- Borri, Simone [8993-73] S15, [8993-74] S15
- Börsch, Michael** 8948 SPSun Session Chair, [8948-50] S8, [8948-53] S9, 8950 Program Committee, [8950-16] S4, [8950-28] S7
- Bortolozzo, Umberto [9004-16] S4
- Bos, Adrie J. J. [8982-40] S8
- Boschert, Paul [8934-2] S1
- Bose, Ranjoy [8997-20] S8
- Bosenberg, Marcus [8926-28] S7
- Bosman, Erwin [8991-38] S9
- Boso, Gianluca [8937-24] SPSun, [8945-18] S5, [8952-12] S3, [8993-89] S18
- Boss, Gerry [8927-40] S10, [8932-45] SPSun
- Bossard, Jeremy A. [8974-54] S9
- Bosshaart, Nienke** [8941-32] S9
- Bossen, Anke [8938-17] S4, [8938-47] SPSun
- Bossy, Emmanuel** [8943-106] S16, [8943-134] SPSun, [8943-48] S7, [8943-9] S2
- Botez, Dan 9002 Program Committee, [9002-50] S12, [9002-56] S13
- Bottomley, Adam [8996-35] SPWed
- Bou, Adrien** [8987-76] SPWed
- Boubanga Tombet, Stephane Albon [8993-80] S16
- Boucarter, Julien [8965-35] S8
- Boucaud, Philippe [8986-8] S2, [8990-46] S9
- Bouccara, Sophie** [8947-47] S11
- Bouchal, Klaus-Dieter [8943-65] S10
- Bouchard, Jean-Pierre 8945 Conference Chair, 8945 S2 Session Chair, 8945 S3 Session Chair, [8945-16] S4
- Bouchard, Richard R. [8943-3] S1
- Boucher, Guillaume [8993-21] S3
- Bouchon, Patrick [8982-20] S4, [8993-23] S4
- Bouchoule, Isabelle [8993-78] S16
- Bouchoule, Sophie [8986-8] S2
- Boudoux, Caroline** [8927-32] S2, [8926-126] S3, [8927-20] S5, [8928-1] S1, [8928-15] S4, [8934-83] S12, 8937 Program Committee, 8937 S2 Session Chair, [8937-7] S2, [8937-9] S2, [8938-22] S4, [8945-16] S4, [8992-5] S2
- Boudreau, Denis** [8954-8] S2, [8957-21] S5, [8994-44] S11
- Bougerol, Catherine [8986-34] S7, [8986-40] S8
- Boughton, Andrew [8948-89] SPSun
- Boukenter, Aziz [8971-13] S2
- Boukhris, Sarah J. [8941-19] S5
- Boulais, Etienne [8972-9] S2
- Boullia, Fahem [8988-24] S6, [8988-26] S6, [8993-43] S8
- Bouma, Brett E. [8926-89] S18, [8926-90] S18, 8927 SPnl Panel Moderator, [8927-55] S13, [8927-56] S13, [8934-10] S2, [8934-51] S8, [8934-57] S9, [8934-59] S9, [8934-97] SPMon, [8936-36] S8, [8938-22] S4, [8938-23] S5, 8946 Program Committee
- Bourban, Pierre-Etienne [8952-5] S2
- Bourdon, Pierre [8961-6] S2, [8961-69] SPTue
- Bourgenot, Cyril J. [8978-8] S3
- Bourguet, Feliza A. [8950-10] S2
- Bourouina, Tarik [8977-16] S4
- Bousi, Evgenia [8934-110] SPMon, [8934-114] SPMon
- Boussard-Plédel, Catherine [8938-3] S1, [8938-40] S8
- Butami, Salim [8988-26] S6, [8994-34] S9
- Boutopoulos, Christos [8970-17] S12, [8970-17] S4, [8972-7] S2
- Boutousov, Dmitri** [8929-10] S3
- Boutwell, Casey** [8987-54] S10
- Bouville, David [8990-36] S7
- Bouye, Clementine [8985-38] S8
- Bouzid, Montasser [8959-25] S6
- Bove, Philippe 8987 Program Committee, 8987 S8 Session Chair, [8987-33] S7, [8987-47] S9, [8987-86] SPWed, [8971-91] SPWed, [8987-97] SPWed
- Bove, V. Michael** 9006 Conference Chair, 9006 S6 Session Chair, 9006 S7 Session Chair, [9006-30] S7
- Bovington, Jock T. [8989-6] S2
- Bower, Andrew J.** [8934-65] S10, [8935-75] SPSun, [8942-28] S7, [8948-96] SPSun
- Bowers, John E. [8989-3] S1, [8989-6] S2
- Bowers, Mark [8985-37] S8
- Bowman, Mary Jo [8931-46] SPMon
- Bowman, Steven [8961-71] SPTue, 9000 Program Committee, 9000 S5 Session Chair, [9000-15] S4
- Bown, Stephen G. [8931-23] S5
- Box, Carol [8943-195] SPTues

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Box, Geoffrey N. 8926 Program Committee, 8926 S12 Session Chair
- Boyd, Michael [8935-35] S8
- Boyd, Robert W.** 8940 S7 Session Chair, [8997-7] S4, [8998-11] S3
- Boye, Robert R.** [8989-20] S6
- Boyle, Colin [9002-56] S13
- Boyson, Toby K. [8993-59] S12
- Bozhanova, Nina G. [8950-37] SPSun
- Bozhko, Dmitry [8943-147] SPSun
- Bozkurt, Alican [8926-12] S3
- Bozovic, Ivan** 8987 Program Committee
- Braaf, Boy [8930-33] S7, [8979-19] S1, [8979-19] S7
- Bracher, Gregor [8994-29] S8, [8994-40] S11
- Braden, Bradford C. [8954-34] SPMon, [8954-35] SPMon
- Bradford, Joshua D. [8964-43] S9
- Bradley, Kelvin [8938-15] S3
- Bradley, Thomas D. [8994-9] S3
- Bradna, Pavel [8929-8] S2
- Bradshaw, David S. [8999-25] S6
- Bradshaw, Patrick 8941 Program Committee
- Bradru, Adrian [8929-22] SPSun, [8934-112] SPMon, [8934-113] SPMon, [8934-115] SPMon, [8934-20] S3
- Bragheri, Francesca [8968-20] S4, [8976-21] S5, [8976-48] S10
- Braiman, Yehuda [8965-13] S3
- Brake, Joshua [8951-11] S3
- Brakenhoff, G. J. 8949 Program Committee
- Braker, Joseph W. [8966-30] S8
- Bramati, Alberto 8996 Program Committee, [8997-26] S10
- Bramati, Arianna [8974-14] S4
- Brambilla, Gilberto [8999-48] S10
- Brancaleon, Lorenzo [8941-29] S8
- Brand, Michael [8934-86] SPMon
- Brand, Sophie [8943-129] SPSun
- Brand, Thomas [8961-72] SPTue
- Brandacher, Gerald [8934-76] S11, [8935-47] S10
- Brandão, Lelaine G. [8939-41] SPSun
- Brandon, Jimi L. [8926-131] S4
- Brands, Peter J. [8943-209] SPTues
- Brandstetter, Markus [8993-67] S14
- Brandstetter, Martin [9002-24] S6
- Brandt, Oliver [8986-29] S6
- Brandt, Yekaterina I. [8955-18] S4, [8955-38] S8
- Brar, Khushvinder [8961-62] S15
- Brasselet, Etienne [8974-4] S1, [8999-2] S1, [8999-27] S6
- Bräuer, Andreas 8983 Program Committee
- Brauer, Jens H. [8984-16] S4
- Braut, Julien 8986 S8 Session Chair, [8986-33] S7, [8986-50] S10
- Braun, Bernd [8960-48] S12
- Braun, Holger [8963-26] S6
- Braun, Thomas A. [8939-33] S6
- Bräuniger, Kim Sarah [8992-13] S3
- Bravo Miranda, Carlos A. [8943-172] SPMon
- Breathnach, Aedán** [8941-45] SPMon
- Brecher, Christian [8960-59] S15, [8965-33] S7
- Breckinridge, James B.** 8992 Program Committee
- Brédas, Jean-Luc 8983 S3 Session Chair, [8983-6] S2
- Bredfeldt, Jeremy S. [8949-10] S3
- Breese, Mark B. H. [8980-39] S10
- Brehm, Bernhard R. [8948-6] S1
- Breitkopf, Sven** [8961-5] S2
- Bremer, Marshall T. [8948-87] SPSun
- Brenner, Stephen P. [8981-20] S5
- Brendel, Rolf [8967-48] S14
- Brener, Igal** [8986-44] S8, [8993-49] S9, [8993-83] S17, [8994-41] S11, [8994-53] S13, [8994-67] SPWed
- Brenner, Malcolm K. [8972-11] S2
- Brenner, Matthew** 8927 Conference Chair, 8927 S10 Session Chair, [8927-39] S10, [8927-40] S10
- Breskin, Ilan [8943-128] SPSun
- Bretagnon, Thierry [8986-20] S4, [8987-8] S2
- Bretenaker, Fabien [8966-20] S6, [8998-56] S12
- Brett, Michael J. [8943-13] S2
- Bruckner, L. [8942-12] S2
- Breunig, Hans Georg [8926-26] S6, [8930-28] S7, [8947-55] S12, [8948-3] SKey, [8948-43] S7, [8948-61] S10
- Breunig, Ingo [8960-6] S2, [8964-6] S2, [8993-10] S1
- Brevet, Pierre-François [8983-7] S2, [8984-3] S1
- Brewer, Molly [8943-5] S1
- Briars, Emma [8931-6] S2
- Bricker, Cameron [8992-15] S3
- Brida, Daniele [8964-8] S2
- Briggman, Kimberly A. [8936-29] S7
- Briggmann, Dieter [9007-16] S6, [9007-17] S6
- Brilkina, Anna A. [8956-36] S9
- Brilland, Laurent [8938-40] S8, [8982-16] S3
- Brilland, Laurent [8938-3] S1
- Brimont, Antoine [8991-36] S8
- Brimont, Christelle [8986-8] S2, [8987-8] S2
- Brinkmann, Ralf 8930 Program Committee, 8930 S4 Session Chair, [8941-17] S5, [8943-55] S8, [8946-14] S4
- Brinks, Daan [8984-54] S14
- Brintakis, Konstantinos [8955-43] S9
- Briscoe, Jayson [8994-27] S8, [8994-43] S11
- Brissonneau, Vincent [8994-57] S14
- Bristow, Alan D. 8984 Program Committee, [8984-22] S6
- Britten, Simon W. [8968-31] S15, [8968-31] S7, [8968-40] SPTue
- Brittenham, Gary [8951-18] S4
- Brixner, Tobias [8984-24] S7
- Broadbridge, Philip J. [8934-113] SPMon
- Brocius, Jordan [8948-33] S6
- Brockenbrough, John [8935-75] SPSun
- Brod, Daniel Jost [8972-31] S8
- Brodbeck, Sebastian [8993-7] S1
- Brodhacker, Lisa** [8971-23] S4
- Brodner, Melanie [8965-32] S7, [8965-34] S7
- Brodnick, Sarah [8928-91] S18
- Brodrick, Markus [9003-21] S5
- Broer, Dick J. 9004 Program Committee
- Brohmman, Maximilian [8955-44] S10
- Bromley, Leigh J. [8993-59] S12
- Brongersma, Mark** [8994-2] S1, [8995-33] S9
- Bronner, Wolfgang [8993-31] S6, [8993-57] S12
- Brooker, Jeffrey** [8947-25] S5
- Brooks, Dana H. [8926-12] S3, [8926-13] S3, [8937-41] SPSun
- Broquin, Jean-Emmanuel Symposium Chair, 8988 Conference Chair, 8988 S1 Session Chair, [8988-14] S3, [8988-37] S8
- Brosh, Inbar [8928-37] S7
- Brotherton-Ratcliffe, David [9006-2] S1
- Brouwer, Dannis M. [8967-49] SPTue
- Brown, Alice C. N. [8950-25] S6
- Brown, Christian T. A. [8959-40] S10
- Brown, Christopher G. [8961-71] SPTue, [9000-15] S4
- Brown, Edward B. [8948-7] S1
- Brown, Eiei [8959-66] S14, [8982-66] SPWed, [9000-23] SPWed
- Brown, Elliott R. 8941 Program Committee, [8941-49] SKey, [8985-1] S1, [8985-10] S3, [8993-71] S14
- Brown, Gail J. 8993 Conference CoChair, 8993 S2 Session Chair, [8993-32] S6
- Brown, Nga L. [8958-10] S3
- Brown, Robert [8927-38] S10
- Brown, Robert A. [8946-31] S7
- Brown, Thomas G. 8949 Conference Chair, 8949 S1 Session Chair, 8949 S11 Session Chair, [8949-34] S7, [8949-38] S8, [8949-69] SPMon
- Brownell, William E. [8946-24] S5
- Brox, Olaf [9002-14] S3
- Brox, Petter [8999-4] S1
- Bruck, Roman [8933-4] S2
- Brückner, Jean-Baptiste [8994-57] S14
- Bruder, Friedrich-Karl [9006-1] S1
- Brüderl, Georg [9002-15] S3
- Brueck, Steven R. J. [8993-71] S14
- Brunera, Aldo [8932-15] S3, [8932-16] S3
- Bruhat, Alexis [8926-24] S6
- Bruinink, Arie [8967-30] S11
- Brun, Mickael [8988-24] S6, [8988-26] S6, [8993-43] S8
- Brunet, Francois [9002-50] S12
- Brunker, Joanna [8943-54] S8
- Brunner, Raimund [8993-75] S15
- Bruns, Oliver T. [8955-54] S12
- Brusa, Roberto S. [8982-12] S3
- Brusberg, Lars [8991-13] S3, [8991-15] S4
- Brust, Mathias 8955 S10 Session Chair, [8955-21] S5, [8955-69] SPSun
- Bryan, Isaac [8986-27] S5, [8986-31] S6
- Bryan, Zachary [8986-27] S5
- Bryer, Jordan A. L.** [8976-2] S1
- Brzobohaty, Oto [8960-40] S10, [8999-3] S1, [8999-8] S2
- Bu, Yanggao [8951-22] S5
- Bubnov, Mikhail M. [8961-29] S7, [8961-32] S8, [8961-41] S10, [8961-56] S13
- Buccoliero, Anna Maria [8939-30] S6
- Bucella, Sadi [8968-28] S6
- Buchanan, Douglas A. [8976-42] S9
- Bücheler, Stephan [8967-43] S15, [8967-43] S7
- Buchleitner, Andreas [8997-16] S6
- Buchsbaum, Andreas [8943-148] SPSun
- Buchta, Zdenek [8941-50] SPMon
- Buchvarov, Ivan [8926-141] S6
- Buchwald, Kristian J. [8980-6] S2
- Buchwald, Walter R. [8993-14] S2
- Bückle, Anni [8960-6] S2
- Buckle, Malcolm [8983-20] S5
- Bückle, Rainer [8948-3] SKey
- Buckley, Brandon W. [8947-13] S3, [8947-35] S9
- Buckley, Erin M. [8936-18] S7, [8942-17] S4
- Bückmann, Tiemo K. [8970-8] S2
- Buckova, Michaela [8929-8] S2
- Buczynska, Dorota [8955-5] S2
- Buczynski, Ryszard** [8964-23] S6, [8964-29] S7, [8964-31] S7, [8982-82] SPWed
- Budansky, Yuri [8926-109] S22
- Büdenbender, Christian [8959-17] S5, [8959-20] S5
- Budker, Dmitry 8997 Program Committee
- Budnicki, Aleksander [8972-25] S6
- Buehler, Andreas [8943-85] S13
- Büeler, Michael [8982-34] S7
- Bueno, Luciano Avallone [8964-44] SPTue, [9003-53] SPWed
- Bugaj, Joseph E. [8956-17] S4
- Bugge, Frank [8965-23] S5, [8965-8] S2, [9002-14] S3, [9002-53] S12, [9002-7] S2
- Bügl, Max [8986-26] S5, [8986-42] S8
- Bugrov, Alexey [8974-6] S2
- Buh, Jose [8986-31] S6
- Bühler, Johannes [8964-8] S2
- Bui, Nhat Quang [8926-60] SPSat
- Bui, Quang N.
- Buividas, Ricardas [8974-23] S6
- Bujak, Lukasz [8955-5] S2
- Bukowska, Danuta M.** [8934-94] SPMon
- Bunning, Timothy J.** [9004-24] S3, [9004-4] S1
- Bunt, Gertrude [8950-14] S4
- Bur, James A. [8994-59] S15
- Buragohain, Alak K. [8996-30] SPWed
- Buragohari, Prathan** [9006-7] S2
- Burckel, D. Bruce [8973-12] S3
- Bureau, Bruno [8938-3] S1, [8938-40] S8
- Burfeind, Chris W. [8976-28] S6
- Burger, Liesl** [8960-55] S15, [8960-68] SPTue
- Burger, Sven** [8980-60] SPWed, [8988-19] S4, [8988-54] SPWed
- Burgess, Jacob A. J. [8984-36] S10, [8984-37] S10
- Burgholzer, Peter [8943-226] SPTues, [8943-65] S10, [8943-90] S13
- Burgner, Christopher B. [8934-1] S1
- Burgoyne, Bryan [8992-22] S5
- Burianek, Dennis A. [8971-29] S5
- Burke, Daniel [8949-41] S9, [8978-14] S5
- Burke, Kathleen A.** [8949-7] S1
- Burkhardt, Anke [8926-120] S1
- Burmeister, David M. [8926-4] S1, [8941-54] S11
- Bürmen, Miran [8936-41] SPSun
- Burn, Andreas [8967-43] S15, [8967-43] S7
- Burnet, Joe [8943-133] SPSun
- Burnett, Arthur L. [8926-51] S10
- Burney, Tanya [8927-40] S10
- Burns, Marie [8934-73] S11
- Burt, Travis [8992-15] S3
- Burton, John [8971-12] S2
- Busacca, Alessandro C. [8990-40] S8, [8990-41] S8, [8990-43] S8
- Busani, Tito L. [8981-63] SPWed, [8983-50] S11
- Busarov, Oleg [8952-41] SPSun
- Buscaglia, Marco [8970-7] S2
- Busch, David R.** [8942-17] S4
- Busch, Kurt [8974-26] S6
- Busch, Ronald [8959-22] S6
- Busch, Theresa M. [8931-17] S4, [8931-3] S1, [8931-47] SPMon, [8931-9] S2
- Buschmann, Volker [8947-40] S9, [8948-94] SPSun, [8950-8] S2
- Buse, Karsten [8960-6] S2, [8964-33] S8, [8964-6] S2, [8993-10] S1
- Busse, Lynda E.** [8959-58] S13, [8961-57] S13, [8968-35] SPTue, [8982-35] S7
- Bussmann, Konrad M. [8996-24] S7
- Busson, Mickael P. [8950-12] S3, [8957-19] S4
- Bustamante, Sandra C.** [8951-42] SPMon
- Butcher, Dennis P. [8983-38] S9
- Butkus, Mantas [8966-18] S5
- Butkus, Simas [8972-42] S9
- Butte, Pramod V. [8932-2] S1
- Butterfield, Brad [9003-51] SPWed
- Butterworth, Jessica H.** [8938-29] S6
- Büttner, Edlef [8948-40] S7, [8964-11] S3
- Button, Brian [8927-43] S11
- Button, Christopher [8965-26] S6
- Butvina, Alexey L. [8938-18] S4, [8939-36] S6
- Buy, Timon P. H. [8935-36] S8
- Buzza, Hilde H. [8931-10] S2
- Byer, Robert L. [8964-30] S7

C

- C. K., Jayasankar [8996-33] SPWed
- Cabaret, Louis [8962-16] S5
- Cable, Alex E.** [8927-30] S7, [8930-32] S7, [8934-1] S1, [8934-22] S4, [8947-25] S5
- Cabral Filho, Paulo Eusébio [8955-61] SPSun, [8955-62] SPSun
- Cabral, Marcio C. [8979-16] S7
- Cabral, Pedro J. [8928-2] S1
- Cabrini, Stefano [8974-6] S2, [8988-16] S4, [8994-49] S12
- Caccamo, Lorenzo [8980-27] S7
- Cacciaccaro Lincoln, Victor A. [8930-48] SPSun
- Cachau, Raul E. [8954-34] SPMon, [8954-35] SPMon
- Cadien, Kenneth C. [8973-10] S3
- Cadier, Benoit [8971-13] S2
- Caetano da Silva, Juarez [8988-67] SPWed
- Caffey, David B. [8993-59] S12
- Cahill, Laurence W. 8990 Program Committee
- Cahill, Lucas [8927-34] S9
- Cai, Hong [8991-21] S5
- Cai, Hong [8988-40] S9
- Cai, Xiaowei [8993-13] S2
- Cai, Xin [8943-159] SPMon, [8943-197] SPTues
- Cai, Xinlun [8960-39] S10

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Cai, Yi 9009 Program Committee, [9009-18] S7
- Caiazza, Fabrizia [8963-4] S1
- Caillaud, Louis [8981-36] S9
- Caillaud, Celine [8982-16] S3
- Caire-Remonny, Boris [8988-23] S5
- Caironi, Mario [8968-28] S6
- Calafiore, Giuseppe [8974-6] S2, [8988-16] S4
- Calciati, Marco [9001-9] S2, [9003-36] S12, [9003-36] S8
- Calderón, Jonathan [8933-17] S5
- Calhoun, William R. [8930-43] S9
- Caliman, Andrei [8966-14] S4
- Calixto-Carrera, Sergio [8976-51] SPTue
- Callado, Iris [8926-77] S15
- Callahan, Michael [8987-37] S7
- Calleja, Enrique 8996 S6 Session Chair, [8996-2] S1
- Callis, Patrik [8956-34] S9
- Callens, Gordon [8986-26] S5, [8986-42] S8, [8987-11] S2
- Calo, Cosimo [8993-9] S1
- Calò, Giovanna [8988-51] S11
- Calvet, Pierre [8961-76] SPTue
- Calvo Padilla, Maria Luisa [8995-38] S10
- Calzada, Maria Eugenia [8993-59] S12
- Camacho-Aguilera, Rodolfo E. [9010-17] S5, [9010-17] S6
- Câmara, Terezinha J. R. [8947-69] SPMon
- Cameron, Brent D. 8951 Program Committee
- Camp Jr., Charles H.** [8948-26] S4, [8948-37] S7
- Campagnola, Paul J.** [8947-65] S14, 8948 Program Committee, 8948 S2 Session Chair, [8948-4] S1, [8948-5] S1
- Campana, Charles F. [8983-29] S7
- Campanelli, Sabina Luisa [8963-36] S6, [8963-36] S9, [8963-5] S1
- Campbell, Elaine C. [8939-6] S1
- Campbell, Jeremy [8933-18] S5
- Campidelli, Stéphane [9004-32] SPWed
- Campion, Richard P. [8988-4] S1
- Campione, Salvatore** [8994-53] S13
- Campos, Alison N. [8935-77] SPSun
- Campos, Carolina P. [8934-129] SPMon
- Campos, Julien [8993-8] S1
- Campos-Delgado, Daniel U. [8947-14] S3
- Campuzano, Gabriel [8980-71] SPWed
- Can, Anil [8934-71] S11
- Canal, Marina [8926-77] S15
- Canat, Guillaume [8961-6] S2, [8961-69] SPTue
- Cancellieri, Emiliano [8997-26] S10
- Cancula, Miha [9004-10] S3
- Candiani, Alessandro [8938-26] S5
- Candido, Tara [8927-51] S12
- Canedy, Chadwick L. [9002-47] S11
- Canevari, Renata A. [8939-41] SPSun
- Cang, Hu** [8950-49] SPSun
- Cangussu, Maria Cristina T. [8932-7] S1
- Canicatti, Riccardo [8990-40] S8
- Canioni, Lionel S. [8959-59] S14, [8959-60] S14, [8969-12] S1, [8969-12] S3, [8974-3] S1, [8974-4] S1
- Cannaday, Ashley E.** [8940-4] S1, [8952-30] S8
- Canonica, Michael [8977-23] S5
- Canovetti, Annalisa [8930-52] SPSun
- Canpolat, Murat** [8937-40] SPSun
- Cantarero, Andrés [8989-4] S1
- Canteli, David [8968-30] S15, [8968-30] S7
- Cantero, Sergio** [8952-15] S4
- Canuto, Sylvio [8969-24] SPTue
- Canva, Michael T. 8957 Program Committee, [8957-16] S4, [8957-28] S6
- Cao, Bin [8944-13] S3
- Cao, Hong-Zhong [8970-13] S3
- Cao, Jianqiu [8961-124] SPTue
- Cao, Liangcai** [9006-31] S7
- Cao, Ruofan [8947-27] S5
- Cao, Shihua [8985-29] S7
- Cao, Suyi [8934-18] S3
- Cao, Yuanying [9002-49] S11
- Cao, Yunhao [8969-16] S3, [8969-16] S5
- Cao, Zhitao [8974-34] SPTue, [8974-38] SPTue, [8974-40] SPTue, [8974-42] SPTue, [8974-44] SPTue
- Capaccioli, Sergio [8955-45] S10
- Capala, Jacek [8940-27] S5
- Capasso, Federico** [8993-76] S16, [8994-51] S13, [8995-23] S6, 9002 Program Committee, [9002-22] S5, [9002-43] S10
- Capitanio, Marco [8946-19] S5, [8950-43] SPSun
- Caplan, David O. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
- Capoglu, Ilker R. [8952-8] S3
- Capolino, Filippo [8980-45] S12, [8994-53] S13
- Caprara, Andrea [8966-26] S8
- Cárabe, Julio [8968-33] S15, [8968-33] S7
- Caracciolo, Etienne [8959-41] S10
- Carbary, Jordan L.** [8956-22] S5
- Carbone, Beatrice [8990-40] S8
- Carbone, Giuseppe [8968-6] S2
- Cardenas, Nelson** [8979-24] S2, [8979-24] S8
- Cardimona, David A. 8993 Program Committee
- Cardinal, Thierry [8959-59] S14, [8969-12] S1, [8969-12] S3, [8974-3] S1, [8974-4] S1
- Cardoso Dos Santos, Marcelina** [8949-53] S11
- Cardoso, Marcos R. [8976-4] S1
- Carelli, Pasquale [8984-13] S3
- Carey, James E. 8972 Program Committee
- Carl, Daniel [8967-41] S14, [9006-13] S3
- Carlin, John A. [8981-20] S5, [8981-41] S11
- Carlton, David [8933-23] S6, [8954-4] S1
- Carlton, Drew T. [8927-10] S3, [8927-11] S3, [8934-8] S2
- Carmody, Neil [8961-45] S11
- Carmon, Tal Eliezer [8960-10] S3, [8976-33] S7, [8999-6] S2, 9000 Program Committee, [9000-8] S2
- Carnegie, David J. [8960-61] S16
- Carnevale, Santino D. [8996-10] S3
- Carney, John J. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
- Carney, Paul R. [8928-98] S20
- Carney, Paul Scott [8934-42] S7, [8934-67] S10, [8935-48] S10, [8935-75] SPSun
- Carothers, Daniel N. 8979 Program Committee, 8979 S5 Session Chair, [8979-6] S5, [8991-26] S6
- Carp, Stefan A. [8936-18] S7
- Carpenter, Lewis G.** [8968-8] S2, [8974-56] S9, [8988-38] S8
- Carpintero del Barrio, Guillermo [8988-25] S6, [8993-43] S8, [9002-59] S13
- Carrano, John C.** SC952
- Carraro, Anita [8945-6] S2
- Carraro, Simone [8986-59] S11
- Carras, Mathieu** [8988-24] S6, [8988-26] S6, [8993-43] S8, [9002-59] S13
- Carrasco-Zevallos, Oscar [8930-35] S8, [8934-23] S4
- Carreon, Hector G. [8972-63] SPTue
- Carrier, R. [8962-13] S4
- Carriere, James T. A.** 8992 Program Committee, 8992 S1 Session Chair
- Carriles, Ramon [8964-47] SPTue
- Carrion, Ricardo [8988-40] S9
- Carroll, David L.** 8962 Program Committee, 8962 S4 Session Chair, [8962-15] S4, [8962-9] S3
- Carroll, James D.** 8932 Conference Chair, 8932 S2 Session Chair, 8932 S3 Session Chair, 8932 S7 Session Chair
- Carruth, Robert R. [8927-10] S3, [8927-11] S3, [8927-12] S3, [8927-19] S5, [8927-2] S1, [8927-29] S7, [8927-5] S1, [8934-78] S12, [8934-8] S2
- Carson, Jeffrey J. L.** [8947-88] SPMon, [8954-3] S1, [8957-18] S4
- Carson, Paul L. [8943-218] SPTues, [8943-38] S6, [8943-50] S8
- Carstens, Henning [8961-5] S2
- Carter, Adrian L. 8961 Program Committee, 8961 S10 Session Chair, [8961-45] S11, [8982-1] S1
- Carter, Kirsten [8930-25] S6, [8930-5] S1
- Cartwright, Alexander N.** 8954 Conference Chair, 8954 S1 Session Chair, 8954 S2 Session Chair, 8954 S3 Session Chair
- Carusotto, Iacopo [8998-56] S12
- Carvalho, Hernandes F. [8947-21] S4, [8948-100] SPSun, [8948-12] S2, [8948-51] S8, [8948-55] S9, [8955-61] SPSun, [8996-26] S7, [8996-32] SPWed
- Carvalho, Luis Albert V. [8930-45] SPSun, [8930-53] SPSun, [8936-39] SPSun
- Carvalho, Luiz B. [8955-62] SPSun
- Carvalho, V. C. M. [8930-45] SPSun
- Carver, Gary E. [8947-20] S4
- Casalino, Giuseppe [8963-36] S6, [8963-36] S9, [8963-5] S1
- Casas-Finet, Jose Ramon [8954-34] SPMon, [8954-35] SPMon
- Case, Jason R. [8935-40] S8
- Casiraghi, Odile [8926-129] S4
- Cassaboy, Guillaume [8986-24] S5
- Cassari, William J.** SC011
- Castaneda, Angelica [8938-38] S8
- Castañón, Gerardo A. [8980-71] SPWed
- Castellano, Fabrizio [8985-51] S11
- Castellanos, Cherry C. [8932-12] S3, [8941-19] S5
- Castellanos, Jason [8947-1] S1
- Castelló-Serrano, Iván [8955-2] S1
- Castillejo, Marta [8984-46] S12
- Castle, Kenneth R.** SC010
- Castro Neto, Jarbas [8920-68] SPWed
- Castro, Guilherme [9003-68] SPWed
- Castro, Livia [8929-4] S1
- Castro-Lopez, Marta [8984-54] S14
- Castro-Ramos, Jorge [8936-35] S8, [8949-66] SPMon
- Casutt, Selina [8982-34] S7
- Catchpole, Kylie R. 8981 Program Committee, [8981-19] S5
- Cattini, Stefano [8951-1] S1
- Cattoor, Romain [8959-60] S14
- Cauwenberghs, Gert 8993 S10 Session Chair
- Cavalié, Pierrick [8993-11] S2
- Cavallini, Anna [8986-16] S4
- Ceballos, Frank [8984-2] S1
- Cecchetti, Carlo Alberto [8926-73] S15
- Cecchi, Stefano Carlo [8990-17] S3
- Cederberg, Jeffrey G. [8966-2] S1, [8984-38] S10, [9000-4] S1
- Ceja Fernández, Andrea [8956-25] S6, [8956-32] S8
- Celestino Marcos, Susana [8946-8] S3
- Celli, Jonathan P.** 8931 S3 Session Chair, [8931-6] S2, [8931-7] S2, [8947-3] S1
- Cengel, Keith A. [8926-135] S5, 8931 S6 Session Chair, [8931-25] S5, [8931-33] S6
- cenko, Andrew T. [8982-76] SPWed
- Cense, Barry [8953-13] S3
- Centi, Sonia [8955-45] S10
- Cerbino, Roberto [8970-7] S2
- Cerna, Cesario Z. [8941-54] S11, [8941-61] S12, [8941-64] S10
- Cerna, Roland [8984-31] S9
- Cernigliaro, George [8974-8] S2
- Cernohorsky, Paul [8937-27] SPSun
- Ceron, Deanna [8935-36] S8
- Cerqueira Sodré, Arismar [8964-45] SPTue
- Cerullo, Giulio [8970-7] S2
- Cerussi, Albert E.** [8927-16] S4
- Cerutti, Laurent [8966-29] S8, [8993-42] S8
- Cervera, F. [8994-14] S4
- Cesar, Marina M. [8929-19] SPSun
- Cesare, Paolo [8928-57] S12
- Cha, Dongkyu [8986-37] S7, [9002-1] S1
- Cha, Du Hwan [8982-68] SPWed
- Cha, Hyungrae** [8993-65] S13
- Cha, Jaeyoung [8928-92] S18, [8935-79] SPSun, [8938-34] S7, [8938-36] S7
- Cha, Myoungsik [8964-42] S9
- Cha, Seongwoo [8962-23] SPTue
- Chabal, Yves J. [8981-36] S9, [8987-67] S13
- Chabot, Victor Luc [8982-39] S8
- Chabrier, Renee [8935-38] S8, [8935-68] SPSun
- Chadha, Arvinder S. [8994-58] S14, [8995-32] S8
- Chadwick, Samantha [8955-21] S5, [8955-69] SPSun
- Chae, Y. [8926-150] SPSat
- Chaem-Maghani, Sadaf [8935-35] S8
- Chaganava, Irakli [9006-9] S2
- Chaigne, Thomas [8943-106] S16, [8943-134] SPSun, [8943-48] S7
- Chaigneau, Marc [8990-46] S9
- Chaiken, Joseph [8935-59] S12, [8935-78] SPSun
- Chaisakul, Papichaya [8990-17] S3
- Chakanga, Kambulakwao [8967-50] SPTue
- Chakif, Mbarek [8955-6] S2
- Chakkalakkal Abdulla, Shahina Mumthaz [8990-30] S6
- Chakrabarti, Subhananda [8987-84] SPWed
- Chakraborty, Arpan [9003-41] S10
- Chakravarty, Swapnaji [8933-14] S4, [8933-15] S4, [8989-23] S7, [8990-26] S5, [8990-28] S5, [8990-31] S6, [8990-33] S6, 8991 Program Committee
- Chalasan, Preetham [8926-122] S1
- Challa, Pavan Kumar** [9004-28] SPWed
- Chalmond, Bernard [8947-53] S12
- Chamberlain, John Martyn [8941-63] S10
- Chamberland, David L. [8926-117] S24, [8943-59] S9
- Chamie, Daniel [8926-91] S18
- Chamma, Emilie [8948-27] S5
- Chamon, Wallace [8946-10] S3
- Champelovier, Dorian [8978-9] S3
- Champion, Audrey [8969-2] S1
- Chamson-Reig, Astrid [8947-88] SPMon
- Chamtouri, Maha [8957-28] S6
- Chan, Aaron C.** [8934-88] SPMon
- Chan, Adriano [8927-40] S10
- Chan, Andrew C. [8929-21] SPSun
- Chan, Antony C. S.** [8947-78] SPMon
- Chan, Jacky C.K. [8947-13] S3
- Chan, Kenneth H. [8929-12] S3, [8929-13] S3, [8929-14] S3, [8929-24] S3Sun, [8929-25] SPSun, [8929-27] SPSun
- Chan, Kin Foong** 8926 Program Committee, 8926 S12 Session Chair
- Chan, Kin Long [8983-59] SPWed
- Chan, Samantha [8952-5] S2
- Chan, Shih-Hao** [8982-10] S2
- Chan, Trevor K. [8977-14] S4, [8995-26] S7
- Chan, Victoria C.** [8949-2] S1
- Chan, Vincent W. S. 8971 Program Committee
- Chan, Wai Kin [8987-68] S1, [8987-85] SPWed
- Chanclou, Philippe [8980-43] S11
- Chandler, John E. [8947-41] S10, [8952-8] S3
- Chandra, Arnab [8931-6] S2
- Chandra, Malavika [8935-80] SPSun
- Chandra, Subhash [8929-2] S1
- Chandralhim, Hengky [8999-6] S2
- Chandran, Sujith [8990-10] S2
- Chandrasekaran, Sri Nivas [8979-23] S2, [8979-23] S8
- Chanelière, Thierry [8985-17] S4
- Chaney, Eric J. [8926-25] S6, [8935-48] S10, [8935-75] SPSun, [8942-28] S7, [8948-96] SPSun
- Chang, Alberto A. [8973-19] S4
- Chang, Caleb Y. [8993-37] S7
- Chang, Cheng-Chung [8943-102] S15
- Chang, Chia Min** [8957-31] S2
- Chang, Chia-Ming [9010-16] S5, [9010-16] S6
- Chang, Chun-Kai [8981-3] S1
- Chang, Chun-Lin L. [8961-100] SPTue, [8961-99] SPTue

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Chang, Ernest W.** [8934-82] S12
 Chang, Hao-Jung [8922-73] SPWed
 Chang, Hao-Yu [8987-51] S11
 Chang, Jeng-Yang [8986-78] SPWed
 Chang, Jun [8945-19] SPSun
 Chang, Ki-Soo [8963-38] SPTue, [8975-12] SPTue
 Chang, Peter [8991-14] S4
 Chang, Robert [8936-29] S7, [8945-15] S4
 Chang, Shan-Ching [8949-59] SPMon
 Chang, Sheng-Yi [8952-2] S1
 Chang, Shufang [8951-22] S5
 Chang, Shu-Wei [8980-62] SPWed, [8980-72] SPWed
 Chang, So Young [8926-121] S1
 Chang, Ta-Wei [8986-53] S10
 Chang, Tyler [8948-67] S11
 Chang, Wen-Ming [8986-36] S7
 Chang, Y. T. [8933-16] S5
 Chang, Yia [8982-43] S8
 Chang, Yin-Ren [9006-23] S5
Chang, Yu-Chung [8947-73] SPMon
Chang, Yu-Chong [8974-18] S5, [8993-87] S17, [9003-8] S2
 Chang, Yu-Wei [8957-27] S6
 Chang, Yu-wen [8935-53] S11
 Chang, Zenghu [8968-16] S4
 Chang-Hasnain, Connie J. [8977-14] S4, 8995 Conference Chair, 8995 S2 Session Chair, [8995-1] S1, [8995-17] S3, [8995-26] S7, [8995-27] S7, [8995-35] S9, [8995-37] S9, [8995-8] S2, [8998-40] S9, [9008-6] S5, [9008-6] S6
 Chao, Norman [8990-5] S1
 Chao, Shih-Min [8981-54] SPWed, [8981-55] SPWed
 Chao, Weiliun [8933-23] S6, [8949-20] S4, [8954-4] S1
 Chao, Yang [8959-36] S8
 Chapin, Caitlin A. [8975-6] S2
 Chapman, David W. [8943-93] S14
 Chapman, Gala [8956-28] S8
Chapman, Glenn H. [8973-6] S2, [8976-2] S1
 Chapman, M. Shane [8931-18] S4, [8931-31] S6
 Chapman, William B. [8993-59] S12
 Chappel, Eric [8976-29] S6, [8976-50] SPTue
 Chard, Simon P. [8959-32] S8
 Charipar, Kristin M. [8970-3] S1
 Charipar, Nicholas A. [8970-3] S1, [8980-25] S6
 Charlton, Martin D. B. [8981-57] SPWed, [8983-58] SPWed
 Charpentier, Christophe [8984-13] S3
 Charra, Fabrice 8983 Program Committee, [8983-35] S8
 Chartier, Thierry [8961-78] SPTue, [8961-88] SPTue, [8980-43] S11
 Chartrand, Pierre [8938-5] S1
 Chase, Christopher [8995-17] S3, [9008-6] S5, [9008-6] S6
 Chassagne, Bruno [8992-25] S6
 Châteauneuf, François [8975-2] S1
 Chattergoon, Krishna [8977-7] S2
Chatterjee, Monish R. [8971-1] S1, [9006-58] S6
 Chatterjee, Subhasri [8952-25] S7
 Chattin, Bill [8990-37] S7
 Chatzipetrou, Marianna [8970-17] S12, [8970-17] S4
 Chau, Fook Siong [8977-17] S4, [8977-18] S4
 Chaudhuri, Durba B. [8951-41] SPMon
 Chauveau, Jean-Michel [8987-8] S2
 Chauvet, Cyprien [8988-66] SPWed
 Chauvet, Mathieu [8994-33] S9
 Chavantes, Maria Cristina [8926-76] S15, [8926-77] S15
 Chavez-Pirson, Arturo [8961-68] SPTue, [9000-20] S5
 Chavoutier, Marie [8959-59] S14
 Che Hak, Rohaida C. [8947-48] S11
 Cheah, Kok-Wai [8983-59] SPWed
 Cheben, Pavel 8988 Program Committee, 8988 S11 Session Chair, [8990-32] S6, 8995 S7 Session Chair, [8995-30] S8, [8995-38] S10
 Checory, Xavier [8986-8] S2, [8990-46] S9
Chee, Alex C. [8927-36] S9
Chee, Ryan K. [8943-81] S12, [8943-82] S12, [8943-83] S12
 Cheema, Mehar [8948-7] S1
 Chellini, Flaminia [8948-57] S9
Chembo, Yanne K. 8960 Program Committee, 8960 S9 Session Chair, [8960-4] S1, [8985-49] S10, [8989-19] S6
 Chen, Bin [8931-4] S1
 Chen, Bing Qi [9003-3] S1
 Chen, C. Y. [8986-7] S2
 Chen, Chao-Wei [8945-2] S1
 Chen, Cheng-Huan 9005 Program Committee
 Chen, Chia-Feng [9003-30] S7
 Chen, Chia-Yuan [8953-6] S2
 Chen, Chih-Shan Jason [8926-15] S3
 Chen, Chih-Yen [8986-53] S10, [9003-30] S7
 Chen, Chin Hsin 9005 Program Committee
 Chen, Chin-Hui [8991-19] S5, [8991-42] S10, [8991-42] S3
 Chen, Chris [8933-20] S6
 Chen, Chuangtian [8964-1] S1
 Chen, Chung-Hui [9003-30] S7
 Chen, Chunyi [9007-21] S7
 Chen, Claire [8972-15] S4
 Chen, Danping [8982-58] SPWed
 Chen, Fei [9002-8] S2
 Chen, G. T. [8986-7] S2
 Chen, Gengxu [8997-5] S3, [8997-5] S7
 Chen, George Y. [8960-43] S11
 Chen, Han [8985-53] S11, [9009-23] S8
 Chen, Horng-Shyang [8986-36] S7, [8986-53] S10, [9003-30] S7, [9003-34] S7
 Chen, Ho-Tsung [8976-43] S9
 Chen, Hung-Hsuan [8985-20] S5
 Chen, Janglin 9005 Program Committee
 Chen, Jeffrey R. [8959-19] S5
 Chen, Jiajie [8957-17] S4
 Chen, Jian [8995-11] S3
 Chen, Jian [8985-31] S7
 Chen, Jianfeng Jeff [8986-65] S14
 Chen, Jianhua [8943-7] S2
 Chen, Jianling [8949-57] SPMon
 Chen, Jianping [8990-49] S9
 Chen, Jinbao [8961-124] SPTue
 Chen, Jingyi [8943-15] S3
 Chen, Jun [8972-53] SPTue
 Chen, Jun [8972-1] S1
 Chen, Jyh-Ping [8955-72] SPSun
 Chen, Ke [8940-42] SPTue
 Chen, Kuei-Hsien [8993-84] S17
 Chen, Li-Chyong [8993-84] S17
 Chen, Ling [8935-44] S9
 Chen, Meishin [8961-4] S1
 Chen, Meng [8959-36] S8
 Chen, Min [8951-33] SPMon
 Chen, Minghan [8994-64] SPWed
 Chen, Moran [8997-15] S6
Chen, Nanguang [8928-21] S5, [8928-24] S6, [8934-117] SPMon, [8947-42] S10, [8948-65] S11
 Chen, Peifeng [8991-37] S9
 Chen, Peng [8969-27] SPTue
 Chen, Qi [8981-49] S12
Chen, Ray T. [8933-14] S4, [8933-15] S4, 8989 Program Committee, [8989-23] S7, [8990-16] S3, [8990-26] S5, [8990-28] S5, [8990-31] S6, [8990-33] S6, 8991 Conference Chair, 8991 S5 Session Chair, [8991-20] S5, [8991-22] S5, [8991-40] S9, [8991-44] SPWed
 Chen, Rensa [8931-3] S1
 Chen, Robert [9006-23] S5
 Chen, Rui [8960-13] S3
 Chen, Ruimin [8943-212] SPTues
 Chen, S. W. [8991-18] S5
Chen, Shean-Jen [8948-4] S1, [8948-5] S1
 Chen, Sheng-Hui [8982-10] S2
 Chen, Shih-Hung [8961-100] SPTue, [8961-99] SPTue
 Chen, Shih-Ken [8982-39] S8
 Chen, Shufen [8948-38] S7
Chen, Shuo [8935-4] S1, [8935-63] SPSun, [8940-14] S3
 Chen, Siming [9002-3] S1
 Chen, Siyu [8943-118] SPSun, [8943-145] SPSun, [8943-151] SPMon
 Chen, Sung-Liang [8943-10] S2, [8943-124] SPSun, [8943-133] SPSun
 Chen, Tao [8948-98] SPSun
 Chen, Tong-Sheng [8944-21] SPMon, [8955-39] SPSun
Chen, Wei R. [8928-68] S14, 8942 Program Committee, 8944 Conference Chair, [8944-15] S4, [8944-16] S4, [8944-17] S4, [8944-22] SPMon, [8944-24] SPMon, [8944-29] SPMon, [8944-3] S1, [8944-33] SPMon, [8944-5] S2, [8944-6] S2, [8944-7] S2, [8944-8] S2
 Chen, Wei Ting [8995-36] S9
 Chen, Weixi [8990-50] SPWed
 Chen, Wen G. [8928-102] S18
 Chen, Xi [8934-32] S5
 Chen, Xia [8989-12] S5, [8993-42] S8
 Chen, Xianfeng [8938-47] SPSun
 Chen, Xiang-Bai [8987-95] S6
 Chen, Xiangfang [8958-17] S4
 Chen, Xiaodong [8934-121] SPMon
 Chen, Xingyou [9002-49] S11
Chen, Xu [8947-33] S1, [8947-33] S7, [8948-38] S7
 Chen, Ya [8982-23] S5
Chen, Ye [8927-8] S2, [8949-13] S3, [8949-4] S1, [8956-13] S3
 Chen, Yeon-Woel [9003-34] S7
Chen, Yi [8957-1] S1, [8974-49] S8
 Chen, Yi-Chen [8976-43] S9
 Chen, Ying-Chih [8949-33] S7
 Chen, Youming [8961-10] S3
 Chen, Yu [8968-33] S15, [8968-33] S7
 Chen, Yu 8928 Program Committee, 8928 S7 Session Chair, [8928-58] S12, [8931-12] S3, [8936-10] S3, [8936-22] S5, 8937 Program Committee, 8937 S2 Session Chair, [8945-2] S1, [8948-88] SPSun
Chen, Yun [9005-15] S4, [9005-7] S2
 Chen, Yuk-Nga [8993-41] S7
 Chen, Yun-Sheng [8926-84] S17, [8934-51] S8, [8943-72] S11, [8943-76] S11, [8955-47] S10
 Chen, Zhan [8947-38] S9, [8948-89] SPSun
Chen, Zhe [8992-9] S2
 Chen, Zhigang [8965-39] S8
 Chen, Zhixing [8948-76] SPSun
 Chen, Zhiyu [9008-9] S7
Chen, Zhongping [8926-125] S3, [8926-143] S7, [8926-145] S7, [8926-79] S16, [8926-83] S17, [8926-87] S17, [8927-39] S10, 8934 Program Committee, 8934 S11 Session Chair, [8934-11] S2, [8934-31] S5, [8934-79] S12, [8934-96] SPMon, [8934-98] SPMon, [8943-63] S10, 8946 Program Committee, 8946 S2 Session Chair, [8946-26] S6
 Chen, Zhuofa [8987-44] S9
 Chenais, Sébastien [8966-13] S4, [8983-30] S7
 Cheng, Alexis [8943-198] SPTues
 Cheng, Baokai [8950-35] SPSun, [8974-32] SPTue
 Cheng, Bingbing [8943-46] S7, [8956-14] S3
 Cheng, Bo Han [8957-31] S7
 Cheng, Chee Yuen [8959-74] SPTue
 Cheng, Emily [8980-78] SPWed, [8993-28] S5
 Cheng, Gangge [8940-11] S3
 Cheng, Jane [8965-6] S2
 Cheng, Jie [8947-33] S1, [8947-33] S7
 Cheng, Ji-Xin [8939-16] S3, [8943-63] S10, [8943-80] S12, 8948 S5 Session Chair, [8948-23] S4, [8948-34] S6
 Cheng, Kai-Yuan [8983-57] SPWed
 Cheng, Liang [8948-23] S4
 Cheng, Michael [8933-1] S4, [8933-11] S4
 Cheng, Michael K. [8971-20] S4, [8971-34] S5
 Cheng, Peter [8965-6] S2
 Cheng, PiJu [8980-72] SPWed
 Cheng, Qixiang [8991-12] S3
Cheng, Shuna [8935-12] S3, [8935-26] S6
 Cheng, Tonglei [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-63] SPWed
 Cheng, Tonglei [8982-62] SPWed
 Cheng, Wei-Chih [9003-58] SPWed
Cheng, Wood-Hi [9003-58] SPWed
 Cheng, Xinru [8999-17] S4
Cheng, Ya [8960-45] S11, [8967-7] S10, [8967-7] S5
 Cheng, Yi-Shing Lisa [8935-26] S6
 Cheng, Yu [8974-41] SPTue
 Cheng, Yueh-Hung [8957-31] S7
 Chennuri, Rohini [8939-19] S3
 Chenot, Sébastien [8986-33] S7, [8986-50] S10
Cheon, Gyeong Woo [8926-122] S1, [8938-34] S7
 Cheong Lem, Laurent L. [8987-6] S2
 Cheong, S. W. [8987-95] S6
 Cherchi, Matteo [8990-14] S3, [8990-2] S1, [8990-22] S4, [8990-3] S1, [8990-4] S1
Cheremkhin, Pavel A. [9006-40] SPWed
 Cherkezyan, Lusik [8947-41] S10, [8952-8] S3
 Chernenko, Alexander [8993-7] S1
 Chernikov, Alexey [8966-21] S6
 Chernomordik, Victor [8940-27] S5
 Cherry, Simon R. [8928-14] S4, [8937-39] SPSun
 Chervin, Christopher N. [8996-24] S7
 Chessa, Jack [8982-45] S9, [8988-68] S10, [8992-17] S4
 Cheung, King Tai [8987-62] S12
 Cheung, Lael [8943-120] SPSun
 Chevalier, Céline [8999-47] S10
 Chhetri, Raghav K. [8927-43] S11, [8934-35] S6, [8952-38] S10
 Chhetri, Suyog [8928-30] SPSat
 Chi, Chongwei [8935-31] S7
 Chi, Chongwei [8935-66] SPSun, [8937-22] S4, [8941-22] S6
 Chi, Chun-Yung [8996-13] S4
 Chi, Gou-Chung [8983-57] SPWed, [8983-58] SPWed, [8986-78] SPWed, [9003-12] S3
 Chi, Miaofang [8969-5] S1
 Chi, Nan [9008-15] S8
 Chi, Ting Ta [8934-38] S6
 Chia, Ray W. [8926-55] S11, [8926-58] SPSat, [8926-59] SPSat, [8941-20] S5
 Chia, Yong Poo [8959-74] SPTue
 Chiamori, Heather [8975-6] S2
 Chiang, Hung-Sheng [8960-49] S13, [8961-82] SPTue
Chiang, I-Da [8957-31] S7
 Chiang, Patrick [8991-19] S5
 Chiasera, Alessandro [8982-12] S3
 Chiavaioli, Francesco [8935-30] S7
 Chiba, Keita [8988-56] SPWed
 Chichibu, Shigefusa F. 8986 Program Committee
 Chico-Calero, Isabel [8934-55] S8
 Chidangil, Santhosh [8940-21] S4
 Chiel, Hillel [8928-35] S7
 Chien, Hui-Chun [8984-27] S1
 Chien, Hung-Chang [9009-18] S7
Chien, Liang-Chy 9004 Conference Chair, 9004 Track Chair, 9005 Conference Chair, 9005 S2 Session Chair, 9005 Track Chair, 9006 Track Chair
 Chien, Wade W. [8926-122] S1
 Chigrin, Dmitry N. [8989-28] S8
 Chigrinov, Vladimir G. 9004 Program Committee, 9004 S4 Session Chair, [9004-8] S3, [9005-20] S2
 Chikamatsu, Akira [8987-17] S3
 Chikkanna, Bhaskar [8946-31] S7
 Childers, Darrell [8991-17] S4
 Childress, Michael [8952-23] S6
 Childs, David T. D. [8994-6] S2, [9002-1] S1, [9002-3] S1
 Chilla, Juan L. 8966 Program Committee, 8966 S4 Session Chair, [8966-26] S8
 Chिमot, Nicolas [9002-11] S3
 Chin Loy, Anthony E. [8934-11] S2
Chin, Lixin [8934-45] S7, [8934-48] S7, [8946-12] S4, [8946-29] S6, [8946-3] S1, [8946-5] S2, [8949-9] S2
 Chin, Y. S. [8997-29] S11

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Chiou, Meng-Jhen [8994-15] S4
 Chistyakov, Alexander A. [8981-37] S9
 Chitgarha, Mohamed Reza [9007-23] S8
 Chithrani, Devika B. [8955-14] S4
Chitnis, Parag V. [8940-25] S5, [8943-104] S15, [8943-89] S13
 Chiu, Chien-Hao [8943-138] SPSun
 Chiu, Hsin-Ying [8984-2] S1
Chiu, Stephanie J. [8930-19] S5
 Chizhik, Alexey I. [8950-15] S4
 Chizhov, S. A. [8959-48] S11
 Chmielewski, Daniel J. [8981-20] S5, [8981-41] S11
 Cho, Beongki [8987-95] S6
 Cho, Chang-Hyun [8972-56] SPTue
 Cho, Daniel S. [8934-68] S10
 Cho, Eugenia H. [8935-23] S5, [8958-10] S3
 Cho, Han Saem [8926-99] SPSun, [8934-87] SPMon
 Cho, Il-Hoon [8950-20] S5
Cho, Jaedu [8947-34] S2, [8947-34] S8
Cho, Jaehye [9003-16] S3, [9003-31] S7, [9003-49] SPWed
 Cho, Josalyn L. [8927-36] S9
 Cho, Mee-Ryoung [9003-69] SPWed, [9003-70] SPWed
Cho, Myung K. [8992-14] S3
 Cho, Nam Hyun [8934-131] SPMon, [8934-132] SPMon
 Cho, Sangyeon [8946-23] S5
 Cho, Sang-Yeon [8994-27] S8, [8994-43] S11
 Cho, Seung Bum [8927-23] S6
 Cho, Sung Hwan [8983-11] S3
 Cho, Sung-Hak [8972-56] SPTue
 Cho, Yong-Chul [8977-9] S3
Cho, Yong-Hoon [8950-24] S6, [8950-40] SPSun, [8996-25] S7
 Cho, Young [8943-102] S15
Choa, Fow-Sen [8993-58] S12, [9002-58] S13
Chodavarapu, Vamsy P. 8954 Program Committee, [8973-23] SPTue, [8973-24] SPTue
 Choe, Kibaek [8944-14] S3, [8947-29] S6, [8947-81] SPMon
Choi, Bernard 8926 Conference Chair, 8926 S1 Session Chair, 8926 SKey Session Chair, [8926-23] S5, [8926-38] S8, [8926-4] S1, [8936-17] S4, [8942-5] S1, 8952 Program Committee, 8952 S5 Session Chair, 8952 S6 Session Chair, [8952-24] S6
 Choi, Bongseok [8974-51] S8
 Choi, Bum-Ho [8987-50] S11
 Choi, Byeong Kwon [8982-50] SPWed, [8985-55] SPWed
 Choi, Choon-Gi [8988-1] S1
 Choi, E. Y. [8983-64] SPWed
 Choi, E-Joon [9004-1] S1, [9004-3] S1
 Choi, Eun-Seo [8938-44] SPSun
 Choi, Hee-Joo [8964-42] S9
 Choi, Hee Ju [8977-9] S3
 Choi, Heejin [8948-69] S11
 Choi, Jacqueline [8939-19] S3
 Choi, Jaeseon [8941-46] SPMon
 Choi, Jiyeon [8972-41] S9, [8972-56] SPTue
 Choi, Ju Hyeon [8982-68] SPWed
 Choi, Kihyun [8986-38] S7, [9002-2] S1
 Choi, Myung-Chul [8950-36] SPSun
 Choi, Myung-hwan [8958-11] S3
 Choi, Pan-Ju [9003-60] SPWed
 Choi, Pyuck-Pa [8986-19] S4
 Choi, Seong Soo [8957-34] S7
 Choi, Seung Ho [8958-3] S1
 Choi, Siyoung Q. [8950-36] SPSun
 Choi, Sun Y. [8966-4] S2
 Choi, Sung soo (Sean) [8943-62] S9
 Choi, Won Kook 8987 Program Committee
 Choi, Wonjun [8952-39] S10, [8984-28] S8
 Choi, Wonshik [8943-202] SPTues, [8952-39] S10, [8978-20] S6, [8984-28] S8
 Choi, Woo June [8963-38] SPTue
 Choi, WooJhon [8930-32] S7, [8934-1] S1, [8934-22] S4
 Choi, Yoon Joon [8986-75] SPWed
 Choi, Young-Wan [8980-35] S9, [8989-17] S5, [9007-12] S5
 Choi, Youngwoon [8946-22] S5, [8949-28] S6, [8952-39] S10
Choma, Michael A. [8927-46] S11, [8934-53] S8, 8953 Program Committee, 8953 S1 Session Chair, [8953-11] S3
 Chong, Andy [8948-9] S1
 Chong, Harold M. H. [8989-12] S5
 Chong, Shau Poh [8948-77] SPSun
 Chong, Y. D. [8998-46] S10
 Choo, Hyuck [8989-26] S8
 Choo, Nayun [8934-132] SPMon
 Chopra, Supriya [8940-13] S3
Choquette, Kent D. [8966-30] S8, 9001 Program Committee, 9001 S3 Session Chair, [9001-17] S4, [9001-8] S2
 Chosrowjan, Haik [8959-27] S7
 Chou Lyu, Hong [8934-95] SPMon
 Chou, Amy [8950-52] S8
 Chou, Chien [8949-58] SPMon, [8952-2] S1
 Chou, Jason T. [8985-37] S8
 Chou, Lidek [8927-39] S10, [8934-11] S2, [8952-2] S1
 Chou, Mitch M. C. 9003 Program Committee, 9003 S5 Session Chair
 Chou, Shin-Ting [8933-16] S5, [8976-47] S10
 Chou, Wang-Hsien [8986-53] S10, [9003-30] S7
 Chou, Wu-Ching [8987-12] S2
 Choudhary, Amit [9004-25] SPWed
Choudhary, Amol [8959-40] S10
 Choudhary, Veena [8987-77] SPWed
 Choudhury, Amarjyoti [8996-30] SPWed
 Chow, Jong H. [8960-26] S6
 Chow, Lee [8987-57] S10
 Chow, Weng W. 8980 Program Committee, [8980-54] S14, [9003-11] S3
Chowdhury, M. I. Sakib [9007-21] S7, [9010-9] S4
Chowdhury, Shwetadwip [8949-52] S11
 Choy, Jonathan [8976-49] S10
 Choyke, Peter L. [8931-12] S3, [8931-38] S8
 Chrastina, Daniel [8990-17] S3
 Christ, Olaf [8945-3] S1
Christen, Jürgen 8986 S5 Session Chair, [8986-21] S4, [8986-32] S6, [8986-73] S15, [8986-77] SPWed, [8986-80] SPWed, [8986-81] SPWed, [8986-82] SPWed, [9003-19] S4
 Christensen, Scott [8961-91] SPTue
 Christodoulides, Demetrios N. [8980-51] S13
 Christol, Philippe [8993-34] S6, [8993-39] S7, [8993-40] S7
 Christopoulos, Stavros [9000-9] S2
 Christy, Robert J. [8926-4] S1, [8941-54] S11
 Chrostowski, Lukas [8989-15] S5, [9010-15] S5, [9010-15] S6
 Chtioui, Mourad [8988-25] S6
 Chu, Che-Kuan [8957-27] S6
 Chu, Chen C. [9001-1] S1
 Chu, Cheng Hung [8957-31] S7
 Chu, Daping [9005-4] S1
Chu, Fei-Hung [8980-44] S11
 Chu, Junhao [8938-21] S4
 Chu, Kengye K. [8927-12] S3, [8927-14] S3, [8927-45] S11, [8927-47] S11, [8927-52] S12, [8927-57] S13
Chu, Patrick B. 8991 Program Committee, 8991 S7 Session Chair
Chu, Shi-Wei [8950-41] SPSun, [8957-30] S7
 Chu, Shu-Chun 8999 Program Committee
 Chu, Woo-Sung [8988-49] S11, [8988-69] SPWed
 Chu, Yong S. [8975-25] S2
Chuang, Frank [8952-4] S1
 Chuang, Shun Lien 8980 Program Committee, [8980-13] S4
 Chuchumishev, D. [8926-141] S6
 Chul, Christopher Hoe-Kong [8935-4] S1
 Chun, Bong-Kwon [8926-150] SPSat
 Chung, Euiheon [8927-26] S6
 Chung, Eunna [8943-100] S15
 Chung, Haeil [8982-54] SPWed
 Chung, Hyunjin [8926-99] SPSun
 Chung, Il-Sug 8995 Program Committee, 8995 S8 Session Chair, [8995-19] S5
Chung, Jung-Ho [8934-124] SPMon
 Chung, Kuang Sheng [8957-31] S7
 Chung, Ming-Han [8949-59] SPMon, [8973-22] S5, [8982-73] SPWed, [8994-68] SPWed
 Chung, Phil-Sang [8932-42] SPSun, [8938-19] S4
 Chung, Thomas K. [8926-128] S3
 Chung, U-In [8977-15] S4, [8977-20] S5
 Chung, Wan Kyun [8927-26] S6
 Chung, Youngjoo [8938-19] S4, [8949-60] SPMon
 Chung, Yung-Chin [8949-58] SPMon
 Chuo, Yen [8943-138] SPSun
 Chusseau, Laurent 8980 S13 Session Chair, [8980-55] S14
Chuyanov, Vadim V. [8965-22] S5
 Chvatal, Lukas [8999-8] S2
Chyi, Jen-Inn 8986 Conference Chair, 8986 S9 Session Chair, [8986-86] SPWed, [8987-12] S2
 Chyla, Michal [8959-26] S6, [8959-29] S7, [8959-75] SPTue
 Cialla, Dana [8957-10] S3
 Cibella, Sara [8984-13] S3
 Cicchi, Riccardo [8926-3] S1, [8939-30] S6, [8948-6] S1
 Ciceri, Fabio [8939-15] S3, [8957-6] S2
 Cicerone, Marcus T. 8948 S6 Session Chair, [8948-26] S4, [8948-37] S7
 Cich, Michael J. [9003-41] S10
 Cichy, Bartłomiej [8982-9] S2
 Ciesielski, Wayne [8945-12] S3
 Cimalla, Peter [8934-86] SPMon
 Cincotti, Gabriella 9009 Program Committee, [9009-19] S7
 Cip, Ondrej [8992-31] SPWed, [8992-32] SPWed
 Cip, Ondrej [8941-50] SPMon
 Cittadini, Andrew J. [8935-48] S10, [8935-75] SPSun
 Cizek, Martin [8992-31] SPWed, [8992-32] SPWed
 Cizmár, Tomás [8972-12] S3, [8999-26] S6
 Clady, Raphael G. C. R. [8972-44] S10, [8972-44] S5
 Clafin, Bruce [8987-37] S7
 Clamp, John [9004-14] S4
 Clancy, Neil T. [8935-35] S8
 Clark, Alex S. [8997-35] S8
 Clark, Craig [8989-20] S6
 Clark, Gabrielle [8942-18] S4
 Clark, Heather A. [8933-8] S3
 Clark, Stewart J. [8984-12] S3
 Clarkin, James P. 8938 Program Committee, 8938 S7 Session Chair
 Clarkson, Eric W. [8936-9] S2
 Clarkson, W. Andrew 8959 Conference Chair, 8959 S7 Session Chair, [8959-55] S13
 Claudon, Julien [8993-16] S3, [8998-41] S9
Claussen, Jonathan C. [8955-31] S7
 Claustre, Patricia [8939-13] S2
 Clayton, Andrew H. A. [8948-107] SPSun
 Cleary, Justin W. [8987-4] S1, [8993-14] S2, [8993-84] S17
 Clegg, James H. [8950-25] S6
 Clements, Isaac P. 8928 Program Committee
 Clergeon, Christophe S. [8978-7] S2
 Clet, Vincent [8964-58] SPTue, [8972-26] S6
 Climov, Mihail [8934-71] S11
Cloos, Elizabeth F. [8961-77] SPTue
 Clouvel, Grégory [8949-14] S3, [8950-44] SPSun
 Cluzel, Romain [8993-39] S7, [8993-40] S7
 Co, Katrina U. [8929-26] SPSun
 Coats, Israel [8941-33] S9
 Coburn, James [8936-22] S5
 Coca-Lopez, Nicolas [8994-29] S8
 Cochard, Jacques [8985-38] S8
 Cocker, Tyler L. [8984-36] S10, [8984-37] S10
 Cocquelin, Benjamin [8959-21] S6
 Codemard, Christophe A. [8960-43] S11
 Coe, James V. [8947-10] S2, [8957-9] S3
Coelho, Luis [8957-20] S4
 Coen, Stephane [8960-5] S1
 Cogswell, Carol J. 8949 Conference Chair, 8949 S3 Session Chair, [8949-46] S9
 Cohen, Luchino Y. [8938-5] S1
 Cohoon, Gregory A. [8960-20] S5
 Collet, Aurélien [8960-4] S1, [8985-49] S10
 Colas, Antoine [8983-35] S8
 Cole, Adam J. [8943-221] SPTues
 Cole, Garrett D. [9000-14] S3
 Cole, Michael C. [8974-1] S1
 Colella, Letizia [9006-8] S2
 Coleman, Andrew J. [8935-42] S9
 Coleman, Matthew A. [8950-10] S2
 Coleman, Steven [8982-4] S1
Coles, Harry J. 9004 Program Committee
 Coles, Matt M. [8999-25] S6, [8999-32] S7
 Colin, Pierre [8926-61] S12
 Collazo, Ramon [8986-27] S5, [8986-31] S6, [8986-64] S14
 Collett, Oliver J. [8960-58] S15
 Collin, Stéphane [8981-33] S8
 Collins, Jack [8954-34] SPMon, [8954-35] SPMon
 Collins, Matthew J. [8997-35] S8
 Collob-Patton, Véronique [9005-3] S1
 Colman, Pierre [8960-2] S1, [8996-7] S2
 Colombelli, Raffaele [8993-41] S7, [8993-48] S9, [9002-28] S6
 Colombier, Jean-Philippe [8967-37] S13
 Colombo, Fernanda C. [8926-77] S15
 Colombo, Miriam [8955-57] S12, [8955-68] SPSun
 Combríe, Sylvain [8960-2] S1
 Comerford, Jeff [8992-15] S3
 Compton, Ryan E. [8984-18] S4
 Conan, Christophe [8976-50] SPTue
 Conan, Jean-Marc [8930-11] S3, [8978-11] S4
 Conchello, José-Angel 8949 Program Committee, 8949 S9 Session Chair
 Concina, Isabella [8987-70] S13, [8987-82] SPWed
 Condon, Nicholas J. [8961-71] SPTue
 Cong, Wenxiang [8937-34] SPSun
Conibeer, Gavin 8981 Program Committee, 8981 S6 Session Chair, [8981-16] S4
 Conjusteau, André [8943-112] SPSun, [8943-18] S3, [8943-223] SPTues, [8943-27] S4, [8943-4] S15
 Connie, Ashfiqua [9003-5] S2
 Connolly, Emma [8954-11] S3, [8954-31] SPMon
 Connolly, James L. [8947-25] S5
 Connors, Michael K. [8965-20] S5
 Conroy, Michael [8961-101] SPTue
 Constant, Eric [8984-49] S13
 Contag, Christopher H. 8947 Program Committee
Contini, Davide [8937-24] SPSun, [8945-18] S5, [8952-12] S3, [8993-93] S18
 Contreras, Delfino Reyes [8994-16] S4
 Contuzzi, Nicola [8963-36] S6, [8963-36] S9, [8963-5] S1
 Cook, Jason R. [8955-46] S10, [8956-15] S4
 Cook, Nathaniel C. [8955-18] S4
 Cook, Rebecca S. [8936-13] S3, [8948-56] S9
 Cook, Richard J. [8926-144] S7, [8934-128] SPMon
 Cook, Trevor J. [8959-37] S9
Cooper, David G. [8993-50] S9
 Coolen, Laurent [8993-82] S17, [8996-37] SPWed
 Cooper, Christy L. [8947-36] S9
 Cooper, Jason [8934-35] S6
 Cooper, Khershed P. [8970-2] S1
Cooper, Peter A. [8974-56] S9, [8988-38] S8
 Cooper, Robert J. [8928-34] SPSat
 Cooper, Thomas M. [8969-23] SPTue
Cooté, Joanna [8988-44] S10
 Copeland, Drew A. [8959-13] S4, [8959-76] SPTue

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Coppola, Giuseppe [8938-42] S8, [8947-46] S11
- Coquillat, Dominique [8985-32] S7
- Corbi, Juliano J. [8947-86] SPMon
- Corcoran, Anthony T. [8945-14] S4
- Corcoran, Christopher J. [8961-95] SPTue
- Corda, Daniela [8957-8] S2
- Cordat, Arnaud [8993-39] S7, [8993-40] S7
- Cordoba, Cristina [8973-19] S4
- Cordova, Miguel [8926-14] S13
- Corena, Len [8961-45] S11
- Corizzo, Ottavio [8963-8] S2
- Corkum, Paul B. [8968-16] S4
- Corless, David J. [8935-35] S8
- Corless, John D. 8992 Program Committee
- Cormack, Robert H. [8949-46] S9
- Cormary, Benoit [8955-16] S4
- Cormier, Eric [8961-32] S8, [8961-56] S13, [8984-49] S13
- Cornelissen, Hugo J.** [9003-3] S1
- Cornet, Marion [8984-49] S13
- Coronato Courrol, Lilia C. [8947-83] SPMon, [8947-85] SPMon
- Correa, Adrian [8926-83] S17
- Correa, Daniel S. [8970-12] S3
- Correa, Luciana [8926-115] S24
- Correia, João Guilherme [8987-16] S3
- Correia, Maria R. [8987-39] S8
- Corrielli, Giacomo [8972-33] S8
- Corsi, Carlo** 8993 S5 Session Chair, [8993-1] SKey
- Corsi, Fabio [8955-57] S12
- Corso, Anthony** [8934-101] SPMon
- Corso, Domenico [8990-42] S8
- Corstjens, Paul [8947-24] S5
- Cortina, Soledad [8946-10] S3
- Coscella, Enrico [8961-14] S4, [8961-97] SPTue
- Cosci, Alessandro [8926-130] S4, [8948-79] SPSun
- Cosendey, Gatién [9001-9] S2
- Cosentino, Luigi [8990-39] S8
- Coskun, Ahmet F.** [8933-21] S6, [8936-32] S7
- Costa, Flordina M. [8987-39] S8
- Costa, Maira S. [8932-23] S5
- Costa, Marco [8926-91] S18, [8926-96] S19
- Costache, Florenta A. [8988-2] S1
- Costantini, Irene [8948-16] S3
- Costin, François [8961-90] SPTue
- Côté, Daniel [8948-27] S5, [8948-99] SPSun
- Coté, Gerard L.** 8951 Conference Chair, [8951-2] S1, [8951-39] SPMon, [8951-40] SPMon, [8951-6] S2, [8951-9] S2
- Coto, Ivette [8970-15] S12, [8970-15] S4
- Coulbourne, Steven B.** [8962-18] S5
- Coumans, F. A.W. [8939-2] S1, [8952-6] S2
- Courjal, Nadège [8988-35] S8
- Courjard, Antoine [8964-58] SPTue, [8964-59] SPTue, [8972-26] S6
- Cournoyer, Alain [8967-23] S10
- Courtney, Sean M. [8961-62] S15
- Courville, Aimeric [8986-33] S7
- Courvoisier, François 8968 Program Committee
- Courvoisier, Sébastien [8972-1] S1
- Courvoisier, Sébastien D. [8972-53] SPTue
- Coutard, Jean-Guillaume [8947-53] S12
- Coutrot, Anne-Lise [8957-28] S6
- Coutu, Ronald A.** 8973 Program Committee, [8973-1] S1, [8973-11] S3, [8973-14] S3, [8973-16] S4, [8973-18] S4, [8973-2] S1, [8973-3] S1, [8975-14] S3
- Couture, Stéphane [9009-14] S6
- Cover, Keith S. [8936-12] S3
- Covey, John [8991-44] SPWed
- Cowan, William D.** 8978 Program Committee
- Cox, Benjamin [8935-55] S12
- Cox, Benjamin L.** [8949-10] S3
- Cox, Benjamin T. [8938-2] S1, [8943-173] SPMon, [8943-210] SPTues, [8943-225] SPTues, [8943-77] S12
- Cox, Dennis D. [8935-36] S8
- Cox, Guy C. 8948 Program Committee
- Cox, Ian G. [8934-95] SPMon
- Cox, Jonathan A. [8989-14] S5
- Cox, Susan [8950-18] S5
- Coxson, Harvey O. [8927-37] S9, [8927-51] S12
- Cradock, Kimberly [8935-48] S10, [8935-75] SPSun
- Cragerud, Emily S. [8961-66] SPTue
- Craig, Alan E.** 8997 Program Committee
- Cramer, Gwendolyn M. [8931-7] S2
- Crane, Nicole J. 8940 Program Committee
- Crawford, Gregory Philip 9004 Program Committee
- Crawford, Michael J. [8934-2] S1
- Craythorne, Emma [8935-42] S9
- Creath, Katherine** [8949-48] S10
- Creazzo, Timothy [8991-21] S5
- Crecea, Vasilica [8946-4] S2
- Crespi, Andrea [8972-31] S8, [8972-33] S8
- Crespo, Helder [9006-22] S5
- Crespo-Monteiro, Nicolas N. [8969-14] S2, [8969-14] S4
- Crespo-Poveda, Antonio [8989-4] S1
- Criante, Luigino [8968-17] S4, [8968-19] S4
- Crick, Dean C. [8933-23] S6
- Crisp, Dakota [8933-15] S4, [8989-23] S7, [8990-31] S6
- Cristiani, Ilaria [8976-21] S5
- Cronin, Stephen B. [8996-13] S4
- Crotti, Matteo [8993-92] S18
- Crouse, David Thomas [8985-35] S8, [8994-54] S13
- Crovisier, Jason** [8956-30] S8
- Crozat, Paul [8990-17] S3, [8990-36] S7
- Crozier, Kenneth B.** [8958-9] S2, 8994 S12 Session Chair, [8994-52] S13
- Crum, Trevor [8965-35] S8
- Crump, Paul [8965-17] S4, [8965-23] S5, [8965-7] SPTue, [9002-53] S12
- Cruz Muñoz, José Luis [8961-123] SPTue
- Ctistis, Georgios [8998-41] S9
- Cua, Eunice Michelle C. [8934-74] S11
- Cubeddu, Rinaldo [8972-22] S6
- Cubukcu, Ertugrul** [8982-8] S2, [8988-42] S9, [8993-79] S16, [8993-85] S17
- Cucinotta, Annamaria [8938-26] S5, [8961-14] S4, [8961-97] SPTue, [8985-14] S3
- Cuenca Martinez, Rodrigo [8935-12] S3, [8935-26] S6
- Cui, Haotian [8936-17] S4
- Cui, Qiannan [8984-2] S1
- Cui, Shanshan [8952-42] SPSun
- Cuisinier, Frédéric J. G. [8939-17] S3
- Culley, Siân [8950-23] S6
- Cullum, John [8931-27] S5
- Culver, Joseph P. 8942 Program Committee, [8943-94] S14
- Cummins, Brian M. [8951-40] SPMon, [8951-9] S2
- Cummins, Thomas M. [8943-178] SPMon
- Cundiff, Steven T. [8940-36] S7, [8984-22] S6
- Cunefare, David L. [8930-19] S5
- Cunningham, Brian T. 8933 Conference Chair, 8933 S2 Session Chair, 8933 S5 Session Chair, [8933-13] S4
- Cunningham, David G. [8991-12] S3
- Cunningham, Garry B. [9005-12] S3
- Cunningham, John E. [9010-4] S3
- Curatolo, Andrea** [8934-48] S7, [8934-6] S1, [8946-29] S6, [8949-9] S2
- Curcio, Christine A. [8930-6] S1
- Curcio, Luciano [8990-40] S8, [8990-41] S8
- Currie, Matthew O. [8963-12] S3, [8963-12] S7, [8970-26] S7
- Curry, Richard J. [8982-24] S5, [8982-38] S8, [8982-41] S8
- Cursiefen, Claus [8930-36] S8
- Cwagel, John M. [8942-28] S7
- Cwypych, Konrad [8983-31] S7
- Cyr, Michel [8988-20] S5
- Czarnota, Gregory J. [8952-19] S5
- Czechowski, Nikodem F. [8957-22] S5
- Czernecki, Robert [8986-25] S5, [8986-57] S11, [8986-60] S11
- Czyszanowski, Tomasz [8966-16] S5, [8986-60] S11, [8995-11] S3, [9001-16] S4

D

- D. E., Syamsundar [8966-20] S6
- D'Souza, Francis [8956-14] S3
- da Costa Fontes Fontes, Karla B. F. [8926-130] S4
- da Costa, Mardoqueu M. [8929-4] S1
- da Cunha, António F. [8987-39] S8
- da Silva Fonseca, Eduardo Jorge** [8947-84] S13, [8999-13] S3
- da Silva, Dilley Ferreira** [8931-22] S4
- da Silva, Tatiana P. N. [8928-72] SPMon
- Daab, Wajih A. [9007-23] S8
- Da-Ana, Patricia Aparecida [8929-4] S1
- Dabos, George [8990-8] S2, [8991-36] S8
- Dadgar, Armin [8986-80] SPWed
- Dado, Milan [8995-38] S10
- Daeubler, Juergen [9003-33] S7
- Dagens, Beatrice [8988-13] S3, [8988-28] S7
- Dahal, Eshan** [8947-27] S5
- Dahan, Asaf [8963-41] S4, [8963-41] S8
- Dahan, Maxime [8950-44] SPSun
- Dahhan, Imad [8966-17] S5
- Dahlgren, Robert P. 8982 Program Committee
- Dahmen, Jeremy L. [8960-23] S5
- Dähnert, Ingo [8947-30] S6
- Dai, Cuiuxia [8934-28] S4
- Dai, Daoxin [8988-29] S7, [8989-11] S4, [8989-27] S8
- Dai, Wen [8974-8] S2
- Dai, Zoujun [8946-16] S4
- Daicho, Yuya [8970-14] S3
- Daigle, Olivier [8928-9] S3
- Dainty, Chris** 8978 Program Committee
- Dajani, Iyad [8961-2] S1, [8961-67] SPTue, [8964-25] S6, [8964-67] SPTue
- Dal Lago, Matteo [9003-48] S11
- Dal Negro, Luca 8994 S10 Session Chair, [8994-26] S8
- Dalal, Roopa [8930-39] S8
- Dalby, Matt [8946-21] S5
- Dale, Elijah B. [8960-32] S9
- Dalimba, Udaya Kumar [8987-90] SPWed
- Dalimier, Eugénie [8926-24] S6, [8926-61] S12, [8934-69] S11
- Dalir, Hamed [9001-5] S1, [9001-7] S2
- Dalla Betta, Gian-Franco** [8982-37] S7
- Dalla Mora, Alberto [8937-24] SPSun, [8945-18] S5, [8952-12] S3
- Dallas, Gordon [8993-55] S10
- Dallessasse, John M. [8991-21] S5
- Dalner, Matthias [9002-46] S11
- Daly, Daniel J. [8946-31] S7
- Daly, John G.** SC015
- Daly, Michael J.** [8937-2] S1
- Dam, Jeppe Seidelin [8964-13] S3, [8964-52] SPTue, [8964-55] SPTue, [8964-56] SPTue
- Dama, Bipin [8990-37] S7
- Damania, Dhwanil [8947-5] S1
- Damestani, Yasaman** [8928-2] S1
- Damilano, Benjamin [8986-33] S7, [8986-50] S10
- Dana, Nicholas** [8943-3] S1
- Danaci, Onur [8993-94] SPWed
- D'Andrea, Cosimo [8972-22] S6
- Danet, Jeann-Marie [8966-19] S6
- Dang, Cuong H. [9002-5] S1
- Dang, Gerard [8995-8] S2
- Dang, Xung [8961-10] S3
- Dani, John A. [8928-83] S15
- Daniel, Amuthachelvi [8939-20] S4
- Daniel, Jürgen H. 9005 Program Committee
- Danielli, Amos [8943-52] S8, [8943-92] S14
- Daniels, Johannes M. A. [8927-42] S10
- Danner, Aaron James 9001 Program Committee
- Dantiste, Olivier A. [8956-8] S2
- Danto, Sylvain [8974-12] S4, [8988-5] S1, [8991-27] S6
- Dantus, Marcos M. [8948-87] SPSun, [8948-9] S1, SC1053
- Daoudi, Khalid [8943-209] SPTues, [8943-26] S4
- Dapkus, P. Daniel [8996-13] S4
- Darab, Ibraheem [8971-12] S2
- Daradich, Amy [8948-99] SPSun
- Darafsheh, Arash** [8931-20] S4
- Dardano, Principia [8999-40] S8
- Darga, Donald [8935-48] S10, [8935-75] SPSun
- Dargatz, Benjamin [8987-41] S8
- Darling, Cynthia L. [8929-12] S3, [8929-13] S3, [8929-21] SPSun, [8929-25] SPSun, [8929-26] SPSun, [8929-27] SPSun
- Darzacq, Xavier [8950-44] SPSun
- Das, Bijoy Krishna [8990-10] S2, [8990-12] S3
- Das, Biswajyoti [8994-10] S3
- Das, Gautom K. [8956-31] S8
- Das, Nandan Kr** [8942-20] S4, [8952-25] S7
- Das, Ronnie [8941-23] S6, [8976-28] S6
- Das, Suman [8970-20] S5
- Das, Sumana [8933-7] S2
- Das, Susanta K. [8972-17] S5
- Dasari, Ramachandra R. [8943-202] SPTues, [8947-12] S3, [8952-39] S10
- Dash, Jyotirmayee [8985-24] S6, [8985-25] S6
- Daskalakis, Konstantinos [8986-39] S8
- Dastmalchi, Pouya [8988-30] S7
- Dauderstädt, Ulrike A. [8977-21] S5
- Daudin, Bruno [8986-34] S7
- Dave, Utsav D. [8993-42] S8
- Davenport, Michael L. [8989-6] S2
- David, Aurelien [9003-1] S1, [9003-41] S10
- David, Nicolas [8947-19] S4
- David, Paul S. [8994-45] S11
- Davidson, Alan [8961-45] S11
- Davidson, Roderick [8984-53] S14
- David-Watine, Brigitte [8947-53] S12
- Davies, Edward [8977-32] S7
- Davies, Glick [9002-27] S6
- Davies, Ian [8965-26] S6
- Davis, Anjul M. 8953 Program Committee
- Davis, Daniel Michael [8950-25] S6
- Davis, Jon P. [8998-58] S13
- Davis, Mitchell A. [8948-66] S11
- Davis, Ronald W. [8954-27] S7, [8976-46] S10
- Davis, Ryan W. [8947-50] S12
- Davis, Scott C. [8931-18] S4, [8931-31] S6
- Davis, Steven J. 8962 Conference Chair, 8962 S1 Session Chair, 8962 S5 Session Chair, [8962-2] S1, [8962-5] S2
- Davis, Wyatt O.** 8977 Program Committee, 8977 S7 Session Chair
- Dawes, Andrew M. [8998-16] S4
- Dawes, Ryan [8948-7] S1
- Dawkins, Bryan [8944-31] SPMon, [8944-8] S2
- Dawson, David [8961-66] SPTue, [8965-12] S3
- Dawson, Jay W.** [8961-28] S7
- Dawson, Jeremy M. [8974-43] SPTue
- Dawson, Martin David [8974-20] S5, [8994-18] S1, [8994-18] S5
- Day Rosario Assis, Karcuis [9008-12] S7
- Day, John C. [8939-32] S6
- Day, Timothy** [8993-59] S12
- Dayeh, Shadi A. [8948-29] S8
- Dayneko, Sergey Vladimirovich** [8981-37] S9
- de Boer, Bart M. [8990-30] S6
- de Boer, Johannes F.** 8927 Program Committee, [8927-42] S10, [8930-26] S6, [8930-33] S7, [8934 Program Committee, [8934-44] S7, [8934-5] S1, [8934-63] S10, [8979-19] S1, [8979-19] S7
- De Boni, Leonardo [8964-50] SPTue, [8964-64] SPTue, [8969-23] SPTue, [8969-24] SPTue
- de Boorder, Tjeerd [8941-4] S2
- de Bruin, Daniel M. [8926-64] S12, [8937-27] SPSun

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- de Carvalho, Luis H. H. [8964-45] SPTue, [9008-17] S8
- de Ceglia, Domenico [8994-62] S15, [8994-66] SPWed
- De Dood, Claudia J. [8947-24] S5
- de Freitas, Anderson Zanardi [8934-129] SPMon
- De Freitas, Carolina [8930-29] S7
- De Giorgi, Milena L. [8997-26] S10
- De Giorgi, Vincenzo [8939-30] S6
- de Groot, Mattijs [8927-42] S10, [8934-5] S1, [8934-63] S10
- de Guise, Hubert [8997-14] S6
- De Haro, Leyma [8950-2] S1
- de Heer, Walter A. [8987-67] S13, [8993-83] S17
- de Hossou, Jeff Th. [8968-13] S3
- de Jesus Gouveia, Carlos [8938-53] SPSun
- de Jesus Silva, Alcenisio Jose [8999-13] S3
- de Jong, Jan H.** [8930-33] S7
- de Kersauson, Malo [8990-46] S7
- De Koninck, Yannick [8989-24] S7
- De Koninck, Yves [8948-27] S5, [8948-99] SPSun
- de la Cruz May, Lelio [8980-42] S11
- de la Fuente, Jesus M. 8955 Program Committee, 8955 S3 Session Chair, [8955-34] S8, [8955-48] S10, [8955-53] S12
- De La Rosa Cruz, Elder [8956-25] S6, [8956-32] S8
- de Lange, Dirk Frederik [8941-24] S6
- de Langen, Joop [8927-42] S10
- de Lary, Brian [8965-35] S8
- De Leenheer, Marc [9007-2] S2
- De Leeuw, Frédéric [8926-129] S4
- de Lima, Mauricio M. [8989-4] S1
- De Lisio, Michael [8948-96] SPSun
- De Los Reyes, Glenda B. [8984-36] S10, [8984-37] S10
- De Luca, Anna Chiara [8938-42] S8, [8957-8] S2, [8994-49] S12, [8999-40] S8
- de Matos, Luciana [8930-53] SPSun, [8936-39] SPSun
- de Mauro, Evandro [8926-73] S15
- de Mello, Claudio S. [8939-41] SPSun
- de Menezes, Priscila Fernanda Campos** [8926-35] SPSun, [8931-41] SPMon, [8931-45] SPMon, [8931-49] SPMon, [8931-8] S2
- de Mengin Poirier, Mikhael [8992-3] S1
- De Mets, Richard [8950-6] S2
- de Mierry, Philippe [8986-33] S7, [8986-50] S10
- De Montigny, Etienne [8926-126] S3, [8927-20] S5, [8928-1] S1, [8937-7] S2, [8937-9] S2, [8938-22] S4, [8992-5] S2
- De Moor, Roeland J.G. [8929-10] S3
- de Nardi, Andrijo B. [8926-35] SPSun, [8931-41] SPMon
- de Natale, Paolo** [8993-74] S15
- De Naurois, Guy-Mael Jacobe [9002-43] S10
- de Oliveira, Ana Julia Rodrigues Fernandes [8980-52] S13
- de Oliveira, Arquimedes L. B. [8947-69] SPMon
- de Oliveira, Júlio César R. F. [8964-45] SPTue, 9008 Program Committee, 9008 S9 Session Chair, [9008-17] S8, 9010 Program Committee, [9010-13] S4, [9010-13] S5
- de Oliveira, Susana P. [8932-15] S3, [8932-16] S3, [8932-39] SPSun, [8932-41] SPSun
- De Rossi, Alfredo [8960-2] S1
- de Rossi, Wagner [8972-52] S13, [8972-52] S8
- De Siena, Gaetano [8926-3] S1
- de Souza, Larissa Marila [8947-86] SPMon
- de Souza, Tiago G. B. [8964-64] SPTue
- De Stefano, Luca [8999-40] S8
- De Stefano, Mario [8999-40] S8
- de Sterke, C. Martijn [8998-46] S10
- de Thomaz, André A. [8947-21] S4, [8948-100] SPSun, [8948-12] S2, [8948-48] S8, [8948-51] S8, [8948-55] S9, [8955-61] SPSun, [8996-26] S7, [8996-32] SPWed
- De Tommasi, Edoardo [8994-49] S12, [8999-40] S8
- De Vittorio, Massimo 8996 Program Committee
- de Vries, Anthony H. B.
- De Wilde, Yannick [8993-26] S4
- Deana, Alessandro M. [8932-18] S4
- Deán-Ben, Xosé Luis [8943-139] SPSun, [8943-174] SPMon, [8943-213] SPTues, [8943-28] S5, [8943-57] S9, [8943-85] S13
- Death, David L.** [8992-15] S3
- deBenedetti, William [8981-36] S9
- Debernardi, Nicola [8945-11] S3
- Debnath, Kapil [8991-18] S5
- Debord, Benoit [8961-16] S4, [8994-9] S3
- DeCastro, Isabele Cardoso Vieira [8932-43] SPSun
- Decerle, Etienne [8980-56] S14
- Decker, Jonathan [8965-17] S4
- Decker, Manuel [8994-41] S11, [8994-67] SPWed
- Deckert, Volker 8957 Program Committee
- Decurey, Jean-Pierre [8997-13] S6
- Dedeoglu, Goksel 8979 Program Committee, 8979 S6 Session Chair
- Deev, Andrei [8993-29] S5, [8993-69] S14
- Degiron, Aloyse [8993-48] S9
- DegiInnocenti, Riccardo [8985-50] S11
- deGrassie, John [8971-14] S3
- DeGroote Nelson, Jessica E. SC1086
- Dehaes, Mathieu [8936-18] S7
- Deharvengt, Sophie J. [8926-28] S7
- Deicke, Frank 9007 S8 Session Chair, [9007-13] S6, 9009 S8 Session Chair
- Delonno, Erica [8965-3] S1
- Deka, Gitanjal** [8948-7] SPSun
- Deka, Nishita** [8982-2] S1
- Dekhter, Rimma [8939-11] S6, [8988-64] SPWed
- del Pino, Pablo 8955 S9 Session Chair, [8955-34] S8, [8955-48] S10, [8955-53] S12
- Delâge, André [8990-32] S6
- Delage, Laurent [8964-51] SPTue
- Delagnes, Jean-Christophe [8993-47] S9
- Delaigue, Martin [8972-24] S6
- Delamarche, Emmanuel [8976-36] S8
- Delamarre, Amaury [8981-23] S6, [8981-51] S13, [8981-8] S2
- Delaunay, Jean-Jacques 8987 Program Committee
- Delauay, Sophie [8987-80] SPWed
- Della Frera, Adriano [8993-89] S18
- Delmas, Marie [8993-34] S6
- Deloison, Florent [8947-64] S14
- Delon, Antoine [8950-6] S2, [8978-9] S3
- Delongchamps, Nicolas Barry [8926-61] S12
- DeLoor, Ronny [8967-25] S10
- Delteil, Aymeric [8979-29] S11
- Delville, Marie Helene [8955-22] S5
- DeMarco, Andrew T. [8936-8] S2
- Demars, Casey D.** [8988-36] S8
- DeMeo, Dante F. [8981-64] S13, [8982-18] S4
- Deminsky, Maxim [8941-59] S12
- Demir, Abdullah** [8965-6] S2
- Demirkiran, Aytac [8952-16] S4
- Demkov, Alexander A. [8987-29] S6
- Demmerle, Frederic [9002-25] S6
- Demory, Brandon J. [8996-14] S4, [8996-16] S5, [8996-17] S5
- Demos, Stavros G. 8940 Conference Chair, 8940 S2 Session Chair, 8940 S6 Session Chair, [8940-26] S5
- Dempewolf, Anja [8986-80] SPWed
- Dempsey, Katherine P. [8942-11] S2, [8947-54] S12
- Dems, Maciej [8995-11] S3, [9001-16] S4
- Denet, Stéphane [8966-29] S8
- Deng, Bin [8935-59] S12, [8935-78] SPSun
- Deng, Dinghuan [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-62] SPWed, [8982-63] SPWed
- Deng, Fei [8974-12] S4
- Deng, Hui [8996-14] S4, [8996-16] S5, [8996-17] S5, [9003-64] SPWed
- Deng, Jia-Huei [8948-63] S11
- Deng, Jie [8977-17] S4, [8977-18] S4
- Deng, Kexin [8937-35] SPSun
- Deng, Longjiang [8980-36] S9, [8988-27] S6
- Deng, Peng [9010-9] S4
- Deng, Xiaofeng [8931-28] S5
- Deng, Zijian [8943-204] SPTues
- Denicke, Stefan [8948-62] S10
- Deniel, Qian [8980-43] S11
- Denisov, Alexander [8985-34] S7
- Denisov, Alexander N. [8961-80] SPTue
- Densmore, Adam [8990-32] S6
- Dent, Paul [8935-78] SPSun
- Denton, Michael L.** [8932-12] S3, [8941-19] S5
- Denz, Cornelia [8977-102] SPLEN
- Depeursing, Christian D. [8949-7] S2
- Deppeur, Marcus [8986-61] S12, [8986-61] S8
- Derbouz Draoua, Karim [8970-15] S12, [8970-15] S4
- Derelle, Sophie [8993-34] S6
- Deren, Przemyslaw J. [8987-93] SPWed
- Dereniak, Eustace L.** [8949-2] S1
- Derenko, Susan [8956-26] S6
- Dergachev, Alex Y. [8959-11] S3
- Derrickson, Dennis J.** [8934-102] SPMon
- DeRose, Christopher T. [8967-27] S11
- Derycke, Vincent [9004-32] SPWed
- Desai, Tapan [8965-4] S1
- Descamps, Dominique [8984-49] S13
- Descos, Antoine [8995-12] S3
- Deshmukh, Atul [8940-12] S3
- Desjardins, Adrien E. [8938-2] S1, [8943-11] S2, [8943-21] S4, [8943-24] S4, [8943-25] S4
- Desmet, Walter [8926-92] S19
- Desoutter, Alban** [8929-6] S2
- deSouza, Nandita [8943-195] SPTues
- DesRoches, Brandon [8982-76] SPWed
- Desrus, Helen [8947-64] S14
- Destaing, Olivier [8950-6] S2
- Destouches, Nathalie N. [8969-14] S2, [8969-14] S4
- Detchprohm, Theeradetch [9002-16] S4
- Deterre, Romain [8928-1] S1
- Detwiler, Benjamin A. [9007-2] S2
- Detz, Hermann [9002-23] S5
- Deuretzbacher, Frank [8999-46] S10
- Deutsch, Christoph [9002-24] S6
- Devanaran, S. [8940-19] S4, [8940-31] S6
- Deveaud-Pledran, Benoit [8984-31] S9
- D'Evelyn, Mark P. [9003-39] S10
- Devine, Jack N. [8934-47] S7
- Devis, Lucie [8987-48] S11
- DeVito, Mark [8965-37] S8, [8965-39] S8, [8965-46] S2
- DeVries, Lawrence K. [8975-23] S4
- DeWhirst, Mark W. [8947-4] S1
- Dewitt, Douglas S. [8943-179] SPMon
- Dey, Priyanka [8939-9] S2
- Deyra, Loic [8959-21] S6
- Dhainaut, Alvide [8947-16] S4
- Dhaini, Ahmad R. [9007-2] S2
- Dhakal, Kamal** [8928-86] S16, [8928-93] S18
- Dhalla, Hafeez [8934-13] S3
- Dhanale, Ashish [8956-38] SPSun
- Dhaouadi, Maroua [8987-48] S11
- Dhillon, Sukhdeep S. [8984-41] S11, 8993 S8 Session Chair, [8993-11] S2, [9002-27] S6
- Dholakia, Kishan** [8935-55] S12, [8939-21] S4, [8939-6] S1, 8946 [8946-30] S7, [8949-31] S7, [8958-14] S3, [8972-12] S3, [8972-2] S1, [8972-3] S1, 8999 Program Committee, [8999-26] S6, [8999-40] S8, [8999-51] S10
- D'Hooge, Jan [8926-92] S19
- Dhuey, Scott [8974-6] S2, [8988-16] S4
- Di Biase, Luigi [8943-3] S1
- Di Carlo, Aldo 8980 Program Committee
- Di Falco, Andrea [8957-8] S2, [8993-24] S4
- Di Gaspare, Alessandra [8985-58] SPWed
- Di Gennaro, Sonia [9006-24] S5
- Di Lieto, Alberto [9000-2] S1
- Di Mario, Carlo 8926 Program Committee
- Di Natale, Charles [8947-53] S12
- Di Nicola, Jean-Michel G. [8985-37] S8
- Di Sieno, Laura [8937-24] SPSun, [8945-18] S5, [8952-12] S3, [8993-93] S18
- Di Teodoro, Fabio 8961 Program Committee
- Di, Jianke [8968-18] S4
- Dianov, Eugeny M. [8938-18] S4, [8939-36] S6, [8961-41] S10
- Diao, Yingying [8935-44] S9
- Dias Vieira, Nilson D. [8972-52] S13, [8972-52] S8
- Dias, Jorge T. [8955-48] S10
- Diaspro, Alberto** 8948 Program Committee, 8948 SPSun Session Chair, [8948-58] S10
- Diaz Diaz, Jesús [8926-138] S6
- Diaz León, Juan J. [8978-15] S5
- Diaz, David** [8935-56] S12
- Dickensheets, David L.** Symposium Chair, 8927 Program Committee, [8949-32] S7, 8977 Program Committee, 8977 S3 Session Chair, [8977-7] S2
- Dickerson, Matthew B. [8983-48] S11
- Dickinson, Brian A. [8929-3] S1
- Dickinson, Eva [8932-4] S1
- Dickinson, J. Thomas 8967 Program Committee
- Dickinson, Mark Russell [8951-34] SPMon, [9004-5] S2
- Dickinson, Mary E. [8934-89] SPMon, 8953 Program Committee, [8953-19] S4, [8953-3] S1, [8953-5] S1
- Dickmann, Klaus [8963-2] S1
- Didierjean, Julien [8959-21] S6, [8959-57] S13, [8959-9] S3
- Diebold, Eric D. [8947-13] S3, [8947-35] S9
- Diebolder, Rolf [8926-103] S21
- Diegel, Olaf [8947-28] S5
- Diehl, Laurent [9002-55] S13
- Diels, Jean-Claude M. 8960 Program Committee, 8960 S15 Session Chair, [8964-15] S4, [8964-16] S4, [8964-62] SPTue
- Dienelt, Anke [8943-140] SPSun
- Dierolf, Volkmar [8982-52] SPWed
- Dietmar, Klemme [8950-13] S3
- Dietrich, Joerg [8965-28] S6
- Dietzek, Benjamin [8926-133] S4, [8928-5] S2, [8940-7] S2, [8948-6] S1, [8972-18] S5
- Dietzel, Andreas H. [8977-35] SPTue
- Dietzinger, Christoph [8982-74] SPWed
- Dieulangard, Anthony [8982-53] SPWed
- Diezemann, Gregor [8950-1] S1
- Diezmann, Alex R. [8950-19] S5
- Differt, Dominik [8984-24] S7
- DiFlorio-Alexander, Roberta M. [8937-13] S3
- Digaum, Jennefir** [8981-12] S3
- Digianantonio, Lucas [8974-6] S2
- Digonnet, Michel J. F. 8982 Conference Chair, [8998-15] S3
- Dijkhuis, Jaap [8987-31] S6
- DiJoux, Mathieu [8972-50] S13, [8972-50] S8
- DiMarzio, Charles A. 8943 Program Committee, 8943 S7 Session Chair, [8948-85] SPSun, 8949 Program Committee, 8949 S5 Session Chair, [8949-24] S5, [8949-30] S6, [8949-45] S9
- Dimofte, Andreea [8926-135] S5
- Ding, Baoquan [8994-38] S10
- Ding, Boyang [8980-19] S5
- Ding, H. [8990-32] S6
- Ding, Hao [8926-139] S24
- Ding, Jianwu [8961-91] SPTue

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Ding, Jun [8985-29] S7
 Ding, Jun [8948-89] SPSun
 Ding, Jun 8928 Conference CoChair, 8928 S13 Session Chair, [8928-61] S13
 Ding, K. [8980-15] S4
 Ding, Ming [8960-21] S5, [8999-48] S10
Ding, Shuyu Y. [8981-44] S12
 Ding, Yimin [8944-9] S3
 Ding, Yujie J. 8984 Program Committee, [9000-12] S3
 Dingel, Benjamin B. 8971 Track Chair, 8985 Track Chair, 8990 Track Chair, 8991 Track Chair, 9007 Conference Chair, 9007 S1 Session Chair, 9007 S3 Session Chair, 9007 Track Chair, 9008 Conference Chair, 9008 S1 Session Chair, 9008 S3 Session Chair, 9008 Track Chair, 9010 S1 Session Chair, 9010 S3 Session Chair, 9010 Track Chair
 Dinger, Reinhold [8961-36] S9
 Dinh, Thien-Nam D. [8964-67] SPTue
 Diniz, Júlio C. M. [9008-17] S8
 Dinten, Jean-Marc [8935-34] S7, [8937-24] SPSun, [8937-25] SPSun, [8939-13] S2, [8939-4] S1, [8947-53] S12, [8952-12] S3
 Dinu, Raluca 8983 Program Committee
 Dionne, Jennifer A. 8994 S11 Session Chair, [8994-32] S9
 Diop, Mamadou [8941-44] SPMon, [8956-6] S2
 Dirsch, Olaf [8926-133] S4
 Dirsch, Rolf J. [8992-10] S3
 Distelbrink, J. H. [8962-13] S4
 Diveki, Zsolt [8984-46] S12
 Divliansky, Ivan B. [8959-54] S12, [8960-50] S13, [8965-16] S4, [8966-13] S4, [8982-36] S7
 Divoky, Martin [8965-7] SPTue
 Diwekar, Mohit [8928-82] S15
 Djordjevic, Ivan B. [9007-16] S6, [9007-17] S6, 9008 Program Committee, 9008 S7 Session Chair
Djuristic, Aleksandra B. 8987 Program Committee, 8987 S3 Session Chair, 8987 S4 Session Chair, [8987-68] S1, [8987-85] SPWed
Dobbelstein, Henrik [8960-16] S4
 Doblas, Ana [8949-37] S8, [8949-39] S8, [8949-40] S8
 Dobilhoff-Dier, Veronika [8934-27] S4
 Dobrodey, Stepan [8939-28] S5
 Dobroui, Serban [8954-15] S4
 Dobson, Kevin D. [8988-5] S1
 Dochow, Sebastian [8939-5] S1
 Dockery, Mary [8943-72] S11
 Dockery, Peter [8943-161] SPMon
 Dogan, Mehmet [8965-20] S5, [8965-24] S5
 Dogariu, Aristide C. [8999-1] S1
 Dogheche, Elhadj [8987-65] S13
 Doherty, Sean [8926-40] S8
 Dohrn, Andreas [8967-30] S11
 Doillon, Charles J. [8948-31] S5, [8972-20] S5
 Dolasinski, Brian D. [8985-3] S1
 Dold, Claus A. [8967-30] S11
 Dolega, Monika [8947-53] S12
 Dolfi, Daniel [8966-19] S6, [8985-17] S4, [8985-43] S9, [9004-16] S4
 Dolj, Sergei [8939-34] S6
 Dokemeyer, Jan [8959-43] S10
Dombi, Peter 8984 S12 Session Chair, [8984-47] S13
 Domes, Mona [8926-137] S6
 Dominec, Filip [8993-47] S9
 Dominguez, Jason [8994-41] S11, [8994-67] SPWed
 Domke, Matthias [8967-33] S12, [8967-33] S4, [8972-38] S9
 Dommann, Alex [8975-17] S3, [8975-8] S2
 Donetsky, Dmitry [8993-51] S10
 Dong, Biqin [8943-116] SPSun, [8943-118] SPSun, [8943-130] SPSun, [8943-145] SPSun, [8943-151] SPMon, [8943-152] SPMon
Dong, Chen-Yuan 8948 Program Committee
Dong, Chunhua [8998-44] S10
 Dong, Erbao [8945-8] S2
 Dong, Hongwei 8928 Program Committee, 8928 S12 Session Chair, [8928-52] S11
 Dong, Jianji [8985-41] S9
 Dong, Jing [8928-33] SPSat, [8942-2] S1, [8952-11] S3
 Dong, Weimin [8965-37] S8, [8965-39] S8, [8965-46] S2
 Dong, Xian-Zi [8970-13] S3
 Dong, Xiao-Bin [9006-56] SPWed
 Dong, Yongjiag [9003-62] SPWed
 Dong, Ze [9009-18] S7
 Donnelly, Joseph P. [8965-20] S5
Donner, Sabine [8926-124] S2
 Dontabactouny, Madhousoudhana [8961-16] S4
 Dontabhaktuni, Jayasri [9004-10] S3
Dontsova, Ekaterina I. [8961-86] SPTue
 Döpke, Benjamin [9002-12] S3, [9004-11] S3
 Dopps, Dustin [8943-84] S13
 Dora, Tapas Kumar [8940-13] S3
Dorada, Pallavi [8985-19] S4, [8985-44] S9
 Doradzinski, Roman [8986-5] S1
 Dorenbos, Pieter [8982-40] S8
Doronin, Alexander [8926-32] S7, [8934-47] S7, [8940-5] S1, [8940-6] S1, [8942-24] S5, [8943-47] S7, [8943-53] S8, [8952-14] S4, [8952-9] S3, [8999-18] S4
 Doroshenko, Maxim E. [8959-77] SPTue, [8959-78] SPTue
 Dorren, Harmen J. S. [8989-8] S10, [8989-8] S3
 Dorronsoro, Carlos [8946-8] S3
Dorsch, Friedhelm 8960 S7 Session Chair, 8963 Conference Chair, 8963 S1 Session Chair, 8963 S3 Session Chair, [8963-26] S6
Dorshow, Richard B. 8956 Program Committee, 8956 S8 Session Chair, [8956-17] S4
 Dorsinville, Roger [8982-48] SPWed
 Dorval, Paul [8935-14] S4
 dos Santos, Alex Ferreira [9008-12] S7
 dos Santos, Aline M. [8948-48] S8
 Dostálová, Tatjana 8929 Program Committee, [8929-8] S2
 Doster, Jay [8959-34] S8, [8959-39] S9
 Doughman, Yongqiu Q. [8953-10] S3
Douglass, Michael R. 8979 Conference Chair, 8979 S7 Session Chair
 Douillard, Ludovic [8993-82] S17
Douplik, Alexandre [8938-51] SPSun, [8943-57] S9
 Dourado, Victor Z. [8932-33] S7
 Douvalis, Alexios P. [8955-43] S9
 Dove, Jacob [8943-199] SPTues
 Dowling, Jonathan P. 8997 Program Committee
 Downes, James E. [8968-23] S5
 Downey, Bradley C. [9003-39] S10
 Downie, John D. 9009 Program Committee
 Downs, Chandler [8981-11] S3
 Doyle, Barry [8946-29] S6
Doyle, Keith B. SC1120
 Doylend, Jonathan K. [8989-6] S2
Drachenberg, Derek R. [8961-28] S7
 Dragic, Peter D. [8961-42] S10
 Drake, Christina [8974-25] S6
 Drake, Tyler K. [8952-28] S7
 Draney, Daniel R. [8943-120] SPSun
 Drauschke, Andreas [8936-14] S3
 Dreesen, Laurent A. [8938-49] SPSun, [8957-25] S5
 Dreidin, Galina V. [9006-17] S3
 Dreischuh, Alexander A. [8984-45] S12
 Drenker, Alexander J. [8963-24] S6
 Drexler, Wolfgang 8930 Program Committee, 8930 S7 Session Chair, 8934 Program Committee, [8934-2] S1, [8934-4] S1, [8939-10] S2, [8943-142] SPSun, [8964-5] S1, [8972-19] S5
 Driad, Rachid [8993-57] S12
Driever, Steffen [8961-108] SPTue, [8984-49] S13
 Dris, Stefanos [8982-7] S1, [9009-17] S7, [9009-4] S4
 Driscoll, Kristina [8981-4] S1
 Drobizhev, Mikhail [8956-34] S9, [8956-35] S9, [8983-27] S7, [8983-28] S7, [8983-29] S7
 Druon, Frédéric [8959-57] S13, [8961-20] S5, [8961-50] S12, [8961-51] S12
 Dryer, Alexandra [8934-72] S11
 Drygiannakis, Dimitrios [8976-44] S9
 Drzaic, Paul S. 9005 Program Committee
 DSouza, Alisha V. [8931-39] S8
DSouza, Roshan I. [8935-10] S3, [8942-9] S2
du Plessis, Monuko [8990-19] S4, [9005-5] S1
 Du, Congwu 8928 Program Committee, 8928 S9 Session Chair, [8928-45] S9
 Du, Detao [8959-76] SPTue
 Du, E. [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
 Du, Jihua [8965-6] S2
 Du, Ping [8983-35] S8
 Du, Qingyang [8988-5] S1
 Du, Shengwang [8988-37] S8
 Du, Yang [8935-31] S7, [8941-22] S6, [8956-5] S1
 Du, Yongzhao [8934-98] SPMon
 Du, Yu [8977-17] S4, [8977-18] S4
 Du, Yun [8960-34] S9
Duan, Can [8934-92] SPMon
 Duan, Guang-Hua [9002-32] S7
 Duan, Lian [8934-16] S3
 Duan, Meixue [8932-8] S1
 Duan, Ningyuan [8988-27] S6
 Duan, Weibo [8982-83] SPWed
Duan, Xiyu [8927-15] S4, [8927-31] S1, [8927-31] S8
 Duan, Xuan-Ming [8947-76] SPMon, [8970-13] S3
 Duan, Yubo [8948-65] S11
 Duan, Zhongchao [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-62] SPWed, [8982-63] SPWed
 Dubarry, Christophe [8994-57] S14
 Dubb, Jay [8936-18] S7
 Dubeau-Laramée, Geneviève [8938-5] S1
 Dubertrand, Jerome [8962-19] SPTue
 Dubertret, Benoit [8955-13] S3, [8996-37] SPWed
 Dubinov, Alexander [8993-80] S16
 Dubino, Sylvain [8958-46] S10, [8945-16] S4
 DuBose, Theodore B. [8934-100] SPMon
 Dubowski, Jan J. [8935-65] SPSun, 8967 Program Committee, 8967 S4 Session Chair, 8969 Conference Chair, 8969 S6 Session Chair
Dubra, Alfredo [8978-13] S4
 Dubrasquet, Romain [8961-61] S14
 Dubrulle, Nelly [8947-53] S12
 Duc, Huynh Thanh [8984-26] S7
 Ducci, Sara [8993-21] S3, [8993-6] SKey, [8997-34] S4
 Duchesne, François [8935-46] S10
 Ducommun, Bernard [8941-36] S9
 Dudhia, Jayesh [8935-2] S1
Dudley, Angela [8999-19] S4, [8999-34] S7, [8999-53] SPWed
Dudley, John M. [8997-13] S6
 Dudutis, Juozas [8967-44] S15, [8967-44] S7
 Dudzik, Grzegorz [8959-52] S12, [8961-81] SPTue, [8964-31] S7, [8964-65] SPTue
 Duesterberg, Richard [8965-6] S2
 Duffy, David C. [8935-32] S7
 Duffy, Megan [8935-42] S9
 Dufour, Denis G. [8975-11] S2
Dufour, Suzie SC1126
 Duke, Douglas M. [8963-19] S5
 Duker, Jay S. [8930-32] S7, [8934-22] S4
 Dullo, Firehun T. [8988-43] S9, [8988-66] SPWed
Duma, Virgil-Florin [8929-22] SPSun, [8936-37] S8
 Dummer, Matthew M. [8932-5] S1
 Dumont, Paul [8966-19] S6
 Dumont-Fillon, Dmitry [8976-29] S6
 Dunaev, Andrey V. [8935-9] S3, [8936-11] S3
 Dunbar, L. Andrea [8974-14] S4, [8994-28] S8
Duncan, Donald D. [8942-8] S2, 8946 Program Committee
 Duncan, Thomas M. [8948-53] S9, [8950-16] S4
 Duncan, Walter M. [8979-8] S5
 Dunias, Par [8945-11] S3
 Dunn, Andrew K. [8948-66] S11, [8950-2] S1, [8950-46] SPSun
 Dunn, Bruce S. 8957 Program Committee
 Dunn, Malcolm H. [8964-10] S3
Dunsby, Christopher W. [8926-71] S14, [8927-7] S2, [8935-2] S1, [8940-16] S4, [8950-25] S6
 Duparré, Michael [8999-34] S7
 Duperre, Joseph [9002-41] S9
 Dupont, Samuel [8982-53] SPWed
 Dupont-Nivet, M. [8993-78] S16
 Dupret, Antoine [8989-22] S7
 Dupuis, Alexandre [8992-22] S5
 Dupuis, Russell D. [9002-16] S4
 Dupuy, Emmanuel [8998-41] S9
 Duraipandian, Shiyamala [8939-31] S6
 Durán, María C. [8972-13] S3
 Durand, Mathieu [8995-25] S7
 Durécu, Anne [8961-69] SPTue
 Durfee, Charles G. [8967-12] S11, [8967-12] S6, [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6
 Durham, J. Scott [8935-19] S4
Durkin, Anthony J. 8926 Program Committee, 8926 S7 Session Chair, [8926-31] S7, [8926-4] S1, 8936 Program Committee, 8936 S4 Session Chair, [8936-17] S4, [8948-59] S10, [8952-21] S6
 Durnev, Mikhail [8993-7] S1
Durr, Nicholas J. [8935-51] S11, [8948-92] SPSun
 Durrant, Tim [8961-72] SPTue
 Durstock, Michael F. [8983-38] S9
 Duscher, Gerd [8969-3] S1, [8969-5] S1, [8969-6] S1
 Dussauze, Marc [8974-3] S1
 Dutt, Gurudev 8997 Program Committee
Dutta, Achyut K. 9008 Conference Chair, 9008 S5 Session Chair, 9010 S6 Session Chair
 Duttonhofer, Thomas [8976-12] S3
 Duval, Craig L. [8934-37] S6, [8934-70] S11
 Dvinelis, Edgaras [8993-45] S8, [9002-39] S9
 Dvoyrin, Vladislav V. [8961-47] S11
 Dwelle, Jordan [8926-78] S16, [8952-40] S10
 Dwilinski, Robert [8968-5] S1
 Dwivedi, Prashant Povel [8964-42] S9
 Dy, Jennifer G. [8926-12] S3, [8926-13] S3
 Dyer, Benjamin T. [8926-71] S14, [8935-2] S1
 Dzhagarov, Boris M. [8942-16] S4
 Dzedzina, Marcus [8959-7] S3
 Dziennis, Suzan [8942-32] S8, [8942-33] S8

E

 Earles, Thomas [9002-56] S13
 Eason, Robert William [8964-61] SPTue, [8976-16] S4
 Eaton, Shane M. [8970-7] S2
 Ebendorff-Heidepriem, Heike [8987-42] S8
 Ebenezar, Jeyasingh [8940-20] S4
 Eberhardt, Ramona [8961-31] S8, [8961-64] S15, [8961-89] SPTue, [8967-40] S14, [8968-34] SPTue, [8978-1] S1
 Eberle, Gregory [8967-15] S12, [8967-15] S7
 Eberle, Melissa M. [8928-43] S8, [8928-46] S9
 Ebermann, Martin [8977-26] S6, [8995-18] S5
Ebrahim-Zadeh, Majid 8964 Program Committee

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Eccles, Michael [8940-6] S1
Eccles, Suzanne [8943-195] SPTues
Echchgadda, Ibtissam 8941 Program
Committee, [8941-54] S11, [8941-64]
S10
Eckersley, Robert J. [8946-13] S4
Eckert, Rolf [8994-28] S8
Eckold, Matthew [8959-55] S13
Eckstein, Andreas [8993-21] S3
Edamatsu, Keiichi 8980 Program
Committee
Edelman, Gerda J. [8941-32] S9
Edelmann, André [8999-37] S8
Eder, Matthias [8926-137] S6
Edgecumbe, John [8961-91] SPTue
Edmans, Andrew [8937-31] SPSun
Edmond, Matthew [8935-49] S10
Edmunds, C. [9002-48] S11
Efimov, Anatoly [8971-4] S1
Eftekhar, Ali Asghar [8957-13] S3, 8994
Program Committee
Egbulefu, Christopher [8948-78] SPSun
Egging, Christian 8950 Program
Committee
Eggleton, Benjamin J. [8994-12] S3,
[8997-35] S8
Egl, Alexander [8939-35] S6
Eglish, Stephen J. Symposium Chair
Ehlan, Tom [8935-36] S8
Ehmke, Tobias [8930-1] S1
Ehrenreich, Thomas [8961-7] S2, [8961-
91] SPTue
Ehrentraut, Dirk [8987-96] S7, [9003-39]
S10
Ehret, Gerhard [8959-20] S5
Ehrhardt, Christian [9003-22] S5
Ehrhardt, Martin [8967-9] S10, [8967-9]
S5, [8968-37] SPTue
Ehrhard, Nikolai [8987-63] S12
Eich, Manfred 8983 Program
Committee
Eichenfield, Matt [8999-6] S2
Eichhorn, Marc 8959 Program
Committee, [8959-60] S14, [8964-41]
S9
Eichler, Christoph [8986-55] S11
Eichler, Hans Joachim [8959-7] S3,
8960 Program Committee
Eickhoff, Martin H. [8986-42] S8
Eidam, Tino [8961-21] S5, [8961-48]
S12, [8961-49] S12, [8961-5] S2
Eikermann-Haerter, Katharina [8934-71]
S11
Einfeldt, Sven [9003-25] S6, [9003-29]
S6
Eisele, Holger 8996 Conference Chair,
8996 S1 Session Chair, [8996-40] S2
Eitan, Michal [8994-42] S11
Ek, Sara [8996-7] S2
Ekerdt, John G. [8987-29] S6
Ekins-Daukes, Nicholas J. 8980
Program Committee, 8981 Program
Committee, [8981-40] S11
El Amili, Abdelkrim [8966-20] S6
El Beheiry, Mohamed [8950-44] SPSun
El Gendy, Aliia A. [8932-35] S7
El Kharbotly, Ahmed M. [8932-35] S7
El Kurdi, Moustafa [8990-46] S9
El Marsy, Eitedal M. [8932-35] S7
El Masry, Manal M. [8932-35] S7
El Sachat, Alexandros [8983-18] S4
El Sherif, Mohamed H. [8982-19] S4,
[8988-31] S7
El Zein, Basma M. [8987-65] S13
ElAfandy, Rami T. [8986-15] S3
Elagin, Mikaela [9002-45] S10, [9002-
62] S14
Elam, David P. [8941-54] S11, [8941-64]
S10
Eldada, Louay A. 8989 Conference
Chair, 8989 S2 Session Chair, 8989
S3 Session Chair, 8989 S6 Session
Chair, [8989-21] S7, 8991 S10
Session Chair
El-Desouki, Munir M. [9003-28] S6
Eldridge, Peter [8986-39] S8
Eldridge, William J. [8957-29] S6
Elezzabi, Abdulhakem Y. 8984
Conference Chair, 8984 S14 Session
Chair, 8984 S3 Session Chair, [8984-
17] S4, [8984-7] S2
Elgcróna, Gunnar [8959-38] S9
El-Ghoroury, Hussein S. [8980-3]
SPWed
El-Ghoussein, Fadi [8937-13] S3
El-Hajje, Gilbert [8981-23] S6, [8981-8]
S2
Elhamri, Said [8993-32] S6
Elhanan, Tal [8927-3] S1
Eliceiri, Kevin W. [8928-91] S18, [8941-
26] S7, 8948 Program Committee,
8948 SPSun Session Chair, [8949-10]
S3, [8949-44] S9, [8964-15] S4
Elim, Sandrio [8965-39] S8
Eliasev, Petr Georgievich [8980-29] S7
Eliyahu, Danny [8960-32] S9, [8960-35]
S9
Ellerbee, Audrey K. [8926-42] S12,
[8933-9] S3, [8934-16] S3, [8936-7]
S2, [8945-13] S4, [8946-17] S4,
[8953-14] S3
Ellinger, Frank [8991-4] S1
Elliott, Chris [8951-32] SPMon
Elliott, Jonathan T. [8931-36] S7, [8956-
6] S2
Elliott, Stephen R. [8982-38] S8, [8982-
41] S8
Ellis, A. Robert [8974-52] S8, [8989-20]
S6
Ellis, Andrew D. [9009-16] S7
Ellis, Bryan [9003-41] S10
Ellis, Holly [8956-28] S8
Ellis, Jonathan D. [8949-34] S7, [8949-
69] SPMon
Ellrich, Frank [8985-23] S5
Ellwood, Robert J. [8943-173] SPMon,
[8943-225] SPTues
Eloy, Jean-Christophe 8977 Program
Committee
El-Sabban, Salwa [8988-63] SPWed
Elsässer, Thomas [8965-2] S1
Elsen, Florian [8959-17] S5
El-Sharkawy, Yasser H. [8947-82]
SPMon
El-Sherif, Ashraf F. [8929-1] S1
Elsner, Ann E. [8930-46] SPSun
Elson, Daniel S. [8935-29] S6, [8935-35]
S8, 8946 Program Committee, 8946
S4 Session Chair, [8946-13] S4
Elste, Liene [8937-20] S4
Elumalai, Brindha [8940-15] S3
El-Zohary, Salah E. [8994-31] S8
Emadi, Tahereh Arezoo [8976-42] S9
Emboras, Alexandros [8988-32] S7
Emelianov, Stanislav Y. 8926 Program
Committee, 8926 S17 Session Chair,
[8926-84] S17, [8930-3] S1, [8934-33]
S5, 8943 Program Committee, 8943
S11 Session Chair, 8943 S8 Session
Chair, [8943-100] S15, [8943-103]
S15, [8943-3] S1, [8943-70] S11,
[8943-72] S11, [8943-73] S11, [8943-
76] S11, [8946-15] S4, [8946-28] S6,
[8955-29] S7, [8955-46] S10, [8955-
47] S10, [8956-15] S4
Emmenegger, Lukas [8993-68] S14
Émond, Frédéric [8935-46] S10
Emsia, Ali [9007-16] S6, [9007-17] S6
Enami, Taira [8967-5] S2, [8967-5] S4
Enami, Yasufumi [8983-43] S10
Enderlein, Jörg 8950 Conference Chair,
[8950-14] S4, [8950-15] S4, [8950-31]
S8, [8950-7] S2
Endo, Akira [8959-26] S6, [8959-29] S7,
[8959-75] SPTue
Endo, Masamori [8962-4] S2
Enejder, Annika M. 8948 S4 Session
Chair, [8948-28] S5
Eng, David K. [8983-44] S10, [8983-45]
S10
Engel, Maria [8939-35] S6
Engel, Philip [8993-86] S17
Engelhardt, Andreas P. [9001-14] S3
Engholm, Magnus [8959-38] S9, [8982-
30] S6, [8982-59] SPWed
Engin, Doruk [8961-11] S3, [8971-12]
S2
Englhard, Anna S [8926-142] S7, [8926-
146] S7, [8926-149] SPSun
Englund, Dirk R. 8994 S6 Session
Chair, [8994-24] S7, 8997 S2 Session
Chair
Enomoto, Tadayuki [8991-39] S9
Ensher, Jason R. [8934-102] SPMon,
[8934-2] S1
Ensley, Trenton R. [8983-3] S1
Enz, Eva [9004-29] SPWed
Eom, Joo Beom [8938-50] SPSun,
[8949-62] SPMon
Eom, Tae Joong [8930-22] S5, [8943-
52] S8
Epiñani, Mauro [8987-82] SPWed
Eppich, Bernd [8965-47] SPTue
Eppig, Timo [8931-27] S5
Epstein, Richard I. 9000 Conference
Chair, [9000-1] S1, [9000-18] S5
Erbert, Goetz [8935-21] S5, [8964-5] S1,
[8965-17] S4, [8965-23] S5, [8965-8]
S2, [8972-19] S5, [9002-12] S3, [9002-
14] S3, [9002-53] S12, [9002-7] S2,
[9002-9] S2
Ercolani, Daniele [8985-32] S7
Erdem, Sultan S. [8931-13] S3, [8956-3]
S1
Erdman, Matthew [8983-50] S11
Erdmann, Rainer [8936-19] S4,
[8948-49] S8, [8948-94] SPSun, 8950
Conference Chair, 8950 S1 Session
Chair, 8950 SKey Session Chair,
[8950-13] S3, [8950-8] S2
Erdogan, Ilknur [8951-18] S4
Eres, Gyula [8969-3] S1, [8969-5] S1
Erickson, David 8958 Program
Committee, [8958-18] S5, [8976-18]
S4, [8976-41] S9
Erickson-Bhatt, Sarah J. [8935-48]
S10, [8935-75] SPSun
Ericson, Marica B. [8948-92] SPSun
Ericson, Marna Elise [8947-21] S4
Ericson, Milton Nance [8951-2] S1
Erkol, Hakan [8943-190] SPTues, [8952-
16] S4
Ermilov, Sergey A. [8943-112] SPSun,
[8943-18] S3, [8943-223] SPTues,
[8943-27] S4
Ernst, Dominic [8938-17] S4
Erpelding, Todd N. [8943-157] SPMon,
[8943-188] SPTues, [8943-56] S9
Ertmer, Wolfgang A. 8999 Program
Committee, [8999-46] S10
Ertorer, Erden [8957-18] S4
Erzurumlu, Reha [8928-58] S12
Esaki, Hiroshi [9010-2] S1
Esashika, Keiko [8954-6] S2
Escalante Zarate, Luis [8961-123]
SPTue
Esche, Hans [8947-30] S6
Escobar, Andre [8931-41] SPMon,
[8931-49] SPMon
Escobar, H. Murua [8941-49] S8
Escoubas, Ludovic [8994-57] S14
Escuti, Michael J. [8999-19] S4
Esen, Cemal [8960-16] S4, [8999-49]
S10
Esenaliev, Rinat O. 8943 Program
Committee, 8943 S9 Session
Chair, [8943-111] SPSun, [8943-179]
SPMon, [8943-32] S5, [8943-33] S5
Esfandypour, Rahim [8976-46] S10
Eshaghian, Shaghayegh [8934-45] S7
Eshel, Ben [8962-6] S2
Esmann, Martin [8984-16] S4
Espagnon, Isabelle [8939-13] S2,
[8939-4] S1
Estes, Patricia S. [8948-68] S11, [8948-
90] SPSun
Estlack, Larry [8941-61] S12
Estrada, Hector [8943-174] SPMon
Etcheberry, Arnaud [8981-51] S13
Etezadi, Dordaneh [8993-64] S13
Ethell, Iryna [8928-95] S19
Etienne-Cummings, Ralph [8943-201]
SPTues
Eurice, Gary [8974-43] SPTue
Evans, Christopher C. [8964-66] SPTue
Evans, Conor L. [8926-2] S1, 8931 S7
Session Chair, [8931-14] S3, [8948-
32] S5
Evans, Gary A. 9002 Program
Committee, 9002 S12 Session Chair
Evans, Keith R. [8986-1] S1
Evans, Paul G. [8987-46] S4
Evdokimov, Maxim [8941-53] S11
Even, Jacky [8980-40] S11, [8980-56]
S14
Evers, Wiel [8981-5] S2
Evirgen, Axel [8993-39] S7, [8993-40]
S7
Evtikhiev, Nikolay [9006-40] SPWed
Ewald, Hartmut [8951-31] SPMon
Excell, Peter [9006-24] S5, [9006-25] S5
Eyal, Avishay [8943-165] SPMon
Eychmüller, Alexander [8955-20] S5
Eyink, Kurt G. [8996-27] S7

F

- Faber, Dirk J.** [8941-32] S9, 8952
Program Committee, 8952 S10
Session Chair, 8952 S9 Session
Chair, [8952-17] S5
Fabian, Simone [8968-34] SPTue
Fabre, Monique [8935-41] S9
Fabris, Laura [8983-38] S9
Facão, Margarida M. [8984-4] S1
Facke, Thomas [9006-1] S1
Fahl, Andreas [8987-63] S12
Fainman, Yeshiahu [8980-14] S4,
[8980-81] S8, [8980-82] SPWed,
[8989-7] S10, [8989-7] S3
Faist, Jérôme [8984-13] S3, [8985-13]
S3, 8993 Program Committee,
[8993-3] SKey, [8993-68] S14, 9002
S6 Session Chair, [9002-20] S5,
[9002-21] S5, [9002-26] S6, [9002-44]
S10
Fakonas, James [8997-32] S11
Falcon, Liberty [8981-22] S6
Fales, Andrew M. [8935-13] S4, [8935-
23] S5, [8957-2] S1, [8957-5] S2
Falkner, Matthias [8994-67] SPWed
Fallahi, Parisa [8997-29] S11
Fallica, Giorgio Piero [8990-27] S5,
[8990-40] S8, [8990-41] S8, [8990-
42] S8, [8990-43] S8
Fan, Angie [8965-4] S1
Fan, Chia-Ming [8981-59] SPWed
Fan, Frank C. 9006 Program Committee
Fan, Guofang [8983-62] SPWed,
[8983-63] SPWed, [8988-70] SPWed
Fan, Jinyu [9002-61] S14
Fan, Jingyun [8997-12] S5
Fan, Qirui [8954-12] S3
Fan, Shanhu 8989 Program
Committee, 8994 S15 Session Chair,
[8994-55] S14, [8995-5] S2, 8998
Program Committee
Fan, Shunping [8948-86] SPSun
Fan, Shuzhen [8964-9] S2
Fan, Xiaokang [8982-58] SPWed
Fan, Xinyan [8961-4] S1
Fan, Xudong 8933 Program
Committee, [8958-20] S5, [8960-10]
S3, [8976-33] S7, 8988 Program
Committee, 8988 S9 Session Chair
Fan, Yuanlong [8975-10] S2, [8980-73]
SPWed
Fan, Zhijian [8944-32] SPMon
Fan, Zhongwei [8941-16] S4
Fang, Kejie [8995-5] S2
Fang, Leyuan [8930-19] S5
Fang, Qiang [8961-70] SPTue
Fang, Qianqian 8937 Program
Committee
Fang, Qiyan [8958-8] S2
Fang, Wei [8960-45] S11
Fanjul-Vélez, Félix [8941-12] S3
Fanning, Geoff [8961-37] S9
Fanning, Thomas R. [9001-1] S1
Fantini, Sergio 8937 Program
Committee
Fantoni, Frederic [8935-34] S7
Farah, Nairouz [8928-99] S20, [8948-75]
SPSun
Farahi, Salma [8938-41] S8, [8943-9] S2
Faraon, Andrei [8994-21] S2, [8994-21]
S6
Fard, Ali M. [8934-78] S12
Fareghi, Mehdi [8926-45] S9
Farhat, Golnaz [8938-25] S5, [8952-19]
S5
Farhat, Karim H. [8940-19] S4
Farhoodfar, Avid [8960-69] SPTue
Farid, Mashal [8938-25] S5
Faridian, Ahmad [8949-17] S4
Farkas, Daniel L. 8947 Conference
Chair, 8947 S1 Session Chair, 8947
S2 Session Chair, 8947 S3 Session
Chair, 8947 S4 Session Chair, 8947
Track Chair, [8947-17] S4, [8947-18]
S4, [8947-20] S4, 8948 Track Chair,
8949 Track Chair, 8950 Track Chair,
8951 Track Chair, 8952 Track Chair,
8953 Track Chair

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Farley, Kevin F. [8961-101] SPTue
Farmani, Farnoosh [8928-87] S16
Farnesi, Daniele [8960-7] S2, [8988-71] SPWed
Faryad, Roger L. [8961-37] S9
Farsi, Sina [8930-18] S4, [8930-19] S5, [8930-21] S5, [8934-13] S3, [8952-35] S9
Faruque, Saleh M. [8971-16] S3
Faryad, Muhammad [8981-39] S10
Fasano, Alessio [8927-10] S3
Fasi, Anthony [8926-17] S4
Fassbender, Wilhelm [8965-49] SPTue
Fastenau, Joel M. [8993-53] S10
Fatakawala, Hussain [8926-85] S17, [8926-86] S17
Fatholoulumi, Saeed [8990-18] S4, [9010-11] S4, [9010-11] S5
Fathpour, Sasan [8990-15] S3
Fattahpoor, Sartoon [8993-17] S3
Fattal, David 8995 Conference Chair, 8995 S1 Session Chair, [8995-29] S8
Fauchet, Philippe M. 8933 Conference Chair, 8933 S1 Session Chair, 8933 S4 Session Chair, 8990 Program Committee, 8990 S4 Session Chair, [8990-21] S4, [8990-24] S4, [8990-48] S9, 8993 S10 Session Chair
Faucou, Marc [8972-50] S13, [8972-50] S8, [8972-57] SPTue
Faulkner, David W. 9007 Program Committee
Faure, Nicolaas M. [9005-5] S1
Favazza, Christopher P. [8943-92] S14
Favero, Ivan [8993-21] S3, [8993-6] SKey, [8997-34] S4
Fazel Bakhsheshi, Mohammad [8941-44] SPMon
Fazzini, Pier-Francesco [8955-16] S4
Featherstone, John D. 8929 Program Committee, [8929-5] S1
Fedele, Stefano [8926-144] S7, [8934-128] SPMon
Fedeli, J. M. [8991-18] S5
Fédéli, Jean-Marc [8988-23] S5, [8990-36] S7
Feder, Kenneth S. [8938-15] S3
Federenko, Yanina [8982-41] S8
Fedorenko, Yanina [8982-38] S8
Fedorka, Sara [8931-11] S3
Fedorov, Nikita [8984-49] S13
Fedorov, Pavel P. [8959-77] SPTue
Fedorov, Vladimir V. [8959-15] S4, [8959-62] S14, [8959-63] S14
Fedorova, Ksenia A. [8964-4] S1
Fedorych, Oleh M. [8980-21] S5
Fedoseyev, Alexandre I. 8981 S7
Session Chair, [8981-42] S11
Feeler, Ryan [8959-34] S8, [8959-39] S9
Fegadolli, William S. [8994-1] S1
Feige, Karsten [8972-13] S3
Feinaeugle, Matthias [8976-16] S4
Feinberg, Stephen E. [8926-17] S4
Feise, David [9002-9] S2
Feizi, Alborz [8949-15] S4
Fejer, Martin M. [8964-47] SPTue
Felder, Delphine [8935-68] SPSun, [8955-41] S9
Feldman, Marc D. [8926-78] S16, [8926-95] S19
Feldman, Martin [8979-10] S6
Feldman, Michael D. [8934-72] S11
Feldman, Revital [8963-41] S4, [8963-41] S8
Feldman, Yuri 8941 Program Committee
Feleppa, Ernest J. [8940-25] S5, [8943-89] S13
Feng, Chengyong [8964-15] S4
Feng, Dazeng [8990-18] S4, [9010-11] S4, [9010-11] S5
Feng, Guoying [8959-80] SPTue
Feng, Hanxin [8956-10] S2, [8976-27] S6
Feng, Jiansheng [8962-20] SPTue
Feng, Le [9006-58] S6
Feng, Liang [8981-21] S6
Feng, Ning-Ning [8991-27] S6
Feng, Shangyuan [8955-55] S12
Feng, Ting [8943-108] S16
Feng, Xiaohua [8943-146] SPSun, [8943-200] SPTues
Feng, Xin [8926-40] S8, [8940-1] S1, [8940-8] S2
Feng, Zheng-Wen [9001-1] S1
Fenn, Michael C. [8931-19] S4
Fennig, Eryn A. [8966-30] S8
Ferchichi, Abdelkerim [8994-57] S14
Ferchiou, Malek [8926-129] S4
Ferdinandus, Manuel [8983-3] S1
Ferencz, Julio Alberto Peres [8961-111] SPTue, [8961-119] SPTue
Ferguson, Ian T. [8987-58] S7
Ferguson, R. Daniel [8930-44] S9, [8934-82] S12
Ferhanoglu, Onur [8938-20] S4, [8948-92] SPSun
Fermann, Martin E. SC744
Fernandes, Adjaci U. [8941-38] SPMon
Fernandes, António J. S. [8987-39] S8
Fernandes, Heloise P. [8955-61] SPSun
Fernandes, Luis Andre [8972-32] S8
Fernandes, Rute F. [8955-25] S6
Fernandez Gonzalez, Alma del Carmen [8972-19] S5
Fernandez, Arnaud [8961-88] SPTue
Fernandez, Dennis S. [8935-73] SPSun
Fernández, Joaquín 9000 Program Committee
Fernández, Susana [8968-30] S15, [8968-30] S7
Fernandez, Victor [9009-11] S6
Fernandez-Dominguez, Antonio I. [8994-37] S10
Fernández-Palacios, Juan P. [9009-16] S7
Feroldi, Fabio [8927-42] S10
Ferra, Jordi F. [9009-16] S7
Ferrara, Maria Antonietta [8938-42] S8
Ferraresi, Cleber [8932-17] S4
Ferrari, Andrea C. [8966-31] SPTue, [8966-5] S2
Ferrari, Maurizio [8982-12] S3
Ferrario, Fabio [8965-15] S4
Ferraro, Pietro [8938-42] S8, [8947-46] S11, [8947-57] S13, [8982-22] S5
Ferreira da Silva, Wagner [8954-29] S7, [8996-33] SPWed
Ferreira, Lydia Masako [8932-13] S3, [8932-22] S4, [8932-23] S5, [8932-24] S5, [8932-25] S5, [8932-26] S5, [8932-27] S5, [8932-29] S6, [8932-30] S6, [8932-31] S6
Ferreira, Mário Fernando S. [8984-4] S1
Ferreira, Paulo Henrique Dias [8973-5] S1, [8983-8] S2
Ferretti, Marco [9003-48] S11
Ferreyra, Romualdo A. [8986-83] SPWed
Ferrieres, Laurence [8966-29] S8
Ferry, Vivian E. [8955-15] S4
Feshitan, Jameal A. [8943-206] SPTues
Festy, Frederic [8948-101] SPSun
Fete, Alexandre [8987-28] S6
Fetrow, Madalyn [8955-38] S8
Feuer, Anne [8967-16] S13, [8967-16] S8
Feugnet, Gilles A. [8998-56] S12
Février, Mickael [8988-28] S7
Février, Sébastien [8961-32] S8, [8961-56] S13
Fibrich, Martin [8929-8] S2, [8959-72] SPTue, [8959-73] SPTue
Fice, Martyn [8988-25] S6
Fiddy, Michael A. [8981-52] S13, [8994-50] S12, [8995-41] S10
Fiebrig, Stephan [8964-33] S8
Fiebig, Christian [8965-8] S2
Fiebig, T. [8926-141] S6
Fiebrandt, Julia [8982-5] S1
Fiedler, Sebastian [8926-50] S10, [8926-53] S11
Fiedler, Wolfgang [8963-24] S6
Fieguth, Paul [8930-25] S6
Field, Jennifer [8945-15] S4
Fields, Mitchell H. 9010 Program Committee
Fields, Renny A. 8971 Program Committee
Figiel, Jeffrey J. [8986-44] S8
Figueiredo Neto, Antonio M. [8947-83] SPMon, [8947-85] SPMon, 9004 Conference CoChair
Figueiredo, Marisa [8927-30] S7
Fihn, Mark 9005 Program Committee
Fiks, Ilya Iosifovich [8937-26] SPSun
Filatov, Gregory N. [8928-50] S10
Filimonov, Grigory A. [8971-8] S1
Fill, Ernst E. [8961-5] S2
Fillon, Raphael [8981-7] S2
Floramo, Arianna [9004-32] SPWed
Finch, Patrick [9002-13] S3
Fini, John M. [8961-13] S4, [8961-27] S7
Fink, Helen [8948-28] S5
Fink, Mathias [8928-63] S13, [8943-106] S16, [8943-48] S7, 8946 Program Committee, [8995-22] S6
Finke, Melanie [8931-27] S5
Finlay, Jarod C. [8926-135] S5, [8931-17] S4, [8931-20] S4, [8931-48] SPMon
Finley, James [8929-15] S4
Finley, Jonathan J. [8994-29] S8, [8994-40] S11, [8996-4] S1, [9002-35] S8
Finocchiaro, Paolo [8990-39] S8
Fintschenko, Yolanda 8976 Program Committee
Fiore, Andrea [8984-34] S9, [8993-17] S3, [8993-19] S3, [8993-20] S3
Fiorentino, Marco [8991-19] S5, [8991-42] S10, [8991-42] S3
Fireman, Micha [8986-47] S9
Firstenberg, Ofer [8997-24] S9
Fischer, Alec [9002-16] S4
Fischer, David G. 8992 Program Committee
Fischer, Joachim [8974-26] S6
Fischer, Jonathan [8964-8] S2
Fischer, Julian [8993-7] S1
Fischer, Marc [8993-44] S8
Fischer, Nicholas O. [8950-10] S2
Fischer, Stefan [8981-9] S3
Fischer, Ulrich H. P. [9007-20] S7
Fisher, Anita M. [8993-33] S6
Fisher, Robert A. 8940 S7 Session Chair, SC206
Fishman, Dmitry [8948-33] S6
Fitsios, Dimitris [8982-7] S1, [8990-14] S3, [8990-22] S4, [8991-33] S8
Fitzpatrick, David [8948-104] SPSun
Fix, Andreas [8959-17] S5, [8959-20] S5
Fixler, Dror [8938-7] S5, [8947-43] S10
Flämlich, Michael [8992-20] S4
Flinders, Dale [8934-3] S1
Flannery, Matt [8965-4] S1
Fleetwood, Dan [8986-47] S9
Fleischhaker, Robert [8972-25] S6
Fletcher, Andrew S. [8971-36] S4, [8971-38] S5
Fleury, Joel [8993-39] S7
Flint, J. Patrick [8993-55] S10
Flissikowski, Timur [8986-29] S6
Florea, Catalin [8959-58] S13, [8961-57] S13, [8968-35] SPTue, [8982-35] S7
Flores, Angel [8961-67] SPTue, [8964-25] S6
Flores, Eileen S. [8926-14] S3
Flores, Yuri V. [9002-45] S10, [9002-62] S14
Flores-Arias, María Teresa [8968-2] SPTue
Flynn, Brendan P. [8931-39] S8
Fodor, Balint [8987-13] S2, [8987-88] SPWed
Fofang, Nche Tumasang [8994-41] S11
Fogarassy, Eric [8967-29] S11
Fogel, Keith E. [8987-59] S12
Fogel, Mark A. [8942-17] S4
Foley, Justin M. [8995-20] S5
Folha, Roberta A. C. [8932-31] S6
Folkersma, Ger K. G. P. [8967-49] SPTue
Follen, Michele [8935-36] S8, [8945-6] S2, [8952-31] S8
Fong, Joan [8990-18] S4
Fong, Patrick W. K. [8987-85] SPWed
Fonseca, Ruben D. [8964-50] SPTue
Fontaine, Frederic-Georges [8957-21] S5
Fontaine, Nicolas [9009-9] S5
Fontecchio, Adam K. [8994-39] S10
Fontenot, Michael [8977-6] S2
Fontes, Adriana [8955-61] SPSun, [8955-62] SPSun
Foo, Yishu [8987-62] S12
Foran, Brendan [8965-3] S1, [8986-49] S9
Forbes, Andrew 8960 Program Committee, 8960 S6 Session Chair, [8960-52] S14, [8960-55] S15, [8960-56] S15, [8960-68] SPTue, [8996-39] SPWed, 8999 Program Committee, 8999 S5 Session Chair, [8999-19] S4, [8999-34] S7, [8999-43] S9, [8999-44] S9, [8999-45] S9, [8999-53] SPWed, [8999-54] SPWed
Forbes, David V. [8981-2] S1, [8981-28] S7, [8981-4] S1, [8981-40] S11, [8981-42] S11
Forchel, Alfred [8993-7] S1
Forcucci, Alessandra J. [8951-15] S4
Ford, Tim N. [8927-14] S3, [8927-45] S11
Foreman, Matthew Roy [8946-20] S5, [8960-22] S5
Forge, Ralf [9000-9] S2
Forget, Sébastien [8966-13] S4, [8983-30] S7
Formigli, Lucia [8948-57] S9
Fornahl, Udo [8965-32] S7, [8965-34] S7
Forouhar, Siamak 8993 Program Committee
Forouhesh Tehrani, Kayvan [8978-17] S5
Forrer, Hans [8963-13] S3, [8963-13] S7
Forrer, Martin [8963-13] S3, [8963-13] S7
Förster, Eckhart [8972-14] S4
Förster, Frederike [8984-9] S2
Förstner, Jens [8984-52] S14
Fort, Alain F. 8983 Program Committee
Fortin-Deschenes, Matthieu [8972-7] S2
Fortuna, Damiano [8930-51] SPSun
Fortunato, Alessandro [8963-9] S2
Fortunato, Thereza Cury [8931-22] S4, [8941-42] SPMon
Foster, Robert [8926-128] S3
Foster, Thomas H. [8931-19] S4
Foth, Hans-Jochen [8931-27] S5, [8931-40] S8
Fotiadi, Andrei A. [8961-102] SPTue
Fouad, Anthony [8945-2] S1
Fourcade-Dutin, Coralie [8961-16] S4
Fourkeas, John T. [8970-19] S5
Fournier, David R. [8935-32] S7
Fournier, H. [8981-7] S2
Fournier, Paula L. [8938-4] S1
Fournier, Jeanne [8929-16] S4
Fowlkes, Jason D. [8969-13] S2, [8969-13] S4
Fox, Nigel [8988-44] S10
Fox, William [8934-82] S12
Fox-Roberts, Patrick [8950-18] S5
Frade Rodriguez, Maria [8978-14] S5
Fradkin, Leonid [8935-36] S8
Fragola, Alexandra [8947-47] S11
Franceschini, Maria Angela [8936-18] S7
Franchini, Kleber G. [8948-48] S8
Franciscangelis, Carolina [9008-17] S8
Franco Rego, Davi [8980-50] S13
Francois, Alexandre [8938-30] S6, [8951-38] SPMon, [8957-24] S5, [8957-25] S5
Francois, Thierry [8987-76] SPWed
Frangolho, Ana [8954-5] S2
Frank, Sascha [8963-3] S1
Franke, Gesa Lilith [8934-19] S3
Franklin, Samantha K. [8955-49] S11
Franson, James D. 8997 Program Committee
Franta, Benjamin [8967-5] S2, [8967-5] S4
Franz, Dennis [8996-8] S2
Franzka, Steffen [8972-39] S9
Fraser, Gerald T. 8945 Program Committee
Fraser, James M. [8963-25] S6
Fraser, Scott 8948 Program Committee, 8953 Conference Chair
Frateschi, Newton C. [8980-82] SPWed
Fratz, Markus [8992-23] S5, [9006-13] S3
Fratzl, Peter 8926 Program Committee
Frauenheim, Thomas [8987-20] S4
Frayssinet, Eric [8986-50] S10
Frazier, Ryan J. [8992-18] S4
Frederich, Hugo [8993-82] S17
Fredericks, Peter M. [8939-9] S2
Freeman, Joshua R. [8993-11] S2, [9002-27] S6
Freeman, Mark R. [8984-36] S10, [8984-37] S10

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Frees, Amy E.** [8947-4] S1
Freidank, Sebastian [8955-33] S7
Freier, Erik [8961-64] S15
Freimuth, Frank [8984-40] S11
Freitag, Benjamin [8926-49] S10
Freitag, Christian [8967-20] S9
Freitas, Alexandre P. [9010-13] S4, [9010-13] S5
French, Paul M. W. [8926-7] S14, [8927-7] S2, 8935 S12 Session Chair, [8935-2] S1, [8940-16] S4, 8947 Program Committee, 8948 Program Committee, 8950 Program Committee, [8950-25] S6, 8956 Program Committee, 8956 S4 Session Chair
Frentzen, M. [8929-28] SPSun
Frenz, Martin [8941-1] S1, 8943 Program Committee, 8943 S12 Session Chair, 8943 S4 Session Chair, [8943-227] SPSun, [8943-228] SPSun
Frere, Samuel [8948-45] S8
Freude, Wolfgang [9009-8] S4
Freudiger, Christian W. [8948-24] S4, [8948-30] S5
Freund, Ronald 9008 Program Committee, 9009 Program Committee
Freundlich, Alexandre 8980 Program Committee, 8980 S10 Session Chair, 8981 Conference Chair, 8981 S1 Session Chair, 8981 S10 Session Chair, 8981 S5 Session Chair, [8981-22] S6, [8981-26] S7, [8981-32] S8, [8981-42] S11
Frevert, Carlo F. [8965-23] S5, [9002-53] S12
Frey, Wolfgang [8943-72] S11
Freyz, Eric [8961-76] SPTue
Friberg, Ari T. [8964-26] S6, [8999-23] S5, [8999-52] SPWed
Fricke, Jörg [8935-21] S5, [8965-17] S4, [9002-7] S2
Fricke-Begemann, Thomas [8991-15] S4
Friebele, E. Joseph 8961 S7 Session Chair, [8961-71] SPTue
Fried, Daniel 8929 Conference Chair, 8929 S1 Session Chair, 8929 S4 Session Chair, [8929-12] S3, [8929-13] S3, [8929-14] S3, [8929-21] SPSun, [8929-23] SPSun, [8929-24] SPSun, [8929-25] SPSun, [8929-26] SPSun, [8929-27] SPSun
Fried, Miklós [8987-13] S2, [8988-39] S8
Fried, Nathaniel M. 8926 Program Committee, 8926 S10 Session Chair, [8926-46] S10, [8926-51] S10, [8926-52] S11, [8926-54] S11, [8926-56] S11
Fried, William A. [8929-25] SPSun
Friedel, Susanna [8968-14] S3
Friedman, Reut [8949-51] S10
Friedrich, Donald M. [8992-2] S1
Friedrichs, Martin [8977-21] S5
Friend, Cynthia M. [8967-56] SPTue
Frigerio, Jacopo [8990-17] S3
Fritsche, Haro [8959-7] S3, [8965-15] S4
Fröhlich, Benjamin [8981-9] S3
Frohme, Marcus [8972-17] S5
Frohns, Florian [8932-1] S1
Frölich, Andreas M. [8974-26] S6
Fromager, Michael [8999-54] SPWed
Froner, Elena [8954-28] S7
Frosch, Torsten [8951-28] S6, [8951-29] S6
Frost, Eric H. [8935-65] SPSun
Frost, Frank [8967-9] S10, [8967-9] S5, [8968-37] SPTue
Frucci, Giulia [8993-20] S3
Fruehauf, Norbert 9005 Program Committee
Fründt, Jana [8965-32] S7
Frye, Seth [8934-126] SPMon
Fu, Anthony [8996-38] S3
Fu, Bo [8979-4] S4
Fu, Buyin [8928-4] S1
Fu, Dan [8948-35] S6
Fu, Enjin [8989-16] S5
Fu, Kai-Mei C. [8933-20] S6, 8997 Program Committee, [8997-1] S2, [8997-1] S6
Fu, Ling 8928 S7 Session Chair, 8928 S8 Session Chair, [8928-51] S10
Fu, Rongxin [8949-43] S9
Fu, Xiaoyong [8934-62] S9
Fu, Yijing [8990-21] S4, [8990-24] S4
Fuchs, Christian [8971-7] S1
Fuchs, Frank 8993 S15 Session Chair, [8993-57] S12
Fuchs, Frank [8974-15] S4, [8974-57] S9, [8995-3] S1
Fuchs, Silvio [8972-14] S4
Fudala, Rafal [8950-4] S1, [8950-51] SPSun
Fuentes-Garcia, Angel [8952-24] S6
Fuentes-Tapia, Israel [9006-38] SPWed, [9006-41] SPWed, [9006-44] SPWed, [9006-46] SPWed
Fufaro, Luca [8997-13] S6
Fuh, Andy Ying-Guey 9004 Program Committee
Fujii, Akihiko [9004-7] S2
Fujii, Eiichi [8968-7] S2
Fujii, Yusuke [9004-15] S4
Fujikata, Junichi [9010-5] S3
Fujimaki, Yosuke [8960-63] S16, [8961-43] S10
Fujimori, Wataru [9004-13] S4
Fujimoto, James G. Symposium Chair, [8927-30] S7, [8930-32] S7, 8934 Conference Chair, 8934 S2 Session Chair, [8934-1] S1, [8934-22] S4, [8947-25] S5, SC312
Fujimoto, Masatoshi [8934-103] SPMon
Fujimura, Kayoko [8974-30] SPTue
Fujioaka, Hiroshi 8986 Conference CoChair, 8986 S2 Session Chair
Fujsaki, Akira [8963-31] S8, [8967-18] S9, [8967-19] S9
Fujita, Alessandra K. [8926-35] SPSun, [8931-41] SPMon, [8931-45] SPMon, [8931-49] SPMon
Fujita, Hiroyuki [8950-32] S8
Fujita, Hisanori [8959-27] S7
Fujita, Katsumasa [8948-64] S11, [8949-54] S11, [8950-41] SPSun, [8957-30] S7
Fujita, Masanori [8943-214] SPTues
Fujita, Masayuki [8959-27] S7
Fujiwara, Masaru [8951-36] SPMon
Fukada, Youichi [9007-11] S5
Fukami, Tadashi [8947-62] S14
Fukaya, Shinpei [9005-14] S3
Fukuda, Naoaki [8967-11] S10, [8967-11] S5
Fukuda, Shinichi [8934-60] S9
Fukui, Hidetoshi [8974-36] SPTue
Fukumura, Tomoteru [8987-17] S3
Fukushima, Kensuke [8986-76] SPWed
Fukushima, Shogo [8979-12] S6
Fukushima, Shu-ichiro [8948-81] S2
Fukuyo, Fumitsugu [8986-68] S14
Fukuzawa, Kodai [8983-24] S6
Fullager, Daniel B. [8994-50] S12, [8995-41] S10
Fülöp, József András [8964-59] SPTue
Funabashi, Masaki [9001-3] S1
Funato, Mitsuru [8986-76] SPWed
Furlong, Mark J. [8993-53] S10, [8993-54] S10, [8993-55] S10
Furniss, David [8938-28] S6, [8938-29] S6
Furtado, Fabianne [8932-13] S3, [8932-27] S5
Furukawa, Hiroshi [8964-47] SPTue
Furukawa, Hiroyuki [8959-27] S7
Furukawa, Koichi [8963-31] S8, [8967-18] S9
Furukawa, Yasunori [8964-12] S3, [8964-35] S8
Furuta, Masanori [8985-46] S10
Fusazaki, Koshi [8987-10] S2
Fusco, Sabato [8947-57] S13
Fusi, Franco [8955-45] S10
Fussell, Andrew L. [8948-91] SPSun
Futia, Gregory [8939-18] S3
- G**
- Gabay, Ilan [8938-32] S7
Gabriel, Jared J. [8983-13] S4
Gacemi, D. [8993-48] S9
Gach, H. Michael [8928-11] S3
Gacoin, Thierry [8987-48] S11
Gaeta, Alexander L. [8940-37] S7, [8998-23] S5
Gaggero, Alessandro [8993-19] S3, [8993-20] S3
Gagnon, Joanie [8957-21] S5
Gaida, Christian [8961-55] S13, [8964-54] SPTue, [8968-32] S15, [8968-32] S7
Gaidar, Daria [8948-3] SKey
Gaimard, Quentin [8993-72] S15
Gaizauskas, Eugenija [8972-42] S9
Galanzha, Ekaterina I. 8942 Program Committee, [8943-31] S5, 8944 S4 Session Chair, [8944-10] S3
Galarneau, Pierre 8960 Program Committee
Galarreta, Betty [8976-30] S7
Galbally-Kinney, Kristin L. [8962-2] S1, [8962-5] S2
Galbraith, Christopher M. [8963-25] S6
Gale, Bruce K. 8976 Program Committee
Galeb, Ranko [8934-3] S1
Galoto, Natale [8990-40] S8
Gallagher-Colombo, Shannon [8931-3] S1, [8931-47] SPMon
Gallant, Andrew J. [8941-63] S10
Gallant, Pascal [8935-46] S10, [8938-5] S1
Gallardo Nelson, Maria J. [8953-20] SPSun
Gallerano, Gian Piero 8941 Program Committee
Gallet, Valentin [8972-28] S7
Galli, Andrea [8938-42] S8, [8947-46] S11
Galli, Giulia [8981-13] S4
Galli, Iacopo [8993-74] S15
Gallion, Philippe [8964-48] SPTue, [9007-9] S4, [9009-22] S8, [9010-8] S4
Gallot, Guilhem 8993 S4 Session Chair
Galmes, Batiste [8997-13] S6
Galopin, Elisabeth [8984-32] S9, [8997-28] S10, [8997-34] S4
Galos, Roland [8943-65] S10
Galstad, Christian [9002-50] S12
Galvani Otuka, Adriano J. [8970-12] S3
Galvao, Ernesto [8972-31] S8
Galvez, Enrique J. 8999 Conference Chair, 8999 S3 Session Chair, 8999 S8 Session Chair, [8999-17] S4
Galvez, Eva [8955-53] S12
Gamatham, R. R. G. [9008-24] S10
Gambarara, Fabio [8971-21] S4
Gambhir, Sanjiv Sam [8943-17] S3, [8943-221] SPTues, [8943-58] S9
Gamm, Ute A. [8952-7] S2
Gamrad, Lisa [8941-49] S8, [8955-7] S2, [8955-9] S2
Gan, Yu [8926-75] S15
Gananathan, Poorani G. [8955-63] SPSun
Gandhi, Alagappan [8980-53] S13
Gandhi, Vishal [8982-13] S3
Gandía, Javier [8968-33] S15, [8968-33] S7
Gandjibakhche, Amir 8940 Program Committee, [8940-27] S5
Ganem, Joseph [9000-15] S4
Ganesan, Singaravelu [8935-24] S5, [8939-20] S4, [8940-15] S3, [8940-2] S1, [8940-20] S4, [8955-63] SPSun
Gangopadhyay, Palash [8996-41] S5
Ganka, Thomas [8982-74] SPWed
Gannon, Caleb [8965-45] SPTue
Gannot, Israel 8938 Conference Chair, 8938 SKey Session Chair, [8938-11] S3, 8940 Program Committee, 8940 S1 Session Chair, [8940-24] S5, [8940-29] S6, [8943-165] SPMon
Gant, Rebecca [8958-10] S3
Gantenbein-Ritter, Benjamin [8952-5] S2
Gao, Bruce Z. [8942-29] S7, [8948-105] SPSun, [8949-68] SPMon
Gao, Chungqing [8959-16] S4
Gao, Dingshan [8985-41] S9
Gao, Fan [8974-8] S2
Gao, Fei [8943-146] SPSun, [8943-200] SPTues
Gao, Feng [8936-38] SPSun, [8937-23] SPSun, [8937-36] SPSun, [8952-42] SPSun, [8952-43] SPSun, [8952-44] SPSun
Gao, Liang [8943-122] SPSun, [8943-205] SPTues
Gao, Liang S. [8943-121] SPSun, [8943-8] S2, [8950-39] SPSun
Gao, Peng [8937-21] S4
Gao, Shengkui [8936-25] S6, [8936-26] S6
Gao, Weibo [8997-29] S11
Gao, Weiqing [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-62] SPWed, [8982-63] SPWed, [8982-70] SPWed
Gao, Xiaohu [8943-156] SPMon
Gao, Yan [8975-20] S4
Gao, Yan [8954-1] S1
Gao, Yvonne Y. [8997-14] S6
Gaponik, Nikolai [8955-20] S5
Gapontsev, Valentin P. [8955-22] S5
Garay, Javier E. [8928-2] S1
Garayt, Jean Philippe [8988-14] S3
Garbacik, Erik T. [8948-91] SPSun
Garbovskiy, Yuriy [9005-9] S2
García de Abajo, F. Javier [8984-21] S5, [8984-51] S14
García Fernández, Tupak E. [8957-32] S7
García Marín, Antonio [8987-55] S10
García Nuñez, Carlos [8987-55] S10
García Rivera, Victor A. [8982-31] S6, [8994-73] SPWed
García, Adriel D. [8987-20] S4
García, Alain [8959-59] S14
García, Michel [9002-51] S12
García, Oscar [8968-33] S15, [8968-33] S7
García-Adeva, Angel J. [8988-50] S11
García-Allende, Pilar Beatriz [8927-17] S4
García-Ballesteros, Juan José [8968-33] S15, [8968-33] S7
García-Blanco, Sonia M. 8975 Program Committee, 8977 Program Committee, 8988 Program Committee, 8988 S2 Session Chair
García-Chocano, V. M. [8994-14] S4
García-Tabares, Elisa [8981-20] S5
García-Urbe, Alejandro [8943-121] SPSun, [8943-157] SPMon, [8943-188] SPTues, [8943-205] SPTues, [8943-56] S9, [8950-39] SPSun
Gardecki, Joseph A. [8927-21] S5, [8934-78] S12
Gardes, Frederic Y. [8989-12] S5, [8990-13] S3, [8990-7] S2, [8991-18] S5
Gardini, Lucia [8946-19] S5, [8950-43] SPSun
Gardner, Adam R. [8952-21] S6
Gardner, G. [9002-48] S11
Gareau, Daniel S. [8926-30] S7, [8926-41] S8, [8937-3] S1, [8938-24] S5, [8940-9] S2, [8941-33] S9, [8947-2] S1, 8951 S5 Session Chair, [8953-21] SPSun
Gargallo, Bernardo [8989-4] S1
Gargsha, Madhusudhana [8926-96] S19
Gariépy, Chloé [8928-1] S1
Gariglio, Stefano [8987-28] S6
Garnache, Arnaud 8966 Program Committee, [8966-11] S8, [8966-29] S8
Garner, Allen L. [8941-59] S12
Garnica, Guillermo [8976-51] SPTue
Garofalo, Antonio [8935-68] SPSun
Garrett, Natalie L. [8948-44] S7
Garrod, Toby J. [9002-50] S12, [9002-56] S13
Garry, Guy 8987 S3 Session Chair, [8987-25] S5
Gärtner, Claudia [8976-22] S5, [8976-24] S5, [8976-37] S8
Gärtner, Maria [8934-86] SPMon
Gartstein, Yury N. [8981-36] S9
Garud, Mandavi [8926-147] S7
Gasim, Anwar [8986-37] S7
Gaskill, Jack D. SC017
Gasper, Gerald [8933-23] S6
Gassenq, Alban A. [8993-42] S8
Gat, Nahum [8993-30] S5
Gatula, Robert [8991-9] S2
Gateau, Jérôme [8943-106] S16, [8943-134] SPSun, [8943-48] S7, [8943-49] S8

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Gatej, Alexander [8963-23] S6
 Gatel, Christophe [8955-16] S4
 Gates, James C. [8968-8] S2, [8974-56] S9, [8982-15] S3, [8988-38] S8, [9002-8] S2
 Gather, Malte C. 8958 Program Committee, 8958 S3 Session Chair, [8958-11] S3
 Gatzogiannis, Evangelos [8948-37] S7
 Gauduel, Yann A. [8954-9] S3
 Gausmann, Stefan [8959-53] S12
 Gautam, Nutan [8996-21] S6
 Gautham, Chitra [8997-27] S10
 Gauthier, Daniel Joseph 8998 Program Committee
 Gauthier-Lafaye, Olivier [8988-51] S11, [8993-8] S1
 Gavel, Donald 8978 Program Committee
 Gawish, Ahmed [8930-25] S6
 Gay, David [8967-23] S10
 Gayen, Swapan K. [8926-63] S12
Gayer, Donnacha [8985-42] S9
 Gayral, Bruno [8986-34] S7, [8986-8] S2
 Gazelet, Joseph [8982-53] SPWed
 Ge, Li [8989-2] S1
 Ge, Nien-Hui [8948-102] SPSun
 Ge, Yongchao [8940-22] S5
 Ge, Yuncheng 8944 Program Committee
 Gebavi, Hrvoje [8961-72] SPTue
 Gebhardt, Martin [8964-54] SPTue, [8968-32] S15, [8968-32] S7
 Gebhardt, Sylvia E. [8978-3] S1
 Gebremichael, Eminent [8959-2] S1
 Gebbs, Raphael [8972-25] S6
 Gebbski, Marcin [8995-11] S3
 Gecys, Paulius [8967-44] S15, [8967-44] S7
 Geddes, Christopher D. 8957 Program Committee
 Geddes, Joseph [8974-50] S8
 Geelen, Bert [8974-21] S5
 Geelhaar, Lutz [8986-29] S6
 Geen, Matthew [8993-54] S10
 Geffen, Noa [8930-38] S8
 Gehlbach, Peter [8938-37] S8
 Gehlich, Nils [8968-32] S15, [8968-32] S7
 Gehlich, Nils [8970-24] S6, [8970-24] S9
 Gehner, Andreas 8978 Program Committee
 Geib, Kent M. 9001 Program Committee
 Geisz, John F. [8981-38] S10
 Gelabert, Pedro [8979-2] S3
 Gelikonov, Grigory V. [8934-108] SPMon, [8934-123] SPMon, [8950-45] SPSun, [8950-47] SPSun, [8971-4] S1
 Gelikonov, Valentin M. [8934-108] SPMon, [8934-123] SPMon, [8950-45] SPSun, [8950-47] SPSun
 Gellermann, Werner 8951 Program Committee
 Gemmi, Mauro [8955-1] S1
 Genack, Azriel Z. [8990-5] S1
 Genberg, Victor L. SC1120
 Gencarelli, Federica [8993-42] S8
 Genevet, Patrice [8993-76] S16, [8995-23] S6
Geng, Jason 8979 Program Committee, 8979 S3 Session Chair, [8979-13] S7, [8979-17] S7
 Gening, Snezhanna [8941-39] SPMon
 Gening, Tatyana [8941-39] SPMon
 Genner, Andreas [8993-67] S14
 Gennison, Jean-Luc [8943-23] S4
 Genty, Goëry [8964-26] S6
Geoffray, Fabien [8988-37] S8
 Geohegan, David B. 8969 Conference Chair, 8969 S1 Session Chair, [8969-3] S1, [8969-5] S1, [8969-6] S1
Georgakoudi, Irene [8947-45] S11, [8947-6] S1, [8948-11] S2, [8948-67] S11
 George, David [8974-31] SPTue, [8974-37] SPTue
 George, David S. [8977-32] S7
George, Simi A. [8959-64] S14, [8959-79] SPTue
George, Thomas F. [8956-12] S3
 Georges, Patrick [8959-21] S6, [8959-57] S13, [8959-9] S3, [8961-20] S5, [8961-50] S12, [8961-51] S12, [8966-19] S6
 Gerace, Dario [8997-23] S9
Geralde, Mariana C. [8927-48] S12, [8927-49] S12, [8947-60] S13
 Gérard, Jean-Michel [8993-16] S3, [8998-41] S9
 Gerardi, Helen K. [8984-18] S4
 Gerasimenko, A. S. [8959-78] SPTue
 Gerasimov, Evgeny G. [8959-10] S3
 Gerelli, Emmanuel [8999-47] S10
 Geremia, Riccardo [8972-33] S8
Gerhardt, Nils C. [8952-34] S9, [9001-15] S4
 Gerhold, Michael [8986-27] S5, 8987 Program Committee, 8987 S7 Session Chair, 8993 Program Committee
 Gericke, Karl-Heinz [8948-62] S10
 Gerlach, Philipp [9001-14] S3, [9001-4] S1
 Gérôme, Frederic [8961-16] S4, [8994-9] S3
 Geron, Amir [8991-10] S3
 Gerritsen, Hans C. 8948 Program Committee
 Gerthoffer, Arnaud [8988-35] S8
 Gervinskias, Gediminas [8970-9] S2, [8972-61] SPTue
 Gerwert, Klaus B. 8928 Program Committee, 8928 S20 Session Chair, [8928-94] S19
 Gessner, Thomas [8977-12] S3, [8995-18] S5
 Gesteira, Maria [8932-15] S3, [8932-16] S3
 Gesualdi, Marcos R. R. [9006-20] S4
 Gevkan, Ivan [8954-16] S4
 Gewiss, Helge [8951-31] SPMon
Ghadiri, Reza [8957-14] S4, [8999-49] S10
 Ghanian, Zahra [8947-70] SPMon
 Ghasemi, Farshid [8957-13] S3
 Ghasemkhani, Mohammadreza [9000-4] S1
 Ghassemi, Pejman [8926-6] S1
 Ghazaryan, Robert K. [8931-44] SPMon, [8942-16] S4
 Ghazinejad, Maziar [8994-63] S15
 Gheewala, Mufaddal M. [8928-83] S15
 Gheith, Mostafa E. [8929-18] S4
 Ghenuche, Petru [8950-12] S3
 Ghibaud, Elise [8988-14] S3
 Ghillino, Enrico [8991-35] S8
 Ghione, Giovanni [9003-36] S12, [9003-36] S8
 Ghioni, Massimo [8950-42] SPSun, [8993-92] S18
 Ghosh, Ambarish [8994-69] SPWed
 Ghosh, Chuni [9001-13] S3
 Ghosh, Nirmalya [8928-100] S20, [8942-20] S4, [8947-87] SPMon, [8952-25] S7
 Ghosh, Rupamanjari [8998-56] S12
 Ghosh, Siddharth [8950-7] S2
 Ghosh, Somnath [9008-18] S9
 Ghosh, Sreya [8949-26] S5
 Ghosh, Yagnaseni [8981-17] S4
 Ghouali, Wajdene [8930-34] S8
 Ghrub, Abdelhamid [8990-46] S9
 Giacomelli, Michael G. [8927-30] S7, [8947-25] S5
 Giaconia, Costantino [8990-40] S8, [8990-41] S8, [8990-43] S8
 Giang, Ha N. [8983-51] SPMon
 Giannetti, Ambra [8935-30] S7, [8956-29] S8, [8976-24] S5, [8988-71] SPWed
 Giannetti, Sara [8938-26] S5
 Giannoulis, Giannis [8982-7] S1, [8991-11] S3
 Giard, Edouard [8993-34] S6
Giardini, Mario Ettore [8983-47] S11
 Gibb, Shawn R. [8986-65] S14
 Gibbon, Tim B. [9008-24] S10
Gibbs-Strauss, Summer L. [8950-26] S7
 Gibson, Brant C. [8987-42] S8
 Gibson, Emily A. [8939-18] S3, [8950-30] S8
 Gidrol, Xavier [8947-53] S12
 Gierl, Christian [9001-6] S2
 Gierlack, Michael [8949-35] S7
 Giessen, Harald W. [8960-48] S12, [8964-14] S3, [8993-25] S4
 Gifford, Richard [8992-12] S3
 Gigan, Sylvain [8943-106] S16, [8943-134] SPSun, [8943-48] S7, 8978 Conference Chair, [8989-22] S7
 Gigante, Bill [8935-32] S7
 Giggensch, Dirk [8971-3] S1, [8971-7] S1
 Gigli, Giuseppe [8997-26] S10
Giglio, Nicholas A. [8926-46] S10
Giguère, Mathieu [8992-22] S5
 Gil, Bernard 8986 Program Committee, [8986-20] S4, [8986-82] SPWed, [8987-8] S2
 Gilbert, Gerald N. [8997-18] S7
 Gilbert, Nick [8965-26] S6
 Gilbreath, G. Charmaine 8971 Program Committee
 Giles, Anoja [8952-19] S5
 Giles, Robert H. [8940-28] S6, 8985 Program Committee, 8985 S3 Session Chair, 8985 S7 Session Chair, 8985 S8 Session Chair, [8985-19] S4, [8985-44] S9
 Gilberti, Valeria [8985-58] SPWed
Gill, Ron [8955-3] S1
 Gill, Sarjeet Singh [8947-75] SPMon
 Gillenwater, Ann M. [8926-136] S5
Gillmer, Steven R. [8949-34] S7
 Gillner, Arnold [8968-31] S15, [8968-31] S7
 Gilmour, M. [8990-32] S6
Gilson, Rebecca [8931-52] SPMon, [8943-168] SPMon
 Giltane, Jennifer [8935-25] S5
 Gimenez-Conti, Irma [8926-131] S4
 Gini, Emilio [9002-44] S10
 Ginolas, Armin [8935-21] S5
 Giordano, Flavio [8939-30] S6
 Giordano, Nicholas [8926-127] S3, [8926-132] S4, [8926-134] S4
Gioux, Sylvain [8935-34] S7, [8937-4] S1
 Giovane, Laura [9001-1] S1
 Giovanelli, Emerson [8947-47] S11, [8955-13] S3
 Giovannini, Daniele [8999-53] SPWed
 Giranda, Christopher D. [8992-12] S3
 Girard, Marc [8935-46] S10
 Girard, Sylvain [8971-13] S2
 Giraudet, Louis [8987-9] S2
 Gires, Oliver [8926-149] SPSun
 Girish, Gandikota [8926-117] S24, [8943-59] S9
 Girkin, John M. [8976-32] S7, [8978-8] S3
 Girschick, Susanne [8926-146] S7
 Girschick, Susanne [8926-142] S7, [8926-149] SPSun
Girshovitz, Pinhas [8949-50] S10
 Gisario, Annamaria [8970-28] S7
 Gisler, Thomas [8965-33] S7
 Giusfredi, Giovanni [8993-74] S15
 Giorgievskva, Elena [8997-2] S3, [8997-2] S7
 Glaab, Johannes [9003-29] S6
Gladish, James C. [8942-8] S2
Gladys, Fanny Moses [8953-13] S3
 Gladysiewicz, Marta [8980-33] S8
 Glass, Timothy E. [8951-8] S2
 Glasser, Adrian [8946-15] S4
 Glasser, Ryan [8998-19] S4
Glatz, Jürgen [8927-17] S4, [8935-5] S1
 Glatz, Nathan E. [8973-1] S1
Gleason, Benn H. [8974-25] S6
 Glebov, Alexei Symposium Chair, 8980 SPlen Session Chair, 8981 SPlen Session Chair, 8982 SPlen Session Chair, 8983 SPlen Session Chair, 8984 SPlen Session Chair, 8985 SPlen Session Chair, 8986 SPlen Session Chair, 8987 SPlen Session Chair, 8988 SPlen Session Chair, 8990 SPlen Session Chair, 8991 Conference Chair, 8991 S4 Session Chair, 8991 SPlen Session Chair, 8994 SPlen Session Chair, 8995 SPlen Session Chair, 8996 SPlen Session Chair, 8997 SPlen Session Chair, 8998 SPlen Session Chair, 8999 SPlen Session Chair, 9000 SPlen Session Chair, 9001 SPlen Session Chair, 9002 SPlen Session Chair, 9003 SPlen Session Chair, 9006 SPlen Session Chair, 9007 SPlen Session Chair, 9008 SPlen Session Chair, 9009 SPlen Session Chair, 9010 SPlen Session Chair
Glebov, Leonid B. [8959-54] S12, [8960-50] S13, [8961-7] S2, [8962-1] S1, [8963-16] S4, [8963-16] S8, [8965-16] S4, [8966-13] S4, [8966-32] SPTue, 8982 Program Committee, [8982-36] S7
 Gleeson, Helen F. 9004 S1 Session Chair, [9004-14] S4, [9004-5] S2
 Glembocki, Orest J. [8984-18] S4
Gleyze, Jean-François [8962-19] SPTue, [8992-25] S6
 Glick, Yaakov [8963-41] S4, [8963-41] S8
 Glickman, Randolph 8941 Program Committee, 8941 S8 Session Chair, [8941-57] S12, [8943-99] S15
 Glösmann, Martin [8930-9] S2, [8934-58] S9
 Glowacki, Ireneusz [8983-10] S3
 Gluba, Marc A. [8987-19] S4
Glückstadt, Jesper [8976-31] S7, 8999 Conference Chair, 8999 S2 Session Chair, [8999-50] S10
 Glukhova, Olga E. [8956-39] SPSun, [8956-40] SPSun, [8956-41] SPSun
 Glunde, Kristine [8927-25] S6, [8948-13] S2, [8948-17] S3
 Glushchenko, Anatoliy V. [9005-9] S2
Gmachl, Claire F. 9002 Program Committee, [9002-63] S14
Gmitro, Arthur F. 8927 Program Committee, 8927 S7 Session Chair, [8927-9] S2, [8937-11] S2
 Gnanadesigan, Muthukaruppan [8926-93] S19, [8934-99] SPMon
 Goano, Michele [9001-9] S2, [9003-36] S12, [9003-36] S8
 Gobbato, Rafael C. [8932-19] S4, [8932-26] S5
 Gobbi, Pier Giorgio [8930-23] S6, [8930-27] S6
 Göbel, Gero [8955-64] SPSun
 Gobert, Olivier [8972-28] S7
 Godavarty, Anuradha [8942-18] S4
 Godbout, Nicolas [8927-20] S5, [8934-83] S12, [8937-7] S2, [8938-22] S4, [8964-22] S6, [8982-33] S7, [8992-5] S2, [9009-14] S6
 Godden, Samuel [8947-71] SPMon
 Godin, Jeremy R. [8980-8] S2
 Godin, Thomas [8999-54] SPWed
 Göeken, Kristian [8955-3] S1
 Goergen, Craig Jonathan [8943-80] S12
 Goertz, David [8943-203] SPTues
Gogoi, Ankur [8996-30] SPWed
 Gogol, Philippe [8988-13] S3, [8988-28] S7
 Gogos, George [8968-27] S6
 Golab, Karolina [8947-31] S6
 Golan, Lior [8927-3] S1
 Goldberg, Brian D. [8934-122] SPMon, [8934-3] S1
 Goldfarb, Fabienne [8966-20] S6, [8998-56] S12
 Goldschmidt, Jan Christoph [8981-9] S3
 Goldschmidt, Ruth [8931-13] S3, [8931-6] S2, [8931-7] S2, [8956-3] S1
 Goldstein, Goldie L. [8949-48] S10
 Goldstein, James [8926-67] S13
Goldys, Ewa M. 8950 Program Committee
 Goll, Bernhard [8991-18] S5
 Golling, Matthias [8966-10] S3, [8966-17] S5, [8966-22] S6, [8966-31] SPTue, [8966-5] S2, [8966-7] S2
 Gollnick, Sandra O. [8926-140] S6, 8944 Program Committee
Golovin, Andrii B. [8985-35] S8
 Goltsov, Alexander [8974-6] S2, [8988-16] S4
 Golubjatnikov, German Yu. [8952-27] S7
 Golubov, Andrey [8941-50] S10
 Golyshchev, A. [8963-34] S8
 Gom, Brad G. [8985-52] S11
 Gomaa, Walid [8929-1] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Gomer, Charles J. 8931 Program Committee
- Gomes Júnior, Rafael Araújo [8932-15] S3, [8932-16] S3
- Gomes, Heitor C. [8932-24] S5
- Gomes, Jean-Thomas [8964-51] SPTue
- Gomez Rivas, Jaime [8996-12] S4
- Gomez, Eliot F. [8983-48] S11
- Gomez, Javier [8984-41] S11
- Gomi, Shinichi [8947-51] S2
- Gommé, Guillaume [8986-8] S2
- Gonçalves Marques, Jose [8987-73] SPWed
- Gonçalves, Anne-Marie [8981-51] S13
- Gonçalves, Jorge N. [8987-16] S3
- Gonçalves, Juliana P. L. [8956-26] S6
- Gong, Cheng [8987-67] S13
- Gong, Haimei [8982-83] SPWed
- Gong, Hui [8928-40] S8, [8928-54] S11, [8928-55] S11, [8928-56] S11, [8928-60] S12, [8928-73] SPMon, [8928-74] SPMon, [8928-76] SPMon, [8942-22] S5
- Gong, Peijun** [8934-45] S7
- Gong, Qihuang [8960-15] S4
- Gong, Sixia [8950-42] SPSun
- Gong, Xiao-jing [8943-7] S2
- Gonthiez, Thierry [8992-16] S4
- Gonzalez Yebra, Ana Lilia [8956-25] S6
- Gonzalez Yebra, Beariz [8956-25] S6
- González, Alejandro [8970-15] S12, [8970-15] S4
- Gonzalez, German [8943-51] S11
- Gonzalez, Jean [8922-18] S4
- Gonzalez, José-Pablo [8968-30] S15, [8968-30] S7
- Gonzalez, Maria 8981 S8 Session Chair, [8981-2] S1, [8981-27] S7, [8981-40] S11
- Gonzalez, Virgilio [8982-45] S9, [8988-68] S10, [8992-17] S4
- González-Carrasco, J. L. [8972-63] SPTue
- Gonzalez-Julian, Jesus [8987-41] S8
- González-Vega, Arturo [8943-172] SPMon
- Goodisman, Jerry [8935-59] S12, [8935-78] SPSun
- Goodrich, Glenn P. [8955-27] S6
- Goodwin, James [8940-4] S1
- Goodwin, Peter M. [8947-56] S13
- Goodwin, Richard L. [8942-29] S7
- Goodyer, Ian D. [8988-44] S10
- Goosen, Marius E. [9005-5] S1
- Gopalan, Padma [8987-46] S4
- Gora, Michalina J. [8927-10] S3, [8927-11] S3, [8934-8] S2
- Gorajek, Lukasz F. [8959-14] S4, [8959-71] SPTue
- Gordeev, Nikita Y. [8965-25] S5
- Gordel, Marta [8955-11] S3, [8983-20] S5
- Gordon, Carlos [9002-59] S13
- Gordon, Michael [8927-28] S7
- Gorfinkel, Boris I. [8982-69] SPWed
- Gorny, Sergey G. [8963-33] S8
- Göröcs, Zoltán S. [8951-12] S3
- Göröcs, Dimitris S.** [8926-85] S17, [8926-86] S17
- Gorshkov, Alexey [8997-24] S9
- Gorski, Przemyslaw Andrzej [8973-26] SPTue
- Görtz, Verena [9004-33] S2
- Goryashchenko, Alexander S. [8950-17] S4
- Goss, Jakob [8986-56] S11
- Gosselin, Yoann** [8928-32] SPSat, [8928-9] S3
- Gosset, Christophe [8964-48] SPTue, [8964-60] SPTue, [8980-56] S14, [8980-71] SPWed, [9007-9] S4, [9009-22] S8
- Gostev, Fedor [8969-22] S4, [8969-22] S6
- Goto, Hiroki [8986-30] S6
- Goto, Hiroshi [8986-30] S6
- Goto, Kentaro [8947-62] S14
- Götte, Jörg B. [8999-41] S9
- Gottschall, Thomas [8961-48] S12, [8961-49] S12, [8972-18] S5
- Gottwald, Tina [8959-25] S6, [8959-31] S7, [8965-27] S6
- Götzendörfer, Stefan [8987-60] S12
- Götzinger, Erich [8930-9] S2, [8934-58] S9
- Goujon, Christophe [8987-80] SPWed
- Goulamhousen, Nadir [8926-126] S3
- Gould, Michael [8933-20] S6
- Gould, Taylor [8936-2] S1
- Goulielmakis, Eleftherios [8982-72] SPWed
- Gourdie, Robert G. 8953 Program Committee
- Gourgou, Cécile [8994-57] S14
- Gourier, Didier [8982-40] S8, [8987-93] SPWed
- Gourisankar, Sai [8955-29] S7
- Goustouridis, Dimitris [8976-44] S9
- Gouveia-Neto, Artur S. [8928-72] SPMon, [8947-69] SPMon, [8964-44] SPTue, [9003-53] SPWed
- Govone, Angelo B. [8926-35] SPSun
- Govorkov, Sergei V. [8966-26] S8
- Govorov, Alexander 8996 S5 Session Chair, [8996-23] S7
- Gowda, Roopa [8948-14] S2
- Goy, Matthias [8978-3] S1
- Goyal, Sandeep K. [8999-44] S9, [8999-45] S9, [8999-53] SPWed
- Goyette, Andreanne** [8928-15] S4
- Gozyk, Iryna [8966-19] S6
- Gozzi, Alessandro [8955-1] S1
- Grabar, Alexander A. [8943-114] SPSun, [8943-23] S4
- Grabherr, Martin 9001 Program Committee, 9001 S4 Session Chair, [9001-4] S1
- Grabill, Chris N. [8974-25] S6
- Gracias, David H. 8993 S18 Session Chair
- Gracia-Salgado, R. [8994-14] S4
- Gracin, Davor [8939-34] S6
- Gradecak, Silvija [8996-6] S2
- Gradziel, Marcin L. [8985-42] S9
- Graf, Benedikt W.** [8926-25] S6, [8946-4] S2, [8948-96] SPSun
- Graf, Roswitha [8959-43] S10
- Graf, Thomas 8960 Program Committee, [8967-16] S13, [8967-16] S8, [8967-20] S9
- Grafe, Ingo [8926-139] S24
- Gragossian, Aram [8984-25] S7
- Graham, C. [8993-47] S9
- Graham, Duncan [8951-9] S2
- Grahmann, Jan 8977 Program Committee, [8977-6] S2
- Grahn, Holger [8986-29] S6
- Grajciar, Branislav [8934-26] S4
- Grajoval, Meir [8998-3] S1
- Gramatica, Furio [8939-15] S3, [8954-5] S2, [8955-68] SPSun, [8957-6] S2
- Grand, Gilles [8988-23] S5
- Grandaunet, Berit [8947-16] S4
- Grande, Marco [8988-51] S11
- Grandidier, Bruno [8996-11] S4
- Grandisoli, Cristine Leticia [8929-4] S1
- Grandjean, Nicolas 8986 Program Committee, [8986-22] S5, [9001-9] S2
- Grandusky, James [8986-65] S14
- Grant, Barbara G.** SC1123
- Grant, Gerald 8935 Program Committee, [8935-13] S4, [8957-29] S6
- Grant, Patricia Ellen [8936-18] S7
- Granzow, Nicolai [8961-26] S7, [8964-28] S7
- Grasel, John [8934-101] SPMon
- Grasselli, Giorgio [8928-57] S12
- Grasshoff, Thomas [8977-3] S2
- Grassman, Tyler J. [8981-20] S5, [8981-41] S11
- Gratt, Sibylle [8943-126] SPSun, [8943-220] SPTues
- Gratton, Enrico 8948 Program Committee
- Graupeter, Thomas** [8959-65] S14
- Graves, Logan R. [8935-1] S1
- Gray, Bonnie L. 8976 Conference Chair, 8976 S1 Session Chair, 8976 S10 Session Chair, [8976-11] S3, [8976-2] S1, [8976-49] S10
- Gray, Malcolm B. [8960-26] S6
- Gray, Rebecca L. [8982-3] S1
- Gray, William [8939-32] S6
- Grayer, Justin S.** [8980-78] SPWed, [8993-28] S5
- Grayson, Matthew [9000-5] S2
- Grazú Bonavía, Maria Valeria [8955-34] S8, [8955-48] S10
- Greanya, Viktoria 8958 Program Committee, 8958 S4 Session Chair
- Grecco, Clóvis [8927-49] S12, [8931-37] S7, [8931-49] SPMon, [8948-79] SPSun
- Greco, Michael J. [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6
- Green, Jared [8961-37] S9
- Green, Jonathan Tyler [8959-35] S8, [8959-44] S10, [8959-49] S11
- Green, Mark A. [8987-71] SPWed
- Green, Mark A. [8955-4] S1
- Green, Martin A. [8981-18] S5, [8981-20] S5
- Green, William M. J. [8990-23] S4, [8993-42] S8
- Greenaway, Mark T. [8988-4] S1
- Greenbaum, Alon** [8936-32] S7, [8949-15] S4
- Greenberg, Yuval [8938-45] SPSun
- Greenwell, Henry [8929-15] S4
- Greffet, Jean-Jacques [8980-18] S5
- Gregersen, Niels [8993-16] S3
- Gregg, Robert H. [8929-15] S4, [8929-16] S4
- Grégoire, Alexandre [8994-44] S11
- Gregor, Ingo 8950 Conference Chair, 8950 S3 Session Chair, 8950 S5 Session Chair, 8950 S6 Session Chair, [8950-14] S4
- Gregory, Kenton W. 8926 Conference Chair, 8926 S15 Session Chair
- Greibus, Mindaugas [8993-45] S8, [9002-39] S9
- Grein, Matthew E. [8971-32] S5
- Greiner, Christoph M. 8988 Conference CoChair, 8988 S4 Session Chair
- Greivenkamp, John E.** SC690
- Grenet, Louis [8981-7] S2
- Grenier, Jason R.** [8972-32] S8
- Grenier, Paul [8935-46] S10, [8938-5] S1
- Grenon, Jean-David [8928-32] SPSat, [8928-9] S3
- Gretz, Norbert [8939-28] S5, [8939-35] S6
- Gribble, Adam** [8926-43] S9, [8935-28] S6
- Grichine, Alexei [8978-9] S3
- Griebner, Uwe [8966-24] S7
- Grieco, Andrew [8989-7] S10, [8989-7] S3
- Griep, Stephanie [8943-98] S1
- Grier, A. [9002-48] S11
- Grier, David G. 8999 Program Committee
- Gries, Wolfgang [8959-7] S3, [8965-15] S4
- Griesse-Nascimento, Sarah [8964-66] SPTue
- Grieve, Katharine [8926-24] S6, [8930-34] S8, [8934-69] S11, [8935-41] S9
- Griffin, Robert [8993-70] S14
- Grillot, Frédéric** [8964-48] SPTue, [8980-40] S11, [8980-56] S14, [8980-71] SPWed, [9009-22] S8
- Grimaldi, Angelica [8976-24] S5
- Grimm, Stephan [8961-34] S8, [8961-74] SPTue
- Grimm, Vyacheslav [8960-29] S3, [8960-29] S7
- Grimshaw, Mike [8965-37] S8, [8965-39] S8, [8965-46] S2, [8966-30] S8
- Griol, Amadeu [8991-36] S8
- Grisatya, Anggita Hapsari [8987-81] SPWed
- Gris-Sánchez, Itandehui [9009-20] S8
- Gris-Valencia, Christos [8988-7] S2
- Groah, Suzanne L. [8938-27] S6
- Grodzinski, Piotr A. 8954 Program Committee
- Gröger, Marion [8930-9] S2, [8934-58] S9
- Grojo, David [8972-44] S10, [8972-44] S5
- Grollman, Rebecca** [8983-60] SPWed
- Gromov, Dmitry G. [8994-74] SPWed
- Gronenborn, Stephan [8966-15] S5
- Gronloh, Bastian [8959-30] S7
- Groom, Daniel J. [8987-29] S6
- Groom, Kristian M. [8994-6] S2
- Grosa, Grégory [8988-37] S8
- Gröschl, Martin [8934-27] S4
- Grosek, Jacob [8960-66] SPTue
- Gross, Petra [8984-16] S4, [8984-44] S12
- Gross, Simon** [8988-12] S3
- Grossard, Ludovic [8964-51] SPTue
- Großmann, Michael [8951-18] S4
- Grote, James G.** 8980 Track Chair, 8981 Track Chair, 8982 Track Chair, 8983 Program Committee, 8983 Track Chair, [8983-48] S11, 8984 Track Chair, 8985 Track Chair, 8986 Track Chair, 8987 Track Chair
- Grounds, Miranda D. [8935-49] S10
- Gruber, Christian [8951-18] S4
- Gruenig, Michael [8943-227] SPSun, [8943-228] SPSun
- Gruev, Viktor [8936-25] S6, [8936-26] S6, [8936-28] S7
- Grulkowski, Ireneusz** [8934-66] S10
- Grün, Hubert [8943-90] S13
- Grünberg, Katrien [8927-42] S10
- Grund, David W. [8985-45] S10
- Grundfest, Daniel T.** [8951-39] SPMon
- Grundfest, Warren S.** 8935 Conference Chair, 8935 S4 Session Chair, 8935 S8 Session Chair, [8941-49] SKey
- Grundmann, Frank-Peter [8961-36] S9
- Grundmann, Michael J. [9003-41] S10
- Grunert, Ronny [8935-69] SPSun
- Grunlan, Melissa A. [8951-40] SPMon
- Grunwald, Rüdiger** [8972-17] S5, 8999 Program Committee, 8999 S6 Session Chair, [8999-15] S3
- Grützner, Gabi [8974-5] S2
- Gryczynski, Ignacy** [8950-4] S1, [8950-51] SPSun
- Gryczynski, Zygmunt Karol** 8950 Conference Chair, 8950 S2 Session Chair, 8950 S8 Session Chair, [8950-4] S1, [8950-51] SPSun, [8951-9] S2, 8957 Program Committee
- Grygorczyk, Ryszard [8950-4] S1
- Gryklien, Remigiusz [8983-10] S3
- Grzanka, Ewa [8986-25] S5
- Grzegory, Izabella [8986-3] S1, [8986-4] S1
- Grzela, Grzegorz [8996-12] S4
- Grzelak, Justyna K. [8957-23] S5
- Gschneidner, Tina [8957-26] S6
- Gu, Bo** Symposium Chair, 8967 Program Committee, 8968 Program Committee, 8970 Conference Chair, 8970 S7 Session Chair
- Gu, Erdan [8994-18] S1, [8994-18] S5
- Gu, Guiru [8993-38] S7
- Gu, Jun [8935-44] S9
- Gu, Ling [8928-97] S19
- Gu, Min** 8948 Program Committee, [8954-101] SPlen, [8974-22] S7, [8993-95] SPWed
- Gu, Qing [8980-81] S8, [8980-82] SPWed
- Gu, Shi [8928-38] S7, [8934-52] S8, [8934-77] S12, [8953-10] S3, [8953-15] S4, [8953-7] S2, [8953-8] S2
- Gu, Tian [8991-27] S6
- Gu, Wenjun [9007-21] S7
- Gu, Xiaodong [8995-28] S7
- Gu, Xinhua [8961-22] S5
- Gu, Xun 8972 Program Committee
- Gu, Yi [9002-49] S11
- Gu, Yueqing 8944 Program Committee, 8956 Program Committee
- Gu, Zetong [8949-45] S9
- Gu, Zetong [8948-85] SPSun, [8949-42] S9
- Gu, Zhiyong [8974-8] S2
- Gua, Xiaoyu [8943-166] SPMon
- Guagliumi, Giulio [8926-92] S19
- Guan, Xiaowei [8988-29] S7, [8988-47] S10
- Guan, Xingguo [8965-37] S8, [8965-39] S8
- Guandalini, Annalisa [8959-41] S10
- Guang, Xing [8965-46] S2
- Guarda, Milena [8932-43] SPSun
- Guck, Jochen R. [8958-6] S2
- Guclu, Caner [8980-45] S12
- Guduru, Surya Sameer Kumar [8968-17] S4

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Güell, Frank [8987-11] S2
 Guenter, James K. 9001 Conference Chair, 9001 S1 Session Chair
 Guerand, Stéphane [8966-19] S6
 Guerin, Nicolas [8965-6] S2
 Guerlin, C. [8993-78] S16
 Gueroui, Zohar [8955-51] S11
 Guerrero Gonzalez, Neil [9008-17] S8, [9010-13] S4, [9010-13] S5
 Guerrero, Carlos [8987-55] S10
 Guerrini, Renzo [8939-30] S6
 Gui, Dong [8947-75] SPMon
 Guichard, Florent [8961-20] S5, [8961-50] S12, [8961-51] S12
 Guillaud, Martial [8935-36] S8, [8945-6] S2, [8952-31] S8
 Guillemoles, Jean-François 8981 Conference Chair, 8981 S1 Session Chair, 8981 S9 Session Chair, [8981-14] S4, [8981-23] S6, [8981-33] S8, [8981-51] S13, [8981-8] S2
 Guillemot, Fabien [8947-64] S14
 Guillermet, Stephanie [8935-14] S4
 Guillet, Thierry [8986-24] S5, [8986-8] S2, [8987-8] S2
 Guillon, Olivier [8987-41] S8
 Guimaraes, Francisco E.G. [8947-86] SPMon
 Guina, Mircea [8950-23] S6, [8961-4] S1, 8966 Program Committee, 8966 S3 Session Chair, [8966-24] S7, [8966-28] S4, [8962-7] S1
 Guintrand, Cyril [8961-91] SPTue
 Gulbrand, Stina [8948-92] SPSun
 Guldner, Felix [8994-19] S1, [8994-19] S5
 Guler, Urcan [8994-3] S1
Gulley, Jeremy R. [8972-29] S7
 Gulsen, Gultekin [8935-53] S11, 8937 Program Committee, [8937-42] SPSun, [8947-34] S2, [8947-34] S8
 Gülsoy, Murat [8929-11] S3, [8941-47] SPMon, [8941-48] SPMon
 Gumprecht, Thomas [8987-88] SPWed
Gunapala, Sarath D. [8993-33] S6
 Gungor, Eda [8960-14] S4
 Gunn, Jason R. [8931-26] S5, [8931-36] S7, [8931-39] S8
 Gunn, L. Cary 8990 Program Committee, 8990 S6 Session Chair
 Gunn-Moore, Frank James [8946-30] S7, [8949-31] S7, [8972-12] S3, [8972-2] S1, [8972-3] S1
 Günter, Peter 8964 Program Committee, 8964 S2 Session Chair, [8964-53] SPTue, [8985-12] S3
 Guntinas-Lichius, Orlando [8926-133] S4
 Gunturk, Bahadır K. [8979-10] S6
 Guo, Baoshan [8948-25] S4
 Guo, Chin-Lin [8948-15] S2, [8949-1] S1
 Guo, Chunlei [8967-1] S1, [8967-1] S3
 Guo, Dingkai [9002-58] S13
 Guo, Guang-Can [8998-44] S10
Guo, Hengchang [8948-88] SPSun
 Guo, James [8965-6] S2
 Guo, Jin [8947-63] S14
Guo, Junpeng [8987-4] S1
Guo, L. Jay [8943-10] S2, [8943-124] SPSun, [8943-38] S6, [8981-60] SPWed, [8995-16] S4
 Guo, Qinghua [8980-73] SPWed
 Guo, Qiushi [8988-42] S9
 Guo, Shaofeng [8961-124] SPTue
 Guo, Wei [8986-31] S6
Guo, Xiaoyang [8962-21] SPTue
 Guo, Xiaoyu [8943-149] SPMon, [8943-198] SPTues, [8943-201] SPTues, [8943-216] SPTues
 Guo, Xinxin [8943-62] S9
Guo, Yihong [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
 Gupta, Banshi D. [8938-46] SPSun, [8987-74] SPWed, [8987-75] SPWed, [8987-77] SPWed, [8992-7] S2, [8992-8] S2
 Gupta, Gaurav K. [8944-2] S1, [8944-3] S1
 Gupta, James A. [9002-40] S9
 Gupta, Manisha [8984-36] S10, [8984-37] S10
 Gupta, Neelam [8977-10] S3
 Gupta, S.K. [8987-84] SPWed

Gupta, Shantanu [8961-10] S3, [8961-11] S3, [8971-12] S2
 Gupta, Sharad [8947-75] SPMon
 Gurell, Jonas [8992-26] S6
 Gurevich, Evgeny [8955-6] S2
 Gurjar, Rajan [8926-17] S4, [8936-40] SPSun, [8951-19] S4
 Gurrarn, Rupa [8965-6] S2
 Guryanov, Alexei Nikolaevich [8961-29] S7, [8961-32] S8, [8961-41] S10, [8961-56] S13
 Gust, Arne [8980-21] S5
 Gustavsson, Johan S. [9001-9] S2
 Gu-Stoppel, Shanshan [8977-4] S2
 Gutierrez da Costa, Henrique S. [8946-17] S4
 Gutiérrez Juárez, Gerardo [8943-172] SPMon
 Gutierrez, Homero [8971-24] S4
 Gutierrez-Navarro, Omar [8947-14] S3
 Gutman, Nadav [8998-46] S10
 Gutscher, Simon [8967-41] S14
 Gutmman, Martin [8986-67] S14, [9003-25] S6
 Guty, François [8998-56] S12
 Guy, Cynthia [8952-28] S7
Guy, Martin [8988-20] S5
 Guyon, Olivier [8978-7] S2
 Guyot, Clément [8988-35] S8
 Guzman, Grace [8939-19] S3
 Gweon, DaeGab 8947 Program Committee, [8950-36] SPSun
 Gwilliam, Russell M. [8982-38] S8, [8982-41] S8, [9002-13] S3
 Gyongyosi, Laszlo [8997-10] S5
 Gyulkhandanyan, Anna G. [8931-44] SPMon, [8942-16] S4
 Gyulkhandanyan, Aram G. [8931-44] SPMon
 Gyulkhandanyan, Grigor V. [8931-44] SPMon, [8942-16] S4

H

Ha, Hyun Dong [8996-25] S7
 Ha, Kyoung-Ho [8991-8] S2
 Haag, Sebastian [8960-59] S15, [8965-33] S7
 Haam, Seungjoo [8956-9] S2
 Haarlammer, Nicoletta [8961-31] S8
 Haas, Gilbert J. [8960-30] S4, [8960-30] S8
 Haas, Harald 9007 S4 Session Chair, [9007-1] S1
 Haase, Katharina [8939-35] S6
 Haase, Wolfgang 9004 Program Committee
 Habermeier, Hanns-Ulrich 8987 Program Committee, 8987 S5 Session Chair, 8987 S6 Session Chair, [8987-30] S6
 Habibkhani, Houman [8979-10] S6
 Haboucha, Adil [8961-88] SPTue
 Haboucha, Adil [8961-78] SPTue
 Hackel, Benjamin J. [8943-194] SPTues
 Hadama, Koichi [8988-15] S4
 Haddad, Michael [8981-50] S1
Haden, Jim [8961-66] SPTue, [8965-12] S3, [8965-37] S8, [8965-46] S2
 Hader, Jorg [8966-8] S3, [9003-37] S13, [9003-37] S9
 Hadim, Hamid [8975-25] S2
 Hadjigeorgiou, Katerina [8951-14] S3
 Hadler, Tim [8955-44] S10
 Hädrich, Steffen [8961-21] S5, [8961-48] S12, [8961-49] S12
 Haedersdal, Merete [8926-21] S5
 Haering, Sigfried [8972-8] S2
 Hafezi, Mohammad [8998-35] S8
 Hafiz, Shopan D. [8986-82] SPWed, [9003-65] SPWed
Hagan, David J. [8983-3] S1
 Hagen, Clemens [8959-8] S3, [8965-31] S7
 Hagen, Joshua A. 8976 S8 Session Chair
 Hagen, Rainer [9006-1] S1
 Hagen, Ronald A. J. [8990-30] S6
 Hager, Gordon D. [8962-1] S1, [8962-7] S2
 Hager, Thomas [8986-55] S11, [9002-15] S3

Haggerty, Bryan P. [8930-46] SPSun
 Hagglund, Gina M. [8993-30] S5
 Haglund, Åsa [9001-9] S2
 Haglund, Richard F. 8967 S3 Session Chair, 8969 S5 Session Chair, [8969-20] S4, [8969-20] S6, [8969-21] S4, [8969-21] S6, [8984-53] S14
Hahn, Joonku [9006-37] S7
 Hahn, Sei Kwang [8958-13] S3
 Hai, Pengfei [8943-191] SPTues
 Haïdar, Riad [8982-20] S4, [8993-23] S4
 Hailles, Helen [8943-196] SPTues
 Hailu, Daniel M. [8985-26] S6
 Hainberger, Rainer [8933-4] S2, [8981-61] SPWed
 Haj-Hosseini, Neda [8935-3] S1, [8945-4] S1
Haji Reza, Parsin [8943-13] S2, [8943-35] S6
 Haji, Mohsin [8988-52] S11
 Hajian, Arsen R. [8934-14] S3, [8982-76] SPWed
Hajarian Kashany, Zeinab [8935-58] S12, [8942-6] S1, [8946-32] S7
 Hakobyan, Davit [8999-2] S1
 Hakuta, Kohzo 8998 Program Committee
 Halagacka, Lukas [8988-13] S3
 Halaney, David L. [8926-78] S16
Halas, Naomi J. 8957 Program Committee
 Halasa, Salaheldin [8932-4] S1
 Haldar, Krishnagan [8935-15] S4
 Hales, Joel M. [8983-3] S1
 Halir, Robert [8995-30] S8, [8995-38] S10
 Hall, Christopher A. SC1039
Hall, Gunnsteinn [8927-25] S6, [8948-13] S2, [8948-17] S3
 Hall, Trevor J. [8988-18] S4, [9007-8] S4, [9008-7] S6, [9008-7] S7
 Halonen, Lauri [8964-69] S7
Halpin, Gabriel M. [8980-66] S1
 Halter, Michael [8945-17] S5
 Haltli, Raymond A. [8989-20] S6
 Haltmeier, Markus [8943-90] S13
Ham, Byoung S. [8998-21] S5
 Hamachi, Leslie [8955-15] S4
Hamadou Ibrahim, Alpha [8999-44] S9
 Hamamoto, Ashley [8926-143] S7, [8934-96] SPMon
 Hamano, Shujiro [8943-117] SPSun
 Hamard, Lauriane [8947-53] S12
 Hambleak, Tomás [8959-72] SPTue
 Hambauer, Sebastian [8943-20] S3
 Hamblin, Michael R. [8926-22] S5, 8932 Conference Chair, 8932 S1 Session Chair, 8932 S6 Session Chair, [8932-17] S4, [8932-32] S7, [8940-8] S2, 8944 Program Committee, 8944 S1 Session Chair, [8944-2] S1, [8944-3] S1
 Hamel, Matthieu [8958-12] S3
 Hamidi, Ehsan [8926-80] S16, [8927-21] S5, [8934-78] S12
 Hamilos, Daniel [8927-36] S9
 Hamilton, Craig J. [8966-18] S5
 Hamilton, Scott A. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
 Hammarling, Krister [8938-48] SPSun, [8982-79] SPWed
Hammel, Stephen [8971-14] S3
Hammer, Daniel X. [8928-3] S1, 8930 Program Committee, 8930 S1 Session Chair, 8930 S9 Session Chair, [8930-43] S9
 Hammerschmidt, Martin [8980-60] SPWed, [8980-7] S2
 Hamra, Patricia [8939-11] S6, [8999-39] S8
 Hamza, Ahmed Mohammad [8935-71] SPSun
 Hamza, Aya Mostafa [8935-71] SPSun
 Hamza, Mostafa [8935-71] SPSun
 Hamza, Yahya Mohammad [8935-71] SPSun
 Hamzavi, Iftefat 8926 Program Committee, 8926 S2 Session Chair
 Han, Dedong [8987-44] S9
 Han, Dong Chul [8988-59] SPWed
 Han, Dong-Pyo [8986-62] S13, [8986-62] S9

Han, Jiande [8962-1] S1
 Han, Jung 8986 S6 Session Chair, [8986-11] S3
 Han, Kewen [8960-10] S3
 Han, Kiok [8987-95] S6
 Han, Liangshun [8988-53] SPWed
 Han, Lu [9003-32] S7
 Han, Nam [9003-59] SPWed
 Han, Sang-Heon [9003-16] S3
 Han, Sanghoon [8982-25] S5, [8985-18] S4
 Han, Sang-Kook [9007-22] S7, [9008-21] S9
 Han, Sang-Pil [8985-55] SPWed, [8985-7] S2, [8985-8] S2
 Han, SeungHoon [8943-69] S10
 Han, Seungyun [8950-40] SPSun
 Han, Sherry X. [8934-93] SPMon
 Han, Xiaoxing [8934-51] S8
 Han, Xue 8928 Program Committee
 Han, Yang [8948-102] SPSun
 Han, Yoon Deok [8983-23] S6
 Han, Young-Geun [8948-15] S2, [8961-10] SPTue, [8982-54] SPWed, [8985-47] S10, [8985-48] S10
 Hanafi, Mohamed [8955-13] S3
 Hanagud, Sathya V. [8994-10] S3
 Hanashi, Takuya [8948-47] S8
 Hanawa, Takao [8969-27] SPTue
 Hand, Duncan P. 8968 Program Committee
 Hanein, Yael [8994-42] S11
 Hanes, Justin [8927-57] S13
 Haneveld, Jeroen [8973-21] S5
 Haney, Michael W. 8991 Program Committee, [8991-27] S6
 Hangleiter, Andreas [8986-19] S4
 Hann, Swook [8968-38] SPTue
 Hanna, Ehab Y. [8926-136] S5
 Hanna, Jun-ichi 9004 Program Committee
 Hanna, Marc [8959-21] S6, [8961-20] S5, [8961-50] S12, [8961-51] S12
Hanna, Simon [8999-30] S6, [8999-7] S2
 Hanna, William [8931-7] S2
 Hannaford, Blake [8939-29] S5
Hannah, Alexander [8943-73] S11
Hans, Kerstin [8993-68] S14
Hans, Loic E. [8974-53] S8
 Hansch, Walter [8982-74] SPWed
 Hansen, Anders K. [8964-5] S1, [8972-19] S5
Hansen, Anja [8935-20] S4
 Hansen, Karolyn M. [8933-2] S1
 Hansen, Kristian R. [8961-96] SPTue, [8961-98] SPTue
 Hansen-Hagge, Thomas E. [8976-37] S8
 Hansinger, Peter [8984-45] S12
 Hansson, Tobias [8960-11] S1
 Hanstorp, Dag [8948-92] SPSun
 Hanzawa, Nobutomo [9009-2] S3
 Hao, Chen-Guan [9003-58] SPWed
 Hao, Xiang [8950-27] S7, [8950-38] SPSun
 Hapke, Christian [8961-36] S9
 Haque, Md. Rezuhanul [8928-50] S10, [8928-78] SPMon, [8934-43] S7, [8952-22] S6
 Haque, Moez [8972-36] S8, [8972-43] S10, [8972-43] S5
Haque, Riaz R. [8980-37] S9, [9010-14] S5, [9010-14] S6
 Harada, Kosuke [8967-54] SPTue
 Harada, Nobuhiro [8956-4] S1
 Harada, Yoshihisa [8963-31] S8, [8967-18] S9, [8967-19] S9
 Harada, Yoshinori [8935-67] SPSun, [8939-26] S5, [8943-117] SPSun
 Haraguchi, Masanobu [8941-31] S8
 Harako, Susumu [8987-94] S11
 Harb, Charles C. [8993-59] S12
Harbater, Osnat [8940-29] S6
 Hardan, Jamie [8947-2] S1
Harding, Kevin G. SC609
Hardy, Luke [8926-52] S11, [8926-54] S11, [8926-56] S11
 Harford, Steve [8971-24] S4
 Hariharan, Srivats [8950-52] S8
 Hariri, Lida P. [8927-41] S10, [8927-54] S13, [8927-55] S13, [8927-56] S13, [8934-57] S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Harjanne, Mikko [8990-14] S3, [8990-2] S1, [8990-22] S4, [8990-3] S1, [8990-4] S1
- Harju, Michael [8961-122] SPTue, [8963-19] S5
- Härkönen, Antti [8966-24] S7
- Harlander, Maximilian [8959-8] S3, [8965-31] S7
- Harlin-Jones, Cheryl [8932-1] S1
- Harm, Walter H. [8978-2] S1
- Harmelin, Alon [8937-1] S1, [8944-12] S3
- Harmon, Eric [9006-10] S2
- Harms, Fabrice [8926-129] S4, [8926-24] S6, [8926-61] S12, [8930-34] S8, [8934-69] S11, [8935-41] S9
- Harmsma, Peter J. [8990-30] S6
- Harouri, Abdelmounaim [8999-47] S10
- Harrer, Thomas [8963-6] S2
- Harrington, James A.** 8938 S5
Session Chair, [8938-16] S4, [8959-1] S1, [8961-77] SPTue
- Harris, Daniel K. [8955-54] S12
- Harris, David M.** 8929 Program
Committee, [8929-15] S4, [8929-16] S4
- Harris, Dennis G.** 8959 Program
Committee, 8959 S8 Session Chair, 8959 S9 Session Chair
- Harris, James S. [8964-47] SPTue, [8976-46] S10
- Harris, R. Scott [8927-36] S9
- Harris, Ronald M. [8948-59] S10
- Harrison, Alan [8945-6] S2
- Harrison, Christopher K. 8975 Program
Committee
- Harrison, Mark C.** [8933-10] S3
- Harrison, Michael [8943-178] SPMon
- Harrison, Paul [9002-48] S11
- Harrison, Tyler J. [8943-135] SPSun, [8943-175] SPMon, [8943-189] SPTues
- Hart, Vern [8943-98] S1
- Härtel, Romano [8950-13] S3
- Hartinger, Alzbeta Elizabeth** [8942-15] S4
- Hartl, Ingmar 8961 Program Committee, 8961 S5 Session Chair
- Härtling, Thomas** [8956-26] S6
- Hartmann, Jean-Michel [8988-26] S6
- Hartmann, Nils O. [8972-39] S9
- Hartmann, Peter** [8982-51] SPWed
- Hartmann, Peter [8935-69] SPSun, [8961-106] SPTue, [8961-125] SPTue, [8963-39] SPTue, [8975-9] S2
- Hartnick, Christopher J. [8926-123] S2
- Hartshorn, Christopher M. [8948-26] S4
- Hartung, Andrea [8959-53] S12
- Hartwig, Haldor [8988-2] S1
- Hartzell, Allyson 8975 Program
Committee
- Haruta, Makito [8928-20] S5
- Harvey, Andrew R. [8945-14] S4
- Harzendorf, Torsten [8974-15] S4, [8974-57] S9
- Hasan, Tayyaba [8926-28] S7, 8931
Conference Chair, 8931 S2 Session
Chair, [8931-13] S3, [8931-15] S3, [8931-18] S4, [8931-2] S1, [8931-23] S5, [8931-26] S5, [8931-31] S6, [8931-36] S7, [8931-39] S8, [8931-53] SPMon, [8931-54] SPMon, [8931-6] S2, [8931-7] S2, [8941-6] S2, [8943-60] S9, [8956-3] S1, [8956-6] S2
- Hasan, Zameer Ul** 8993 Track Chair, 8996 Track Chair, 8997 Conference Chair, 8997 Track Chair, 8998 Track Chair, 8999 Track Chair, 9000 Program Committee, 9000 Track Chair
- Hasbargen, Uwe [8951-18] S4
- Hase, Eiji [8948-81] S2
- Hasegawa, Kiyoshi [8956-4] S1
- Hasegawa, Takemi [8926-69] S14, [8935-43] S9
- Hasegawa, Tetsuya [8987-17] S3
- Hasenberg, Thomas** [8926-55] S11, [8926-58] SPSat, [8926-59] SPSat, [8941-20] S5
- Hasharoni, Kobi [8991-10] S3
- Hashemi, Mohammad Reza [8985-2] S1
- Hashemi, Seyed Ehsan [9001-9] S2
- Hashimoto, Hirofumi [8997-8] S4
- Hashimoto, Hiroyuki [8947-11] S2
- Hashimoto, Kosuke [8939-39] SPSun
- Hashimoto, Mamoru [8948-41] S7
- Hashimoto, Naoki [8986-45] S8
- Hashimoto, Nobuyuki** 9005 Program
Committee
- Haskell, Richard C.** [8934-100] SPMon, [8934-101] SPMon
- Hasnmüller, Stephan [8951-18] S4
- Hasnain, Ali** [8928-21] S5, [8928-24] S6
- Hassan, Khaled [8977-28] S6
- Hassan, Moinuddin 8938 S4 Session
Chair, [8938-13] S3, [8940-27] S5
- Hassani Nia, Iman** [9000-26] S5
- Hassebrook, Anton [8968-27] S6
- Hassen, Walid [8935-65] SPSun
- Hassinen, Timo [8999-52] SPWed
- Hastie, Jennifer E. 8966 Program
Committee, 8966 S7 Session Chair, [8966-9] S3, [8994-18] S1, [8994-18] S5
- Hastings, Arthur R. [8979-5] S4
- Hatabayashi, Kunitada [8947-51] S12
- Hatak, Noella [8926-110] S22, [8926-116] S24
- Hatakeyama, Takumi [8986-13] S3
- Hatami, Soheil [8955-20] S5
- Hatano, Hideki [8964-12] S3, [8964-34] S8
- Hatheway, Alson E. SC781
- Hatori, Masami [8964-35] S8
- Hattasan, Nannicha [8989-24] S7, [8993-42] S8
- Hattori, Azusa N. [8987-52] S11
- Hattori, Issei [8926-69] S14
- Hattori, Kou [8994-65] SPWed
- Hau, Chi M. [8939-2] S1
- Haub, John [8961-45] S11, [8982-1] S1
- Haug, Patrick [8963-6] S2
- Haupt, Matthias [9007-20] S7
- Hauri, Christoph Peter [8964-59] SPTue, [8985-11] S3
- Haus, Joseph W.** [8933-2] S1, [8994-62] S15, [8994-66] SPWed
- Hauschild, Dirk [8965-34] S7
- Hauser, Carmen [8948-46] S8
- Hauswald, Christian** [8986-29] S6
- Hautmann, Christine [8984-43] S11
- Havenith, Martina 8941 Program
Committee
- Havráněk, Vladimír [8988-39] S8
- Havrilla, David L. [8963-6] S2
- Hawk, Rasheeda M. [8960-14] S4
- Hawkins, Aaron R. [8988-40] S9
- Hawkins, Peter [8984-46] S12
- Hawkins, Thomas W. [8961-42] S10, [8992-18] S4, [8994-72] SPWed
- Hay, Nick [8959-23] S6, [8959-32] S8
- Hayakawa, Carole [8948-66] S11
- Hayashi, Hiroaki [8996-9] S3
- Hayashi, Hiroyuki [8929-20] SPSun
- Hayden, Joseph S. [8959-64] S14
- Häyrynen, Markus [8982-13] S3
- Hazama, Hisanao [8926-48] S10
- Hazart, Jérôme** [8994-34] S9
- He, Dawei [8984-2] S1
- He, Honghui [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
- He, Kuang [8944-19] S4
- He, Lei [9002-41] S9
- He, Lina [8991-21] S5
- He, Qiong [8995-36] S9
- He, Sailing** 8989 Conference Chair, 8989 S1 Session Chair, 8989 S4 Session Chair, 8989 SKey Session Chair, [8989-11] S4, [8989-25] S7
- He, Xiang Nan [8954-1] S1
- He, Xuan [9009-5] S4
- He, Yong [8940-42] SPTue
- He, Yonghong [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
- He, Zhijun [8995-42] S10
- Head, Stephen** [8949-34] S7
- Headley, Clifford** 8961 Program
Committee, 8961 S3 Session Chair
- Healy, Noel [8990-7] S2, [8993-42] S8
- Heaven, Michael C. 8962 Conference
Chair, 8962 S2 Session Chair, [8962-1] S1, [8962-3] S1
- Heck, Martijn J. [8989-6] S2
- Hecker, Klaus 9005 Program
Committee
- Heckl, Oliver H. [8972-25] S6
- Heckman, Emily M.** [8983-48] S11
- Heddlston, John M. [8948-26] S4
- Heebner, John E. [8985-37] S8
- Heflin, Stephanie [8930-21] S5
- Heflin, Stephanie [8952-35] S9
- Hefter, Ulrich [8961-75] SPTue
- Hegde, Gopal [8980-47] S12, [8994-10] S3
- Hegde, Gurumurthy [9005-20] S2
- Heggie, Tanner J.** [8985-52] S11
- Hegmann, Frank A. [8941-50] S10, [8984-36] S10, [8984-37] S10
- Hegstad, Janne-Lise [8926-7] S1
- Hehl, Gregor F. M. [8948-40] S7
- Hehlen, Markus P. 9000 S4 Session
Chair, [9000-3] S1
- Heide, Michael [8926-44] S9
- Heidrich, Helmut 8988 Program
Committee
- Heidrich, Marko [8949-6] S2
- Heidt, Alexander M. [8940-35] S7
- Heidt, Gerald L. 9006 Program
Committee, 9006 S3 Session Chair
- Heikenfeld, Jason C.** 8977 Program
Committee, 9005 Program
Committee
- Heim, Peter J. S. [8934-1] S1
- Heine, Frank F. 8971 Program
Committee
- Heinemann, Dag [8972-6] S2
- Heinemann, Stefan W. [8959-7] S3, 8965 Program Committee, 8965 S3 Session Chair, 8965 S7 Session Chair, [8965-15] S4
- Heinen, Bernd [8966-21] S6
- Heinmiller, Andrew [8943-120] SPSun
- Heinrich, Arne [8959-8] S3, [8965-31] S7
- Heinrich, Friedhelm [8972-17] S5
- Heinrich, Matthias [8980-51] S13
- Heinselmann, Karen [9000-5] S2
- Heinz, Dominik [8986-73] S15
- Heinz, Tony F.** [8969-15] S3, [8969-15] S5, [8994-23] S7
- Heinze, Stefan [8987-30] S6
- Heise, Herbert M.** [8951-7] S2
- Heisterkamp, Alexander** [8930-1] S1, [8941-49] S8, 8972 Conference Chair, 8972 S1 Session Chair
- Hekmatshoar, Bahman [8987-59] S12
- Held, Gerrit [8943-227] SPSun, [8943-228] SPSun
- Helffert, Stefan F. [8999-37] S8
- Hell, Stefan W. 8948 Program
Committee, [8950-22] SKey
- Helle, Oystein [8999-4] S1
- Heller, Donald F. [8928-12] S3
- Heller, Edwin J. [8989-20] S6
- Heller, Evan K. [8991-35] S8
- Helleso, Olav G. [8988-43] S9, [8988-66] SPWed, [8999-4] S1, [8999-48] S10
- Hellmann, Ralf [8967-24] S10
- Hellström, Jonas** [8959-38] S9
- Hellström, Staffan [8981-4] S1
- Helmy, Amr S. [8988-9] S2
- Helton, Kristen L. [8958-10] S3
- Helvajian, Henry** 8967 Program
Committee, 8967 Track Chair, [8967-22] S10, 8968 Track Chair, 8969 Track Chair, [8969-7] S2, 8970 Conference Chair, 8970 S1 Session Chair, 8970 S3 Session Chair, 8970 Track Chair, 8973 Track Chair, 8974 Track Chair, 8975 Track Chair
- Hemenway, David M. [8961-66] SPTue, [8965-12] S3, [8965-46] S2
- Hemmati, Hamid** 8971 Conference
Chair, 8971 S2 Session Chair, 8971 S4 Session Chair, [8971-10] S2, [8971-18] S3
- Hemmer, Philip R.** 8956 S7 Session
Chair, 8997 Conference Chair, 8997 S3 Session Chair
- Hemming, Alexander V. [8961-45] S11, [8982-1] S1
- Hempel, Martin [8965-2] S1, [9002-52] S12
- Hempel, Thomas [8986-32] S6
- Henary, Maged [8956-28] S8
- Henderson, Barbara W. [8931-46] SPMon
- Hendon, Christine P.** [8926-102] SPSun, [8926-75] S15
- Hendow, Sami T.** 8961 Program
Committee, 8961 S8 Session Chair, [8961-35] S9
- Hendrickson, Joshua R. [8987-4] S1, [8993-14] S2, [8993-84] S17
- Hengesbach, Stefan [8959-53] S12, [8965-11] S3, [8965-19] S4
- Henion, Scott R. [8971-39] S5
- Henkel, Sheryl N. [8943-111] SPSun, [8943-32] S5
- Henker, Ronny [8991-4] S1
- Henkin, Arie [8982-76] SPWed
- Henn, Sebastian R. [8934-6] S1
- Henneberger, Fritz 8980 Conference
Chair, 8980 S7 Session Chair, [8980-22] S6
- Hennessy, Ricky J. [8952-10] S3
- Hennig, Georg [8926-50] S10, [8928-13] S4, [8951-18] S4
- Hennig, Guido Symposium Chair, 8967 Program Committee
- Hennig, Simon [8950-50] SPSun
- Henning, Albert K. Symposium
Committee, 8975 Program
Committee, 8976 Program
Committee
- Henrie, Jason [8961-62] S15
- Henriet, Rémi [8960-4] S1, [8985-49] S10
- Henrot, Fabien [8988-35] S8
- Henry Wijesinghe, Rechire Eranga [8934-131] SPMon, [8934-132] SPMon
- Henry, Leanne J. [8960-66] SPTue
- Henry, M. David [8973-12] S3
- Henry, Samuel C. [8941-52] S10
- Hens, Zeger [8993-42] S8, [8996-20] S6
- Hensen, Matthias [8984-24] S7
- Henzen, Alex 9005 Program Committee
- Heo, Jung [8947-9] S2, [8949-5] S1, [8956-9] S2
- Heo, Junseok [8986-74] S15
- Heo, Sung-Wook [8988-69] SPWed
- Herbert, Sylvia [8994-39] S10
- Herbrich, Sebastian [8948-62] S10
- Herbst, Johannes [8993-75] S15
- Herculano, Rondinelli D. [8976-4] S1
- Herford, Alan S. [8926-105] S21, [8926-107] S21
- Herline, Alan J. [8939-27] S5
- Herling, Therese W. [8947-48] S11
- Herman, Peter R.** 8967 S6 Session
Chair, [8968-1] S1, 8972 Conference
Chair, 8972 S11 Session Chair, 8972 S7 Session Chair, [8972-32] S8, [8972-36] S8, [8972-43] S10, [8972-43] S5
- Herrmann, Boris [8943-142] SPSun
- Herrmann, Gregers G. [8926-65] S12
- Hermanutz, Frank [8967-16] S13, [8967-16] S8
- Hermerschmidt, Andreas [8974-53] S8
- Hermendorf, Jörg [8963-1] S1
- Hernandes, Antonio Carlos [8964-50] SPTue
- Hernandez, Victor M. [8930-29] S7
- Hernandez, Vincent J. [8985-37] S8
- Hernandez, Yves [8961-85] SPTue
- Hernández-Hernández, Edgar [9006-45] SPWed
- Hernández-Torres, Julian [8973-28] SPTue
- Herpich, Iris [8939-35] S6
- Herrera, Joaquin A. [8939-19] S3
- Herrera, Oscar D.** [8991-24] S6
- Herrera-Jasso, Rafael [8964-47] SPTue
- Herrera-May, Agustín Leobardo [8973-28] SPTue
- Herrington, Simon [8939-21] S4
- Herrmann, Thomas [8972-55] SPTue
- Herseiman, P. [9008-24] S10
- Hersman, F. William [8962-13] S4
- Herman, Barbara** [8981-9] S3
- Hervé, Lionel [8935-34] S7, [8937-24] SPSun, [8937-25] SPSun, [8952-12] S3
- Herzig, Hans Peter [8974-53] S8, [8977-25] S6, [8993-68] S14
- Herzka, Daniel A. [8948-80] SPSun
- Heselich, Anja [8932-1] S1
- Hesketh, Peter J. 8976 S5 Session
Chair, [8976-10] S3
- Hess, Ortwin** 8980 Program
Committee, 8998 Program
Committee, [8998-2] S1
- Hesse, Jan [8963-29] S7
- Hestroffer, Karine [8986-34] S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Hetzel, Reinhold** [9003-45] S11
 Heuer, Axel [8948-72] SPSun, [8960-53] S14
 Heuke, Sandro [8940-7] S2
 Heuke, Sandro [8926-133] S4
 Heuken, Michael 9003 Program Committee
 Hewak, Daniel W. [8982-38] S8, [8982-41] S8
 Hewko, Mark [8940-10] S2, [8948-74] SPSun, [8948-82] SPSun
 Hey, Rudolf [8989-4] S1
 Hibbs-Brenner, Mary [8932-5] S1
 Hibst, Raimund [8926-103] S21
Hickmann, Jandir Miguel [8947-84] S13, 8999 Program Committee, [8999-13] S3
 Hidi, Izabella [8957-10] S3
 Hien, Nguyen Thi Minh [8987-95] S6
 Hier, Harry S. [8993-51] S10
 Higashi, Yuichi [9003-52] SPWed
 Higashi, Yuuma [8969-10] S2
 Higashihata, Mitsuhiro [8967-54] SPTue, [8987-10] S2, [8987-78] SPWed, [8987-79] SPWed
 Higby, Paige L. [8938-12] S3
 Hight-Walker, Angela R. [8948-26] S4
 Higuchi, Mikio [8959-56] S13
 Higuchi, Yuichi [8988-15] S4
 Hikita, Atsuniko [8947-7] S2
 Hikita, Yasuyuki [8987-27] S6
 Hikosaka, Toshiki [8986-51] S10
 Hilbert, Vinzenz [8972-14] S4
 Hilborn, Yuans [8938-48] SPSun
 Hild, Konstanze [9002-6] S2
 Hildebrandt, Andre [8984-52] S14
 Hildebrandt, Lars [8993-44] S8
 Hildebrandt, Niko 8955 Program Committee, [8955-31] S7
 Hildenbrand, Anne [8964-41] S9
 Hill, Cory J. [8993-33] S6
 Hill, Daniel [8933-17] S5
 Hill, David B. [8927-43] S11
 Hill, M. [8980-15] S4
 Hill, Malcolm [8926-118] S1, [8926-119] S1
 Hill, Mark D. [8982-3] S1
 Hill, Tyler [8996-14] S4, [8996-16] S5, [8996-17] S5
 Hille, Carsten [8947-40] S9, [8948-94] SPSun
 Hille, Pascal [8986-42] S8
 Hilleman, Devin [8998-12] S3, [8998-22] S5
 Hiller, Karla [8977-26] S6, [8995-18] S5
 Hillier, Glen [8981-40] S11
 Hillman, Elizabeth M. 8928 Program Committee
 Hillman, Timothy R. [8943-202] SPTues, [8952-39] S10
 Hillmann, Dierck [8934-19] S3
 Hillrichs, Georg [8938-14] S3
 Himics, László [8988-39] S8
 Himmelhuber, Roland [8991-24] S6
 Hind, Andrew R. [8992-15] S3
 Hingerl, Kurt [8964-47] SPTue
 Hinkel, Laura [8934-19] S3
 Hinkey, Robert T. [8993-36] S7
 Hinkov, Borislav [9002-44] S10
Hinnrichs, Michele [8977-10] S3
 Hinojosa, Ana C. [8939-19] S3
 Hinz, Martin [8971-3] S1
 Hinz, Michael [8951-31] SPMon
 Hinz, Gerald [8950-1] S1
 Hirai, Hideaki [8992-29] SPWed, [8992-30] SPWed
 Hirakawa, Kazuhiko 8984 Program Committee
 Hiramatsu, Hiroyuki [8951-36] SPMon
 Hiramatsu, Kazumasa [8986-68] S14
 Hirano, Mitsuharu [8926-69] S14, [8935-43] S9
 Hirasawa, Takeshi [8943-137] SPSun, [8943-154] SPMon, [8943-214] SPTues
 Hirata, Eishu [8927-7] S2
 Hirayama, Hideki 8986 Program Committee, [8993-15] S2
 Hirayama, Noritomo [9003-52] SPWed
 Hirohashi, Junji [8964-12] S3, [8964-34] S8, [8964-35] S8
 Hirose, Kazuyoshi [9002-34] S8, [9002-54] S12
 Hirose, Yasushi [8987-17] S3
 Hirota, Koji [8934-43] S7, [8952-22] S6
 Hirschberg, Henry 8928 Conference Chair, 8928 S3 Session Chair, 8928 S4 Session Chair, [8928-10] S3, [8928-11] S3, [8928-14] S4, [8928-30] SPSat
 Hirsekorn, Olaf [8965-28] S6
 Hirst, Louise C. [8981-15] S4, [8981-2] S1, [8981-40] S11
 Hirte, Kathleen [8968-34] SPTue
 Hisatomi, Masannori [9001-20] SPWed
 Hitchcock, Charles L. [8947-10] S2
 Hitosugi, Taro [8987-21] S5
Hitzenberger, Christoph K. [8930-8] S2, [8930-9] S2, 8934 Program Committee, 8934 S9 Session Chair, [8934-21] S4, [8934-54] S9, [8934-80] S12
 Hjelmstad, David [8930-54] SPSun
 Hjortdal, Jesper O. [8930-57] SKey
 Hiawatsch, Nadine [8976-37] S8
 Ho, Arthur 8930 Conference Chair, 8930 S6 Session Chair, 8930 SAwd Session Chair, 8930 SPSun Session Chair, [8930-24] S6
 Ho, Cheng-Han [8985-27] S6
 Ho, Derek [8926-78] S16
 Ho, Ho-Pui A. 8957 Program Committee, [8957-17] S4
 Ho, Jyh-Jier J. [8981-62] SPWed
 Ho, Kenneth K. Y. [8947-49] S11
 Ho, Khek Yu [8939-22] S4
 Ho, Thuan [8938-27] S6
 Ho, Yu-Chieh [8981-55] SPWed
Ho, You Zhe [8957-31] S7
 Hoang, Thang B. [8984-34] S9, [8993-17] S3
Hochberg, Michael [8990-1] S1
 Hochgeschwender, Ute [8928-85] S16
 Hochman, Bernardo S. [8932-13] S3, [8932-19] S4, [8932-22] S4, [8932-25] S5, [8932-26] S5, [8932-27] S5, [8932-29] S6, [8932-30] S6, [8932-31] S6
 Hochreiner, Armin [8943-148] SPSun, [8943-226] SPTues
 Hochuli, Roman [8943-210] SPTues
 Hocking, Anne M. [8941-52] S10
 Hocquet, Steve [8992-25] S6
 Hode, Tomas 8932 Program Committee, 8932 S4 Session Chair, 8932 S5 Session Chair, 8944 Program Committee, 8944 S2 Session Chair, [8944-17] S4, [8944-24] SPMon, [8944-29] SPMon, [8944-3] S1, [8944-7] S2
 Hodgkinson, Jane [9002-8] S2
 Hodgson, Norman 8959 Program Committee, SC752
 Hoehner, Bernhard [8930-17] S4
 Hoener, Kylan [8961-66] SPTue, [8965-12] S3
 Höfer, Marco [8959-20] S5
 Hoff, Mari [8947-16] S4
 Hoffman, James R. [8984-36] S10, [8984-37] S10
 Hoffman, Lisa [8947-88] SPMon
 Hoffman, Marc P. [8986-31] S6
 Hoffman, Stephan [8985-50] S11
 Hoffmann, Armin [8961-48] S12, [8961-49] S12
 Hoffmann, Axel [8986-26] S5, [8986-42] S8, 8987 Program Committee, 8987 S1 Session Chair, [8987-11] S2, [8987-6] S2, [8987-7] S2, 8996 Program Committee
 Hoffmann, Dieter [8959-17] S5, [8959-20] S5, [8959-30] S7, [8959-53] S12, [8965-11] S3, [8965-19] S4, [8965-30] S7
 Hoffmann, Jörg [8970-11] S3
 Hoffmann, Lars [8986-19] S4
 Hoffmann, Marc P. [8986-27] S5
 Höfner, Josef [8959-53] S12
 Hofkens, Johan 8950 Program Committee
 Höfler, Heinrich A. [8992-23] S5
 Höfling, Roland 8979 Program Committee, 8979 S4 Session Chair
Höfling, Sven 8993 Program Committee, [8993-17] S3, [8993-19] S3, [8993-44] S8, [8993-7] S1, [9002-46] S11
 Hofmann, Martin R. [8952-34] S9, [9001-15] S4, [9002-12] S3, [9004-11] S3
 Hofmann, Ulrich [8975-16] S3, [8977-4] S2, [8977-5] S2, [8977-8] S2
 Hofmann, Ulrich G. [8945-3] S1, [8947-79] SPMon
 Hofstetter, Daniel [8993-68] S14
 Hogan, Josh [8934-107] SPMon, [8935-10] S3, [8942-9] S2
 Hogan, William K. [8932-5] S1
 Hogarth, Kyle [8927-33] S9
 Hogg, Richard A. [8959-40] S10, [8994-6] S2, [9002-1] S1, [9002-3] S1
 Høglund, Linda [8993-33] S6
 Høgstvedt, Lasse [8964-13] S3, [8964-52] SPTue
 Hoh, Denny [8961-34] S8
 Hoheisel, Dominik [8973-4] S1
 Hoheisel, Raymond 8981 Program Committee, [8981-15] S4, [8981-2] S1, [8981-27] S7
 Hohenau, Andreas [8999-48] S10
 Hohmann, Judith [8970-10] S3
 Højgaard, Liselotte [8979-22] S2, [8979-22] S8
 Hojatoleslami, S. Ali [8934-112] SPMon
 Hokanson, Adam S. [8938-4] S1
Hola, Miroslava [8992-31] SPWed
 Holc, Katarzyna [8986-59] S11, [9002-17] S4, [9002-19] S4
 Holdsworth, Kirsty L. [9004-33] S2
 Holdt, Lesca M. [8951-18] S4
 Holdynski, Zbigniew [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
 Hole, Arti R. [8928-7] S2, [8940-12] S3
 Holgado Bolaños, Miguel 8968 Program Committee
 Holl, Peter [8966-27] S8
 Holland, Daniel B. [8949-1] S1
 Holleville, David [8966-19] S6
 Holley, Susan O. [8943-157] SPMon
 Hollingsworth, Jennifer A. 8955 Program Committee, [8981-17] S4
 Hollmann, Joseph L. [8949-24] S5, [8949-30] S6
 Hollowell, Andrew E. [8989-20] S6
 Holly, Carlo [8965-11] S3, [8965-19] S4
 Holmes, Andrew S. [8977-32] S7
 Holmes, Barry M. [8988-52] S11
 Holmes, Christopher H. [8968-8] S2, [8974-56] S9, [8982-15] S3, [8988-38] S8, [9002-8] S2
 Holmes, Mark [8986-38] S7, [9002-2] S1
 Holmlund, Christer [8992-10] S3
Holschuh, Brad [8975-3] S1
 Holst, Karen [8938-12] S3
 Holten, Roger H. [8961-7] S2
 Holwitz, Eric A. [8932-12] S3
 Holzberger, Simon [8961-5] S2
 Holzer, Marco [8963-6] S2
Holzner, Konstantin Benno [8961-108] SPTue
 Homann, Christian [8951-18] S4
 Homewood, Kevin [8982-24] S5, [8982-38] S8, [8982-41] S8
 Homma, Shu [8928-23] S6
 Hommel, Detlef [8980-21] S5, [8986-19] S4
 Hömmerich, Uwe H. [8959-66] S14, [8982-66] SPWed, [9000-23] SPWed
Homola, Jiri 8957 Program Committee
 Homsy, Alexandra [8993-68] S14
 Homyk, Andrew [8994-1] S1
 Hon, Schang-jing [8980-4] S1, [8986-71] S15
Honda, Norihiro [8926-48] S10
 Honda, Tooru [8986-13] S3
 Honda, Toshio 9006 Program Committee
 Honda, Yoshio [9003-14] S3
 Hondebrink, Erwin [8943-26] S4, [8943-43] S7
Honea, Eric C. 8961 Program Committee, 8961 S9 Session Chair, [8961-62] S15
 Hönel, Dennis [9006-1] S1
 Hong, Chang-Hee [9003-59] SPWed
 Hong, Hyun-Gi [8991-8] S2
 Hong, Hyun-Gue [8977-15] S4
 Hong, Jisoo [8949-19] S4, [9006-18] S4
Hong, Minghui 8968 Program Committee
 Hong, Nam-Pyo [8989-17] S5
 Hong, Seok-jun [8928-11] S3
 Hong, Su Jeong [8928-80] SPMon
 Hong, Tu [8969-16] S3, [8969-16] S5
 Hong, Yi [8943-46] S7
 Hong, Young-Joo [8930-31] S7, [8930-7] S2, [8934-109] SPMon, [8934-30] S5
 Honigman, Allen [8929-16] S4
 Honigstein, Danielle [9006-16] S4
Honkanen, Seppo K. [8974-58] S9, 8982 Program Committee, [8982-13] S3, [8982-23] S5, [8982-30] S6, [8988-34] S8, [8994-11] S3
 Hönninger, Clemens [8961-16] S4, [8961-50] S12, [8961-52] S12, [8972-24] S6
 Honsaker, Christian B. [8944-13] S3
 Honsberg, Christiana B. 8981 Program Committee
Hoon, Song [8977-20] S5
 Hoopes, P. Jack [8931-36] S7
 Hoose, Tobias [8991-5] S1
 Hoover, Erich E. [8934-2] S1
Höpfner, Henning [9001-15] S4
Hopkins, F. Kenneth 8983 Program Committee
 Hopp, M. [8929-28] SPSun
 Hoppel, Robert [8949-35] S7
 Hopper, Colin [8926-144] S7, [8934-128] SPMon
 Hopstaken, Marinus [8987-59] S12
 Hopwood, Jeffrey A. [8962-2] S1
 Horacek, Martin [8959-35] S8
 Horcher, Elizabeth [8952-13] S4
 Hori, Kunio [8948-47] S8
 Horikawa, Tsuyoshi [8990-47] S9, [9010-5] S3
 Horiuchi, Hideki [8947-7] S2
 Horiegger, Joachim [8927-30] S7, [8934-22] S4
Horn, Ray-Hua [8986-14] S3, 9003 Program Committee, [9003-24] S5, [9003-26] S6
 Horrocks, Jonathan [8943-181] SPMon
 Horsley, David A. [8977-14] S4, [8995-26] S7
 Horstmann, Jens [8943-55] S8
 Hortelano, Vanesa [8965-2] S1
 Horwath, Joachim [8971-7] S1
 Hosen, Ian D. [8983-14] S4
 Hoshi, Masayuki [8964-35] S8
 Hoshi, Yoko [8945-18] S5
 Hoskinson, Alan R. [8962-2] S1
 Hösler, H. [9002-53] S12
Hosoda, Masaki [8926-98] S20
 Hosoda, Takashi [9002-38] S9
 Hossain, Mohammed I. [9002-48] S11
 Hossain, Zabir [8999-12] S3
 Hosseini Teherani, Ferechteh H. 8987 Conference Chair, [8987-33] S7, [8987-47] S9, [8987-86] SPWed, [8987-91] SPWed, [8987-97] SPWed, 8993 Program Committee
 Hosseini, Amir [8991-20] S5, [8991-22] S5, [8991-31] S7
 Hosseini, Poorya [8946-22] S5, [8949-28] S6
 Hosseini, Seyed Rasoul [8994-72] SPWed
Hosseinpour, Shaghayegh [8976-49] S10
 Hosta-Rigau, Leticia [8955-71] S12
 Hostutler, David A. [8962-7] S2
 Hotaling, James M. [8939-29] S5
 Hou, Minmin [8975-6] S2
 Hou, Shuoben [8983-47] S11
 Hou, Vivian W. [8927-18] S4, [8936-27] S6, [8945-5] S1
Houbertz, Ruth 8974 Program Committee, 8974 S2 Session Chair, 8974 S3 Session Chair, 8991 Program Committee, [8991-5] S1
Hourelid, Nicolette N. [8932-9] S2
 Houston, Joseph [8931-21] S4
 Houston, Jessica P. [8947-27] S5
 Howling, Richelle JM [8947-8] S2
 Howard, Eric [8944-6] S2
 Howe, Roger T. [8975-101] SPLEN
Howell, John C. [8997-19] S7, 8998 Program Committee, [8998-13] S3
 Howell, Stephen W. [8994-45] S11
 Howland, Greg A. [8997-19] S7
Howlett, Isela [8927-28] S7, [8954-4] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Hoy, Christopher L. [8952-7] S2
Hoying, James B. [8953-9] S2
Hoyt, Taylor [8926-95] S19
Hrabina, Jan [8992-31] SPWed, [8992-32] SPWed
Hrelescu, Calin [8955-35] S8, [8980-19] S5
Hribek, Petr [8959-49] S11
Hristu, Radu [8948-106] SPSun
Hsiao, Hui-Hsin [8981-59] SPWed
Hsiao, Phoebe [8990-6] S1
Hsieh, Allen [8965-6] S2
Hsieh, Bao-Yu [8943-105] S16
Hsieh, Chieh [8986-5] S10, [9003-23] S5, [9003-30] S7, [9003-34] S7
Hsieh, Chi-Ti [8980-62] SPWed
Hsieh, Mei-Li [8994-59] S15
Hsu, Che-Wei [8947-73] SPMon
Hsu, Chin-Ying Stephen [8948-95] SPSun
Hsu, Dahsiung [8943-113] SPSun
Hsu, Jin-Chen [8994-70] SPWed
Hsu, Julie C. [8948-102] SPSun
Hsu, Mike S. [8928-43] S8, [8928-46] S9, [8928-50] S10
Hsu, S. S. H. [8991-18] S5
Hsu, Wei-Chen [8941-35] S9, [8952-32] S8
Hsu, Yih-Chih 8944 Program Committee, [8944-34] SPMon, [8944-4] S1
Hsueh, Hsu-Hung [8986-14] S3
Htoon, Han [8981-17] S4
Hu, Chen [8993-42] S8
Hu, Chia-Chang [9007-26] SPWed
Hu, Chun-Rui [8948-34] S6
Hu, Dandan [8949-56] SPMon
Hu, Honghua [8983-3] S1
Hu, Hui [8982-52] SPWed
Hu, Juejun [8974-12] S4, [8988-27] S6, [8988-5] S1, [8991-27] S6
Hu, Lili [8982-58] SPWed
Hu, M. S. [8986-7] S2
Hu, Neng-Chung [9003-3] S1
Hu, Qi [8964-13] S3, [8992-28] S6
Hu, Qing [8993-13] S2
Hu, Shuren [8933-5] S2
Hu, Sijun [8936-15] S3, [8947-32] S6
Hu, Song [8943-180] SPMon, [8943-212] SPTues
Hu, Xiaonan [8980-49] S12
Hu, Xinda [8979-14] S7
Hu, Yike [8987-67] S13
Hu, Ying S. [8950-49] SPSun
Hu, Youfang [8989-12] S5, [8990-13] S3, [8991-18] S5
Hu, Zhigao [8938-21] S4
Hua, Hong [8979-14] S7
Huang, Brendan [8927-46] S11, [8934-53] S8, [8953-11] S3
Huang, Chao [8943-215] SPTues, [8943-224] SPTues, [8943-86] S13
Huang, Chen [8984-6] S2
Huang, Chi-Chieh [8958-7] S2
Huang, Chien-Fu [8981-59] SPWed
Huang, Chih-Chia [8943-155] SPMon
Huang, Chih-Hsien [8943-68] S10
Huang, Chih-Li [8980-3] SPWed
Huang, Chiung-Yi [9003-26] S6
Huang, Chuan [8944-26] SPMon, [8956-37] S9
Huang, David [8934-22] S4
Huang, Ding-Wei [8957-31] S7
Huang, Fuqing [8987-44] S9
Huang, Guang-Hao [8988-60] SPWed
Huang, Guoliang [8949-43] S9
Huang, Hsin Wei [8957-31] S7
Huang, Huan [8972-16] S4
Huang, Jie [8974-32] SPTue, [8974-33] SPTue
Huang, Jinxin [8936-9] S2
Huang, Jiwei [8935-76] SPSun
Huang, Kai [8997-4] S3, [8997-4] S7
Huang, Leaf [8944-34] SPMon, [8944-4] S1
Huang, Lin [8948-77] SPSun
Huang, Michael [8995-17] S3, [9008-6] S5, [9008-6] S6
Huang, Min Ali [8976-30] S7
Huang, Ningfeng [8998-8] S2
Huang, Patrick [8974-9] S3
Huang, Qian [8943-19] S3
Huang, Qin [8928-48] S10
Huang, Qin [8927-30] S7
Huang, Shen-Che [9001-19] S4
Huang, Shenghong [9001-12] S3
Huang, Sheng-Lung L. [8961-100] SPTue, [8961-99] SPTue
Huang, Shujin [8995-34] S9, [9005-8] S2
Huang, Shu-Wei [8960-2] S1
Huang, Steven He [8960-25] S6
Huang, Weidong [8970-22] S6, [8970-22] S9
Huang, Xi [8954-1] S1
Huang, Yang-Yue [8983-58] SPWed
Huang, YanYi [8948-97] SPSun, [8948-98] SPSun
Huang, Yao-Wei [8995-36] S9
Huang, Yaxun [8931-28] S5
Huang, Ye [8961-91] SPTue
Huang, Yen-Ta [8950-41] SPSun, [8957-30] S7
Huang, Yi-An [8952-15] S4
Huang, Yidong 8991 Program Committee
Huang, Yi-Kai [8974-18] S5, [8993-87] S17, [9003-8] S2
Huang, Yin [8988-30] S7
Huang, Ying-Ying [8940-8] S2
Huang, Yi-Pai 9005 Program Committee
Huang, Yong [8934-46] S7, [8934-76] S11, [8935-47] S10, [8949-23] S5
Huang, Yonggang [8958-9] S2
Huang, Yong-Zhen [8960-34] S9
Huang, Yu-Ping [8997-22] S8
Huang, Z. Josh 8928 Program Committee
Huang, Z. Rena [8989-16] S5
Huang, Zheng 8944 Program Committee
Huang, Zhen-Li 8950 Program Committee
Huang, Zhihong [8994-21] S2, [8994-21] S6
Huang, Zhihong [8934-29] S5
Huang, Zhiwei 8939 S2 Session Chair, [8939-22] S4, [8939-31] S6, 8940 Program Committee, 8940 S3 Session Chair, [8948-29] S5, [8948-95] SPSun
Huante-Ceron, Edgar [8990-45] S9
Hubbard, Seth M. 8981 Program Committee, 8981 S4 Session Chair, [8981-28] S7, [8981-4] S1, [8981-40] S11, [8981-42] S11
Hubbuch, Jürgen [8976-14] S3
Huber, Dale L. [8955-18] S4
Huber, Heinz [8967-33] S12, [8967-33] S4, [8972-38] S9
Huber, Robert A. [8930-32] S7, 8934 Program Committee, [8934-24] S4, [8934-7] S2
Huber, Rupert 8984 Program Committee, [8984-40] S11
Hubner, Eric E. [8990-5] S1
Hübner, Uwe [8957-10] S3
Hübsch, Daniel [8985-23] S5
Huck, Alexander [8997-31] S11
Hudcová, Lucie [8941-12] S3
Hueber, Dennis M. [8936-18] S7
Huefner, Anna [8957-3] S1
Huet, Landry [8993-78] S16
Huffaker, Diana L. [8981-24] S6, [8981-50] S1, 8996 Conference Chair, 8996 S2 Session Chair, [8996-22] S6, [8996-3] S1
Hugger, Stefan [8993-57] S12
Hughes, David H. 8997 Program Committee
Hughes, Lawrence C. [8993-70] S14
Hughes, Mark A. [8982-24] S5, [8982-38] S8, [8982-41] S8
Hughes, Mike [8991-17] S4
Hughes, Thomas [8977-21] S5
Hughes, Thomas [8956-34] S9, [8956-35] S9, [8983-28] S7
Hugi, Andreas [9002-20] S5, [9002-21] S5
Hugonin, Jean-Paul [8980-18] S5
Hugonnot, Emmanuel [8961-76] SPTue
Hughes, Maxime [9002-1] S1
Huh, Jae-Won [9004-12] S4, [9004-18] SPWed
Huh, Yong-Min [8956-9] S2
Huie, Philip [8930-39] S8
Huignard, Jean-Pierre [8943-44] S7, [8943-9] S2, 8993 Program Committee, 8993 S8 Session Chair
Huis in 't Veld, Bert A. J. [8967-32] S12, [8967-32] S4, [8967-49] SPTue, [8968-13] S3
Hull, David [8943-98] S1
Hulme, Jared C. [8989-6] S2
Hulse, Charles A. [8992-2] S1
Hülsewede, Ralf [8965-28] S6
Hult, Dane William [8964-25] S6
Huncke, Richard [8935-56] S12
Hung, Muming [8981-57] SPWed
Hung, Shi-Yao [8943-105] S16
Hungria-Hernandez, Teresa [8955-16] S4
Hunker, Jeffrey D. [8989-20] S6
Hunt, Heather K. [8933-24] SPSun, [8960-23] S5
Hunt, John D. [8985-59] SPWed
Huo, Zhen [8974-33] SPTue
Hupel, Christian [8968-34] SPTue
Huppert, Theodore J. 8937 Program Committee
Hur, In Hoe [8986-75] SPWed
Hurdud, Nicolae [8958-12] S3
Hurley, Bryan P. [8927-52] S12
Hurni, Christophe A. [9003-41] S10
Hurtado, Antonio [8986-44] S8
Hurtado, Juan [8991-36] S8
Husaini, Saima [8966-6] S2
Huser, Thomas R. 8950 Program Committee, [8950-50] SPSun, [8952-4] S1, 8999 Program Committee
Husko, Chad A. [8960-2] S1
Hussain, Altaf [8943-26] S4
Hussain, Sakhawat [8986-50] S10
Huszar, Emese [8961-82] SPTue
Hutchens, Thomas C. [8926-46] S10, [8926-52] S11, [8926-56] S11
Hutchings, David C. [8988-52] S11
Hutchings, Joanne C. [8939-32] S6
Hutchins, Laura [8943-31] S5
Hüttenberger, Dirk [8931-27] S5, [8931-40] S8
Hüttmann, Gereon [8927-44] S11, [8930-36] S8, [8934-19] S3, [8955-33] S7
Huye, Leslie Erskine [8972-11] S2
Huyen, Nguyen Thi [8987-95] S6
Huyet, Guillaume [8995-21] S6
Huynh, Elizabeth [8943-203] SPTues, [8943-71] S11
Huynh, Khang T. [8950-46] SPSun
Huynh, Nam Trung [8943-77] S12
Huys, Roeland [8947-51] S12
Hvozدارa, Lubos [8993-68] S14
Hwang, Han-Jeong [8928-62] S13, [8928-75] SPMon
Hwang, Harold Y. [8987-27] S6
Hwang, Ho Sik [8930-22] S5
Hwang, Inh [8983-53] SPWed
Hwang, In-Wook [8969-26] SPTue
Hwang, Jacob [8961-10] S3
Hwang, Jaehyun [8947-9] S2
Hwang, Jaehyun [8949-5] S1
Hwang, Jeeseong 8936 Program Committee, 8936 S2 Session Chair, [8936-29] S7, [8945-15] S4, [8945-17] S5
Hwang, Sang Seok [8926-150] SPSat
Hwang, Sekyu [8934-36] S6
Hwang, Sunyong [9003-27] S6
Hwang, Yoonha [8941-55] S11, [8944-14] S3, [8947-29] S6, [8947-81] SPMon
Hwu, R. Jennifer 8985 Program Committee, 8985 S11 Session Chair, 8985 S4 Session Chair
Hyater-Adams, Simone [8982-66] SPWed
Hyland, James [9006-10] S2
Hyllus, Philipp [8999-46] S10
Hysi, Eno [8943-222] SPTues, [8943-84] S13
Iakovlev, Vladimir [8966-14] S4, [9001-16] S4
Iakushev, Sergii O. [8972-30] S7
lanoul, Anatoli I. [8996-34] SPWed, [8996-35] SPWed
Ibarra-Escamilla, Baldemar 8964 Program Committee
Ibarra-Torres, Juan Carlos [9006-55] SPWed
Ibey, Bennett L. 8941 Conference Chair, [8941-18] S5, [8941-57] S12, [8941-58] S12, [8941-60] S12, [8941-61] S12, [8941-62] SPSun, [8955-49] S11
Ibrahim, Zuhair [8934-76] S11, [8935-47] S10
Ibsen, Morten [8976-16] S4
Ichihashi, Yasuyuki [9006-33] S7
Ichikawa, Tsubasa [9006-27] S6, [9006-28] S6, [9006-42] SPWed
Ida, Taiichiro [8945-9] S3
Ido, Masafumi [9005-14] S3
Idehenre, Ighodalo [8933-2] S1
Ido, Tatemu [9010-18] S6, [9010-18] S7
Iftimia, Nicusor [8930-44] S9, [8934-82] S12, [8935-45] S9
Igarashi, Hironori [8961-93] SPTue
Ighene, Yusuke [8996-9] S3
Ignatjeva, Natalya Yu. [8948-8] S1
Ilijima, Andrey [8999-39] S8
Ignatovich, Filip V. 8992 Program Committee, 8992 S4 Session Chair
Ihleemann, Jürgen [8991-15] S4
Ihrler, Stephan [8926-146] S7
Iijima, Hideki [8935-52] S11
Iijima, Yasuhiro [8967-17] S9
Iino, Ryota [8933-22] S6
Ijzerman, Wilbert L. [9003-47] S11
Ikeda, Kazuhiro [8989-7] S10, [8989-7] S3
Ikeda, Kyohei [9006-26] S6
Ikemura, Kenji [8935-53] S11
Ikenoue, Hiroshi [8967-52] SPTue, [8987-10] S2, [8987-78] SPWed, [8987-79] SPWed
Ikonen, Elna [8948-84] SPSun
Ikonic, Zoran [9002-48] S11
Ikuhara, Yuichi [8987-36] S7
Ikuno, Yasushi [8930-50] SPSun
Ichenko, Vladimir S. 8960 Conference Chair, 8960 S1 Session Chair, 8960 S11 Session Chair, [8960-32] S9, [8960-35] S9, [8960-37] S10, [8960-38] S10, [8960-9] S2, [8989-10] S4
Ilev, Ilko K. [8930-43] S9, 8938 Program Committee, [8938-13] S3, [8938-8] S2
Ilgner, Justus F. 8926 Conference Chair, 8926 S1 Session Chair, 8926 S3 Session Chair, 8926 S6 Session Chair
Iliadis, Nikos [8982-7] S1, [8991-11] S3
Iliova, Ekaterina [8998-59] S13
Iliopoulos, Eleftherios [8986-39] S8
Illarramendi, María Asunción [8983-16] S4
Iluz, Zeev [8994-42] S11
Im, Chang-Hwan [8928-62] S13, [8928-75] SPMon
Im, Yeonsu [9006-37] S7
Imafuji, Osamu [8986-54] S11
Imai, Kaita [8947-39] S9
Imai, Koichi [8964-35] S8
Imamoglu, Atac [8997-29] S11
Imamura, Takeshi [8947-7] S2
Imbert, Julien [8993-34] S6
Immonen, Marika P. [8991-37] S9
Imms, Ryan [8947-32] S6
Imre, Sandor [8997-10] S5
In, J. H. [8967-39] S14
Inada, Natalia Mayumi [8927-48] S12, [8927-49] S12, [8931-32] S6, [8947-60] S13, [8947-86] SPMon
Inbar, Eran [8961-60] S14, [8964-2] S1
Infusino, Scott [8926-123] S2
Ingildeev, Denis [8967-16] S13, [8967-16] S8
Ingold, Kirk A. [8964-30] S7
Innocenti, Claudia [8955-1] S1
Inomata, Daisuke [8987-49] S11
Inoue, Azusa [8983-15] S4, [8983-17] S4
Inoue, Narumi [8967-26] S11
Inoue, Shin-ichiro [8983-42] S10, [8986-64] S14, [8988-10] S2
Inoue, Takashi [8948-60] S10, [8949-11] S3
Insana, Michael F. [8946-27] S6
Intemann, Steffan [9001-4] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Intes, Xavier** 8937 Conference Chair, 8937 S1 Session Chair, 8937 S3 Session Chair, 8937 S4 Session Chair, [8937-28] SPSun, [8937-29] SPSun, [8937-31] SPSun, [8937-32] SPSun, [8937-34] SPSun, [8937-37] SPSun
- Inyang, Aloysius [8965-29] S6
- Ioannides, Panayiotis [8934-114] SPMon
- Ioppolo, Tindaro** [8960-18] S4
- lordachita, Iulian I. [8926-122] S1
- Irby, Pierce B. [8926-52] S11, [8926-54] S11, [8926-56] S11
- Irish, Jonathan C. [8937-2] S1
- Irudayaraj, Joseph M. [8950-20] S5, [8950-48] SPSun
- Irwin, David A. [8962-14] S4, [8965-18] S4, [8965-49] SPTue
- Isella, Giovanni [8990-17] S3
- Ishida, Akane [8936-3] S1, [8951-35] SPMon
- Ishigaki, Mika [8938-39] S8, [8939-24] S5, [8951-24] S5, [8951-25] S5
- Ishigure, Takaaki [8989-30] SPlen, [8989-31] SPlen, [8991-1] S1, [8991-43] SPWed
- Ishihara, Miya** 8942 Program Committee, [8943-137] SPSun, [8943-154] SPMon, [8943-214] SPTues
- Ishihara, Nagisa [8980-17] S4
- Ishihara, Ryu [8951-24] S5
- Ishihara, Syoutarou [8928-47] S9
- Ishii, Katsunori [9005-17] S4
- Ishii, Katsunori** [8926-72] S14, [8929-7] S2
- Ishii, Kiyoo 9008 Program Committee, 9008 S6 Session Chair, 9010 S7 Session Chair
- Ishii, Kunihiko [8950-9] S2
- Ishii, Norihiko [9006-15] S3
- Ishii, Satoshi [8950-48] SPSun
- Ishii, Yuzo [8988-15] S4
- Ishikawa, Hiroaki [8975-4] S1
- Ishikawa, Takako [8983-61] SPWed
- Ishikawa, Yoshie [8969-10] S2
- Ishimaru, Ichirou [8936-3] S1, [8951-35] SPMon, [8951-36] SPMon
- Ishizaka, Masashige [9010-5] S3
- Ishizawa, Shunsuke [8996-9] S3
- Ishizawa, Takeaki [8956-4] S1
- Ishidow, Eléna [8969-24] SPTue
- Ishio Lima, Joaquim [8988-67] SPWed
- Isikman, Serhan O. [8936-32] S7
- Iskra, Peter [8982-74] SPWed
- Islam, M. Shahidul [8928-50] S10, [8928-78] SPMon, [8934-43] S7, [8952-22] S6
- Islam, Mohammed Narzul [8964-27] S7
- Islam, S. M. [8986-66] S14
- Isoda, Hiroshi [9009-19] S7
- Isono, Hideki 9008 S4 Session Chair, 9010 Program Committee, 9010 S5 Session Chair, [9010-3] S2
- Istfan, Raef [8936-20] S4
- Itagaki, Naho [8987-1] S1, [8987-35] S7
- Itina, Tatiana E. [8969-4] S1
- Ito, Armando S. [8947-83] SPMon
- Ito, Arisa [8926-74] S15, [8941-30] S8
- Ito, Fuyumi [8968-36] SPTue
- Ito, Hiromasa 8993 Program Committee
- Ito, Kazuma [8983-4] S1
- Ito, Shinji [8961-93] SPTue
- Itoh, Izumi [8992-29] SPWed
- Itoh, Kazuyoshi** [8947-11] S2
- Itoh, Yoshi [8935-2] S1
- Itoh, Yoshifumi [8940-16] S4
- Ivanenko, Mikhail M. [8960-29] S3, [8960-29] S7
- Ivanov, Sergey [8959-51] S12
- Ivanovs, Girts [9008-11] S7
- Ivaturi, Aruna [8981-10] S3, [8981-9] S3, [9000-7] S2
- Iveland, Justin [8986-69] S15, [9003-35] S12, [9003-35] S8
- Iversen, Theis F. Q. [8992-28] S6
- Ivinskaya, Aliaksandra [8995-31] S8
- Iwai, Hidenao [8931-38] S8, [8947-62] S14
- Iwai, Katsumasa [8938-6] S2
- Iwai, Makoto [9003-14] S3
- Iwakuni, Tatsuhiko [9007-11] S5
- Iwamoto, Hiroyuki [9004-21] SPWed
- Iwamoto, Satoshi [9002-33] S8
- Iwanaga, Masanobu [8974-51] S8
- Iwano, Takayuki [8928-28] SPSat
- Iwasaki, Shuhei [9004-20] SPWed
- Iwaszczuk, Krzysztof [8984-48] S13, [8993-50] S9
- Iwata, Fujio** 9006 Program Committee
- Iwata, Tsuyoshi [8980-68] SPWed
- Iwatsuki, Katsumi 9007 S6 Session Chair, [9007-4] S4
- Iwaya, Mitsuhiro [8991-16] S4
- Iwaya, Motoaki [8986-35] S7, [8986-6] S1
- Iwazaki, Hideaki [8945-9] S3
- Iwinska, Malgorzata [8966-5] S1
- Iyama, Koichi [8959-24] S6, [8959-27] S7
- Iyer, Krishna [8982-39] S8
- Iyer, Shanthi [9005-12] S3
- Izake Kiriakous, Emad Louis [8939-9] S2
- Izatt, Joseph A. [8930-15] S4, [8930-18] S4, [8930-19] S5, [8930-21] S5, [8930-35] S8, 8934 Conference Chair, 8934 S1 Session Chair, [8934-13] S3, [8934-23] S4, [8941-5] S2, [8949-52] S11
- Izdebski, Krzysztof 8926 S2 Session Chair
- Izeddin, Ignacio [8950-44] SPSun
- Izumi, Ryo [9004-22] SPWed
- Izumi, Teruo [8967-17] S9
- Izumskaya, Natalia [8986-77] SPWed, [8986-81] SPWed

J

- Jabbour, Joey M. [8935-12] S3, [8935-26] S6
- Jabczynski, Jan K. [8959-14] S4, [8959-71] SPTue
- Jaber, Mohammad [8942-28] S7
- Jaber, Sarah [8993-25] S4
- Jacac, Jaroslaw [8970-6] S2
- Jacinto da Silva, Carlos [8954-29] S7, [8996-33] SPWed
- Jacob, Jonah H. [8965-20] S5, [8965-24] S5
- Jacobs, Eileen [8943-157] SPMon
- Jacobs, Valerie L. [8928-8] S3
- Jacobsen, Alfred** 8979 Program Committee, 8979 S5 Session Chair
- Jacobsohn, Kenneth [8943-98] S1
- Jacquelard, Christophe [8962-16] S5
- Jacques, Steven L.** [8926-30] S7, [8937-3] S1, 8941 Program Committee, 8941 S2 Session Chair, 8941 Track Chair, [8941-26] S7, [8941-28] S7, [8941-43] SPMon, 8942 Track Chair, [8942-13] S3, 8943 Program Committee, 8943 S16 Session Chair, 8943 Track Chair, 8944 Track Chair, 8945 Track Chair, 8946 Track Chair, 8952 Program Committee, SC029
- Jacquot, Maxime [8989-19] S6
- Jaedicke, Volker** [8952-34] S9
- Jaeger, Michael [8943-227] SPSun, [8943-228] SPSun
- Jaeger, Nicolas A. F. [9010-15] S5, [9010-15] S6
- Jaeggi, Beat [8967-10] S10, [8967-10] S5, [8967-25] S10
- Jaeschke, Peter [8963-27] S7
- Jaffer, Farouc A. [8926-80] S16
- Jaffiol, Rodolphe [8949-53] S11, [8950-11] S3
- Jaffray, David A. [8937-2] S1
- Jaffres, Anael [8959-57] S13
- Jagadeesan, Jayender [8927-41] S10
- Jagadish, Chennupati** 8989 Program Committee
- Jäger, Erwin E. [8967-24] S10
- Jäger, Matthias [8961-34] S8, [8982-5] S1
- Jäger, Roland [9001-14] S3, [9001-4] S1
- Jagtap, Jaidip M. [8940-40] SPTue
- Jahan, Nahid Akhter [8980-17] S4
- Jahangir, Shafat [8986-37] S7, [8986-74] S15, [9003-17] S4
- Jahanmirinejad, Saede** [8993-19] S3, [8993-20] S3
- Jahn, Karolina [8947-40] S9, [8948-94] SPSun
- Jahn, Martin [8957-10] S3
- Jahn, Tobias [8976-22] S5
- Jahn, Uwe [8996-2] S1
- Jahns, Jürgen** 8989 Program Committee, [8999-37] S8
- Jain, Ankita [8964-68] SPTue
- Jain, Priyanka [8955-38] S8
- Jain, Rakesh K. [8934-51] S8
- Jain, Ravinder K. [8960-66] SPTue
- Jain, Saurabh [9009-11] S6
- Jain, Virander Kumar [8971-5] S1
- Jákl, Petr [8939-25] S5, [8999-3] S1
- Jakob, Annik [9002-17] S4
- Jakobi, Jurij [8955-7] S2
- Jakobsen, Christian [8961-3] S1
- Jakobsen, Mogens Havsteen [8995-31] S8
- Jalali, Bahram [8947-13] S3, [8947-35] S9, [8972-15] S4
- Jalilian, Hrak R. [8948-32] S5
- Jamil, Muhammad [8986-65] S14
- Jamois, Cécile [8999-47] S10
- Jamon, Damien [8988-14] S3
- Janches, Diego [8959-19] S5
- Janes, Joachim [8975-16] S3, [8977-4] S2, [8977-5] S2, [8977-8] S2
- Jang, Eunje [8956-9] S2
- Jang, Hyounguk [8945-2] S1
- Jang, Jaeduck [8949-8] S2
- Jang, Jae-Won [8974-10] S3
- Jang, Ji-Hyang [9005-19] SPWed
- Jang, Kyungwon [8977-1] S1, [8977-1] S8
- Jang, Min Ho [8996-25] S7
- Jang, Mooseok [8949-36] S8
- Jang, Sei-Hum [8983-5] S1
- Jang, Sun-Joo** [8926-88] S18, [8926-94] S19, [8926-99] SPSun, [8934-40] S6
- Jang, Won Hyuk [8949-61] SPMon
- Jang, Woo-Young [8949-8] S2, 8958 S5 Session Chair
- Jangjoo, Alireza [8982-67] SPWed
- Janicot, Sylvie [8966-19] S6
- Janjua, Bilal [8986-37] S7, [9003-28] S6
- Jank, Michael [8987-88] SPWed
- Jankevicius, Feliksas [8939-38] SPSun
- Janse van Rensburg, Christo [8990-19] S4, [9005-5] S1
- Jansen, E. Duco** 8928 Conference Chair, 8928 S14 Session Chair, [8928-35] S7, 8941 Conference Chair, 8941 S1 Session Chair, 8941 S5 Session Chair
- Jansen, Florian [8961-46] S11, [8961-55] S13, [8961-58] S13, [8961-79] SPTue, [8961-84] SPTue
- Jansen, Krista [8926-82] S17, [8943-79] S12
- Janz, Siegfried 8990 Program Committee, [8990-32] S6, [8995-30] S8, [8995-38] S10
- Jarczynski, Manfred** [8965-32] S7
- Jarecki, Rob [8973-12] S3
- Jarosz, Jessica [8930-11] S3, [8930-13] S3
- Jarozewicz, Leszek R.** [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-44] S9, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
- Jarrah, Mona** [8985-2] S1, 8993 Program Committee
- Jarrell, Travis [8949-3] S1
- Jarvis, Jan-Philip [8993-57] S12
- Jarvis, Scott [8981-58] SPWed
- Jary, Dorothee [8939-13] S2
- Jsaitis, Audrius [8949-14] S3, [8950-44] SPSun
- Jasensky, Joshua** [8947-38] S9, [8948-89] SPSun
- Jatar, Shashank [9010-11] S4, [9010-11] S5
- Jauregui-Misas, Cesar [8961-31] S8, [8961-46] S11, [8961-55] S13, [8961-58] S13, [8961-64] S15, [8961-73] SPTue, [8961-79] SPTue, [8961-84] SPTue, [8972-18] S5
- Javanmard, Mehdi [8954-27] S7, [8976-46] S10
- Javaux, Clémentine [8996-37] SPWed
- Javidi, Tara [8936-7] S2
- Javaji, Brahmanandam [8980-47] S12
- Jaworski, Pawel [8983-20] S5
- Jayachandran, S. [8939-20] S4
- Jayakumar, Muthu Kumara Gnanasamandhan [8955-36] S8, [8997-4] S3, [8997-4] S7
- Jayaraman, Vijaysekhar [8927-30] S7, [8930-32] S7, [8934-1] S1, [8934-22] S4
- Jayasankar, C. K. [8987-43] S8, [9003-61] SPWed
- Jayasuriya, Dinuka [8938-29] S6
- Jayatilleka, Hasitha [9007-3] S3
- Jayet, Baptiste** [8943-44] S7
- Jazbinsk, Mojca [8964-53] SPTue, [8985-11] S3, [8985-12] S3
- Jean, Cyril [8981-33] S3
- Jean, Isabelle [8938-5] S1
- Jean-Marie, Alain [8980-55] S14
- Jechow, Andreas** [8948-72] SPSun, [8960-53] S14
- Jedamzik, Ralf** [8982-51] SPWed
- Jedrzycki, Daniel [8965-47] SPTue, [9002-14] S3
- Jeffery, Dean [8943-189] SPTues
- Jeifimovs, Konstantin [8977-25] S6
- Jelmezko, Fedor 8997 Program Committee
- Jelic, Vedran** [8984-36] S10, [8984-37] S10
- Jelinek, Michal** [8959-78] SPTue
- Jelinková, Helena** [8929-8] S2, 8959 Program Committee, 8959 S14 Session Chair, [8959-72] SPTue, [8959-73] SPTue, [8959-77] SPTue, [8959-78] SPTue
- Jemec, Jurij [8936-41] SPSun
- Jen, Alex K. Y.** 8983 Program Committee, [8983-3] S1, [8983-43] S10, [8983-5] S1
- Jen, Chih-Yu [8984-39] S10, [8985-21] S5
- Jena, Debdeep [8986-66] S14
- Jenkins, Mark W. [8967-27] S11
- Jenkins, Michael W. [8928-35] S7, [8928-38] S7, [8934-52] S8, [8934-62] S9, [8934-77] S12, 8953 Program Committee, 8953 S3 Session Chair, [8953-10] S3, [8953-15] S4, [8953-7] S2, [8953-8] S2
- Jenkins, Patrick [8947-27] S5
- Jenkins, Phillip P. [8981-2] S1, [8981-27] S7
- Jenkins, Samir [8943-15] S3
- Jennewein, Thomas D. [8997-9] S4
- Jensen, Ole Bjarlin [8964-3] S1, [8964-5] S1, [8972-19] S5
- Jentsch, Ulrich [8965-34] S7
- Jeon, Dae Woo [9003-55] SPWed
- Jeon, Heonsu [8974-47] SPTue, [8974-7] S2, [8993-65] S13, 9003 Conference Chair
- Jeon, Jong-Hyun [9003-55] SPWed, [9003-60] SPWed
- Jeon, Mansik [8943-102] S15, [8943-15] S3, [8943-71] S11, [8954-33] SPMon
- Jeon, Min Yong** [8935-70] SPSun, [8982-50] SPWed, [8985-55] SPWed, [8985-7] S2
- Jeon, Seok-Hee [9006-36] S7
- Jeon, Seong-Ran [9003-66] SPWed
- Jeon, Sumin [8983-23] S6
- Jeong, Chang Yeong [8980-63] SPWed, [8980-64] SPWed
- Jeong, EunJu [8935-70] SPSun
- Jeong, Eun-Mi [9007-22] S7
- Jeong, Gitae [8991-8] S2
- Jeong, Hui-seok [9003-69] SPWed
- Jeong, Hyejin [9001-8] S2
- Jeong, Jong-Rae [9006-29] S6
- Jeong, Ki-Hun [8927-13] S3, [8958-16] S4, [8958-4] S1, [8977-1] S1, [8977-1] S8, [8985-6] S2
- Jeong, Kwang-Un [9005-11] S3
- Jeong, Kwang-Yong [9002-37] S8
- Jeong, Seok-Hwan [8990-47] S9
- Jeong, Sung Ho [8967-39] S14
- Jeong, Tung H.** 9006 Program Committee
- Jeong, Useok [8988-59] SPWed
- Jeong, Young Uk [8941-55] S11
- Jepsen, Peter Ud** 8941 Program Committee, [8984-12] S3, [8984-48] S13, [8989-28] S8, [8993-50] S9
- Jerjes, Waseem K. 8926 Program Committee, 8926 S4 Session Chair
- Jesacher, Alexander [8968-3] S1

INDEX OF PARTICIPANTS

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Jessop, David [8985-50] S11
Jetchske, Sylvia [8961-34] S8, [8961-74] SPTue
Jetter, Michael [8966-23] S7
Jetter, Volker [8967-41] S14
Jezek, Jan [8939-25] S5, [8947-58] S13, [8960-40] S10
Jhang, Jia-Shing [8985-20] S5
Jheng, Dong-Yo [8961-99] SPTue
Ji, Chen [8965-48] SPTue
Ji, Hong [8987-42] S8
Ji, Minbiao [8948-24] S4, [8948-30] S5, [8948-39] S7
Ji, Philip N. [9008-16] S8, [9010-7] S4
Ji, Xin [8955-10] S3
Ji, Yang [8963-25] S6
Ji, Yoon Young [8927-23] S6
Jia, Junjun [8987-5] S4
Jia, Mengyu [8952-42] SPSun
Jia, Zhensheng [9009-18] S7
Jian, Yifan [8930-40] S9, [8934-25] S4, [8934-74] S11, [8934-93] SPMon
Jiang, Aiting [9002-57] S13
Jiang, Ching-Long [8965-27] S6, [8965-29] S6
Jiang, Guomin [8991-25] S6, [8993-46] S8
Jiang, Hao [8957-18] S4
Jiang, Hengyun [9008-9] S7
Jiang, Hongrui 8958 Program Committee, 8958 S2 Session Chair, [8958-7] S2
Jiang, Huabei 8926 Program Committee, [8931-11] S3
Jiang, James [8934-1] S1
Jiang, Jingying 8942 Program Committee, [8942-37] SPSun, [8942-7] SPSun
Jiang, Li Jia [8954-1] S1, [8969-8] S2
Jiang, Ming-Chien [8986-14] S3
Jiang, Qi [9002-30] S7
Jiang, Shibin Symposium Chair, 8982 Conference Chair
Jiang, Shudong [8937-13] S3
Jiang, Shuo [8945-19] SPSun
Jiang, Wei 8991 Program Committee, [8991-46] SPWed, [8991-9] S2
Jiang, Wenhan 8978 Program Committee
Jiang, Wenkan [9003-39] S10
Jiang, Wenzhe [8993-70] S14
Jiang, Xiangqian [8988-22] S5
Jiang, Xue-Feng [8960-15] S4
Jiang, Xunpeng [8950-48] SPSun
Jiang, Yifan [9002-25] S6, [9002-57] S13
Jiang, Yore [8968-18] S4
Jiang, Yupeng [8963-40] SPTue
Jiang, Yuxuan [8993-83] S17
Jiang, Zhigang [8993-83] S17
Jiao, Shuliang [8934-116] SPMon, [8934-28] S4, [8943-169] SPMon, [8943-78] S12, [8943-97] S14
Jimenez Villar, Ernesto [8957-32] S7
Jimenez, Felipe [8983-16] S4, [9009-16] S7
Jimenez, Juan [8965-2] S1
Jin, Chaoyuan [8984-34] S9
Jin, Dayong [8947-26] S5
Jin, Gofan [9006-31] S7
Jin, Honglin [8944-26] SPMon, [8944-28] SPMon
Jin, Honglin [8956-37] S9
Jin, Junbo [8951-33] SPMon
Jin, Lei [8928-96] S19
Jin, Michael H. C. 8983 Program Committee
Jin, Shirong [9002-6] S2
Jin, Xiaomin [8980-66] S1, [9003-57] SPWed
Jin, Yishi [8928-84] S16
Jing, Chengbin [8938-21] S4
Jing, Joseph C. [8926-125] S3, [8926-143] S7, [8926-145] S7, [8926-79] S16, [8927-39] S10, [8934-11] S2, [8934-79] S12, [8934-96] SPMon
Jitsuno, Takahisa [8929-20] SPSun
Jo, Aream [8928-65] S13
Jo, Hye Ran [9004-31] SPWed, [9004-32] SPWed
Jo, Janggung [8943-170] SPMon
Jo, Javier A. [8926-131] S4, [8935-12] S3, [8935-26] S6, [8947-14] S3
Jo, Seong June [8986-75] SPWed
Jo, Seong Soon [8983-11] S3
Jo, YoungJu [8952-29] S8
Jo, Yukari [8930-50] SPSun
Joche, Christoph [8961-73] SPTue
Jofre, Ana M. [8960-11] S3
Johansen, Mette Marie [8961-96] SPTue, [8961-98] SPTue
Johansson, Peter [8957-26] S6
John, Demis D. [8934-1] S1
John, Robert [8984-34] S9
Johnes, David M. [8942-11] S2
Johnson, A. T. Charlie [8973-25] SPTue
Johnson, Bart C. [8934-122] SPMon, [8934-3] S1
Johnson, Blair [8951-19] S4
Johnson, Chris J. [9010-1] S1
Johnson, Christopher P. [8951-19] S4
Johnson, Eric G. [8961-77] SPTue
Johnson, Klein L. [8932-5] S1
Johnson, Lee [8974-11] S3
Johnson, Matthew B. [8993-36] S7
Johnson, Matthew T. [8966-30] S8, [9001-17] S4
Johnson, Sadie [8943-194] SPTues
Johnson, Sean P. [8943-61] S9
Johnson, Steven G. SC608
Johnson, Thomas W. [8934-99] SPMon
Johnson, Thorsten R. [8926-137] S6
Johnston, Benjamin [8988-12] S3
Johnston, Keith P. [8955-29] S7
Johnston, Richard S. [8927-18] S4, [8936-27] S6
Jokerst, Jesse V. [8943-17] S3, [8943-221] SPTues, [8943-58] S9
Jollivet, Clémence [8960-50] S13
Jolly, Alain [8992-25] S6
Jolly, Sundeep [9006-30] S7
Jonas, Stephan [8927-46] S11, [8953-11] S3
Joncic, Mladen [9007-20] S7
Joner, Michael [8926-92] S19
Jones Estrada, Rodrigo E. [8957-32] S7
Jones, Adam M. [8974-52] S8
Jones, David B. [8952-34] S9
Jones, David Caradoc [8961-3] S1
Jones, David J. [8948-77] SPSun
Jones, Dustin P. [8931-7] S2
Jones, Ivy Krystal [8959-66] S14
Jones, Marshall G. [8963-17] S5
Jones, Philip H. [8999-7] S2
Jones, Sarah L. [8959-19] S5
Jones, Wynne [8993-54] S10
Jonin, Christian [8983-7] S2, [8984-3] S1
Jonnal, Ravi S. [8930-20] S5
Jonusauskas, Linas [8972-61] SPTue
Jonuscheit, Joachim [8985-23] S5
Joo, Chulmin [8947-9] S2, [8949-5] S1, [8956-9] S2
Joo, Jinsoo W. [8983-23] S6
Joo, Manuel [8968-29] S6
Joos, Karen M. 8930 Program Committee, 8930 S1 Session Chair
Joosten, Sven M. [8959-22] S6
Jordan, Lukas R. [8993-65] S13
Jordan, Rafael C. [9003-22] S5
Jorge, Ana Elisa S. [8926-22] S5, [8934-129] SPMon, [8948-79] SPSun
Jorge, Pedro A. S. [8938-53] SPSun, [8957-20] S4
Joris, Bernard [8938-49] SPSun
Jose, Jithin [8943-2] S1
Joseph, Cecil S. [8940-28] S6, [8985-19] S4
Joseph, Shiju G. [8934-90] SPMon
Josephson, Lee [8931-14] S3
Joshi, Bishnu [8927-15] S4, [8927-31] S1, [8927-31] S8
Joshi, Kavita [8985-24] S6
Joshi, Pratixa P. [8955-29] S7, [8955-47] S10
Joshi, Rajendra [8968-35] SPTue, [8982-35] S7
Joshi, Shailendra [8951-41] SPMon
Joshi, Siddharth [9002-11] S3
Jostmeier, Thorben [8984-26] S7
Joudrier, Anne-Laure [8981-51] S13
Jouhannaud, Julien [8935-68] SPSun
Jouy, Pierre [8993-68] S14
Jovanovic, Nemanja [8978-7] S2
Jovin, Thomas M. 8955 Program Committee
Joyce, Donna M. [8983-48] S11
Joyner, Michael [8951-19] S4
Ju, Gun Wu [8977-9] S3
Ju, Myeong Jin [8930-31] S7
Juan, Mathieu L. [8954-17] S4
Juan, Ta-Ko [8995-36] S9
Juan, Yu-Shan [8980-75] SPWed
Juárez-Ramírez, Julio César [9006-43] SPWed, [9006-54] SPWed
Jubera, Véronique [8959-59] S14
Jue, Jason P. [9008-16] S8
Jugessur, Aju S. [8994-7] S2
Juhász, Tibor [8941-16] S4
Jukam, Nathan [8984-41] S11
Julie, R. [9008-24] S10
Jumreomvong, Oranicha [8935-64] SPSun
Jun, Eunkwon [8949-61] SPMon
Jun, Syungwon [8947-34] S2, [8947-34] S8
Junesand, Carl [8989-3] S1
Jung, Bo H. [8966-4] S2
Jung, Byungjo [8949-61] SPMon
Jung, Ho June [8992-14] S3
Jung, Hwa Kyoung [8992-14] S3
Jung, Hyunho [8974-47] SPTue
Jung, Il-Woong 8977 Program Committee
Jung, Jae Hwang [8952-29] S8
Jung, Jae Yun [8926-121] S1
Jung, Jae-eun [8977-20] S5
Jung, Justin [8936-20] S4
Jung, Mannhohng [8926-150] SPSat
Jung, Sang-Min [9008-21] S9
Jung, Seungyong [9002-25] S6, [9002-57] S13
Jung, Woo-Gwang 8993 Program Committee
Jung, Yookyung [8948-32] S5
Jung, Youngho [8991-6] S2
Jung, YoungJin [8942-18] S4
Jungbluth, Bernd [8959-17] S5, [8959-30] S7, [8959-53] S12
Junger, Stephan [8994-56] S14
Jungwirth, Matthew E. [8978-4] S1
Juodkakis, Saulius [8970-9] S2, [8972-61] SPTue, 8974 Program Committee, [8974-23] S6
Jurai?, Krunoslav [8939-34] S6
Juratli, Mazen A. [8943-31] S5
Jurbergs, David [9006-1] S1
Jurdy, Anne-Marie [8982-26] S8
Juska, Gediminas [8997-33] SPWed
Jussila, Henri [8982-23] S5
-
- K**
- Kabas Sarp, Ayse Sena [8929-11] S3
Kablukov, Sergey I. [8961-102] SPTue, [8961-86] SPTue
Kachel, Martin [8967-30] S11
Kaczmarowski, Amy L. [8934-126] SPMon, [8941-26] S7
Kadam, Ulhas [8950-20] S5
Kadbur Prabhakar Rao, Venkatesh [8975-5] S4
Kadic, Muamer [8970-8] S2
Kadiyala, Anand [8974-43] SPTue
Kadkhodazadeh, Shima [8996-5] S1, [8996-7] S2
Kadoiwa, Kaoru [8965-1] S1
Kadwani, Pankaj [8964-54] SPTue
Kadys, Arunas [8970-9] S2
Kaenders, Wilhelm G. [8964-1] S1
Kafar, Anna [8986-23] S5, [8986-56] S11, [8986-60] S11
Kafka, Jan Robert [8995-31] S8
Kagawa, Keiichiro [8947-39] S9
Kageyama, Takeo [9002-3] S1
Kahaly, Subhendu [8972-28] S7
Kahle, Hermann [8966-23] S7
Kahouli, Abdelkarim [8986-33] S7
Kai, Yutaka [9008-3] S2
Kaierle, Stefan [8963-1] S1, [8963-20] S5, [8963-29] S7
Kaindl, Robert A. 8984 Program Committee
Kaino, Toshikuni 8983 Conference Chair, 8983 S10 Session Chair
Kaippert, Beatrix [8932-17] S4
Kaiser, Martin [8955-20] S5
Kajari-Schröder, Sarah [8967-48] S14
Kajbafzadeh, A. M. [8926-45] S9
Kajdacsy-Balla, Andre [8939-19] S3, [8939-29] S5
- Kajzar, François** 8983 Conference Chair, 8983 S5 Session Chair, [8983-10] S3, [8983-49] S11
Kakabakos, Sotirios E. [8976-35] S7, [8976-44] S9
Kakauridze, George [9006-9] S2
Kakiuchi, Kiyomi [8974-17] S5
Kakiuchida, Hiroshi [9004-17] S4, [9004-23] SPWed
Kakizaki, Kouji [8961-93] SPTue
Kako, Satoshi [8986-38] S7, [9002-2] S1
Kakuno, Yumi [8947-62] S14
Kalagara, Hemashilpa [8980-29] S7
Kalavrouziotis, Dimitrios [8990-8] S2, [8991-11] S3
Kalawsky, Roy [8936-15] S3
Kalchenko, Vyacheslav [8937-1] S1, [8944-12] S3
Kaleski, Eterpi [8981-5] S2
Kalies, Stefan [8972-12] S3, [8972-6] S2
Kalinina, Karina V. [8982-46] S9
Kalinina, S. [8948-46] S8
Kalish, Sapir [8930-37] S8, [8930-55] SPSun
Kalishman, Jennifer [8943-153] SPMon
Kalisky, Yehoshua Y. 8964 Conference CoChair, 8964 S1 Session Chair
Kalkandjev, Todor Kirilov [8959-60] S14
Kalkman, Jeroen [8934-56] S8, [8942-26] S7
Kalkman, Koen [8952-17] S5
Kall, Mikael [8957-26] S6
Källapur, Abhijit Gopinath [8993-59] S12
Kalli, Kyriacos [8982-15] S3
Kallweit, Nicole [8928-42] S8
Kalosha, Vladimir [9001-10] S2
Kalsekar, Viren [8976-7] S2
Kaluzhnyi, Nikolay A. [8965-25] S5
Kamali, Tschackad [8939-10] S2, [8972-19] S5
Kamber, Derrick S. [9003-39] S10
Kamei, Shin [9008-4] S3
Kamensky, Vladislav Antonievich [8948-8] S1
Kamer, Brian [8964-15] S4, [8964-62] SPTue
Kameyama, Takeyoshi [8926-93] S19
Kamijo, Koji [9006-15] S3
Kaminska, Bozena [8954-3] S1, [8957-18] S4, [8973-19] S4
Kamiya, Mako [8950-32] S8, [8956-4] S1
Kamiya, Shinichi [9001-3] S1
Kamiyama, Satoshi [8986-35] S7, [8986-6] S1, 9003 Program Committee, 9003 S6 Session Chair
Kammerlocher, Mathias [8994-40] S11
Kamon, Mattan [8977-36] S2
Kamp, Martin [8993-17] S3, [8993-19] S3, [8993-44] S8, [8993-7] S1, [9002-46] S11
Kampfrath, Tobias 8984 S10 Session Chair, [8984-40] S11
Kamrani, Ehsan [8958-19] S5
Kamysz, Wojciech [8947-31] S6
Kan, Cheuk W. [8935-32] S7
Kanada, Masamitsu [8949-11] S3
Kanakis, Giannis [8991-11] S3
Kanapathipillai, Sangarapillai [8930-24] S6
Kanasar, Antonios G. 8955 Program Committee, 8955 S2 Session Chair, [8955-25] S6, [8955-66] SPSun
Kanaya, Tomoaki [8926-91] S18
Kane, Daniel J. [8964-10] S3
Kane, Deborah M. [8980-11] S3
Kane, Susan [8931-36] S7
Kaneda, Yushi [8966-33] SPTue
Kaneko, Junichi [8956-4] S1
Kanellos, George Theodore [8982-64] SPWed, [8982-7] S1, [8990-14] S3, [8990-22] S4, [8991-33] S8
Kanemitsu, Yoshihiko [8987-27] S6
Kanemori, Atsushi [9002-4] S1
Kang, Chul [8985-57] SPWed
Kang, Dongkyun 8927 S5 Session Chair, [8927-19] S5, [8927-2] S1, [8927-21] S5, [8927-29] S7, [8927-4] S1, [8927-5] S1
Kang, DongYel [8934-96] SPMon
Kang, Hee Young [8982-68] SPWed
Kang, Heesung [8949-61] SPMon

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Kang, Hobin J. [8929-23] SPSun
Kang, Hyun Jae [8943-216] SPTues
Kang, Hyun Wook 8926 Conference Chair, 8926 S11 Session Chair, 8926 S9 Session Chair, [8926-47] S10, [8926-60] SPSat
Kang, Jeon Woong [8947-12] S3
Kang, Ji-Hun [8984-14] S3
Kang, Jin U. [8926-122] S1, [8928-92] S18, [8934-106] SPMon, [8934-17] S3, [8934-46] S7, [8934-76] S11, [8935-47] S10, [8935-79] SPSun, 8938 Program Committee, 8938 S3 Session Chair, [8938-34] S7, [8938-36] S7, [8938-37] S8, [8943-149] SPMon, [8943-166] SPMon, [8943-198] SPTues, [8943-201] SPTues, [8949-23] S5
Kang, Lin [8985-31] S7
Kang, Seungyeon [8964-66] SPTue
Kang, Tae-Wook [9003-20] S5
Kang, Uk-Song [8959-48] S11
Kang, Xiang-Ning [8980-66] S1, [9003-57] SPWed
Kang, Yimin [8990-38] S8
Kang, Yong-Jin [9003-55] SPWed, [9003-60] SPWed
Kang, Yu-Ting [9003-12] S3
Kang, Zhiwen [8957-17] S4
Kani, Jun-Ichi [9007-11] S5
Kaniber, Michael [8994-29] S8, [8994-40] S11, [8996-4] S1
Kanibolotsky, Alexander [9002-10] S2
Kanick, Stephen C. [8926-28] S7, [8931-18] S4, [8931-31] S6, [8951-20] S5
Kaniyappan, Udayakumar [8935-24] S5, [8940-2] S1
Ka?ka, Jan [8947-58] S13
Kanka, Mario [8951-10] S3
Kannan, Pradeesh [8959-40] S10
Kanno, Atsushi [9002-4] S1, [9007-10] S5, [9007-25] S8
Kanno, Iwao [8928-67] S14
Kanno, Takahiro [8928-47] S9
Kanoh, Hiroto [8948-41] S7
Kanskar, Manoj [8965-12] S3, [8965-37] S8, [8965-39] S8, [8965-46] S2, [8966-30] S8
Kansky, Jan E. [8971-32] S5
Kantojärvi, Uula [8992-10] S3
Kantola, Emmi L. [8950-23] S6, [8961-4] S1, [8966-28] S4
Kanzaki, Koichi 9005 Program Committee
Kao, Fu-Jen 8948 Program Committee, 8948 S10 Session Chair, [8948-63] S11, [8948-71] SPSun, [8948-73] SPSun
Kao, Tsung-Ting [9002-16] S4
Kao, Tsung-Yu [8993-13] S2
Kao, Yu-Cheng [8986-14] S3
Kapellner Rabinovitz, Yuval 8979 Program Committee, 8979 S6 Session Chair
Kaplan Messas, Audrey [8930-38] S8
Kaplan, David Lee [8974-7] S2
Kapon, Elyahou 8966 Program Committee, 8966 S6 Session Chair, [8966-14] S4, [9001-16] S4
Kapp, F. [9008-24] S10
Kapulainen, Markku [8990-14] S3, [8990-2] S1, [8990-22] S4, [8990-3] S1, [8990-4] S1
Kapustianyk, Volodymyr [8969-25] SPTue
Kar, Ajoy K. [8964-29] S7, [8964-32] S8
Kar, Subrat [8971-5] S1
Karabiyik, Mustafa [8985-4] S1
Karadag, Yasin [8960-40] S10
Karahalios, Dimitri [8951-12] S3
Karanasos, Antonios [8926-93] S19
Karasek, Vitezslav [8999-3] S1, [8999-8] S2
Karbasi, Salman [8992-18] S4, [8994-72] SPWed
Karbaum, Christopher [8986-21] S4, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed
Karczewski, Grzegorz [8984-41] S11
Karedla, Narain V. S. [8950-15] S4
Karimi, Ebrahim [8999-12] S3, [8999-24] S5
Kariin, Tord [8977-21] S5
Karlsson, Håkan [8959-38] S9
Karmarkar, Subhajt [8943-163] SPMon
Karnowski, Karol [8934-95] SPMon, [8946-9] S3
Karow, Malte [8961-116] SPTue
Karpensky, Nicole [8987-19] S4
Karpierz, Mirosław A. [8961-118] SPTue
Karpinski, Pawel [8983-21] S5
Karpiouk, Andrei B. [8934-33] S5, [8946-15] S4, [8946-28] S6
Karpman, Maurice S. 8975 Program Committee
Karpinen, Mikko 8991 Program Committee, [8991-2] S1
Karras, Tapio [8992-1] S1
Kartashov, Yaroslav V. [8994-33] S9
Kartha, Vasudevan Bhaskaran [8940-21] S4
Karunamuni, Ganga H. [8953-10] S3
Karvonen, Lasse [8982-23] S9
Kasahara, Ryosuke [8992-29] SPWed
Kasai, Jun-ichi [9010-18] S6, [9010-18] S7
Kasai, Seiya [8987-45] S9
Kasamori, Kouhei [8977-11] S3
Kasaragod, Deepa K. [8934-60] S9, [8934-61] S9, [8952-26] S7
Kaschke, Johannes [8974-27] S7
Käsebier, Thomas [8995-10] S3
Kasemann, Raphael [8959-20] S5
Kash, Kathleen [9003-32] S7
Kashiwazaki, Takahiro [8983-15] S4
Kashyap, Ramon [8938-35] S7, [8992-4] S1, 9000 Program Committee, 9000 S1 Session Chair, [9000-16] S4, [9000-17] S4, [9000-25] SPWed
Kaskelyte, Dalia [8972-42] S9
Kaskow, Mateusz [8959-71] SPTue
Kasotakis, Emannouil [8955-66] SPSun
Kaspar, Sebastian [8966-27] S8
Kasparova, Mgdalena [8929-8] S2
Kaspi, Ron [9002-42] S9
Kass, Michael [8943-153] SPMon
Kassegne, Sam 8976 S4 Session Chair, [8976-45] S10
Kastanos, Evdokia [8951-14] S3
Kastelik, Jean-Claude [8982-53] SPWed
Kastner, Evan [8935-59] S12, [8935-78] SPSun
Kasukawa, Akihiko [9001-3] S1
Kasunic, Keith J. SC1052, SC1085
Katagiri, Takashi [8938-31] S7, [8938-43] S8
Kataoka, Ken [8986-76] SPWed
Kataria, Himanshu [8989-3] S1
Katayama, Ikufumi [8964-7] S2
Katayama, Takuma [8986-54] S11
Katayama, Tsukasa [8987-17] S3
Katis, Ioannis [8976-16] S4
Kato, Tomoyuki [9008-13] S7
Kato, Yoshinori [8959-24] S6, [8959-27] S7
Kato, Yuji [8952-45] SPSun
Katopodis, Vasilis [9009-17] S7
Kats, Mikhail A. [8993-76] S16, [8995-23] S6
Katsu, Yosuke [8986-35] S7
Katsuyama, Tsukuru 8993 Program Committee
Katz, Aubrey J. [8927-10] S3
Katz, Gideon [8991-10] S3
Katz, Howard [8987-46] S4
Katz, Moti 8964 Program Committee, 8964 S3 Session Chair
Katz, Ori [8943-106] S16, [8943-134] SPSun, [8943-48] S7
Katzir, Abraham [8938-32] S7
Kauffman, Joshua J. [8982-78] SPWed
Kaun, Stephen [8986-47] S9
Kaune, Brigitte [8941-13] S4
Kaur, Guneet [8933-11] S4
Kaur, Sarabjot [9004-14] S4
Kausal, Hemani [8971-5] S1
Kaushal, Saket [8990-10] S2
Kavanagh, Karen L. [8973-19] S4, [8996-1] S1
Kavanagh, Thomas [8948-101] SPSun
Kavehrad, Mohsen 9007 Program Committee, 9007 S6 Session Chair, [9007-18] S7, [9007-21] S7, [9010-9] S4
Kavokin, Alexey [8993-7] S1
Kawabe, Yutaka [8983-24] S6
Kawaguchi, Masao [8986-54] S11
Kawaguchi, Yasushi [8945-9] S3
Kawaguchi, Yoshizo [8967-18] S9
Kawahara, Hirotaka [8987-78] SPWed
Kawahito, Shoji [8947-39] S9
Kawakami, Hiroshige [8926-74] S15, [8941-31] S8
Kawakami, Yoichi [8986-76] SPWed
Kawakubo, Masayoshi [8932-17] S4, [8944-2] S1, [8944-3] S1
Kawamata, Shin [8947-51] S12
Kawanishi, Tetsuya [8983-42] S10, [9002-4] S1, [9007-10] S5, [9007-25] S8
Kaware, Vaibhav [8985-24] S6
Kawasaki, Masashi 8987 Program Committee
Kawase, Kodo 8941 Program Committee
Kawashima, Hiroyasu [8982-56] SPWed
Kawashima, Toshiyuki [8959-24] S6, [8959-27] S7
Kawata, Satoshi 8948 Program Committee, [8948-64] S11, [8949-54] S11, [8950-41] SPSun, [8957-30] S7, [8974-2] S1, [8974-24] S6, [8974-45] SPTue, [8974-46] SPTue
Kawata, Yoshimasa [8983-4] S1
Kawauchi, Satoko [8928-19] S5, [8928-22] S5, [8928-79] SPMon, [8938-52] SPSun, [8941-10] S3
Kayahara, Takashi [8963-31] S8, [8967-18] S9, [8967-19] S9
Kazanci, Huseyin [8937-40] SPSun
Kazanzides, Peter [8943-6] S1
Kazarian, Sergei G. [8926-115] S24
Kazovsky, Leonid G. [9007-2] S2
Ke, Haixin [8943-136] SPSun, [8943-157] SPMon, [8943-188] SPTues, [8943-56] S9
Ke, L. [8989-12] S5
Keane, Margaret G. [931-23] S5
Kearley, Mark [8965-26] S6, [8965-35] S8
Kearney, Steven P. [8946-16] S4
Keay, Joel C. [8993-36] S7
Kebede, Bemnet [8973-18] S4
Keck, Donald B. [8961-23] S6
Kee, Chul-Sik [8985-57] SPWed
Kee, Jack Sheng [8990-29] S6
Keever, Mark R. [9001-1] S1
Kehlet, Louis M. [8964-55] SPTue
Kelaita, Youisif A. [8997-32] S11
Kelb, Christian [8977-31] S7
Kelbassa, Ingomar 8963 Program Committee, [8970-24] S6, [8970-24] S9
Keller, Bradley B. 8953 Program Committee, [8953-6] S2
Keller, Matthew D. 8928 Program Committee
Keller, Stacia 8986 Program Committee
Keller, Ursula 8966 Program Committee, 8966 S8 Session Chair, [8966-10] S3, [8966-100] SPlen, [8966-17] S5, [8966-22] S6, [8966-31] SPTue, [8966-5] S2, [8966-7] S2
Kelley, Mark C. [8935-25] S5
Kellihier, James [8938-15] S3
Kellnberger, Stephan [8943-147] SPSun
Kelly, Anthony E. [8988-52] S11
Kelly, Douglas J. [8935-2] S1, [8940-16] S4
Kelly, Jim F. [8993-60] S12
Kelly, Kristen M. 8926 Program Committee, 8926 S6 Session Chair, [8926-23] S5, [8926-31] S7, [8948-59] S10
Kelp, Glen [8957-11] S3
Kelso, John [9003-4] S1
Kemiktarak, Utku [8995-25] S7
Kemme, Shanayln A. 8974 Program Committee, [8974-52] S8, [8989-20] S6
Kemnitzer, Matthias [8959-41] S10
Kemp, Alan J. [8994-18] S1, [8994-18] S5
Kemper, Björn [8941-14] S4
Ken, Chuihan-Fu [8947-73] SPMon
Kenar, Necla [8935-57] S12
Kenechukwu, Obi [8960-25] S6
Kennedy, Brendan F. [8927-50] S12, [8934-48] S7, 8946 Program Committee, 8946 S6 Session Chair, [8946-12] S4, [8946-29] S6, [8946-3] S1, [8946-5] S2
Kennedy, Gordon Thomas [8927-7] S2
Kennedy, Ian M. [8956-31] S8
Kennedy, Keith [8961-66] SPTue, [8965-12] S3, [8965-37] S8, [8965-46] S2
Kennedy, Kelsey M. [8946-12] S4, [8946-3] S1, [8946-5] S2
Kennedy, Paul K. [8941-8] S3
Kennedy-Cabrera, Héctor David [8973-28] SPTue
Kenny, Fiona [8978-14] S5
Kent, Thomas F. [8996-10] S3
Keo, Sam A. [8993-33] S6
Kerdja, Tahar [8996-39] SPWed
Kern, Christian [8984-45] S12
Kersch, Alfred [8967-33] S12, [8967-33] S4
Kervella, Gaël [8988-25] S6
Kesavulu, C. R. [8987-43] S8
Kessel, David H. 8931 Conference Chair, 8931 S1 Session Chair, [8931-1] S1, [8941-6] S2
Kessler, Steffen [8963-26] S6
Kettel, Jeff [8962-13] S4
Ketteridge, Peter A. [8964-38] S9
Keum, Dongmin [8958-16] S4
Keymel, Kenneth [8931-21] S4
Khachaturidze, Alexandr [8986-57] S11
Khachatryan, Edward [8943-99] S15
Khairi, Maggie A. [8929-18] S4
Khajuria, Deepak [8926-114] S23
Khalaf, Gamal A. F. M. [8988-63] SPWed
Khalifa, Ahmed E. [8981-65] SPWed
Khalil, Diaa [8934-125] SPMon, [8977-16] S4, [8977-24] S6, [8977-28] S6, [8988-63] SPWed
Khalilov, Valery K. [8938-9] S2
Khamas, Salim [8994-6] S2
Khan, Altaf A. [8946-10] S3
Khan, Altaf [8956-13] S3
Khan, Malik Muhammad Nazir [8932-37] S7
Khan, Malik Muhammad Nazir [8928-39] S7
Khan, Saara A. [8933-9] S3, [8945-13] S4
Khan, Saeed [8990-15] S3
Khan, Shazia [8931-6] S2
Khanikaev, Alexander B. [8957-11] S3, [8985-36] S8
Khanna, Suraj [9002-27] S6
Khangonekar, Pramod P. [8928-98] S20
Khatami, Ramin [8928-69] SPMon, [8928-70] SPMon
Khatibzadeh, Nima [8946-24] S5, [8947-15] S3
Khatri, Farzana [8971-29] S5
Kherani, Nazir [8968-1] S1
Khettal, Elyes [8982-33] S7
Khitrov, Victor [8961-30] S8
Khimadze, Alexander T. [8948-89] SPSun
Kholder, Wael [8926-49] S10, [8926-50] S10
Khokar, A. [8989-12] S5
Khokha, Mustafa K. [8927-46] S11
Khondee, Supang [8927-31] S1, [8927-31] S8
Khoo, Peggy [8952-26] S7
Khoshakhlagh, Arezou [8993-33] S6
Khoushabi, Azadeh [8952-5] S2
Khrenova, Maria G. [8950-17] S4
Khurgin, Jacob B. 8984 S2 Session Chair, [8984-1] S1, 8992 Program Committee, [8992-21] S5, [8996-15] S5, 8998 Program Committee, [8998-1] S1, [8998-20] S5, [9000-13] S3
Kiang, Yeon-Woel [8934-38] S6, [8957-27] S6, [8986-36] S7, [8986-53] S10, [9003-30] S7
Kibria, Fayruz [8943-222] SPTues
KIBRIA, MD Golam [9003-5] S2
Kidambi, Piran [8985-50] S11
Kido, Michiko [8935-52] S11
Kiehl, Tim-Rasmus [8946-35] SPSun
Kieleck, Christelle [8964-41] S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Kienel, Marco [8961-21] S5
Kiesslich, Ralf 8927 Program
Committee
Kiessling, Jens [8964-6] S2
Kietzlig, Anne-Marie [8967-36] S13,
[8967-4] S2, [8967-4] S4
Kieu, Khanh Quoc [8948-14] S2, [8960-
20] S5, [8961-53] S12, [8982-23] S5
Kikuchi, Hiroshi [9006-15] S3
Kikuchi, Hirotosugu 9004 Program
Committee
Kilcher, Lucio [8977-22] S5
Kilchoer, Cédric [8974-53] S8
Kildishev, Alexander V. [8994-3] S1
Kilgore, Kevin [8928-35] S7
Kilgus, Jakob [8943-65] S10
Killi, Alexander [8959-25] S6, [8959-31]
S7
Killian, Thomas [8931-8] S2
Kilosanidze, Barbara N. [9006-9] S2
Kim, Amy S. [8929-3] S1
Kim, Arkady V. [8961-56] S13
Kim, Beop-Min 8928 Program
Committee, 8928 S13 Session Chair,
[8928-65] S13, [8928-80] SPMon,
[8935-62] S12, 8941 Program
Committee
Kim, Bok Hyeon [8985-57] SPWed
Kim, Bong Kyu [8935-70] SPSun
Kim, Bongkyun [8938-19] S4
Kim, Bumju [8934-81] S12, [8935-54]
S11
Kim, Byeongwan [8983-41] S9, [8983-
56] SPWed
Kim, Byoung Joo [8964-42] S9
Kim, C. K. [8967-39] S14
Kim, Chang-Gun [8989-17] S5
Kim, Chang-Ho [8972-41] S9
Kim, Chang-Seok [8947-34] S2, [8947-
34] S8
Kim, Changsoo [8926-100] SPSun
Kim, Choo Ho [8986-75] SPWed
Kim, Chul S. [9002-47] S11
Kim, Chulhong [8943-102] S15, [8943-
15] S3, [8943-211] SPTues, [8943-69]
S10, [8943-71] S11, [8954-33] SPMon
Kim, Dae Yu [8930-30] S7
Kim, Dai-Sik [8982-25] S5, 8984
Program Committee, [8984-57]
SPWed, [8985-18] S4, [8985-56]
SPWed
Kim, David M. [8940-23] S5
Kim, Do-Hyun [8983-40] S9
Kim, Do-Hyun [8936-29] S7, [8938-10]
S3, [8938-54] SPSun, [8938-8] S2
Kim, Dong Uk [8975-12] SPTue
Kim, Donggyu [8978-20] S6
Kim, Dong-Ha [8954-30] SPMon
Kim, Donghyun [8947-52] S12, [8954-
13] S3, [8954-30] SPMon
Kim, Dong-Uk [8963-38] SPTue
Kim, Dong-Young [9003-27] S6
Kim, Doo-Gun [8980-35] S9
Kim, Do-Won [9008-22] S10
Kim, Dug Young [8927-23] S6, [8947-
68] SPMon
Kim, E. S. [8983-64] SPWed
Kim, Hyunyoung 8983 Program
Committee, 8983 S11 Session Chair,
[8983-34] S8, [8983-41] S9, [8983-56]
SPWed
Kim, Eun-Soo [9006-56] SPWed, [9006-
57] SPWed
Kim, Gi Bum [9003-31] S7, [9003-49]
SPWed
Kim, Guang-Hoon [8959-48] S11
Kim, Hak-Rin [9004-9] S3
Kim, Hanbit [8974-47] SPTue
Kim, Han-Ki [8987-61] S12
Kim, Heungsoo [8968-21] S5, [8968-5]
S1, [8970-3] S1, [8980-25] S6
Kim, Hong-Seung [8980-35] S9
Kim, Ho-Sang [8992-14] S3
Kim, Hwi [8977-20] S5
Kim, Hye-Jeong [8982-68] SPWed
Kim, Hyemin [8958-13] S3
Kim, Hyoungyu [8949-60] SPMon
Kim, Hyoungsoo [8988-57] SPWed
Kim, Hyun Koo [8935-62] S12
Kim, Hyungki [8955-30] S7
Kim, Hyun-Joo [8961-110] SPTue
Kim, Hyun-Joong [9003-56] SPWed
Kim, Hyunjun [8950-36] SPSun
Kim, Hyun-Seung [9007-22] S7
Kim, Hyunsung [8986-62] S13, [8986-
62] S9
Kim, Jae Hyun [8987-64] S12
Kim, Jae-Jun [8958-16] S4, [8958-4] S1
Kim, Jang-Joo 8983 Program
Committee
Kim, Ja-Yeon [9003-55] SPWed, [9003-
60] SPWed
Kim, Jeehyun [8934-131] SPMon, [8934-
132] SPMon, [8943-211] SPTues,
[8943-69] S10
Kim, Jeesu [8943-71] S11
Kim, Je-Hyung [8996-25] S7
Kim, Jeong-Ho [8982-68] SPWed
Kim, Jeonghun [8983-41] S9
Kim, Jeong-in [9008-22] S10
Kim, Ji Won [8961-83] SPTue
Kim, Jin K. [8994-45] S11
Kim, Jin Won [8926-100] SPSun, [8926-
99] SPSun
Kim, Ji-Yeun [8949-8] S2
Kim, Jomsool [8962-23] SPTue
Kim, Jong Hak [8983-41] S9
Kim, Jong Kyu 9003 Program
Committee, 9003 S7 Session Chair,
[9003-27] S6
Kim, Jongsik [8946-27] S6
Kim, Joo Ha [8938-44] SPSun
Kim, Joondong [8954-19] S5, [8994-35]
S9
Kim, Ju Wan [8949-60] SPMon
Kim, Ju-Hyun [9003-70] SPWed
Kim, Jun Woo [8986-75] SPWed
Kim, Jun Young [8927-32] SPSun
Kim, Jung Kyung [8941-46] SPMon
Kim, Jung Woo [8977-15] S4
Kim, Jungho [8943-71] S11
Kim, Jungkyu [8988-40] S9
Kim, Junki [8975-12] SPTue
Kim, Jun-Ki [8963-38] SPTue
Kim, Jun-Whee [8988-60] SPWed,
[8988-61] SPWed, [9005-19] SPWed
Kim, Ki Hean [8927-26] S6, [8930-2] S1,
[8934-36] S6, [8934-84] S12, [8935-
54] S11
Kim, Ki Hyun [8949-3] S1
Kim, Ki Su [8958-13] S3
Kim, Kwangjin [9007-12] S5
Kim, Kyoung Hoon [8986-63] S14
Kim, KyoungHo [8984-30] S8
Kim, Kyu Hyun [8960-10] S3, [8976-33]
S7, [8999-6] S2
Kim, Kyuhan [8950-36] SPSun
Kim, Kyujung [8947-52] S12, [8954-32]
SPMon
Kim, Kyungbum [8961-22] S5
Kim, Kyung-Han [8972-41] S9
Kim, Kyung-Jo [8991-24] S6
Kim, Kyu-Sang [8986-62] S13, [8986-
62] S9
Kim, Michele M. [8931-17] S4, [8931-
42] SPMon, [8931-43] SPMon,
[8931-47] SPMon, [8931-48] SPMon,
[8931-9] S2
Kim, Mijin [9002-47] S11
Kim, Min Kwan [8950-24] S6
Kim, Min-Ho [9003-16] S3
Kim, Minju [8927-26] S6
Kim, Minkyu [8976-39] S8
Kim, Minkyu [8927-19] S5, [8927-2] S1,
[8927-29] S7, [8927-4] S1, [8927-5] S1
Kim, Moonhee [8997-3] S3, [8997-3] S7
Kim, Mu-Geon [9004-9] S3
Kim, Myoung Joon [8930-2] S1
Kim, Myung K. [8949-19] S4, [9006-18]
S4
Kim, Myunghwan [8980-63] SPWed,
[8980-64] SPWed
Kim, Na Young [8993-7] S1
Kim, Nakjoong 8983 Program
Committee, [8983-55] SPWed
Kim, Nam [9005-13] S3, [9006-29] S6,
[9006-36] S7, [9006-52] SPWed,
[9006-53] SPWed
Kim, Nam Seong 8968 Program
Committee
Kim, Namje [8985-55] SPWed, [8985-7]
S2, [8985-8] S2
Kim, Peter C. W. [8935-79] SPSun
Kim, Pilhan [8927-26] S6, [8941-55]
S11, [8944-14] S3, [8947-29] S6,
[8947-81] SPMon
Kim, Roderick [8926-17] S4
Kim, S. J. [8986-10] S2, [8986-43] S8
Kim, Sanghoon [8952-35] S9
Kim, Sangin [8980-63] SPWed, [8980-
64] SPWed
Kim, Sang-Mook [9003-50] SPWed
Kim, Se-Heon [8994-1] S1
Kim, Sehui [8943-69] S10
Kim, Seong-Jin [8961-43] S10
Kim, Seongjun [8941-46] SPMon
Kim, Serguei [8965-36] S8
Kim, Seung-Cheol [9006-56] SPWed,
[9006-57] SPWed
Kim, Seunghyun [8951-11] S3
Kim, Sihan [8991-8] S2
Kim, Soeun [8985-57] SPWed
Kim, Soo Heyon [8933-22] S6
Kim, Sochoel [8947-9] S2, [8949-5] S1
Kim, Sook Young [8954-13] S3
Kim, Steve Sang Nyon [8983-48] S11
Kim, Suenne [8987-67] S13
Kim, Sug-Whan [8992-14] S3
Kim, Sun Woon [8986-75] SPWed
Kim, Sunduck [8948-15] S2, [8985-47]
S10, [8985-48] S10
Kim, Sung Jin 8954 Program
Committee, [8954-19] S5, [8993-46]
S8, [8994-35] S9, [8996-31] SPWed
Kim, Sunghwan [8974-7] S2, [8980-67]
SPWed
Kim, Sungjee [8934-36] S6
Kim, Sungmin [9006-37] S7
Kim, Sung-Moon [8988-49] S11
Kim, Sun-Nam [9004-21] SPWed,
[9004-22] SPWed
Kim, Sunwon [8926-100] SPSun, [8926-
99] SPSun
Kim, Tae Shik [8934-40] S6
Kim, Tae Wan [8981-43] S11
Kim, Taehyeong [8980-67] SPWed
Kim, Taek [8991-8] S2
Kim, Wihan [8934-32] S5
Kim, Wihan [8934-39] S6
Kim, Yeongeun [8927-26] S6
Kim, Yoon-Ho [8997-16] S6
Kim, Young L. [8926-39] S8, [8958-3] S1
Kim, Young Sun [9003-16] S3
Kim, Youngchan [8952-29] S8
Kim, Young-Duk [8950-36] SPSun
Kim, Youngjae [8948-31] S5, [8972-20]
S5, [8992-22] S5
Kim, Young-Joo [8983-40] S9
Kim, Young-Soo [8992-14] S3
Kim, Young-ae [8928-90] S18
Kim, Young-ae [8928-86] S16
Kim, Young-Wook [8955-15] S4
Kimball, Joseph D. [8950-4] S1, [8950-
51] SPSun
Kim-Chauveau, Hyonju [8986-50] S10
Kimerling, Lionel C. [8960-3] S1
Kimme, Simon [8977-3] S2
Kimmelman, Ossi [8961-103] SPTue
Kimpel, Frank [8961-10] S3, [8971-12] S2
Kimura, Shigeharu [8954-6] S2
Kimura, Shigeya [8986-51] S10
Kimura, Takehiro [8926-74] S15
Kinashi, Kenji [8983-24] S6, [8983-26]
S6, [8983-51] SPWed
King, Branden J. [8933-2] S1
King, Philip S. 8979 Conference Chair,
8979 S7 Session Chair
King, Roger [9001-4] S1
King, Sharon V 8949 S7 Session Chair,
[8949-37] S8, [8949-39] S8, [8949-
40] S8
Kinjo, Masataka [8947-39] S9
Kinoshita, Hiroaki [8961-43] S10
Kinoshita, Nobuhiro [9006-15] S3
Kinoshita, Ryota [8991-43] SPWed
Kinoshita, Toru [8986-64] S14
Kinoshita, Yoshiaki [8947-52] S12
Kinross, Alison W. [8963-25] S6
Kinsky, Michael [8943-111] SPSun,
[8943-32] S5
Kinzel, Jörg [8984-9] S2
Kiontek, Sven [8963-14] S4, [8963-14]
S8, [8963-15] S4, [8963-15] S8,
[8970-27] S7, [8972-48] S12, [8972-
48] S7
Kip, Detlef [8982-52] SPWed
Kipfsthul, Laura [8994-19] S1, [8994-19]
S5
Kipp, Tobias [8955-44] S10, [8996-8] S2
Kippenberg, Tobias J. 8960 Program
Committee, [8994-4] S1
Kipshidze, Gela [8993-51] S10, [9002-
38] S9
Kiran Kumar, K. [8987-43] S8
Kiraz, Alper [8960-40] S10
Kirby, Miranda [8927-37] S9, [8927-51]
S12
Kirch, Jeremy [9002-56] S13
Kirch, Robert D. [8945-3] S1
Kiris, Tugba [8926-53] S11
Kirk, Rodney W. [8927-50] S12, [8935-
49] S10, [8946-12] S4
Kirkbride, K. Paul [8993-59] S12
Kirkpatrick, Blair C. [8993-24] S4
Kirkpatrick, Sean J. 8942 Program
Committee, [8942-1] S1, 8946
Program Committee
Kirkles, Matthew A. [8970-3] S1
Kirste, Lutz [8993-31] S6, [9003-33] S7
Kirste, Ronny [8986-27] S5, [8986-31]
S6
Kirsten, Lars [8926-120] S1
Kischkat, Jan F. [9002-45] S10
Kiseleva, Elena B. [8948-8] S1
Kishino, Katsumi [8996-9] S3
Kisin, Mikhail V. [8980-3] SPWed
Kiskis, Juris [8948-28] S5
Kiss, Takano [8967-17] S9
Kissel, Heiko [8965-5] S1
Kissel, Matthew [8978-12] S4, [8978-15]
S5
Kistler, Benjamin [8945-4] S1
Kita, Shota [8994-47] S12, [8994-76]
SPWed
Kita, Tetsuya [8929-7] S2
Kitagawa, Seiichi [8974-30] SPTue
Kitaguchi, Masahiro [8983-25] S6
Kitamura, Ken [8986-65] S14
Kitamura, Kenji [8964-12] S3, [8964-34]
S8
Kitamura, Takashi 9005 Program
Committee
Kitayama, Ken-ichi [9009-19] S7
Kittel, Sonja M. 8968 Program
Committee
Kittelmann, Jörg [8976-14] S3
Kitzerow, Heinz S. 9004 Program
Committee
Kitzler, Ondrej [8964-17] S4
Kitzler, Ondrej [8964-36] S8
Kiviniemi, Vesa 8928 Program
Committee
Kivisaari, Pyry [8980-2] S1
Kivshar, Yuri [8994-41] S11, [8994-67]
SPWed
Klaessens, John M. [8926-57] S11,
[8935-61] S12, [8936-12] S3, [8936-
21] S5, [8941-4] S2
Klantsataya, Elizaveta [8938-30] S6,
[8960-24] S5
Klapetek, Petr [8992-31] SPWed
Klar, Thomas A. 8955 S5 Session Chair,
[8955-35] S8, [8970-6] S2, 8980 S2
Session Chair, [8980-19] S5
Klarskov, Pernille [8984-12] S3, [8993-
50] S9
Klassen, Henry J. [8928-101] S16
Klaus, Michael [9002-50] S12
Klehr, Andreas [9002-12] S3, [9002-14]
S3
Klein, Brianna [8996-21] S6
Klein, Jan Jasper [8974-5] S2
Klein, Jürgen [8959-20] S5
Klein, Justin S. [8937-39] SPSun
Klein, Karl-Friedrich 8938 Program
Committee, 8938 S8 Session Chair,
[8938-14] S3
Klein, Markus 9003 Program
Committee
Klein, Oliver J. [8931-14] S3
Klein, Thomas [8934-24] S4
Kleinbauer, Jochen D. [8972-25] S6
Kleinebudde, Peter [8948-91] SPSun
Kleiner, Jonas [8972-40] S9
Kleinfeld, David [8928-84] S16
Kleinow, Philipp [8993-31] S6
Kleinschmidt, Anna Lisa [8960-29] S3,
[8960-29] S7
Klem, John F. [8993-36] S7, [8994-53]
S13
Klementieva, Natalia V. [8950-37]
SPSun
Klemm, Annett B. [8974-13] S4, [8995-
21] S6
Klemm, Richard [8976-37] S8
Klempt, Carsten [8999-46] S10

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Klenke, Arno [8961-21] S5, [8961-48] S12, [8961-49] S12, [8961-5] S2
 Klenner, Alexander [8966-10] S3
 Klepzig, Kay-Uwe [8936-33] S8
Kleshnin, Mikhail S. [8937-26] SPSun
 Kley, Ernst-Bernhard 8974 Program
 Committee, [8974-15] S4, 8995
 Program Committee, [8995-10] S3,
 [8995-3] S1
 Klimczak, Mariusz [8964-23] S6, [8964-
 29] S7, [8964-31] S7
 Klimov, Victor I. [8996-18] S5
 Klimowich, William [8973-27] SPTue
 Kliner, Andrea [8961-89] SPTue
Kliner, Dahv A. [8961-66] SPTue
Kling, Rainer 8968 Program
 Committee, [8972-50] S13, [8972-50]
 S8, [8972-56] SPTue, [8972-57]
 SPTue
 Klinzing, Stefan [8963-14] S4, [8963-14]
 S8, [8963-15] S4, [8963-15] S8
 Klitzman, Bruce [8935-23] S5, [8958-10]
 S3
 Kloetzer, Madlen [8948-3] SKey
 Klonidis, Dimitrios [9009-16] S7
 Klopfer, Michael [8960-66] SPTue
 Klosner, Marc [8928-12] S3
 Klotzbach, Udo [8963-37] SPTue, 8967
 S15 Session Chair, 8968 Conference
 Chair, 8968 S1 Session Chair, 8968
 S7 Session Chair
 Kloust, Hauke [8955-67] SPSun
 Klug, Michael A. 9006 Program
 Committee
 Klumel, Genadi [8965-21] S5
 Kluschke, Franziska [8940-7] S2
 Knap, Wojciech [8985-32] S7
 Knapp, Wolfgang 8963 Program
 Committee, 8963 S2 Session Chair
 Knauer, Arne [8986-67] S14, [9003-25]
 S6, [9003-29] S6
 Kneipp, Moritz [8943-174] SPMon,
 [8943-20] S3
 Kneissl, Michael 8986 Program
 Committee, [8986-67] S14, 9002
 Program Committee, 9002 S4
 Session Chair, [9003-25] S6, [9003-
 29] S6
Kner, Peter A. 8978 Program
 Committee, [8978-16] S5, [8978-17]
 S5
 Knicker, Katharina [9000-9] S2
 Knigge, Steffen [8965-23] S5, [8965-8]
 S2, [9002-53] S12
 Kniggendorf, Ann-Kathrin [8945-10] S3
 Knights, Andrew P. 8990 Program
 Committee, 8990 S3 Session Chair,
 [8990-45] S9
 Knoll, Dieter [8991-18] S5
Knopf, George K. [8973-17] S4, [8973-
 20] S5
 Knorz, Annerose [8967-41] S14
 Knott, Graham W. [8928-57] S12
 Knowles, Tuomas P. J. [8947-48] S11
 Knox, Wayne H. [8964-24] S6
 Knutsen, Per Magne [8928-84] S16
 Knutti, James W. Symposium
 Committee
 Ko, Alex C. [8940-10] S2, [8948-74]
 SPSun, [8948-82] SPSun
 Ko, Hyunsung [8985-7] S2, [8985-8] S2
 Ko, Jae-Kyu [9003-70] SPWed
 Ko, Myoung Ock [8985-55] SPWed
 Ko, Seung Hwan [8950-40] SPSun
 Ko, Yeong Hwan [8986-85] SPWed
 Koball, Sebastian [8951-31] SPMon
 Kobayashi, Hisataka [8931-12] S3,
 [8931-38] S8, 8956 Program
 Committee, 8956 S3 Session Chair,
 [8956-1] S1
 Kobayashi, Junya [8934-103] SPMon
 Kobayashi, Shumpei [8935-73] SPSun
 Kobayashi, Shun [8938-43] S8
Kobayashi, Shunsuke 9004 Program
 Committee
 Kobayashi, Toshiya [8997-6] S4
 Kobayashi, Yasuyuki [8986-12] S3
 Kobayashi, Yohei [8961-93] SPTue
 Kobayashi, Yuji [8986-68] S14
 Kobelke, Jens [8961-74] SPTue, [8972-
 22] S6
 Koberling, Felix [8936-19] S4, [8947-40]
 S9, [8948-49] S8, [8948-94] SPSun,
 8950 Conference Chair, 8950 S4
 Session Chair, 8950 S7 Session
 Chair, [8950-8] S2
 Koblmueeller, Gregor [9002-35] S8
 Kobrin, Boris [8974-50] S8
 Koc, Azize [8967-38] S14
Kocaoglu, Omer P. [8930-41] S9,
 [8930-42] S9
 Koch, Brian R. [9002-29] S7
 Koch, C. [8993-67] S14
 Koch, Edmund [8926-120] S1, 8927
 Program Committee, [8934-86]
 SPMon, [8975-9] S2
 Koch, Karl W. [8992-18] S4, [8994-72]
 SPWed
 Koch, Martin [8966-21] S6
 Koch, Martin 8941 Program Committee
Koch, Maximilian [8927-17] S4, [8935-
 5] S1
 Koch, Stephan W. 8966 S2 Session
 Chair, [8966-1] S1, [8966-12] S4,
 [8966-21] S6, [8966-8] S3, 8980
 Program Committee, [9003-37] S13,
 [9003-37] S9
 Kochubey, Vyacheslav I. [8955-59]
 SPSun
 Kochueva, Marina V. [8948-8] S1
 Kochuveedu, Sajji T. [8954-30] SPMon
 Kociak, Mathieu [8986-34] S7
 Kodama, Takahiro [9009-19] S7
 Kodymová, Jarmila 8962 Program
 Committee
 Koerber, Sebastian [8991-5] S1
 Koehler, Raymond C. [8934-18] S3
 Koelle, Sabine [8926-44] S9, [8926-49]
 S10
 Koenig, Anne [8937-24] SPSun
 Koenning, Tobias P. [8962-14] S4,
 [8965-45] SPTue
 Koerner, Hilmar [8983-38] S9
 Koerperick, Edwin J. [8993-53] S10
 Koesters, Arnd [8965-10] S3
 Koeth, Johannes [8993-44] S8
 Koga, Kazunori [8987-35] S7
 Koh, Jong Kwan [8983-41] S9
 Koh, Ju Heon [8992-14] S3
 Kohei, Hagiwara [8985-39] S8
 Kohl, Andreas [8943-209] SPTues
 Kohlenberg, Elicia M. [8948-74] SPSun
 Köhler, Bernd [8965-18] S4, [8965-38]
 S8, [8965-5] S1
 Köhler, Klaus [8966-27] S8, [9002-17]
 S4, [9002-19] S4, [9003-33] S7
 Kohler, Robert [8968-11] S3, [8968-21]
 S5
 Kohli, Niharika [8988-62] SPWed
 Koida, Kowa [8928-31] SPSat
 Koike, Kazuto [8987-45] S9
 Koike, Nobuyuki [8983-61] SPWed
 Koike, Yasuhiro 8983 Conference Chair,
 8983 S1 Session Chair, [8983-15] S4,
 [8983-16] S4, [8983-17] S4, [9004-13]
 S4, [9004-15] S4, [9004-20] SPTue
 Koizumi, Kazuhiro [9003-52] SPWed
 Koizumi, Noriaki [8935-67] SPSun
 Kokki, Teemu [8961-103] SPTue
 Kokkonen, Annukka [8991-2] S1
 Kokudo, Norihiro [8956-4] S1
 Kolb, Jan Philip [8934-24] S4
 Kolb, Johanna S. [8966-15] S5, [9001-
 14] S3
 Kolbe, Tim [8986-67] S14, [9003-25] S6,
 [9003-29] S6
 Kolesnikova, Anna S. [8956-39] SPSun,
 [8956-40] SPSun, [8956-41] SPSun
 Kolesov, Roman L. [8997-5] S3, [8997-5]
 S7
Kolios, Michael C. [8938-25] S5,
 [8943-12] S2, [8943-127] SPSun,
 [8943-222] SPTues, [8943-84] S13,
 [8946-35] SPSun, [8952-19] S5
 Kolker, Andru [8930-14] S3
 Kolkovsky, Valery [8984-41] S11
Kolle, Mathias [8958-2] S1
Kollias, Nikiforos 8926 Conference
 Chair, 8926 S5 Session Chair, 8926
 SKey Session Chair, [8926-1] SKey
 Kolpakov, Stanislav A. [8961-123] SPTue
 Kolste, Kolbein [8951-20] S5
 Koltchanov, Igor [8980-61] SPWed
 Komar, Vitaliy K. [8959-78] SPTue
 Komissarov, Alexey [8965-22] S5
 Komitov, Lachezar 9005 Program
 Committee
 Komlenok, Maksim Sergeevich [8969-
 28] S1, [8969-28] S3
 Komorowska, Katarzyna [8982-9] S2
 Komuro, Shuji [8987-94] S11
 Konak, Tetyana [8959-15] S4
 Kondo, Atsushi [8983-17] S4
 Kondo, Seiji [8948-47] S8
 Kong, DuanHua [8991-8] S2
 Kong, Fanting [8949-33] S7
 Kong, Hong Jin [8962-23] SPTue
 Kong, Hyunjoon [8948-96] SPSun
 Kong, Jing [8993-76] S16
 Kong, Lingjiang [8971-26] S4
 Konger, Raymond L. [8926-39] S8
 Konidakis, Ioannis [8982-11] S3
 König, Karsten [8926-26] S6, [8930-28]
 S7, [8947-55] S12, 8948 Conference
 Chair, 8948 S11 Session Chair,
 [8948-3] SKey, [8948-43] S7, [8948-
 52] S9, [8948-59] S10, [8948-61] S10,
 [8948-83] SPSun
 König, Marcelle [8950-8] S2
 König, Peter [8927-44] S11
 König-Barde, Christophe [8950-6] S2
 Konkol, Matthew R. [8983-45] S10
Kono, Junichiro [8974-24] S6, [8974-
 46] SPTue, [8984-19] S5
 Konov, Vitaly I. [8969-28] S1, [8969-28]
 S3
 Konrad, Thomas [8999-44] S9, [8999-
 45] S9, [8999-53] SPWed
 Konstantaki, Maria [8982-11] S3
 Koomson, Valencia M. J. [8989-16] S5
 Koos, Christian [8970-5] S2, [8991-5]
 S1, [8992-23] S5, [9009-8] S4
 Kocpluch, Michael [8955-18] S4
Kopf, Daniel [8960-48] S12
 Koponen, Joona J. [8961-103] SPTue,
 [8961-37] S9
 Kopp, Fabian [8986-55] S11
Kopp, Victor I. [8961-94] SPTue,
 [8990-5] S1
 Koppitsch, Guenther [8933-4] S2
 Koptev, Maxim Yu [8961-56] S13
 Koptyaev, Sergey Nikolaevich [8994-60]
 S15
 Korbelik, Jagoda [8945-6] S2
Korbelik, Miaden 8944 Program
 Committee, 8944 S1 Session Chair,
 [8944-1] S1
 Korhonen, Minna M. [8964-26] S6
 Korhonen, Tia [8991-2] S1
 Korn, Anja [8950-28] S7
 Korn, Georg [8962-17] S5
 Korobeynikov, Igor V. [8975-24] SPTue
 Korobko, Dmitry A. [8980-59] SPWed
 Korotkova, Olga 8971 Program
 Committee
 Korpijärvi, Ville-Markus [8982-7] S1
 Kosa, Nadhir [8961-35] S9
 Kose, Kivanc [8926-12] S3
 Kose, Kivanc [8926-13] S3
 Kosemura, Yumi [8975-4] S1
 Koshelev, Alexander [8974-6] S2, [8988-
 16] S4
 Koshiba, Masanori [9009-2] S3
 Koshino, Keiji [8990-47] S9
 Koshiro, Hikari [9005-17] S4
 Koshizaki, Naoto [8969-10] S2
 Koshy, Salini S. [8929-2] S1
 Kosma, Kyriaki [8960-42] S11
 Kostecki, Roman [8938-30] S6
 Kostopoulou, Athanasia [8955-43] S9,
 [8955-66] SPSun
 Kostrov, Andrey N. [8969-22] S4, [8969-
 22] S6
Kostuk, Raymond K. [8927-28] S7
Kotb, Hussein Eissa [8961-120] SPTue
 Koteeswaran, Dornadula [8935-24] S5,
 [8939-20] S4, [8940-15] S3, [8940-2]
 S1
 Kotha, Shiva [8937-28] SPSun
 Kotlyarov, Alexander N. [8926-104] S21
 Kotov, Leonid V. [8961-32] S8, [8961-56]
 S13
 Köttig, Felix [8934-86] SPMon
 Kou, Deqiang [8935-31] S7
 Koudsi, Badia [8979-15] S7
 Koukitsu, Akinori [8986-64] S14
 Koukouvinos, Georgios [8976-44] S9
 Kourouma, H. Y. S. [9008-24] S10
 Koutsides, Charalambos [8982-15] S3
 Kovalchuk, Evgeny V. [9000-14] S3
 Kovalchuk, Olga [8941-50] S10
 Kovalenko, Daria [8956-26] S6
 Kovalenko, Nazar O. [8959-78] SPTue
 Kovalenkovas, Deividas [8993-45] S8,
 [9002-39] S9
 Kovalev, Alexander A. [8967-47] SPTue
 Kovalik, Joseph M. [8971-29] S5, [8971-
 34] S5
 Kovanis, Vassilios I. 8980 Program
 Committee, [8980-40] S11
 Kovar, Joy [8943-120] SPSun
 Kowalik, Kerstin [8968-29] S6
 Kowalska, Dorota [8957-22] S5
 Kowalski, William J. [8953-6] S2
 Koyama, Fumio 8995 Conference Chair,
 8995 S4 Session Chair, [8995-28]
 S7, [8995-9] S5, 9001 Program
 Committee, [9001-5] S1, [9001-7] S2
Koyama, Yoshisada [8971-28] S5
 Kozacik, Stephen T. [8974-12] S4,
 [8983-44] S10, [8983-45] S10
 Koziol, Pawel E. [8968-39] SPTue,
 [8968-9] S2, [8973-26] SPTue
 Kozlova, Olena [8975-15] S3
 Kracht, Dietmar [8961-105] SPTue,
 [8961-116] SPTue, [8961-87] SPTue
Kraczek, Jeffrey R. [8971-9] S1
 Kraemer, Sebastian [8963-24] S6
 Krafft, Christoph [8928-5] S2, [8939-5]
 S1
 Krainak, Michael A. [8959-19] S5, 8971
 Program Committee
 Krainer, Lukas [8967-43] S15, [8967-43]
 S7
 Kraittl, Jens [8951-31] SPMon
 Krajewska, Aleksandra [8961-81] SPTue
 Krajnik, Bartosz [8957-23] S5
 Krakowski, Michel [9002-51] S12
 Kral, Andrej [8928-42] S8
 Krall, Michael [9002-24] S6
 Kramer, Anne [8934-83] S12
 Krämer, Benedikt [8948-49] S8, [8950-
 8] S2
 Kramer, Christian [8984-24] S7
 Kramer, Greg M. [8976-28] S6
 Krämer, Karl W. [8981-10] S3, [8981-9]
 S3, [9000-7] S2
 Krämer, Ria G. [8961-89] SPTue
 Kramer, Richard 8928 Program
 Committee
Krames, Michael R. 9003 Program
 Committee, 9003 S2 Session Chair,
 [9003-1] S1, [9003-41] S10
 Kränkel, Christian 8959 Program
 Committee
 Krasieva, Tatiana B. [8948-59] S10
Krasilenko, Vladimir G. [9009-25]
 SPWed
 Krasnaberski, Aliaksei [8960-29] S3,
 [8960-29] S7
 Krasnov, Vitaly [9006-40] SPWed
 Krasulick, Stephen B. [8991-21] S5
 Kratz, Karl [8955-19] S4
 Krauch, Niels [8965-11] S3
 Kraus, Martin [8967-16] S13, [8967-16]
 S8
 Kraus, Martin F. [8927-30] S7, [8934-22]
 S4
 Krause, Volker 8965 Program
 Committee, 8965 S4 Session Chair,
 [8965-10] S3
 Krauss, Thomas F. [8974-13] S4, [8991-
 18] S5, [8995-21] S6, [8998-50] S11
 Krausz, Ferenc [8961-5] S2, [8982-72]
 SPWed
 Krauth, Joachim [8964-14] S3
 Krauthamer, Victor [8928-3] S1
 Kravchenko, Ivan I. [8933-5] S2
Krawinkel, Judith [8941-49] S8
 Kreher, David [8983-35] S8
Krejci, Martin [8965-35] S8
 Krell, Asher M. [8926-128] S3
Kremer, Matthias P. [8976-53] SPTue
 Kremers, Christian [8989-28] S8
 Kremp, Tristan [8938-15] S3
 Kremser, Bert [8968-14] S3
 Krenn, Joachim R. [8999-48] S10
 Krenner, Hubert J. [8984-9] S2
Kress, Bernard C. SC1125
Kress, Jeremy [8941-25] S6
 Kreth, Friedrich-Wilhelm [8928-13] S4
 Krey, Stefan [8992-11] S3
 Kreyling, Moritz [8958-6] S2

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Krich, Jacob J. [8981-21] S6
Krickhahn, Christian [8931-40] S8
Krieg, Sandro M. [8943-20] S3
Krieger, Axel [8935-79] SPSun
Kriese, Jason M. [8993-30] S5, [8993-60] S12
Krimi, Redouane [8983-23] S6
Krinisky, Suzanne WS1059
Krishna, C. Murali [8926-147] S7, [8926-148] S7, [8928-7] S2, [8939-14] S3, [8940-12] S3, [8940-13] S3
Krishna, Lakshmi [8981-6] S2
Krishna, Sanjay 8973 Program Committee, [8985-59] SPWed, [8996-21] S6
Krishnamoorthy, Ashok V. 8991 Program Committee
Krishnamoorthy, Sriram [8986-46] S10
Krishnamoorthy, Pradeep Kumar [8964-68] SPTue
Kristiansen, Niels I. [8997-31] S11
Krockenberger, Yoshiharu [8987-22] S5
Kröger, Niels [8939-28] S5, [8939-35] S6
Kroisamer, Julia-Sophie [8934-21] S4
Kroker, Stefanie [8995-10] S3
Krokhin, Arkadii A. [8994-16] S4
Krol, Denise M. 8972 Program Committee
Krost, Alois J. [8986-80] SPWed
Krueger, Arnd K. 8948 Program Committee
Krueger, James G. [8926-30] S7, [8926-41] S8, [8938-24] S5, [8940-9] S2, [8941-33] S9, [8947-2] S1
Krug, Marc [8930-36] S8
Krüger, Alexander [8926-124] S2, [8928-42] S8, [8935-20] S4, [8941-13] S4
Kruger, Robert A. 8943 Program Committee
Kruizinga, Pieter [8943-29] S5
Krumholz, Arie [8943-188] SPTues
Krupatkin, Alexander I. [8935-9] S3
Krupka, Jerzy [8986-5] S1
Kruschke, Bastian [8965-15] S4
Kruse, Carsten [8980-21] S5, [8986-19] S4
Kruse, Corey [8968-27] S6
Kruse, Kevin L. [8988-36] S8, [8991-3] S1
Krutzler, Christian [8936-14] S3
Krzempek, Karol [8959-52] S12, [8961-81] SPTue, [8964-31] S7, [8964-65] SPTue
Krzyszowska, Halina [8990-21] S4, [8990-24] S4
Ku, Geng [8943-19] S3
Ku, Pei-Cheng [8981-49] S12, [8986-10] S2, [8986-43] S8, [8996-14] S4, [8996-16] S5, [8996-17] S5, [9003-64] SPWed
Ku, Yun-Cheng [8994-70] SPWed
Kuan, Peiwen [8982-58] SPWed
Kuan, Wei-Li [8957-3] S1
Kuang, Cuifang [8950-27] S7, [8950-38] SPSun
Kuang, Ping [8994-59] S15
Kubasik-Thayil, Anisha [8972-12] S3
Kubby, Joel 8978 Conference Chair, 8978 S5 Session Chair, 8978 S6 Session Chair, [8978-12] S4, [8978-15] S5, 8990 Conference Chair
Kubecek, Václav [8959-78] SPTue
Kubooka, Toshihiro [8971-28] S5
Kucharski, Robert [8986-25] S5, [8986-3] S1, [8986-4] S1, [8986-5] S1
Kuchta, Daniel M. [9010-6] S4
Kudenov, Michael W. [8949-2] S1
Kudo, Takuya [8989-31] SPlen
Kudo, Tomoyuki [8978-7] S2
Kudoh, Suguru N. [8939-39] SPSun
Kudryashov, Alexis V. 8960 Conference Chair, 8960 S16 Session Chair, [8960-51] S13, 8978 Program Committee
Kuebler, Stephen M. [8974-25] S6, [8981-12] S3
Kuech, Thomas F. [8981-43] S11
Kueller, Viola [8986-67] S14, [9003-25] S6
Kues, Wilfried [8955-7] S2
Kufner, Corinna [8934-24] S4
Kuhl, Michael [8941-43] SPMon
Kuhn, Christian [8986-67] S14, [9003-25] S6, [9003-29] S6
Kuhn, Vincent [8959-25] S6, [8959-31] S7
Kühnemann, Frank [8964-33] S8
Kuimova, Marina K. [8947-48] S11
Kuipers, Laurens Kobus [8984-51] S14
Kuittinen, Markku [8982-13] S3, [8994-11] S3
Kukreja, Lekha [8940-12] S3
Kulagina, Marina M. [8965-25] S5
Kulakovskii, Vladimir D. [8993-7] S1
Kulik, A. V. [8959-48] S11
Kulikovskiy, Anton N. [8952-41] SPSun
Kulikovskiy, Artem N. [8952-41] SPSun
Kulkarni, Prathamesh [8953-3] S1
Kulkova, Irina V. [8996-5] S1
Kullberg, Richard C. 8975 Program Committee
Kulmala, Tero [8966-31] SPTue, [8966-5] S2
Kumagai, Shinya [8977-29] S7
Kumagai, Yoshinao [8986-64] S14
Kumakura, Kazuhide [8986-12] S3
Kumano, Hidekazu [8980-17] S4
Kumar, Abhishek [8934-4] S1
Kumar, Amit [8928-100] S20, [8928-93] S18, [8928-97] S19
Kumar, Dinesh [8973-15] S3
Kumar, Gangadharan Ajith [8956-38] SPSun
Kumar, Kitty [8968-1] S1
Kumar, Nardeep [8984-2] S1
Kumar, Neeraj [8954-28] S7
Kumar, Nitish [8987-13] S2
Kumar, Pramod [8926-5] S1
Kumar, Prashant [8988-22] S5
Kumar, Pravindra [9007-15] S6
Kumar, Shailesh [8997-31] S11
Kumar, Vijay [8999-21] S5
Kumavor, Patrick D. [8943-110] SPSun, [8943-150] SPMon, [8943-5] S1
Kumi-Barimah, Eric [9000-23] SPWed
Kumkar, Malte [8972-25] S6, [8972-40] S9
Kummara, Venkata Krishnaiah [8996-33] SPWed
Kümmell, Tilmar [8980-21] S5
Kunimori, Hiroo [8971-28] S5
Kunyansky, Leonid [8943-173] SPMon
Kunza, Christoph [8967-16] S13, [8967-16] S8
Kunzer, Michael [9003-33] S7
Kuo, Anthony N. [8930-15] S4, [8930-19] S5, [8930-35] S8
Kuo, Catherine K. [8948-11] S2
Kuo, Chien-Cheng [8982-10] S2
Kuo, Hao-Chung [8981-3] S1, 8986 Program Committee, [8986-7] S2, [8986-78] SPWed, 9003 Program Committee, [9003-12] S3, [9003-15] S3
Kuo, Hsun Chih [8986-10] S2, [8986-43] S8
Kuo, Nathanael [8943-149] SPMon
Kuo, Shiuhyang [8926-17] S4
Kuo, Yi-Ching [8936-5] S1, [8976-47] S10
Kuo, Ying-Shen [8981-45] S12
Kupferman, Michael [8926-136] S5
Kupiec, Stephen A. [8979-5] S4
Kupinski, Matthew A. [8936-8] S2, [8936-9] S2
Küppers, Franko [9001-6] S2, [9007-16] S6, [9007-17] S6, 9008 Program Committee, [9008-2] S2
Kura, Dzelal [8963-13] S3, [8963-13] S7
Kurabayashi, Katsuo [8927-31] S1, [8927-31] S8
Kurachi, Cristina [8926-130] S4, [8926-22] S5, [8926-35] SPSun, [8927-48] S12, [8927-49] S12, [8931-10] S2, [8931-22] S4, [8931-32] S6, [8931-37] S7, [8931-41] SPMon, [8931-45] SPMon, [8931-49] SPMon, [8931-50] SPMon, [8931-51] SPMon, [8931-8] S2, [8941-42] SPMon, [8947-60] S13, [8947-86] SPMon, [8948-79] SPSun
Kuramoto, Kyosuke [8965-1] S1
Kurashima, Celso Setsuo [8979-16] S7
Kurata, Hiroyuki [9006-49] SPWed
Kurczveil, Géza [8991-42] S10, [8991-42] S3
Kure, Thomas [8986-26] S5
Kuri, Toshiaki [9007-10] S5
Kurihara, Seiji [9004-21] SPWed, [9004-22] SPWed
Kurita, Masanobu [9006-35] S7
Kurlov, Sergii S. [9002-45] S10, [9002-62] S14
Kurokawa, Hironori [8986-35] S7
Kurokawa, Kazuhiro [8934-30] S5
Kurosaka, Yoshitaka [9002-34] S8, [9002-54] S12
Kurosaki, Ryoza [8967-18] S9
Kurosawa, Hiroyuki [8980-17] S4
Kurotani, Reiko [8928-47] S9
Kurotsu, Mariko [8926-74] S15, [8941-15] S4
Kurth, Steffen [8977-26] S6, [8995-18] S5
Kurtz, Ronald M. [8941-16] S4
Kurzke, Henning [8948-72] SPSun
Kusakabe, Kazuhide [8986-45] S8
Kusek, Mark E. [8927-52] S12
Kushibiki, Toshihiro [8943-137] SPSun, [8943-214] SPTues
Kushner, Mark J. [8962-12] S3
Küster, Matthias [8965-18] S4
Kut, Carmen [8927-25] S6, [8934-18] S3, [8948-80] SPSun
Kuwabara, Takayuki [8983-37] S9
Kuwahara, Yutaka [9004-21] SPWed, [9004-22] SPWed
Kuwaki, Nobuo [9009-10] S5, [9009-19] S7
Kuwano, Shigeru [9007-11] S5
Kuyken, Bart [8990-23] S4, [8993-42] S8
Kuzel, Petr [8993-47] S9
Kuzmin, Konstantin G. [9009-6] S4
Kuznetsov, Ilya [8923-23] S6
Kuznetsov, Mark [8934-122] SPMon, [8934-3] S1, [8977-2] S1, [8977-2] S8
Kuznetsov, Sergey S. [8948-8] S1, [8952-27] S7
Kuznetsov, Yuri [8937-1] S1, [8944-12] S3
Kuznetsova, Nadezda [8996-7] S2
Kuznetsova, Yuliya [8993-71] S14
Kwan, Elliott [8936-17] S4, [8952-21] S6
Kwiatkowski, Jacek [8959-71] SPTue
Kwon, Dongil [8977-15] S4
Kwon, Dong-Jun [8975-23] S4
Kwon, Min-Ki [9003-55] SPWed, [9003-60] SPWed
Kwon, Min-Kyung [8950-44] SPSun
Kwon, Osung [8997-16] S6
Kwon, Yong Seok [8982-50] SPWed, [8985-55] SPWed
kwon, young bong [8964-21] S5, [8997-22] S8
Kwon, Young Key [8959-23] S6, [8959-32] S8
Kwong, David N. [8991-20] S5
Kwong, Dim-Lee [8990-29] S6
Kwong, Gu-sang [8928-80] SPMon
Kwong, Jessica [8937-42] SPSun
Kwong, Nai-Hang [8984-32] S9, [9000-20] S5
Kwong, Tiffany C. [8935-53] S11, [8937-16] S3
Kyle, Erin C. H. [8986-47] S9
Kyogaku, Masafumi [8947-11] S2
Kyotoku, Bernardo B. C. [9010-13] S4, [9010-13] S5
-
- La Ferrara, Vera [9004-29] SPWed
La Fontaine, Javier [8979-21] S2, [8979-21] S8
Laakso, Anti [8982-7] S1
Labadi, Zoltan [8987-88] SPWed
Labanca, Ivan [8950-42] SPSun
Labardi, Massimiliano [9004-30] SPWed
Labeye, Pierre R. [8988-24] S6, [8988-26] S6, [8993-43] S8
Lacava, Zulmira G. M. [8954-14] S4
Lachaine, Rémi [8972-9] S2
Lachinova, Svetlana L. [8971-8] S1
Lacombe, Francois 8927 Program Committee
Lacroix, Steve [8948-27] S5
Lacroix, Suzanne [9009-14] S6
Lademann, Jürgen M. [8926-26] S6, [8940-7] S2, 8942 Program Committee, 8942 S4 Session Chair, [8942-12] S2, [8948-3] SKey, 8951 Program Committee
Lademann, Olaf [8942-12] S2
Lægsgaard, Jesper [8961-104] SPTue, [8961-96] SPTue, [8961-98] SPTue
Lafane, Slimane [8996-39] SPWed
Laffers, Wiebke [8947-30] S6
Laffitte, Audrey [8972-57] SPTue
Lafon, Robert E. [8971-32] S5
Laforest, Timothe [8989-22] S7
Lafosse, Xavier [8966-11] S8, [8993-6] SKey
Lafuiri, Gauthier [8947-51] S12
Lagarto, Joao [8926-71] S14, [8935-2] S1, [8940-16] S4
Lagatsky, Alexander A. [8959-40] S10
Lagendijk, Ad [8978-18] S6, [9003-47] S11
Lagerwall, Jan P. [9004-31] SPWed
Laghumavarapu, Ramesh Babu [8981-24] S6, [8996-22] S6
Lagoda, Gwen A. [8926-51] S10
Lagutchev, Alexei [8959-10] S3, [8994-3] S1
Lahdo, Rabi [8963-1] S1
Lai, Chih-Wei [8984-33] S9
Lai, David [8948-89] SPSun
Lai, Po-Cheng [8992-27] S6
Lai, Po-Yen [8961-100] SPTue, [8961-99] SPTue
Lai, Puxiang [8943-113] SPSun, [8943-114] SPSun, [8943-167] SPMon, [8943-187] SPMon, [8943-42] S7
Lai, Tsung-Lin [9001-19] S4
Lai, Wei-Cheng [8933-14] S4, [8933-15] S4, [8990-26] S5, [8990-31] S6, [8990-33] S6
Lai, Wei-Chi [9003-8] S2
Lai, Xiaomin [8928-55] S11, [8928-56] S11, [8928-60] S12, [8928-68] S14, [8928-71] SPMon, [8928-73] SPMon, [8928-74] SPMon, [8949-18] S4, [8949-57] SPMon, [8951-30] SPMon
Lai, Yi-Chun [8983-57] SPWed, [8983-58] SPWed
Lai, Ying-Yu [9001-19] S4
Lai, Yi-Ying [8966-33] SPTue
Lai, Zhenhua [8948-85] SPSun, [8949-42] S9, [8949-45] S9
Laibinis, Paul E. [8933-12] S1
Laios, Alexander [8935-15] S4
Lajevardipour, AIREZA [8948-107] SPSun
Lake, Robert [8973-11] S3, [8973-3] S1
Lakhotia, Harshit [8928-100] S20, [8947-87] SPMon, [8954-7] S2
Lakhtakia, Akhlesh 8974 Program Committee, 8974 S8 Session Chair, [8981-39] S10
Lakkegowda, Yogesha [8947-61] S13
Lakowicz, Joseph R. 8948 Program Committee, 8957 Conference Chair, 8957 S3 Session Chair, 8957 S6 Session Chair, 8957 S7 Session Chair
Lakshman, Minalini [8943-120] SPSun
Lakshmana, Sudheendra [8956-31] S8
Lal, Niraj N. [8981-19] S5
Lalanne, Philippe [8966-11] S8, 8980 S9 Session Chair, [8980-16] S20, 8995 Program Committee, [8995-6] S2
Laliberté, Mathieu [8948-31] S5, [8972-20] S5
Lall, Gurprit [8934-113] SPMon
LaLumondiere, Stephen [8965-3] S1, [8981-43] S11, [8986-49] S9
Lam, Adam [8927-47] S11
Lam, Edmund Y. [8934-88] SPMon, [8947-78] SPMon
Lam, Ka Po [8942-11] S2, [8947-54] S12, [8947-80] SPMon
Lam, Stephen 8927 Conference Chair, 8927 Program Committee, 8927 S9 Session Chair, [8927-34] S9, [8927-35] S9, [8927-37] S9, [8927-51] S12
Lam, Sylvia F. [8935-36] S8
LaMantia, Nicole [8929-24] SPSun
Lamb, Erin S. [8948-39] S7
Lambin lezzi, Victor L. [8938-35] S7, [8992-4] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Lambrech, Armin** 8993 Program Committee, [8993-75] S15
- Lambrechts, Andy** [8947-51] S12, [8974-21] S5
- Lammer, Jan** [8934-58] S9
- Lamponi, Marco** [8988-25] S6, [9002-51] S12
- Lan, Xinwei** [8950-35] SPSun, [8974-32] SPTue, [8974-33] SPTue
- Lan, Yung-Chiang** [8957-31] S7
- Lancée, Charles T.** [8934-7] S2
- Lanco, Loïc** [8993-6] SKey, [8997-25] S9
- Landais, David** [8961-78] SPTue
- Landfester, Katharina** [8942-12] S2
- Landini, Ida** [8955-45] S10
- Landskrön, Jürgen** [8949-35] S7
- Lane, Pierre M.** [8927-34] S9, [8927-35] S9, [8927-51] S12, [8935-19] S4, [8935-36] S8
- Lang, Klaus-Dieter** [8991-13] S3
- Lang, Tino** [8972-21] S6
- Lange, Janine** [8972-17] S5
- Lange, Jeffrey J.** [8950-5] S2
- Länge, Kerstin** [8976-8] S2
- Lange, Robert** [8955-64] SPSun
- Lange, Wienke** [8928-96] S19
- Langenbucher, Achim** [8931-27] S5
- Langer, Gregor** [8943-65] S10
- Langer, Klaus-Dieter** 9007 Program Committee, 9007 S7 Session Chair
- Langer, Tomi** [8998-31] S7
- Langley, Zachary** [8948-88] SPSun
- Langner, Andreas** [8960-43] S11, [8961-40] S10
- Lani, Sebastian** [8977-23] S5
- Lanier, Thomas E.** [8972-29] S7
- Lankenau, Eva** [8930-36] S8
- Lantigua, Christopher** [8963-16] S4, [8963-16] S8
- Lantratov, Vladimir M.** [8965-25] S5
- Lantsov, Alexey Dmitrievich** [8994-60] S15
- Lanuti, Michael** [8927-54] S13
- Lany, Stephan** [8987-14] S3
- Lanza, Gregory M.** [8943-197] SPTues
- Lanzoni, Patrick** [8977-23] S5
- Laoui, Samir** [8956-8] S2
- Lapchak, Paul A.** [8932-2] S1
- Lapeyrade, Mickael** [9003-25] S6, [9003-29] S6
- Laplace-Builhé, Corinne** [8926-129] S4
- Lapointe, Jean** [8990-32] S6, [8995-38] S10, [9002-40] S9
- Lapotko, Dmitri** [8926-136] S5, [8935-7] S3, [8972-11] S2
- Lappa, Alexander V.** [8926-104] S21, [8952-41] SPSun
- Lappas, Alexandros** [8955-43] S9, [8955-66] SPSun, [8987-71] SPWed
- Laratta, Peter K.** [8927-37] S9
- Largeau, Ludovic** [8990-46] S9
- Larger, Laurent** [8960-4] S1, [8985-49] S10, [8989-19] S6, [8997-13] S6
- Laribi, Sana** [8981-14] S4
- Larichev, Andrey V.** [8930-16] S4
- Larin, Kirill V.** 8930 Program Committee, 8930 S1 Session Chair, [8930-3] S1, [8934-33] S5, [8934-89] SPMon, 8942 Conference Chair, 8942 S2 Session Chair, 8942 S5 Session Chair, 8942 S9 Session Chair, [8942-10] S2, 8946 Conference Chair, 8946 S1 Session Chair, 8946 SRem Session Chair, [8946-18] S5, [8946-25] S6, [8946-28] S6, [8946-7] S2, 8953 Program Committee, 8953 S2 Session Chair, [8953-12] S3, [8953-19] S4, [8953-3] S1, [8953-5] S1
- Larina, Irina V.** [8934-89] SPMon, [8953-19] S4, [8953-3] S1, [8953-5] S1
- Larisch, Gunter** [9001-10] S2, [9001-2] S1
- LaRocca, Francesco** [8930-18] S4
- Larquet, Eric** [8957-19] S4
- Larsen, Rasmus** [8979-22] S2, [8979-22] S8, [8979-3] S3
- Larson Smith, Kjersta** [8943-75] S11
- Larson, Noble** [8934-122] SPMon
- Larsson, Anders** 9001 Program Committee
- Lasagni, Andres F.** [8968-10] S3
- Lascialfari, Alessandro** [8955-43] S9
- Lascoux, Noëlle** [8983-7] S2, [8984-3] S1
- Lashkari, Bahman** [8926-113] S23, [8943-62] S9, [8943-96] S14
- Laskin, Alexander V.** [8960-52] S14, [8960-60] S16
- Laskin, Vadim V.** [8960-60] S16
- Laslo, David N.** [8992-12] S3
- Lasri, Jacob** [8961-60] S14, [8964-2] S1
- Lastras-Martínez, Alfonso** [8964-47] SPTue
- Lastras-Martínez, Luis Felipe** [8964-47] SPTue
- Latas, Sofia C.** [8984-4] S1
- Latham, Bruce** [8946-3] S1
- Lathia, Justin** [8948-26] S4
- Latimer, Cassandra** [8926-46] S10
- Latrive, Anne** [8926-129] S4, [8934-69] S11
- Lattermann, Annika** [8948-6] S1
- Lau, Andy K. S.** [8927-27] S7, [8947-49] S11
- Lau, Kei May** 9003 Program Committee, 9003 S10 Session Chair
- Laudereau, Jean-Baptiste** [8943-23] S4
- Laudny, Urszula A.** [8961-118] SPTue
- Laufer, Jan G.** [8943-109] S16, [8943-140] SPSun, [8943-61] S9
- Lauprêtre, Thomas** [8998-56] S12
- Laurain, Alexandre** [8966-12] S4, [8966-8] S3
- Laurell, Fredrik** [8966-4] S2
- Laurence, Audrey** [8928-15] S4, [8928-32] SPSat
- Laurence, Ted A.** [8950-10] S2
- Laurent, Arnaud** [8971-13] S2
- Laurila, Marko** [8961-96] SPTue
- Lauritsen, Kristian** [8950-13] S3
- Laursen, Bo W.** [8951-9] S2
- Laussy, Fabrice P.** [8997-26] S10
- Lauzurica, Sara** [8968-30] S15, [8968-30] S7
- Lavanga, Luigi** [8999-40] S8
- Laverdant, Julien** [8980-18] S5, [8993-82] S17, [8996-37] SPWed
- Lavergne, Émeric** [8960-62] S16
- Laverty, Sean** [8944-31] SPMon, [8944-8] S2
- Lavery, Lawrence** [8979-21] S2, [8979-21] S8
- Lavinsky, Daniel** [8930-39] S8
- Lavrinenko, Andrei V.** [8989-28] S8
- Lavrova, Olga** [8981-63] SPWed, [8983-50] S11
- Law, Kwok Keung** 8993 Program Committee, 8993 S6 Session Chair, [8993-5] SKey
- Law, Wing-Cheung** [8954-33] SPMon
- Lawall, John R.** 8995 Program Committee, 8995 S10 Session Chair, [8995-25] S7
- Lawler, Katherine** [8949-12] S3
- Lawrie, Jenifer L.** [8933-12] S1
- Lawson, Paige WS1059**
- Lawton, Penny F.** [8976-32] S7
- Lazar, Josef** [8941-50] SPMon, [8992-31] SPWed, [8992-32] SPWed
- Lazarev, Alexander** [9009-25] SPWed
- Lazarou, Ioannis** [9009-17] S7, [9009-4] S4
- Lazarow, Frances B.** [8926-145] S7
- Lazerand, Thierry** [8973-9] S3
- Ldentsov, Nikolay** [9003-29] S6
- Le Boudec, Patrice** [8992-25] S6
- Le Bris, Claude** [8967-23] S10
- Le Camus, Arthur** [8959-59] S14
- Le Coarer, Etienne P.** [8992-16] S4
- Le Corre, Gwénaële** [8941-36] S9
- Le Feber, Boris** [8984-51] S14
- Le Garrec, Bruno J.** [8962-17] S5
- Le Goffic, Olivier** [8961-78] SPTue
- Le Gouët, Jean-Louis** [8985-17] S4
- Le Gouët, Julien** [8961-69] SPTue
- Le Rouz, Judikaël** [8994-57] S14
- Le Trequesser, Quentin** [8955-22] S5
- Le, Binh Huy** [8986-41] S8
- Le, Hanh N. D.** [8938-10] S3, [8938-54] SPSun, [8938-8] S2
- Le, Loan T.** [9002-63] S14
- Le, Quang Trung** [9007-16] S6, [9007-17] S6, [9008-2] S2
- Le, Sy Dat** [8980-43] S11
- Le, V. N. Du** [8936-22] S5
- Leach, Jacob H.** [8986-1] S1
- Leaci, Roschiara** [8930-52] SPSun
- Leahy, Conor** [8934-64] S10
- Leahy, Martin J.** [8926-101] SPSun, [8934-104] SPMon, [8934-107] SPMon, [8934-111] SPMon, [8934-34] S5, [8934-90] SPMon, [8935-10] S3, [8941-45] SPMon, 8942 Conference Chair, 8942 S3 Session Chair, 8942 S9 Session Chair, [8942-25] S7, [8942-9] S2, [8943-161] SPMon, [8943-2] S1, [8951-5] S1, [8954-11] S3, [8954-31] SPMon
- Leake, Kaelyn D.** [8988-40] S9
- Leang, Tatiana** [8983-30] S7
- Lear, Kevin L.** 9001 Program Committee
- Leary, James F.** 8947 Conference CoChair, 8947 S5 Session Chair, 8947 S6 Session Chair, [8947-36] S9, [8956-11] S3
- Leavitt, Richard P.** [9002-41] S9
- Lebed, Evgeniy** [8934-91] SPMon
- Leblond, Frédéric** [8926-126] S3, 8928 Program Committee, 8928 S6 Session Chair, [8928-1] S1, [8928-15] S4, [8928-32] SPSat, [8928-8] S3, [8928-9] S3, [8937-7] S2, [8951-20] S5
- Leburton, Jean-Pierre** [8993-81] S16
- Lecaros, Rumwald Leo G.** [8944-4] S1
- Lechuga, Laura Maria** 8933 Program Committee, 8957 Program Committee, 8990 Program Committee
- Lecocq, Vincent** [8966-29] S8
- Lecomte, Michel** [9002-51] S12
- Lecona-Sánchez, Francisco** [9006-46] SPWed
- Ledemi, Yannick** [8982-31] S6, [8994-73] SPWed
- Ledentsov, Nikolay N.** [8965-25] S5, 8980 Program Committee, 8980 S8 Session Chair
- Ledig, Johannes** [8987-63] S12
- Ledjii Bell, Muyinatu A.** [8943-149] SPMon, [8943-216] SPTues, [8943-22] S4, [8943-6] S1
- Ledoux-Rak, Isabelle** 8983 Program Committee, 8983 S2 Session Chair, [8983-1] S1
- Leduc, Mikael** [8927-20] S5, [8982-33] S7, [8992-5] S2, [9009-14] S6
- Ledvina, Mirek** [8997-2] S3, [8997-2] S7
- Lee, A. S. Y.** [8933-16] S5
- Lee, Albert** [8957-11] S3
- Lee, Andrew D.** [9002-30] S7
- Lee, Anthony M.** [8926-16] S4, [8926-8] S2, [8927-34] S9, [8927-35] S9, [8927-51] S12
- Lee, Benjamin L.** 8979 Conference Chair, 8979 S3 Session Chair, 8979 S4 Session Chair
- Lee, Brendan** [8926-139] S24
- Lee, Byeong Ha** [8930-22] S5, [8949-60] SPMon
- Lee, Byeong-Hyeon** [8980-35] S9
- Lee, Byeong-Il** [8938-50] SPSun, [8949-62] SPMon
- Lee, Byoung Ho** 9005 Program Committee
- Lee, ByungKun** [8934-22] S4
- Lee, Changho** [8943-211] SPTues, [8943-69] S10, [8954-33] SPMon
- Lee, Charles Y. C.** 8983 Program Committee
- Lee, Cheolho** [9004-9] S3
- Lee, Chia-Yu** [9003-15] S3
- Lee, Chih-Kung** [8933-16] S5, [8936-5] S1, [8949-59] SPMon, [8951-17] S4, [8973-22] S5, [8976-43] S9, [8976-47] S10, [8982-73] SPWed, [8992-27] S6, [8994-68] SPWed
- Lee, Ching-Ting** [8987-51] S11, [8987-87] SPWed, [9003-18] S4
- Lee, Chung Ghiu** [8985-57] SPWed
- Lee, Chun-Yao** [8981-59] SPWed
- Lee, Da Ae** [8928-80] SPMon
- Lee, Daniel C.** [8990-18] S4, [9010-11] S4, [9010-11] S5
- Lee, Don Haeng** [8941-46] SPMon
- Lee, Dong Ho** [8988-59] SPWed
- Lee, Dukhyung** [8982-25] S5
- Lee, El-Hang** 8989 Conference Chair, 8989 S5 Session Chair, 8989 S7 Session Chair, 8989 S8 Session Chair
- Lee, Eui Su** [8985-7] S2, [8985-8] S2
- Lee, Eun Seong** [8934-120] SPMon
- Lee, Eung Jang** [8996-28] SPWed
- Lee, Eun-Ju** [8928-80] SPMon
- Lee, Geng-Yen** [8986-86] SPWed
- Lee, Hak Kyu** [8982-50] SPWed
- Lee, Hee Yoon** [8934-16] S3
- Lee, Ho Jun** [9004-9] S3
- Lee, Hong-Seok** [8977-20] S5
- Lee, Hong-Shik** [9003-69] SPWed
- Lee, Hsiang-Chieh** [8927-30] S7
- Lee, Hsin-Ying** [8987-87] SPWed, [9003-18] S4
- Lee, Hsuan** [8950-41] SPSun, [8957-30] S7
- Lee, Hwang** 8997 Conference Chair
- Lee, Hyeon Cheor** [8959-68] SPTue
- Lee, Hyunseok** [8997-32] S11
- Lee, Il-Min** [8985-8] S2
- Lee, Jae Hwi** [8949-60] SPMon
- Lee, Jae Yong** [8981-60] SPWed
- Lee, Jae Yong** [8934-120] SPMon
- Lee, Jangwoon** [8927-40] S10
- Lee, Jee Woong** [8952-29] S8
- Lee, Jeongkuk** [8993-65] S13
- Lee, Jeongseop** [8961-83] SPTue
- Lee, Ji Youn** [8936-26] S7
- Lee, Ji-Hoon** [9004-3] S1
- Lee, Jonathan Y.** [8990-48] S9
- Lee, Jong Won** [9003-27] S6
- Lee, Jong-Ho** 8987 S10 Session Chair, [8987-50] S11
- Lee, Jonghwan** [8934-49] S8, [8952-37] S10
- Lee, Jong-Min** [8926-100] SPSun
- Lee, Jong-Moo** [8991-45] SPWed
- Lee, Joonhee** [9002-5] S1
- Lee, Jun** [8934-124] SPMon
- Lee, Jun Ho** [8930-2] S1
- Lee, Jung Hwan** [8959-68] SPTue
- Lee, Junhyung** [8995-24] S6
- Lee, Kee-Keun** 8975 Program Committee, [8975-1] S1
- Lee, Kenneth K. C.** [8968-11] S1, [8972-36] S8, [8972-43] S10, [8972-43] S5
- Lee, Keon Jae** 8993 S17 Session Chair
- Lee, Kieup** [9004-32] SPWed
- Lee, Kijoon** [8928-33] SPSat, [8942-2] S1, [8952-11] S3
- Lee, Kong-Weng** [8965-6] S2
- Lee, Kun Ho** [8938-38] S8
- Lee, Kwang-Sup** 8983 Program Committee, [8983-23] S6
- Lee, Kwan-Yong** [8993-40] S9
- Lee, Kyoung-Don** [8992-14] S3
- Lee, Kyung Min** [9004-4] S1
- Lee, Kyungwoon** [8988-59] SPWed
- Lee, Kyu-Tae** [8981-60] SPWed
- Lee, Ling** [8934-74] S11
- Lee, Luke P.** 8958 Conference Chair, 8958 S1 Session Chair
- Lee, Marissa K.** [8950-29] S7
- Lee, Meng-Jie** [8986-86] SPWed
- Lee, Michele** [8960-14] S4
- Lee, Min Woo** [8926-99] SPSun
- Lee, Ming-Chang M.** [8990-38] S8
- Lee, Min-Jin** [9003-70] SPWed
- Lee, Minjoon L.** 8996 Program Committee, [8997-1] S2, [8997-1] S6
- Lee, Minkyung** [8983-46] SPSun
- Lee, Minwoo** [8927-32] SPSun
- Lee, Myungjae** [8974-7] S2
- Lee, Reginald K.** 8994 Program Committee
- Lee, Robert C.** [8929-13] S3
- Lee, Sang Hyuck** [8930-20] S5
- Lee, Sang-Ho** [9003-56] SPWed
- Lee, Sang-Hun** [8977-9] S3
- Lee, Sang-Joon** [8926-150] SPSat
- Lee, Sang-Won** [8934-120] SPMon
- Lee, Seong Hun** [8930-2] S1
- Lee, Seung Hee** 9004 Program Committee
- Lee, Seung Suk** [8938-44] SPSun
- Lee, Seung Yup** [8935-80] SPSun
- Lee, Seung-Young** [8948-23] S4
- Lee, Shu-Sheng** [8933-16] S5
- Lee, Sin-Doo** 9005 Conference Chair
- Lee, Somin E.** [8955-15] S4

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Lee, Soo Sang [8959-68] SPTue
Lee, Stephanie L. [8926-127] S3, [8926-132] S4, [8926-134] S4
Lee, Stephen T. [8959-37] S9
Lee, Suho [8950-36] SPSun
Lee, Suk-Hee [8967-39] S14
Lee, Sung Nam [8983-55] SPWed
Lee, Sung-Gyu [8974-7] S2
Lee, Sunki [8926-99] SPSun
Lee, Tae-Hoon [8982-38] S8, [8982-41] S8
Lee, Tae-Kyeong [8980-35] S9
Lee, Tim K. [8926-32] S7
Lee, Ting-Yim [8931-36] S7, [8941-44] SPMon
Lee, W. P. Andree [8934-76] S11, [8935-47] S10
Lee, Wangkuen [8961-22] S5
Lee, Woei-Ming [8951-16] S4
Lee, Wonju [8947-52] S12, [8954-13] S3
Lee, Wonsuk [8960-10] S3, [8976-33] S7
Lee, Woo Young [8982-68] SPSun
Lee, Y. [8966-31] SPTue
Lee, Yeon Ui [8983-64] SPWed
Lee, Yong [9010-12] S4, [9010-12] S5
Lee, Yong Tak [8977-9] S3
Lee, Yong-Hee [9002-37] S8
Lee, Yong-Jae [8935-70] SPSun
Lee, Yoonho [8959-68] SPTue
Lee, Young [8966-5] S2
Lee, Young Jong [8948-26] S4, [8948-37] S7
Lee, Young Soo [8985-57] SPWed
Lee, Yu-Chun [9003-58] SPWed
Lee, Yun-Shik 8964 Program Committee, 8964 S2 Session Chair
Leeb, Regina [8926-44] S9
Leedy, Kevin D. [8987-1] S1, [8987-4] S1
Leem, Jung Woo [8981-66] SPWed
Lefauveux, Nicolas A. [8960-62] S16
Lefkir, Yaya [8969-14] S2, [8969-14] S4
Lefrançois, Simon [8948-39] S7
Légaré, François [8948-31] S5, [8972-20] S5
Leger, James R. 8960 Program Committee, 8960 S12 Session Chair, [8960-49] S13, [8961-82] SPTue
Léger, Yoan 8984 S11 Session Chair, [8984-31] S9
Legratiel, Luc [8966-11] S8
Legros, Christophe [8977-22] S5
Legros, Mathieu [8938-5] S1
Lehmann, Andrew [8968-23] S5
Lehmberg, Jens [8943-20] S3
Lehneis, Reinhold [8959-46] S11
Lehr, Jorge [8967-4] S2, [8967-4] S4
Lehrman, Neil [8929-16] S4
Lehtimäki, Hannu [8992-1] S1
Lei, Chun 9001 Conference Chair, 9001 S2 Session Chair
Lei, Fan [8956-18] S4
Lei, Lihua [8988-70] SPWed
Lei, Lin [8993-36] S7
Lei, Ming [8949-63] SPMon, [8949-64] SPMon
Lei, Shuting [8968-16] S4
Lei, Ying [8947-76] SPMon
Leich, Martin [8961-34] S8, [8982-27] S6, [8982-5] S1
Leick, Lasse [8961-112] SPTue
Leif, Robert C. 8947 Conference Chair, 8947 S10 Session Chair, 8947 S7 Session Chair, 8947 S9 Session Chair, [8947-26] S5, 8979 S1 Session Chair
Leigh, Steven Y. [8949-4] S1
Leinonen, Tomi [8961-4] S1, [8966-24] S7, [8966-28] S4
Leira, Cristina [8970-15] S12, [8970-15] S4
Leisching, Patrick [8964-1] S1
Leisher, Paul O. [8965-45] SPTue, [8966-30] S8, SC1091
Leising, Günther [9003-45] S11
Leiss-Holzinger, Elisabeth [8943-148] SPSun
Leitch, Andrew W. R. [9008-24] S10
Leite, Ilaiali S. [8927-48] S12, [8927-49] S12
Leite, Marieli Fernanda Martins [8931-32] S6
Leitenstorfer, Alfred [8964-8] S2, [8984-40] S11
Leitgeb, Rainer A. 8934 Program Committee, 8934 S10 Session Chair, [8934-26] S4, [8934-4] S1
Leitner, Michael [8943-148] SPSun
Lekhal, Kaddour [8986-50] S10
Lelarge, François [8988-25] S6, [8993-9] S1, [9002-11] S3
Lemaître, Aristide [8980-18] S5, [8981-51] S13, [8984-32] S9, [8993-21] S3, [8997-28] S10, [8997-34] S4
Lemberg, Vladimir [8929-10] S3
Lembessis, Alkiviadis [9006-3] S1
Lemij, Hans G. [8930-26] S6, [8934-44] S7
Lemoult, Fabrice [8995-22] S6
Lempe, Benjamin [8935-69] SPSun, [8963-39] SPTue
Lenarz, Thomas [8928-42] S8
Lendl, Bernhard [8993-67] S14
Lendlein, Andreas [8955-19] S4, [8955-65] SPSun
Lendvay, Thomas [8939-29] S5
Lenef, Alan [9003-4] S1
Lenferink, Aurfried T. [8939-15] S3, [8939-2] S1
Leng, Jinyong [8961-124] SPTue
Leng, Yuxin [8962-21] SPTue
Lenssen, Kars-Michiel H. 9005 Program Committee
Lenstra, Daan 8980 S14 Session Chair, [8980-10] S3, [8980-9] S3
Lentijo, Sergio [8933-4] S2
Lentijo-Mozo, Sergio [8955-16] S4
Lentine, Anthony L. [8989-14] S5
Lenz Cesar, Carlos [8947-21] S4, [8948-100] SPSun, [8948-12] S2, [8948-48] S8, [8948-51] S8, [8948-55] S9, [8955-61] SPSun, [8957-32] S7, [8996-26] S7, [8996-32] SPWed
Lenz, Martin O. [8950-25] S6
Lenzetti, Ivo [8930-51] SPSun, [8930-52] SPSun
Leo, François [8993-42] S8
Leo, Giuseppe 8993 Program Committee, 8993 S6 Session Chair, [8993-21] S3, [8993-6] SKey, [8997-34] S4
Leo, Karl [8981-34] S9, 8995 S9 Session Chair, [8995-40] S10
Leonhardt, Darin [8994-45] S11
Leonhäuser, Britta [8965-5] S1
Leoni, Roberto [8984-13] S3, [8993-19] S3, [8993-20] S3
Lepert, Arnaud Y. [8966-26] S8
Lequeux, Nicolas [8947-47] S11, [8955-13] S3
Lerner, Matthias [8993-17] S3, [8993-19] S3
Lermusiaux, Laurent [8957-19] S4
Lerosey, Geoffroy [8995-22] S6
Leroux, Charles-Edouard [8978-9] S3
Leroux, Mathieu [8986-33] S7
Leroux, Thierry [9005-3] S1
Lesage, Frédéric [8928-1] S1, [8934-49] S8
Lester, Luke F. [8981-63] SPWed, [8986-44] S8, 9002 Program Committee, 9002 S1 Session Chair
Lesundak, Adam [8941-50] SPMon
Leszczynski, Mike [8986-60] S11
Letatire, Xavier 8993 S13 Session Chair, [8993-22] S4, [8995-12] S3, [8995-2] S1
Letfullin, Renat R. [8956-12] S3
Lethiec, Clotilde [8993-82] S17, [8996-37] SPWed
Lett, Paul D. [8998-19] S4
Lettieri, Gian-luca [8976-50] SPTue
Leubner, Susanne [8955-20] S5
Leuchs, Gerd [8964-19] S5
Leung, Hui Min [8937-11] S2
Leung, John [8927-2] S1
Leung, Pui Tang [8984-32] S9
Leung, Sarah J. [8956-20] S5
Leung, Terence S. [8943-176] SPMon
Leung, Vanessa Y. [9003-47] S11
Leung, Yu Hang [8987-68] S1, [8987-85] SPWed
Leunig, Andreas [8926-142] S7
Leute, Robert A. R. [8986-73] S15
Leuthold, Juerg [9009-8] S4
LeVan, Paul D. 9000 Program Committee
Levard, Hugo [8981-14] S4
Leveccq, Xavier [8949-14] S3, [8950-44] SPSun, [8960-62] S16
Levesque, Quentin [8982-20] S4
Levi, Nir [8930-37] S8
Levi, Ofer [8952-20] S5, SC1126, SC309
Levin, Zach S. [8981-29] S7
Levine, Emily [8934-73] S11
Levy, Daniel [8963-41] S4, [8963-41] S8
Levy, Moshe [8965-21] S5
Levy, Uriel 8974 Program Committee, 8998 Program Committee, [8998-3] S1, [8998-6] S2
Lewandowski, Przemyslaw [8984-32] S9
Lewin, Alexander [8965-29] S6
Lewin, Peter A. [8935-56] S12
Lewis, Aaron [8939-11] S6, [8988-64] SPWed, [8992-24] S5, [8999-39] S8, [9006-16] S4
Lewis, Ashley [8982-75] SPWed
Lewis, Jay S. [9005-12] S3
Lewis, Liam [8995-21] S6
Lewis, Richard J. [8961-33] S8
Leyder, Stéphanie [8972-44] S10, [8972-44] S5
Leymarie, Joël [8986-8] S2
Lhermite, Jérôme [8961-32] S8, [8961-56] S13
L'Heureux, Guillaume [8980-18] S5
L'Huillier, Anne [8972-21] S6
L'huillier, Johannes A. [8972-55] SPTue
Li, Airon [8934-75] S11, [8953-16] S4
Li, Anan [8928-55] S11, [8928-73] SPMon
Li, Ang [8948-98] SPSun
Li, Bin [8962-22] SPTue
Li, Bing [8928-48] S10
Li, Changhui [8943-204] SPTues
Li, Chao [9009-1] S2
Li, Cheng [8991-19] S5
Li, Chengshuai [8949-49] S10
Li, Chenxi [8952-43] SPSun
Li, Chia-Yeh [8984-38] S10
Li, Chiye [8943-121] SPSun, [8943-205] SPTues, [8943-36] S6, [8943-40] S6, [8943-8] S2, [8950-39] SPSun
Li, Chun [8943-19] S3
Li, Chunqiang [8944-13] S3
Li, Cunbo [8944-20] SPMon
Li, D. [9002-48] S11
Li, Daizong [9001-13] S3
Li, Danfeng [8987-28] S6
Li, Dehui [9000-11] S3
Li, Edward [8934-68] S10
Li, Fangxin [8988-9] S2
Li, Fengqiang [8934-72] S11, [8934-75] S11, [8953-16] S4
Li, Gang [8959-36] S8
Li, Guangbin [8937-19] S4
Li, Guan-Wei [8936-5] S1, [8976-47] S10
Li, Guifang [8985-22] S5, 9007 S2 Session Chair, 9008 S2 Session Chair, 9009 Conference Chair, 9009 S2 Session Chair, 9009 S4 Session Chair, 9010 S2 Session Chair
Li, Guixin [8983-59] SPWed
Li, Guo [8943-16] S3
Li, Guo Jun [8960-54] S14
Li, Guoqing [9004-25] SPWed
Li, Hai [8943-110] SPSun, [8943-150] SPMon
Li, Haijun [8927-31] S1, [8927-31] S8
Li, Han [8974-18] S5, [8993-87] S17, [9003-8] S2
Li, Hanyang [8998-7] S2
Li, Hao [8943-116] SPSun, [8943-130] SPSun, [8943-145] SPSun, [8943-151] SPMon, [8943-152] SPMon
Li, Haosibaoyin [9002-49] S11
Li, Hebin [8984-22] S6
Li, Heng [8948-93] SPSun
Li, Hongxiao [8934-121] SPMon
Li, Huanliu [8960-39] S10
Li, Hui [9001-10] S2, [9001-2] S1
Li, Hui [8926-33] SPSun, [8943-123] SPSun, [8944-22] SPMon, [8944-23] SPMon
Li, Huijun [8975-10] S2
Li, Jianan [8927-42] S10
Li, Jianzhao [8968-1] S1
Li, Jiao [8937-23] SPSun, [8937-36] SPSun
Li, Jiasong [8930-3] S1, [8934-33] S5, [8946-28] S6
Li, Jiawen [8926-125] S3, [8926-79] S16, [8926-83] S17, [8926-79] S12
Li, Jia-Yi [8948-28] S5
Li, Jie [8938-4] S1, [8938-55] S2
Li, Jin [8998-7] S2
Li, Jing [8943-184] SPMon
Li, Jing [8928-74] SPMon
Li, Jing [8939-12] S2
Li, Jinghong [8987-66] S13
Li, Jiun-Yun [9002-58] S13
Li, Jiyou [8940-42] SPTue
Li, Joanne [8942-28] S7
Li, Junjie [8948-23] S4
Li, Junwei [8943-156] SPMon
Li, K. [8991-18] S5
Li, Kai [8928-26] S6, [8932-8] S1
Li, Ke [8955-56] S12
Li, Kefeng [8982-58] SPWed
Li, Kenneth K. [9005-1] S1, [9005-6] S2
Li, Kun [8995-42] S10
Li, Kun [9005-4] S1
Li, Lan [8974-12] S4, [8988-27] S6, [8988-5] S1, [8991-27] S6
Li, Lei [8943-122] SPSun, [8943-212] SPTues
Li, Lei [9008-3] S2
Li, Li [8943-1] S1
Li, Lin 8963 Program Committee
Li, Lu [8933-36] S7
Li, Lu [9009-7] S4
Li, Meng-Lin [8943-138] SPSun, [8943-155] SPMon, [8943-39] S6
Li, Ming [8975-19] S4
Li, Minghua [8935-27] S6
Li, Ming-Jun [8927-25] S6, [8948-13] S2, [8948-17] S3, [8994-64] SPWed
Li, Ming-Jyun [8934-38] S6
Li, Neinyi [9001-12] S3
Li, Pai-Chi 8943 Program Committee, 8943 S3 Session Chair, 8943 S6 Session Chair, [8943-105] S16
Li, Pengcheng 8928 Program Committee, 8928 S10 Session Chair, [8928-48] S10, [8942-21] S5, [8951-4] S1
Li, Qi [8949-43] S9
Li, Qifei [8939-7] S2, [8947-77] SPMon
Li, Qiming [8986-44] S8
Li, Qingbo [8940-11] S3, [8940-42] SPTue
Li, QingQuan [8938-29] S6
Li, Qingyun [8927-26] S6, [8934-36] S6, [8934-84] S12
Li, Rui [8943-80] S12
Li, Rui [8926-87] S17, [8934-31] S5, [8946-26] S6
Li, Rukan [8964-1] S1
Li, Runze [8949-63] SPMon
Li, Runze [8949-64] SPMon
Li, Ruxin [8962-21] SPTue
Li, Shiwei [8928-74] SPMon
Li, Shuai [8950-27] S7
Li, Shulin [8990-49] S9
Li, Shuqin [8935-13] S4
Li, Sinan [8946-13] S4
Li, Steven X. [8959-18] S5
Li, Tianjie [8946-36] SPSun
Li, Ting [9003-13] S3
Li, Ting [8928-26] S6, [8932-8] S1
Li, Tuotuo [8979-17] S7
Li, Wei [8973-13] S3
Li, Wentao [8982-58] SPWed
Li, Xiang [8926-79] S16
Li, Xiangning [8928-76] SPMon
Li, Xiangping [8993-95] SPMon
Li, Xiao feng [8980-80] SPWed
Li, Xiaohang [9002-16] S4
Li, Xiaohui [8980-49] S12
Li, Xiaoqin 8984 S8 Session Chair, [8984-50] S4
Li, Xingde 8927 S3 Session Chair, [8927-25] S6, [8927-38] S10, 8934 Program Committee, [8934-18] S3, [8934-9] S2, [8948-13] S2, [8948-17] S3, [8948-80] SPSun
Li, Xinying [9007-5] S4
Li, Xiuling [8994-8] S2
Li, Xue [8982-83] SPWed
Li, Yahui [8948-93] SPSun
Li, Yan [9005-2] S1
Li, Yang [8956-10] S2

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Li, Yang [8994-47] S12, [8994-76] SPWed
- Li, Yangcheng** [8960-11] S3, [8960-12] S3
- Li, Yanming** [8999-19] S4
- Li, Yanping [8990-50] SPWed
- Li, YanYan** [8962-21] SPTue
- Li, Yao [8927-57] S13
- Li, YaQian [8956-5] S1
- Li, Ye [9007-12] S5
- Li, Yen-Yin [8961-99] SPTue
- Li, Yifan [8937-42] SPSun
- Li, Yingying** [8949-68] SPMon
- Li, Yu [8950-49] SPSun
- Li, Yu [8950-21] S5
- Li, Yuan [8988-70] SPWed
- Li, Yuan** [8961-77] SPTue
- Li, Yufeng [8965-27] S6
- Li, Yuhua [8944-15] S4, [8944-16] S4
- Li, Yuyu [8931-7] S2, [8947-3] S1
- Li, Zheng [8944-30] SPMon
- Li, Zhen-Yu [8986-78] SPWed
- Li, Zhi [9010-11] S4, [9010-11] S5
- Li, Zhifang [8943-123] SPSun, [8944-22] SPMon, [8944-23] SPMon
- Li, Zhi-Li** [8960-19] S5
- Li, Zhong-An [8983-5] S1
- Li, Zhongshan S. [8964-52] SPTue
- Li, Zhongwu [8940-11] S3, [8940-42] SPTue
- Li, Zhuoran [8984-6] S2
- Li, Zidong [8958-8] S2, [8976-9] S2
- Li, Zongxi [8926-2] S1
- Lian, Christine [8948-85] SPSun
- Liang, Baolai L. [8981-24] S6, [8996-22] S6
- Liang, Bo [8931-11] S3
- Liang, Chen [8935-11] S3
- Liang, Chen [8949-2] S1
- Liang, Chia-Pin [8928-58] S12, [8931-12] S3, [8936-22] S5
- Liang, Di [8991-42] S10, [8991-42] S3
- Liang, Fang [8967-4] S2, [8967-4] S4
- Liang, Guozhen [8980-49] S12, [9002-60] S14
- Liang, Hong [9010-11] S4, [9010-11] S5
- Liang, Houkun [9002-60] S14
- Liang, Jinyang [8943-132] SPSun, [8943-36] S6, [8979-7] S5
- Liang, Kaicheng [8927-30] S7
- Liang, Peng [8934-92] SPMon
- Liang, Qi-Yu [8997-24] S9
- Liang, Rongguang** [8935-11] S3, 8936 Conference Chair, 8936 S6 Session Chair, [8936-10] S3, [8936-16] S4, [8936-25] S6, [8936-26] S6, [8936-28] S7, [8936-31] S7, [8936-6] S2, 8945 Program Committee, [8948-68] S11, SC868
- Liang, Rui [9002-38] S9
- Liang, Shanshan [8926-79] S16, [8943-63] S10
- Liang, Song [8988-53] SPWed
- Liang, Song [8990-50] SPWed
- Liang, Wei [8960-32] S9, [8960-35] S9
- Liang, Wenxuan** [8927-25] S6, [8948-13] S2, [8948-17] S3, [8948-80] SPSun
- Liang, Xiaolong [8956-5] S1
- Liang, Xing [8931-17] S4, [8931-35] S7
- Liang, Xing [8931-43] SPMon
- Liang, Yong [9002-34] S8, [9002-54] S12
- Liao, Che-Hao [8986-36] S7, [8986-53] S10, [9003-30] S7
- Liao, Chen-Chin [8934-38] S6
- Liao, ChienSheng** [8948-34] S6
- Liao, Chun Yen** [8995-36] S9
- Liao, Guozhen [8992-9] S2
- Liao, Jiexi [8972-29] S7
- Liao, Meisong [8982-55] SPWed, [8982-56] SPWed, [8982-63] SPWed
- Liao, Ran [8952-46] SPSun
- Liao, Yang [8967-7] S10, [8967-7] S5
- Libberton, Ben [8947-44] S11
- Lieberman, Anatoly A. [8967-47] SPTue
- Libertino, Sebania 8990 Program Committee, [8990-27] S5, [8990-40] S8, [8990-42] S8
- Lichkova, Ninel Vasiljevna [8938-18] S4, [8939-36] S6
- Licht, Abigail S. [8981-64] S13
- Licht, Daniel J. [8942-17] S4
- Lichtenstein, Norbert** [8965-26] S6, [8965-35] S8
- Lichtmanecker, Stefan [8996-4] S1
- Lichy, Allison M. [8938-27] S6
- Lieb, Thomas J.** SC1089
- Liebano, Richard E. [8932-23] S5, [8932-29] S6
- Lieberman, Marya 8976 S2 Session Chair, [8976-15] S4
- Liebl, Sebastian [8965-34] S7
- Liedl, Bernhard [8926-44] S9
- Liem, Andreas [8961-64] S15
- Lien, Chi-Hsiang** [8948-4] S1, [8948-5] S1
- Lien, Ching-Ling [8943-178] SPMon
- Lienau, Christoph 8984 S7 Session Chair, [8984-16] S4, [8984-23] S6, [8984-44] S12
- Liew, Yih Min [8934-45] S7
- Liff, Shawna M. [8991-14] S4
- Ligler, Frances S.** 8933 Program Committee
- Ligtenberg, Hans [8979-23] S2, [8979-23] S8
- Ligthart, Jurgen M. A. [8926-93] S19
- Likar, Bostjan [8936-41] SPSun
- Likhachev, Mikhail E. [8961-29] S7, [8961-32] S8, [8961-41] S10, [8961-56] S13
- Lim, Andy Eu-Jin [8990-1] S1
- Lim, Da-jung [8977-20] S5
- Lim, Daryl [8935-51] S11
- Lim, Eun-Kyung [8956-9] S2
- Lim, Hanwhuy [8983-56] SPWed
- Lim, Hyang-Tag [8997-16] S6
- Lim, Hyun Soo** [8935-57] S12
- Lim, Jaeguyn [8949-8] S2
- Lim, John [8950-52] S8
- Lim, Soon Thor [8980-53] S13, [8990-35] S7
- Lim, Sung Wook [8993-54] S10
- Lim, Yiheng** [8953-13] S3
- Limpert, Jens [8959-46] S11, 8961 Program Committee, [8961-18] S5, [8961-21] S5, [8961-31] S8, [8961-46] S11, [8961-48] S12, [8961-49] S12, [8961-5] S2, [8961-55] S13, [8961-58] S13, [8961-64] S15, [8961-73] SPTue, [8961-79] SPTue, [8961-84] SPTue, [8972-18] S5
- Lin, Ai-Ling [8956-38] SPSun
- Lin, Angie C. [8964-47] SPTue
- Lin, Charles P. 8947 Program Committee
- Lin, Cheng-Ting [8980-75] SPWed
- Lin, Chiang-Hsin [8994-70] SPWed
- Lin, Chien-Chung [8981-3] S1, [9003-15] S3
- Lin, Chih-Ting [8976-47] S10
- Lin, Chun-Han [9003-23] S5, [9003-34] S7
- Lin, Da-Wei [8981-3] S1, [9003-12] S3, [9003-15] S3
- Lin, Eric [8934-74] S11
- Lin, Fangting [8938-21] S4
- Lin, Guan-Bo [9003-16] S3
- Lin, Hao [8983-14] S4
- Lin, Hao Tsun** [8995-36] S9
- Lin, Hongtao [8974-12] S4, [8988-27] S6, [8988-5] S1, [8991-27] S6
- Lin, Hongze** [9003-62] SPWed, [9003-63] SPWed
- Lin, Hung-I [8986-14] S3
- Lin, Jian [8948-29] S5, [8948-95] SPSun
- Lin, Jiandie [8943-50] S8
- Lin, Jintian [8960-45] S11
- Lin, John Yu-luen [8928-84] S16
- Lin, Ke [8975-10] S2, [8975-20] S4
- Lin, Kung-Hsuan [8984-11] S3
- Lin, Lan [8974-54] S9
- Lin, Li-Jung [8950-26] S7
- Lin, Pei-Yi [8936-18] S7
- Lin, Pin-Yi [8955-72] SPSun
- Lin, Po-Han Tom [8951-17] S4
- Lin, Po-Lin [8948-63] S11
- Lin, Qiangli [8996-18] S5
- Lin, Riqiang [8943-7] S2
- Lin, Shawn-Yu** 8994 Conference Chair, 8994 S14 Session Chair, [8994-59] S15
- Lin, Ta [8986-86] SPWed
- Lin, Tzu-Shun [8987-87] SPWed
- Lin, Tzy-Rong [8980-72] SPWed, [8994-70] SPWed
- Lin, Wei-Jen [8938-38] S8
- Lin, Xiao [9006-6] S1
- Lin, Xiao [8940-14] S3
- Lin, Xiaohui [8991-40] S9
- Lin, Xiaona [8944-22] SPMon
- Lin, Xiaoqian [8935-63] SPSun
- Lin, Xin [8970-22] S6, [8970-22] S9
- Lin, Yan-Cheng [8987-12] S2
- Lin, Yen-Yin** [8961-99] SPTue, [8964-63] SPTue
- Lin, Yi-Hsin** 9004 Program Committee
- Lin, Youxi [8993-51] S10
- Lin, Yuankun [8974-31] SPTue, [8974-37] SPTue, [8985-29] S7, [8988-57] SPWed
- Lin, Yu-Cheng** 8976 Program Committee
- Lin, Yu-Ching [8994-15] S4
- Lin, Yuehe 8976 Program Committee
- Linask, Kersti K. 8953 Program Committee, [8953-10] S3
- Lincot, Daniel [8981-33] S8
- Lincot, Daniel 8981 Program Committee
- Lindauer, Ute [8943-20] S3
- Lindblom, Magnus [8992-26] S6
- Lindecrantz, Susan** [8988-43] S9, [8988-66] SPWed
- Lindemann, Markus [9001-15] S4
- Lindemeier, Jennifer [8970-11] S3
- Linden, Eric [8929-16] S4
- Linden, Kurt J.** 8965 Program Committee, 8965 S8 Session Chair, 9003 Program Committee, [9003-43] S11, SC747
- Lindenmann, Nicole [8991-5] S1
- Lindner, Florian [8982-27] S6
- Lindvold, Lars R. [8926-65] S12
- Linfield, Edmund [9002-27] S6
- Ling, Dongxiang [8960-65] SPTue, [8985-33] S7
- Ling, Tao [8943-124] SPSun, [8943-38] S6, [8995-16] S4
- Ling, Yuye** [8951-12] S3
- Linget, Héloïse [8985-17] S4
- Link, Sandro M. [8966-10] S3, [8966-22] S6, [8966-7] S2
- Linkov, Alexander [9003-4] S1
- Linkov, Pavel A. [8955-28] S6, [8981-37] S9
- Lins, Emery C. [8926-34] SPSun, [8929-4] S1, [8937-33] SPSun
- Linz, Norbert [8955-33] S7
- Linz, Whitney W. [8936-4] S1
- Lio, Anton [8943-223] SPTues
- Lipatov, Denis S. [8961-56] S13
- Lipsanen, Harri [8982-23] S5, [8982-30] S6
- Lipson, Michal F.** [8960-8] S2, [8990-100] SPlen
- Lipworth, Guy [8985-59] SPWed
- Lisauskas, Alvydas [8985-58] SPWed
- Lischke, S. [8991-18] S5
- Liscidini, Marco [8993-21] S3
- Lisdat, Fred [8955-58] S12, [8955-64] SPSun
- Lishan, David G.** 8973 Program Committee, 8973 S5 Session Chair
- Lismont, Marjorie [8938-49] SPSun, [8957-25] S5
- Lissotschenko, Vitalij N. [8960-29] S3, [8960-29] S7
- Litorja, Maritoni [8945-1] S1, [8945-15] S4
- Litovsky, Silvio [8926-84] S17
- Litt, Amardeep S. [8959-13] S4, [8959-76] SPTue
- Little, Charles D. 8953 Program Committee
- Littlejohns, Callum** [8989-12] S5
- Littleton, Bradley [8948-101] SPSun
- Litvin, Igor A. [8960-52] S14, [8960-55] S15, [8960-56] S15, [8960-58] S15, [8960-64] S16, [8960-68] SPTue
- Litwinski, Christian [8936-19] S4
- Liu, Ai Qun** [8957-31] S7, [8995-36] S9
- Liu, Aiyun [8938-21] S4
- Liu, Amy W. K.** 8993 Program Committee, [8993-53] S10
- Liu, Arthur C. [8976-49] S10
- Liu, Baochang** [8931-17] S4, [8931-47] SPMon, [8931-48] SPMon, [8931-9] S2
- Liu, Bo [9008-3] S2
- Liu, Bo [8965-13] S3
- Liu, Boang [8935-12] S3
- Liu, C. [8986-7] S2
- Liu, Caihua [8942-38] SPSun
- Liu, Celong [8952-47] SPSun
- Liu, Cheng-Hui [8940-11] S3, [8940-42] SPTue
- Liu, Chih Hao [8942-10] S2
- Liu, Cindy Z.** [8942-27] S7
- Liu, Cong** [8950-46] SPSun
- Liu, Dalin [8995-42] S10
- Liu, David [8973-2] S1
- Liu, Fang Zhou [8987-68] S1
- Liu, Fei [8996-25] S7
- Liu, Feng [8988-42] S9
- Liu, Feng [8993-79] S16
- Liu, Gang Logan [8957-1] S1
- Liu, Gangjun** [8934-98] SPMon
- Liu, George [8935-48] S10, [8935-75] SPSun
- Liu, H. [8994-18] S1, [8994-18] S5
- Liu, Haipeng** [9006-32] S7
- Liu, He [8995-34] S9, [9005-8] S2
- Liu, Hwei [8958-7] S2
- Liu, Hong [9010-1] S1
- Liu, Hong** 8935 Program Committee, 8942 Program Committee, 8944 S4 Session Chair, [8944-15] S4, [8944-16] S4, [8944-17] S4, [8944-24] SPMon, [8944-29] SPMon, [8944-30] SPMon, [8944-6] S2, [8944-7] S2
- Liu, Hsueh-Hsing [8986-86] SPWed
- Liu, Hui [8948-9] S1
- Liu, Hui Chun 9002 Program Committee
- Liu, Hui Chun [9002-20] S5, [9002-21] S5
- Liu, Huiyong [8987-54] S10
- Liu, Huiyong 8996 Program Committee, [9002-30] S7
- Liu, Jialei [8983-63] SPWed
- Liu, Jian [8959-4] S1, 8961 Program Committee, 8961 S12 Session Chair, [8961-19] S5, [8972-16] S4
- Liu, Jianlin** [8987-83] SPWed
- Liu, Jie [8974-33] SPTue
- Liu, Jing [8950-20] S5, [8950-48] SPSun
- Liu, Jing [8960-10] S3, [8976-33] S7
- Liu, Jonathan J.** [8930-32] S7
- Liu, Jonathan T. 8927 S8 Session Chair, [8927-8] S2, [8928-16] S4, [8949-13] S3, [8949-4] S1, [8956-13] S3, 8977 Program Committee, 8977 S1 Session Chair
- Liu, Lan [8964-20] S5
- Liu, Li [8985-41] S9
- Liu, Linbo [8935-44] S9
- Liu, Lingling [8952-42] SPSun, [8952-43] SPSun
- Liu, Liren [8965-42] SPTue
- Liu, Lixin [8948-93] SPSun
- Liu, Mengkun [8987-24] S5
- Liu, Mengyang [8943-142] SPSun
- Liu, Minshi [8963-40] SPTue
- Liu, Na [8994-38] S10
- Liu, Peng** [8935-16] S4, [8937-5] S1
- Liu, Peter Q.** [8985-13] S3
- Liu, Phillip [8948-88] SPSun
- Liu, Q. Y. [8990-32] S6
- Liu, Qiang [8988-12] S3
- Liu, Qing [8990-29] S6
- Liu, Quan** [8926-18] S4, [8935-4] S1, [8935-63] SPSun, [8940-14] S3, [8940-17] S4, [8940-3] S1, [8955-42] S9, [8957-4] S1
- Liu, Quan** [8974-41] SPTue
- Liu, Rong [8939-37] SPSun
- Liu, Rongrong [8944-25] SPMon
- Liu, Rui [8928-48] S10
- Liu, Rui [8958-8] S2
- Liu, Shaoyong [8935-27] S6, [8948-86] SPSun
- Liu, Sheng** [8994-41] S11
- Liu, Shi [8981-45] S12
- Liu, Shun [8948-7] SPTue
- Liu, Sijin** [8955-73] SPSun
- Liu, Susan [8977-36] S2
- Liu, Tan** [8934-28] S4, [8943-78] S12
- Liu, Tao [8980-49] S12
- Liu, Tze-An [8985-20] S5
- Liu, Wenzhong** [8934-41] S7, [8943-169] SPMon, [8943-97] S14
- Liu, Xia [8937-35] SPSun
- Liu, Xiang [8987-68] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Liu, Xiang [8968-3] S1
Liu, Xiaojing [8934-116] SPMon, [8934-28] S4, [8943-78] S12
Liu, Xiaojun [8943-217] SPTues
Liu, Xiaoping [8990-23] S4, [8993-42] S8
Liu, XiaoQi [8998-26] S6
Liu, Xiaoqi [8948-23] S4
Liu, Xin [8954-33] SPMon
Liu, Xinhou [8983-62] SPWed, [8983-63] SPWed
Liu, Xinyu [8935-44] S9
Liu, Xiuli [8951-30] SPMon
Liu, Xu [8950-27] S7, [8950-38] SPSun
Liu, Xuan [9003-62] SPWed
Liu, Xuan [8934-106] SPMon, [8934-17] S3
Liu, Ya-Ging [8947-73] SPMon
Liu, Yan [8943-114] SPSun, [8950-39] SPSun
Liu, Yang [8935-13] S4, [8957-2] S1
Liu, Yang [8945-19] SPSun
Liu, Yang [8987-66] S13
Liu, Yan-Ge [8960-19] S5
Liu, Yanyan [8942-22] S5
Liu, Yifan [9005-15] S4, [9005-2] S1
Liu, Yu [8987-46] S4
Liu, Yuan [8934-65] S10
Liu, Yuan [8943-206] SPTues, [8943-46] S7, [8956-14] S3, [8956-21] S5
Liu, Yuan-Zhi [8934-67] S10
Liu, Yubin [8944-23] SPMon
Liu, Yuh-Shuan [9002-16] S4
Liu, Yulong [8940-11] S3
Liu, Yumin [8975-19] S4, [8980-57] S14
Liu, Yuming [8941-26] S7
Liu, Yung-Tsung [8981-59] SPWed
Liu, Yuxin [8974-43] SPTue
Liu, Z. C. [8980-15] S4
Liu, Zeming [8969-14] S2, [8969-14] S4
Liu, Zhan Hui [8986-53] S10, [9003-23] S5
Liu, Zhengfan [8947-33] S1, [8947-33] S7, [8948-38] S7
Liu, Zhi Hui [8960-54] S14
Liu, Zhongfa [8956-42] SPSun
Liu, Zhongtao [8931-28] S5
Liu, Zhuolin [8930-41] S9, [8930-42] S9
Liverani, Erica [8963-9] S2
Livrozet, Marie J. [8959-17] S5
Livshits, Daniil A. [8964-4] S1
Llyodberg, Inger H. [8938-27] S6
Lloyd, Seth 8997 Program Committee
Lloyd, William R. [8935-80] SPSun
Lluscá, Marta [8968-30] S15, [8968-30] S7
Lo Turco, Sara [8968-19] S4
Lo, Cecilia W. 8953 Conference Chair
Lo, Fu-Jiou Joe [8958-8] S2, [8976-9] S2
Lo, Guo-Qiang [8990-1] S1, [8990-29] S6
Lo, Stanley M. [8990-48] S9
Lo, William [8934-59] S9, [8934-97] SPMon, [8936-36] S8, [8938-23] S5
Lo, Yu-Hwa 8993 S18 Session Chair
Lobo, Charlene J. [8970-21] S5
Lobo, Neysha [9003-29] S6
LoCascio, Dario M.R. [8990-30] S6
Lochner, Zachary [9002-16] S4
Lockau, Daniel [8980-7] S2
Locke, Andrea K. [8951-40] SPMon
Locknar, Sarah A. [8947-20] S4
Loebmann, Korbinian [8948-91] SPSun
Loeschberger, Anna [8948-49] S8
Löffler, Andreas [8986-55] S11
Löffler, Jörg F. [8967-30] S11
Logan, Cooper M. [8929-26] SPSun
Logan, David [8961-37] S9
Logan, S. M. [8990-32] S6
Lohner, Tivadar [8987-13] S2
Lohrenz, Jan [8984-43] S1
Löhring, Jens [8959-17] S5, [8959-20] S5
Lohse, Detlef [8967-32] S12, [8967-32] S4
Loiko, Yuri V. [8960-61] S16
Loiseau, Pascal [8959-57] S13
Loiseau, Sacha 8947 Program Committee
Lollia, Guillaume [8993-27] S5
Lombard, Laurent [8961-51] S12, [8961-6] S2, [8961-69] SPTue
Lombardi, Wellington [8931-32] S6
Lombardo, Michael [8943-119] SPSun, [8943-75] S11
Lombardo, Salvatore A. [8990-27] S5, [8990-40] S8, [8990-42] S8
Lombez, Laurent 8981 S3 Session Chair, [8981-23] S6, [8981-33] S8, [8981-8] S2
Lombosi, Csaba [8964-59] SPTue
Loncar, Marko 8974 Program Committee, [8993-76] S16, 8994 Program Committee, 8994 S7 Session Chair, [8994-22] S2, [8994-22] S6, [8994-47] S12, [8994-76] SPWed, 8997 Program Committee
Long, Feixiao [8937-28] SPSun
Long, Heng [8960-34] S9
Long, James P. [8996-24] S7
Longdell, Jevon J. [8943-47] S7, [8943-53] S8
Loo, Roger [8993-42] S8
Look, David C. [8980-24] S6, 8987 Conference Chair, 8987 S2 Session Chair, [8987-1] S1, [8987-37] S7, [8987-4] S1
Loosen, Peter [8966-15] S5
Looser, Herbert [8993-68] S14
Lopater, Jonathan [8926-61] S12
Lopes, Heno [8926-77] S15
Lopez Royo, Francisco [8991-36] S8
López, I. [8987-16] S3
Lopez, John [8972-50] S13, [8972-50] S8, [8972-57] SPTue
Lopez-Lisbona, Rosa M. [8927-35] S9
López-Luke, Tzarara [8956-25] S6, [8956-32] S8
López-Mercado, Cesar A. [8961-102] SPTue
Lopez-Romero, D. [8996-2] S1
Lopinski, Greg [8990-32] S6
Loranger, Sébastien [8992-4] S1, [9000-17] S4, [9000-25] SPWed
Lorbeer, Raoul-Amadeus [8949-6] S2
Lorenser, Dirk [8934-6] S1, [8934-83] S12, [8935-49] S10, [8935-60] S12
Lorentzen, Justin R. [8981-27] S7
Lorenz, Gunar [8977-36] S2
Lorenz, Katharina 8987 Program Committee, [8987-16] S3, [8987-39] S8, [8987-73] SPWed
Lorenz, Pierre [8967-9] S10, [8967-9] S5, [8968-37] SPTue
Lorenzo, Corinne [8941-36] S9
Loriette, Vincent [8947-47] S11
Lorin de la Grandmaison, Emmanuel [8967-23] S10
Lorke, Michael [8987-20] S4
Losilla, Nuria S. [8991-36] S8
Lotfabad, Shahin S. [8928-41] S8, [8928-77] SPMon
Lotfi, Hossein [8993-36] S7
Lothet, Emilie H. [8928-35] S7
Lotshaw, William [8965-3] S1, [8981-43] S11, [8986-49] S9
Lott, James A. 9001 Program Committee, [9001-10] S2, [9001-2] S1
Lou, Jun [8984-2] S1
Lou, Xiutao [9003-63] SPWed
Lou, Yang [8943-112] SPSun, [8943-141] SPSun
Loubychev, Dmitri [8993-53] S10
Louchet, Hadrien [9009-6] S4
Louchet-Chauvet, Anne [8985-17] S4
Louchev, Oleg A. [8964-34] S8
Lourdudoss, Sebastian [8989-3] S1
Love, Gordon D. [8978-8] S3
Love, Steven P. [9000-3] S1
Lovell, Jonathan [8943-71] S11
Low, Tony 8994 S8 Session Chair, [8994-25] S7
Lowder, Tyson L. [8961-37] S9
Loza-Alvarez, Pablo [8978-10] S4
Lozes-Dupuy, Françoise [8988-51] S11, [8993-8] S1
Lu, Chen D. [8930-32] S7, [8934-22] S4
Lu, Chien-Yao [8980-13] S4, [9001-13] S3
Lu, Chunte Andy [8966-32] SPTue
Lu, Cuixia [8944-32] SPMon
Lu, Dan [8965-48] SPTue
Lu, Fan [8995-42] S10
Lu, Fanglu [8995-35] S9, [8995-37] S9
Lu, Haifei [8957-17] S4
Lu, Haipeng [8988-27] S6
Lu, Hong [8926-91] S18
Lu, Huihui [8992-9] S2
Lu, Ja-Yu [8985-20] S5, [8985-27] S6
Lu, Jing [8939-12] S2, [8951-13] S3
Lu, Jinling [8928-48] S10
Lu, Junsheng [8942-37] SPSun, [8942-7] SPSun
Lu, Kenny [8951-12] S3
Lu, Na [8987-58] S7
Lu, Pengfei [8975-19] S4
Lu, Rongwen [8930-6] S1, [8950-34] SPSun
Lu, Tien-Chang 8995 Program Committee, 8995 S3 Session Chair, [8995-13] S4, [9001-19] S4
Lu, Wei [8961-10] S3, [8961-11] S3
Lu, Weina [8927-10] S3, [8927-11] S3, [8934-8] S2
Lu, Xiaoming [8962-21] SPTue
Lu, Xuejun [8993-38] S7
Lu, Yan-Qing 9004 Program Committee
Lu, Yiqing [8947-26] S5
Lu, Yongfeng Symposium Chair, [8954-1] S1, 8967 Program Committee, 8967 S9 Session Chair, 8968 Program Committee, 8968 S6 Session Chair, [8968-38] SPTue, [8969-8] S2
Lu, Yuan [8948-86] SPSun
Lu, Yuhua [8951-33] SPMon
Lu, Zenghai [8934-61] S9
Lu, Zhaolin [8980-20] S5, [8980-37] S9, [8980-48] S12, [9010-14] S5, [9010-14] S6
Lu, Zhenghong [8983-12] S3
Luan, Chunyan [8987-62] S12
Luan, Feng [8960-36] S9
Lubatschowski, Holger [8941-13] S4, [8941-14] S4
Lubicz, Stephane [8926-110] S22, [8926-116] S24
Luby-PHELPS, Katherine [8948-13] S2, [8948-17] S3
Lucas, Jacques [8938-3] S1, 8982 Program Committee
Lucas, Pierre 8938 Program Committee, 8938 S2 Session Chair
Lucas, Seth [8929-12] S3
Lucas-Leclin, Gaëlle [8966-19] S6
Lucchetta, Daniele Eugenio [8968-19] S4
Luce, Jacque [8962-19] SPTue
Lucero, Adrian [8964-15] S4
Lucianetti, Antonio [8960-31] S4, [8960-31] S8, [8965-7] SPTue
Lücke, Andreas [8984-32] S9
Lucznik, Boleslaw [8986-3] S1
Ludewig, Peter [9002-6] S2
Ludewig, Thomas [8977-21] S5
Ludovico, Antonio D. [8963-36] S6, [8963-36] S9, [8963-5] S1
Lue, Niyom [8947-12] S3, [8952-39] S10
Luecke, Michael [8963-20] S5
Luff, B. Jonathan [8990-18] S4, [9010-11] S4, [9010-11] S5
Lugará, Pietro Mario [8968-6] S2
Lugauer, Hans-Jürgen [8986-26] S5
Lui, Harvey [8926-16] S4, [8926-19] S4, [8926-8] S2, [8939-3] S1, [8939-33] S6
Lui, Hsien Fei Hardy [8987-85] SPWed
Luiza da Rosa, Andreia 8987 Program Committee, [8987-20] S4
Luk, Alex T. [8937-15] S3
Luk, Ming Ho [8984-32] S9
Luk, Ting-Shan [8986-44] S8, [8994-41] S11
Luke, Geoffrey P. [8943-70] S11
Lükens, Gerrit [9002-19] S4
Lükermann, Florian [8984-24] S7
Lukes, Sarah J. [8949-32] S7
Lukianova-Hleb, Ekaterina Y. [8926-136] S5, [8935-7] S3, [8972-11] S2
Lukin, Mikhail D. [8997-24] S9
Lukowski, Ariel [8982-47] S9
Lukyanov, Konstantin A. [8950-37] SPSun
Lukyanov, Sergey Anatolyevich [8950-37] SPSun
Lum, Daniel [8997-19] S7
Lumb, Matthew P. [8981-15] S4, [8981-2] S1, [8981-27] S7, [8981-38] S10, [8981-40] S11
Lumeau, Julien [8963-16] S4, [8963-16] S8
Lundin, Wsevolod V. [8986-79] SPWed
Lunelli, Lorenzo [8982-12] S3
Lunnemann Hansen, Per [8998-45] S10
Luo, Bin [9008-9] S7
Luo, Jingdong [8983-43] S10, [8983-5] S1
Luo, Ming [9009-1] S2
Luo, Qingming 8928 Conference Chair, 8928 S11 Session Chair, [8928-53] S11, [8928-55] S11, [8928-56] S11, [8928-60] S12, [8928-64] S13, [8928-68] S14, [8928-73] SPMon, [8928-74] SPMon, [8928-76] SPMon, 8942 Program Committee, [8942-21] S5, [8942-22] S5, [8944-11] S3, [8944-27] SPMon
Luo, Wei [8936-32] S7, [8974-9] S3
Luo, Xisheng [8937-19] S4, [8956-10] S2, [8956-18] S4
Luo, Yu [8994-37] S10
Luo, Yunhan [8992-9] S2
Luo, ZhenYue [9005-15] S4
Lupan, Oleg [8987-48] S11, [8987-57] S10
Luquet, Serge [8928-87] S16
Lurie, Kristen L. [8926-42] S12, [8936-7] S2, [8945-13] S4
Lusk, Mark T. [8981-6] S2
Luster, Andrew D. [8927-36] S9
Luszczynska, Beata [8983-10] S3
Lutkenhaus, Jeffrey R. [8974-31] SPTue, [8974-37] SPTue
Lütkenhaus, Norbert [8999-53] SPWed
Lüttmann, Jörg [8959-20] S5
Lützen, Arne [8983-22] S5
Lützwow, Peter [8933-6] S2
Lutzweiler, Christian [8943-139] SPSun
Luu, Trang Trung [8982-72] SPWed
Lux, Kirsten [8936-14] S3
Lux, Oliver [8959-7] S3
Lv, Xiaohua [8928-55] S11, [8928-73] SPMon, [8949-57] SPMon
Lv, Xiao-Meng [8960-34] S9
L'vovna Zerova, Vera [8986-79] SPWed
Ly, Sonny [8950-10] S2
Lynch, Jennifer M. [8942-17] S4
Lynch, Stephen [9002-8] S2
Lyngso, Jens K. [8961-3] S1
Lynn, Brittany [8979-6] S5, [8991-26] S6
Lyon, Alexander R. [8926-71] S14, [8935-2] S1
Lyytikäinen, Jari [8966-14] S4

M

- M. G., Murali [8987-90] SPWed
M., Balu David [8939-20] S4
Ma, Dinglong M. [8926-85] S17, [8926-86] S17
Ma, Gang [8926-23] S5
Ma, Huan [8927-12] S3, [8927-14] S3
Ma, Hui [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
Ma, Jie [8948-85] SPSun
Ma, Jonathan [8952-22] S6
Ma, Liheng [8984-56] SPWed
Ma, Lijun [8943-41] S6
Ma, Lijun [8943-52] S8
Ma, Ming [9003-31] S7, [9003-49] SPWed
Ma, Pei [8934-77] S12, [8953-10] S3, [8953-7] S2, [8953-8] S2
Ma, Rubin [8990-32] S6
Ma, Siyu [8942-29] S7, [8948-105] SPSun
Ma, Teng [8926-79] S16, [8926-83] S17, [8926-87] S17, [8934-31] S5, [8934-79] S12, [8943-122] SPSun, [8943-63] S10, [8946-26] S6
Ma, Xibo [8935-66] SPSun
Ma, Yangjin [8990-1] S1
Ma, Yinfa [8950-35] SPSun
Ma, Yutao [8934-15] S3
Ma, Zhenhe [8953-18] S4
Ma, Zhenqiang [8995-15] S4
Maassdorf, Andre [8965-17] S4
Mabuchi, Hideo 8997 Program Committee
Macaluso, Claudio [8930-52] SPSun
MacAulay, Calum [8927-34] S9, [8927-51] S12, [8935-19] S4, [8935-36] S8, [8945-6] S2, [8952-31] S8

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Macchi, Carlos E. [8982-12] S3
 MacCraith, Brian D. 8954 Program
 Committee
- Macdonald, Callum** [8940-6] S1,
 [8952-9] S3
- Macdonald, Rainer** [8945-18] S5
 MacDougall, Sean K. W. [8981-10] S3,
 [9000-7] S2
- Mace, Charles R. [8933-3] S1
 Macfaden, Alexander [8993-49] S9
 Machado, Pedro [8961-77] SPTue
 Machi, Junji [8940-25] S5
 Machida, Naoki [8926-74] S15, [8941-21]
 S5
- Machnev, Andrey A. [8959-10] S3,
 [8994-74] SPWed
- Maciel, Carlos Dias [8937-33] SPSun
 Mack, Brigitte [8926-149] SPSun
- Mackay, Tom G.** [8981-39] S10
- Mackenzie, Jacob I. 8959 Program
 Committee, 8959 S10 Session Chair,
 8959 S11 Session Chair, [8959-55]
 S13, [8988-8] S2
- Mackenzie, Ken [8973-9] S3
 MacKenzie, Roger [8990-32] S6
 Mackie, Thomas R. [8949-10] S3,
 [8949-44] S9, [8964-15] S4
- MacKinnon, Nicholas B. [8947-17] S4,
 [8947-18] S4
- Mackowski, Sebastian [8955-26] S6,
 [8955-5] S2, [8957-22] S5, [8957-23]
 S5
- Maclean, Jessica O.** [8988-4] S1
- Macleod, H. Angus** SC321
- Macnab, Andrew John [8926-45] S9
 Maco, Bohumil [8928-57] S12
- Madabhushi, Rangaraj 9007 Program
 Committee
- Madamopoulos, Nicholas 9007
 Program Committee
- Madden, Timothy 8962 Program
 Committee, [8964-67] SPTue
- Maddera, Lucinda E. [8950-5] S2
 Madéo, Julien [8984-41] S11
- Madonna, Megan C. [8934-70] S11
- Madore, Wendy-Julie [8926-126] S3,
 [8927-20] S5, [8928-15] S4, [8934-
 83] S12, [8937-7] S2, [8938-22] S4,
 [8982-33] S7, [8992-5] S2, [9009-14]
 S6
- Madsen, Steen J.** 8928 Conference
 Chair, 8928 S1 Session Chair, 8928
 S2 Session Chair, [8928-10] S3,
 [8928-11] S3, [8928-30] SPSat
- Maduray, Kaminee [8931-5] S1
 Maeda, Narihiko 8986 Program
 Committee
- Maeda, Yasuhiro [8938-39] S8, [8951-
 24] S5
- Maeder, Xavier [8975-8] S2
- Maehara, Seiji [8943-117] SPSun
 Maekawa, Hikaru [9004-19] SPWed
 Maemoto, Toshihiko [8987-45] S9
- Maese-Novio, Alejandro [8995-30] S8
 Mafi, Arash [8964-57] SPTue, [8992-18]
 S4, [8994-72] SPWed
- Mafu, Mhlambululi [8999-53] SPWed
- Mañaña, Isidro B.** [8951-27] S6, [8955-
 27] S6
- Magata, Yasuhiro [8931-38] S8
 Magliocco, Richard J. [8971-36] S4,
 [8971-37] S4, [8971-38] S5, [8971-39]
 S5
- Magnan, François [8957-21] S5
 Magno, Giovanni [8988-51] S11
 Magnum, Benjamin [8981-17] S4
- Magnusson, Robert** [8988-17] S4
- Magri, Renan [8930-49] SPSun
- Maguen, Ezra 8930 Program
 Committee, 8930 S3 Session Chair,
 8930 S6 Session Chair
- Mah, Misoon Y.** 8983 Program
 Committee
- Mahadevan-Jansen, Anita** 8928
 Program Committee, 8928 S10
 Session Chair, 8934 Track Chair,
 8935 Conference Chair, 8935 S5
 Session Chair, 8935 S6 Session
 Chair, 8935 Track Chair, [8935-22]
 S5, [8935-25] S5, [8935-33] S7, 8936
 Track Chair, [8936-24] S6, 8937
 Track Chair, 8938 Track Chair, 8939
- Conference Chair, 8939 S1 Session
 Chair, 8939 Track Chair, [8939-27]
 S5, 8940 Track Chair, 8972 Track
 Chair, 8976 Track Chair
- Mahajan, Sumeet [8957-3] S1
 Mahato, Krishna Kishore [8926-5] S1,
 [8929-2] S1, [8932-11] S2, [8932-28]
 S6, [8935-72] SPSun, [8943-143]
 SPMon
- Mahe, Agnes [8961-76] SPTue
 Mahendroo, Mala [8948-13] S2, [8948-
 17] S3
- Maher, Mary Ann 8973 Conference
 Chair, 8973 S1 Session Chair, 8973
 S3 Session Chair
- Maher, Michael C. [8970-1] S1
 Maheshwari, Amita [8940-13] S3
 Mahimkar, Manoj [8926-147] S7
- Mahjoubfar, Ata** [8972-15] S4
- Mahjouri-Samani, Masoud [8969-3] S1,
 [8969-5] S1
- Mahlanga, Thandeka [8999-43] S9
 Mahlke, Megan [8941-60] S12
 Mahmassani, Ziad [8926-25] S6, [8948-
 96] SPSun
- Mahon, Sari [8927-40] S10
 Mahrt, Rainer F. 8995 Program
 Committee, [8996-20] S6
 Mai, Katherine [8953-10] S3
 Mai, Zhiming [8931-13] S3, [8956-3] S1
 Maia, Decio [9008-5] S4, [9008-5] S5
 Mailis, Sakellaris [8964-61] SPTue,
 [8990-7] S2
- Maillard, Vincent [8950-12] S3, [8957-19]
 S4
- Mailart, Emmanuel [8957-16] S4
 Maio, Vincenza [8939-30] S6
 Maisonneuve, Mathieu [8957-33] S7
 Maisons, Grégory [8993-43] S8, [9002-
 59] S13
- Maissen, Curdin** [8984-13] S3, [8985-
 13] S3
- Maitland, Duncan J. 8941 Program
 Committee
- Maitland, Kristen C.** [8935-12]
 S3, [8935-26] S6, 8951 Program
 Committee, 8951 S4 Session Chair
- Maitre, Agnès** [8993-82] S17, [8996-
 37] SPWed
- Maitry, Sandipan [8977-36] S2
 Maiwald, Martin [8935-21] S5, [9002-7]
 S2
- Majaron, Boris** [8926-29] S7, [8941-37]
 SPMon
- Majdani, Omid [8926-138] S6
 Maji, Dolonchampa [8956-43] S4
 Majid, Imtiaz [8961-101] SPTue, [8961-7]
 S2, [8961-91] SPTue
- Majid, Mohammed Abdul [8986-15] S3,
 [9002-1] S1
- Majkic, Aleksej [8964-53] SPTue
- Major, Arkady** [8940-10] S2, [8948-74]
 SPSun, [8948-82] SPSun, [8959-42]
 S10, [8959-50] S12, [8960-47] S12,
 [8972-23] S6
- Major, Kevin J. [8968-35] SPTue, [8982-
 35] S7
- Makara, Mariusz [8982-44] S9
 Makarona, Eleni [8976-35] S7
- Makarov, Nikolay S.** [8996-18] S5
 Makarowa, Irina [8986-56] S11
- Maker, Ashley J.** [8960-28] S6, [8982-
 2] S1
- Makihira, Tomoyuki [8930-8] S2
 Makimoto, Toshiki [8986-12] S3
 Makino, Kenji [8983-17] S4
 Makino, Takayuki [8987-26] S5
 Makio, Satoshi [8964-35] S8
- Makita, Shuichi** [8930-31] S7, [8934-
 109] SPMon, [8934-30] S5, [8934-60]
 S9
- Mäkynen, Jussi [8977-27] S6, [8992-10]
 S3
- Malak, Maurine** [8977-25] S6
 Malan, S. [9008-24] S10
 Malandrini, Alex [8930-52] SPSun
 Malchus, Joerg [8965-10] S3
 Maldiney, Thomas [8982-40] S8, [8987-
 93] SPWed
- Maldonado-Basilio, Ramon [9007-8] S4
 Maleki, Lute [8960-2] S1, [8960-32]
 S9, [8960-35] S9, [8960-38] S10,
 [8989-10] S4
- Malekizandi, Mohammadreza** [9007-
 16] S6, [9007-17] S6
- Malic, Ermin 8984 S6 Session Chair,
 [8984-20] S5
- Malik, Aditya [8993-42] S8
 Malik, Bilal H. [8935-12] S3, [8935-26]
 S6
- Malik, Omer [8989-2] S1
 Malikov, Alexandr G. [8963-34] S8
 Malinauskas, Mangirdas [8970-9] S2,
 [8972-60] SPTue, [8972-61] SPTue
 Malindretos, Joerg [8986-21] S4
 Malinow, Roberto [8928-84] S16
 Malis, Oana 9002 S9 Session Chair,
 [9002-48] S11
- Maliszewski, Krzysztof A.** [8934-95]
 SPMon
- Maliwa, Badri P. [8950-51] SPSun
 Malka, Victor [8954-9] S3
 Malko, Anton V. [8981-17] S4, [8981-36]
 S9
- Malikov, Serghei [8937-38] SPSun
 Mallas, Christian [8977-5] S2, [8977-8]
 S2
- Mallidi, Srivalleesha [8931-15] S3,
 [8931-53] SPMon, [8931-54] SPMon,
 [8943-60] S9
- Mallipeddi, Raj [8935-42] S9
 Malloy, Kevin [8966-3] S1
 Malm, Erik [8949-20] S4
 Malmqvist, Lars [8930-56] S4
 Malpuech, Guillaume [8997-28] S10
- Malsan, Jonathan R.** [8936-40] SPSun
 Malureanu, Radu [8989-28] S8
 Malvache, Arnaud [8978-11] S4
 Malyarchuk, Viktor [8958-9] S2
- Malyutenko, Volodymyr K.** [9000-24]
 SPWed, [9003-67] SPWed
- Mamgain, Hitesh [8940-12] S3
 Mamin, H. Jonathon [8997-3] S3,
 [8997-3] S7
- Mammo, Eliyas D. [8981-10] S3, [9000-
 7] S2
- Mamou, Jonathan [8940-25] S5, [8943-
 89] S13
- Mamuschkhin, Viktor [8968-40] SPTue
 Manabe, Hitoshi [8986-30] S6
 Managó, Stefano [8938-42] S8
 Managó, Stefano [8957-8] S2
 Mancini, Roberto [8955-9] S2
 [8997-3] S7
- Mandel, Isroel** [8994-54] S13
- Mandelis, Andreas** 8926 Conference
 Chair, 8926 S21 Session Chair, 8926
 S23 Session Chair, 8926 S24 Session
 Chair, [8926-108] S22, [8926-113]
 S23, 8943 Program Committee, 8943
 S15 Session Chair, [8943-62] S9,
 [8943-96] S14
- Mandl, Martin [9003-17] S4
 Mandriou, Mihaela [8983-49] S11
 Manek-Hönninger, Inka B. [8959-59]
 S14, [8959-60] S14, [8974-4] S1
- Manfra, M. J. [9002-48] S11
 Mangang, Melanie [8968-22] S5, [8968-
 5] S1
- Mangeney, Juliette [8993-48] S9
 Mangeret, Norman [8935-14] S4
- Mangold, Mario** [8966-10] S3, [8966-
 17] S5, [8966-22] S6, [8966-31]
 SPTue, [8966-5] S2, [8966-7] S2
- Mangold, Markus [8993-68] S14
 Maniangan, Antonia [8935-73] SPSun
 Maniotis, Pavlos [8991-33] S8
 Mann, Stefan [8970-23] S6, [8970-23]
 S9
- Mann, Stephen [8947-48] S11
 Manna, Liberato [8955-43] S9
 Manner, Jörg [8953-4] S1
- Mannila, Rami** [8977-27] S6, [8977-30]
 S7, [8992-10] S3
- Manning, Hugh B. [8935-2] S1, [8940-
 16] S4
- Manns, Fabrice** 8930 Conference
 Chair, 8930 SAwd Session Chair,
 8930 SPSun Session Chair, [8930-24]
 S6, [8930-29] S7, [8934-33] S5
 Manoharan, Yuvaraj [8940-2] S1
 Manquest, Christophe [8997-34] S4
 Mans, Torsten G. [8959-43] S10
 Månson, Jan-Anders E. [8952-5] S2
 Mansour, Carine [8987-80] SPWed
 Mansour, Kamjou [8960-33] S9
 Manstein, Dieter [8926-9] S2
- Mansuripur, Tobias S. [9002-22] S5,
 [9002-43] S10
- Martineo, Matias E. [8932-21] S4
 Manz, Christian [8966-27] S8
 Manzani, Danilo [8973-5] S1
 Manzella, Christon [8963-30] S7
- Manzo, Anthony J.** [8967-22] S10,
 [8969-7] S2
- Manzoor, Saima [8975-19] S4
Manzur, Tariq 8987 Program
 Committee, 8993 Program
 Committee
- Mao, Qingkai [8985-31] S7
 Mao, Sien [8947-13] S3
 Mao, Wenbin [8976-10] S3
 Mao, Yamin [8935-31] S7
- Maragaki, Stella** [8972-39] S9
 Maragó, Onofrio Maria [8999-7] S2
 Marandi, Alireza [8964-30] S7
 Marangos, Jonathan P. [8984-46] S12
 Marc, Pawel [8961-117] SPTue, [8961-
 118] SPTue, [8961-126] SPTue, [8982-
 44] S9, [8982-47] S9, [9009-12] S6
- Marcandella, Claude [8971-13] S2
- Marcateanu, Corina** [8934-115]
 SPMon
- Marcet, Stephane [8947-19] S4
 Marchant, Steve [8965-26] S6
 Marchena, Elton [8991-21] S5
 Marchese, Linda [8985-35] S8
 Marchesini, Gerardo [8954-5] S2
 Marchev, Georgi [8964-41] S9
 Marconi, Mario C. [8933-23] S6, [8949-
 20] S4, [8954-4] S1, [8973-13] S3
- Marcoux, Pierre Robert [8939-4] S1
- Marcu, Laura** 8926 Conference Chair,
 8926 S14 Session Chair, [8926-85]
 S17, [8926-86] S17, [8928-14] S4,
 8935 Program Committee
- Marcus, Edward [8929-16] S4
- Marder, Seth R.** 8983 Program
 Committee, [8983-3] S1
- Mareczko, Alizée Anny [8964-59]
 SPTue, [8972-26] S6
- Marega, Euclydes [8994-73] SPWed
 Margalit, Niv [8991-10] S3
 Margenthaler, Julie A. [8943-188]
 SPTues
- Mari, Jean Martial [8938-2] S1, [8943-
 21] S4, [8943-24] S4, [8943-25] S4
- Maria, Michaël [9002-51] S12
 Mariampillai, Adrian [8946-35] SPSun,
 [8952-19] S5, [8972-36] S8
- Mariani, Giacomo** [8981-50] S1
 Mariani, Pascale [8943-23] S4
 Mariazzi, Sebastiano [8982-12] S3
 Mariette, Henri [8981-7] S2
 Mariaggio, Stefania [8957-8] S2
 Marinova, K. [8926-141] S6
 Marjanovic, Marina [8926-25] S6, [8935-
 48] S10, [8935-75] SPSun, [8942-28]
 S7, [8948-96] SPSun
- Märk, Julia [8943-109] S16, [8943-140]
 SPSun
- Markauskas, Edgaras [8967-44] S15,
 [8967-44] S7
- Markey, Mia K.** [8952-10] S3, [8952-40]
 S10
- Markhvida, Igor [8926-32] S7
 Marko, Igor P. [9002-6] S2
 Markos, Christos [8982-15] S3, [8983-
 18] S4
- Markov, Vladimir B.** [8979-5] S4
 Markovic, Bojan [8993-93] S18
 Markovic, Stacey [8937-18] S4
 Marks, Brian S. [8971-2] S1
 Markwald, Roger R. [8942-29] S7
 Marom, Anat [8928-37] S7, [8928-44] S9
 Marom, Dan [9009-16] S7
 Marona, Lucija [8986-25] S5, [8986-56]
 S11, [9002-18] S4
- Marques, Aparecida Maria C. [8932-20]
 S4, [8932-38] SPSun
- Marques, Manuel J. M.** [8934-112]
 SPMon
- Marques-Hueso, Jose [8981-10] S3,
 [9000-7] S2
- Marquestaut, Nicolas [8969-12] S1,
 [8969-12] S3, [8974-3] S1, [8974-4] S1
 Marris-Morini, Delphine [8988-23] S5,
 [8990-17] S3, [8990-36] S7
 Marrone, Babetta L. [8976-23] S5
 Marrucci, Lorenzo [8999-12] S3, [8999-
 16] S4, [8999-24] S5

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Mars, Jérôme [8935-34] S7
Marsault, Felix [8997-28] S10
Marschall, Sebastian [8930-25] S6
Marsh, John H. [8988-52] S11
Marsh, Richard John [8950-23] S6
Mart, Cody [8960-66] SPTue
Martelli, Fabrizio [8945-18] S5
Marti Vega, Antonio 8981 Program Committee
Martin, Aiden [8970-21] S5
Martin, Airton Abrahão 8939 Program Committee, [8939-41] SPSun
Martin, Bruno [8992-16] S4
Martin, Claire [8928-87] S16
Martin, Haydn [8988-22] S5
Martin, Inocencio J. [8999-6] S2
Martin, Justin [8926-41] S8
Martin, Kathleen E. [8983-50] S11
Martin, Leopoldo L. [8999-6] S8
Martin, Matthieu [8985-1] S1, [8985-10] S3, [8993-71] S14
Martin, Michael J. [9000-14] S3
Martin, Olivier J. F. [8954-2] S1
Martin, Richard D. [8985-40] S8
Martinache, Frantz [8978-7] S2
Martinielli, L. [9003-35] S12, [9003-35] S8
Martinielli, Lucio [8986-69] S15
Martineghi, Romain [8989-19] S6
Martinez Rodriguez, Luis Javier [8998-8] S2
Martinez Vazquez, Rebeca [8976-21] S5
Martinez, Aaron D. [8981-6] S2
Martinez, Alan D. [8959-63] S14
Martinez, Andrea [8956-25] S6
Martinez, Anthony [8993-9] S1
Martinez, Cindy R. [8935-53] S11
Martinez, Jennifer S. [8950-2] S1
Martinez, Julio [8983-50] S11
Martinez, Linnell [8973-9] S3
Martinez, Miguel [8955-29] S7
Martinez, Ramses V. [8927-21] S5
Martinez, Rebecca J. [8993-55] S10
Martinez, Ty [8978-4] S1
Martinez-Corral, Manuel [8949-39] S8, [8949-40] S8
Martinez-Jimenez, Gregorio [8990-7] S2
Martinez-Niconoff, Gabriel [8942-5] S1
Martinez-Pastor, Juan P. [8933-17] S5
Martini Jørgensen, Thomas [8953-4] S1
Martini, Rainer [9002-64] S14
Martins da Costa, Mardoqueu [8926-34] SPSun, [8937-33] SPSun
Martins, Daniel [8949-12] S3
Martins, Emiliano R. [8995-21] S6
Martins, Franck [8926-24] S6
Martins, Indayara Bertoldi [9007-9] S4, [9010-8] S4
Martinsen, Rob 8965 Program Committee, 8965 S5 Session Chair, 8965 S6 Session Chair, [8965-37] S8, [8965-46] S2
Martins-Santana, Alexandre [8962-16] S5
Marti-Sendra, Javier [8991-36] S8
Marturano, Joseph [8948-11] S2
Marty, Eric [8928-87] S16
Marty, Maud [8928-87] S16
Martyukien, Tadeusz [8964-23] S6, [8964-31] S7
Martynov, Igor L. [8981-37] S9
Martynshkin, Dmitry V. [8959-15] S4, [8959-62] S14, [8959-63] S14
Maruo, Shoji [8970-14] S3
Maruta, Akihiro [9009-19] S7
Maruyama, Go [8992-30] SPWed
Maruyama, Ryo [9009-10] S5, [9009-19] S7
Marvdashti, Tahereh [8934-16] S3
Marvinney, Claire [8969-21] S4, [8969-21] S6
Marzenell, Stefan [8959-22] S6
Masamoto, Kazuto [8928-67] S14
Maschke, Ronny [8935-69] SPSun
Mashanovich, Goran Z. [8989-12] S5, 8990 Program Committee, [8990-13] S3, [8990-7] S2, [8991-18] S5, [8993-42] S8
Mashimo, Hiroshi 8927 Program Committee, [8927-30] S7
Masilamani, Vadivel [8940-19] S4, [8940-31] S6
Masili, Mauro [8930-47] SPSun
Masina, Bathusile N. [8996-39] SPWed
Maslennikova, Anna V. [8948-8] S1, [8952-27] S7, [8956-36] S9
Maslov, Alexey V. [8960-11] S3, [8960-12] S3, [8961-53] S12
Maslov, Konstantin I. [8943-132] SPSun, [8943-153] SPMon, [8943-16] S3, [8943-168] SPMon, [8943-180] SPMon, [8943-188] SPTues, [8943-212] SPTues, [8943-36] S6, [8943-37] S6, [8943-51] S8, [8943-52] S8, [8943-64] S10, [8943-66] S10, [8943-86] S13, [8943-91] S14, [8943-92] S14, [8943-95] S14
Masoudi Motlagh, Mohammad [8936-4] S1
Masruri, Masruri [8985-14] S3
Masselink, William T. 9002 S11 Session Chair, [9002-45] S10, [9002-62] S14
Massi, Daniela [8939-30] S6
Massies, Jean [8986-33] S7, [8986-50] S10
Massodi, Iqbal [8931-6] S2
Masson, Jonathan [8977-22] S5
Mastanduno, Michael A. 8937 S3 Session Chair, [8937-13] S3
Masuda, Kensuke [8992-30] SPWed
Masuda, Sachio [9006-51] SPWed
Masuhara, Hiroshi 8983 S6 Session Chair, [8983-19] S5
Masui, Kyoko [8974-2] S1, [8974-24] S6, [8974-45] SPTue, [8974-46] SPTue
Masumura, Kento [8983-26] S6
Masuno, Shinichiro [8967-21] S9
Maswadi, Saher [8941-57] S12, [8943-99] S15
Mata Calvo, Ramon [8971-3] S1, [8971-7] S1
Mata, Diogo [8987-39] S8
Mataloni, Paolo [8972-31] S8, [8972-33] S8
Matcher, Stephen J. 8926 Program Committee, [8926-111] S23, [8934-61] S9, [8952-26] S7
Matczynsyn, Katarzyna [8955-11] S3, [8983-20] S5
Mathason, Brian [8971-12] S2
Matheussen, Joe [9001-13] S3
Mathevet, Fabrice [8983-35] S8
Mathews, Marlon S. [8928-18] S5
Mathews, Nripan [8981-35] S9
Mathews, Scott A. [8930-43] S9, [8970-3] S1, [8980-25] S6
Mathies, Richard A. [8988-40] S9
Mathur, Vaibhav [8934-3] S1, [8977-2] S1, [8977-2] S8
Matsko, Andrew B. 8960 Program Committee, 8960 S2 Session Chair, [8960-2] S1, [8960-32] S9, [8960-35] S9, [8960-38] S10, [8989-10] S4
Matsubara, Eiichi [8964-7] S2
Matsuda, Keiji [8928-28] SPSat
Matsuda, Masaru [8953-13] S3
Matsuda, Yukimasa [9004-7] S2
Matsudaria, Paul [8949-25] S5
Matsueda, Toshiharu [8986-30] S6
Matsui, Takashi [9009-2] S3
Matsui, Tatsunosuke [8980-68] SPWed, [8983-25] S6, [8983-52] SPWed
Matsukawa, Takeshi [8964-9] S2
Matsumoto, Koh 8986 Program Committee
Matsumoto, Naoya [8948-60] S10, [8949-11] S3
Matsuo, Shinji [9002-36] S8
Matsuo, Shoichiro 9009 Program Committee, [9009-10] S5, [9009-19] S7, [9009-21] S8
Matsuo, Takeshi [8974-36] SPTue
Matsuo, Yuki [8977-11] S3
Matsuoka, Yasunobu [9010-12] S4, [9010-12] S5
Matsushima, Koichi [8987-1] S1, [8987-35] S7
Matsushima, Kyoji [9006-50] SPWed, [9006-51] SPWed
Matsushita, Masafumi [8963-31] S8, [8967-18] S9
Matsuura, Yuji 8938 Program Committee, 8938 S6 Session Chair, [8938-31] S7, [8938-43] S8, [8938-6] S2, [8943-107] S16
Matthäus, Christian [8948-6] S1
Matthews, Dave [8965-10] S3
Matthews, Thomas E. [8952-36] S9
Matthias, Ben [8935-20] S4
Matthias, Sabrina [8970-27] S7, [8972-48] S12, [8972-48] S7
Mattingley, Mark [8993-54] S10
Mattioli, Francesco [8993-19] S3, [8993-20] S3
Mattison, Scott P. [8943-177] SPMon, [8943-207] SPTues, [8953-17] S4
Mattoussi, Hedi 8955 Program Committee, 8955 S7 Session Chair, [8955-10] S3, [8955-24] S5, [8955-5] S2, [8955-67] SPSun
Matula, Thomas J. [8943-119] SPSun, [8943-75] S11
Matulionis, Arvydas [8986-48] S9
Matylytsky, Victor V. [8968-24] S5, [8976-3] S1
Matyschok, Jan [8972-21] S6
Matzdorf, Christian [8961-64] S15
Mauch, Stefan [8978-1] S1
Mauclair, Cyril [8967-29] S11, [8967-37] S13
Maunz, Peter [8989-20] S6
Mauskopf, Adam [8926-80] S16
Maussang, Kenneth [8993-11] S2
Mavadia, Jessica [8934-18] S3, [8934-9] S2
Mawst, Luke J. [8981-43] S11, 9002 Program Committee, 9002 S2 Session Chair, [9002-50] S12, [9002-56] S13
Maximenko, Sergey I. [8981-27] S7
Maximov, Mikhail V. [8965-25] S5
Maxson, Ryan T. [8943-177] SPMon, [8953-17] S4
Maxwell, Charles J. [8979-8] S5
Maxwell, Gisele [8959-2] S1
Maxwell, Graeme [8988-22] S5
May, Alexander R. [8988-65] SPWed
Mayer, Benedikt [8994-40] S11, [9002-35] S8
Mayer, Bernhard [8964-8] S2
Mayer, Theresa S. [8974-25] S6, [8974-54] S9
Mayo, Daniel C. [8969-21] S4, [8969-21] S6
May-Smith, Timothy C. [9009-11] S6
Maysonnave, Jean [8993-11] S2, [9002-27] S6
Maytin, Edward V. 8931 S5 Session Chair, [8931-18] S4, [8931-29] S6, [8931-31] S6, [8931-39] S8
Mazanec, Tomas [8959-35] S8
Mazili, Michael [8957-8] S2, [8972-3] S1, [8999-29] S6, [8999-40] S8, [8999-51] S10
Mazumder, Nirmal [8948-73] SPSun, [8996-30] SPWed
Mazur, Eric [8964-66] SPTue, [8967-5] S2, [8967-5] S4, [8967-56] SPTue, [8968-15] S4, 8972 Program Committee, [8972-1] S1, [8972-53] SPTue, [8994-47] S12, [8994-76] SPWed
Mazurenka, Mikhail [8945-18] S5
Mazzillo, Massimo Cataldo [8990-40] S8, [8990-41] S8
Mazzola, Maurizio [8982-12] S3
Mazzotti, Davide [8993-74] S15
Mazzucchelli, Serena [8955-57] S12
McAllister, Blake [8963-10] S3, [8963-10] S7
McAlpine, Jessica [8935-36] S8
McBride, Samantha [8960-14] S4
McBirney, Roy [8963-12] S3, [8963-12] S7, [8970-26] S7
McCachren, Samuel [8947-4] S1
McCal, Dennis [8961-37] S9
McCarthy, Delwin K. [8929-15] S4, [8929-16] S4
McCarthy, Owen J. T. [8947-5] S1
McCawley, Thomas K. [8929-15] S4
McClatchy, David B. [8931-31] S6
McClintic, Abbi M. [8941-52] S10
McClintock, Ryan [8987-33] S7, [8987-47] S9, [8987-86] SPWed, [8987-97] SPWed
McClure, Jason [8992-19] S4
McComb, David W. [8983-38] S9
McComb, Timothy S. [8961-37] S9
McConney, Michael E. [9004-4] S1
McCormack, Devin R. [8934-70] S11
McCormick, Daniel T. [8926-119] S1, [8935-48] S10, [8935-75] SPSun
McCoy, Darryl [8948-18] S3
McDaniel, Martin D. [8987-29] S6
McDermott, William E. 8962 Program Committee
McDonald, Steve M. 8948 Program Committee
McElroy, Austin B. [8926-78] S16
McFarlane, William [8991-14] S4
McGloin, David [8960-40] S10
McGovern, Cushla [8926-112] S23
McGrath, Felicity C. [8984-46] S12
McGuigan, William [8935-32] S7
McGurn, Arthur R. [8994-48] S12
McIntosh, H. [8990-32] S6
McKay, Aaron M. [8964-17] S4, [8964-36] S8
McKenna, Barbara [8935-80] SPSun
McKenzie, Eric [8941-122] SPMon
McLaren, Melanie G. [8999-43] S9, [8999-44] S9, [8999-53] SPWed
McLaughlin, Robert A. 8927 Program Committee, 8927 S12 Session Chair, [8927-50] S12, [8934-45] S7, [8934-83] S12, [8935-49] S10, [8935-60] S12, [8946-12] S4, [8946-29] S6, [8946-3] S1, [8946-5] S2, SC981
McLaughlin-Drubin, Margaret [8947-45] S11, [8947-6] S1
McLean, David I. [8926-16] S4, [8926-8] S2
McLeod, Euan R. [8954-10] S3, [8974-9] S3
McLeod, Robert R. 8974 Program Committee, 8974 S4 Session Chair, [8974-1] S1
McMackin, Ian [8974-50] S8
McMillan, Dayton D. [8931-17] S4, [8931-42] SPMon
McMillan, James F. [8960-2] S1
McMillen, Ben W. [8972-35] S8
McNabb, Ryan P. [8930-15] S4, [8934-23] S4
McNamara, Paul M. [8934-104] SPMon
McPhee, Gordon [8942-21] S5
McPheeters, Matthew T. [8928-38] S7
McShane, Michael J. 8951 Program Committee, 8951 S2 Session Chair
McVeigh, Elliot [8948-80] SPSun
McVade, Melanie Gault [8935-33] S7
McWilliams, Annette M. [8927-37] S9
Meade, Jeffrey T. [8982-76] SPWed
Meany, Thomas D. [8997-35] S8
Mechet, Pauline [8980-30] S8
Mechin, David [8938-40] S8, [8961-72] SPTue, [8961-78] SPTue, [8982-16] S3, [8982-29] S6
Medeiros, Alexandra I. [8927-48] S12, [8927-49] S12
Medeiros, Lazaro [8939-41] SPSun
Medhat, Mostafa [8977-24] S6
Medintz, Igor L. 8955 Program Committee, [8955-31] S7
Medoff, Benjamin D. [8927-36] S9
Medrano, Carolina C. [8964-53] SPTue, [8985-11] S3, [8985-12] S3
Medvedev, Ivan [8973-1] S1
Medvedev, Nikolay [8954-22] S5
Medvedkov, Oleg I. [8961-32] S8
Medyukhina, Anna [8928-5] S2
Meejon Smith, Siwaporn [8987-6] S2
Meemon, Panomsak [8934-127] SPMon, [8949-55] SPMon
Meena, Bharat Lal [8940-18] S4
Mefferd, Wayne [8966-26] S8
Mefti, Selma [8976-29] S6, [8976-50] SPTue
Mega, Yair J. [8949-42] S9
Megens, Mischa [8977-14] S4, [8995-26] S7
Meglinski, Igor [8926-32] S7, [8934-47] S7, [8937-1] S1, [8940-5] S1, [8940-6] S1, 8942 Program Committee, [8942-24] S5, [8943-47] S7, [8943-53] S8, [8944-12] S3, [8952-14] S4, [8952-9] S3, [8999-18] S4
Mégret, Patrice [8961-102] SPTue
Megy, Robert [8988-28] S7
Mehi, Jim [8943-120] SPSun

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Mehn, Dora [8939-15] S3, [8954-5] S2, [8957-6] S2
 Mehner, Eva [8960-48] S12
 Mehnke, Frank [8986-67] S14, [9003-25] S6, [9003-29] S6
Mehrabani, Simin [8960-14] S4, [8982-6] S1
Mehran, Mahyar [8976-2] S1
 Mehravar, Seyed Soroush [8948-14] S2, [8982-23] S5
 Mehrotra, Akhil [8981-22] S6, [8981-26] S7
 Mehrtens, Thorsten [8986-19] S4
 Mehta, Dalip Singh [8934-133] SPMon
 Mehta, Kalpesh B. [8928-24] S6, [8934-117] SPMon
Mei, Liang [8952-18] S5, [9003-62] SPWed, [9003-63] SPWed
 Meier, Amanda K. [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6
Meier, Christoph [8938-17] S4, [8938-47] SPSun
Meier, Torsten 8984 Program Committee, [8984-26] S7, [8984-52] S14
 Meimon, Serge C. [8930-11] S3, [8930-13] S3, [8978-11] S4
 Meiners, Wilhelm [8970-24] S6, [8970-24] S9
 Meinig, Marco [8977-26] S6, [8995-18] S5
 Meining, Alexander [8927-17] S4
 Meinschien, Jens [8965-32] S7, [8965-34] S7
 Meire, Maarten [8929-10] S3
 Meisch, Tobias [8986-32] S6, [8986-73] S15, [8986-9] S2
 Meisenberg, Annika [8928-96] S19
 Meiser, Niels [8966-4] S2
 Meissner, Helmuth E. [8959-5] S2
 Meissner, Kenith E. 8951 Program Committee, [8951-42] SPMon, [8951-8] S2
 Meissner, Stephanie [8959-5] S2
 Meister, Joerg [8929-28] SPSun
 Melamed, Jonathan [8940-22] S5
 Melamed, Shlomo [8930-14] S3
 Melchior, Pascal [8984-24] S7
 Melgaard, Seth D. [9000-1] S1, [9000-4] S1
 Mella, Héctor A. [8953-20] SPSun
 Mellor, Christopher J. [8988-4] S1
 Melnik, Eva [8933-4] S2
 Melnikov, Igor V. [8959-10] S3, [8994-74] SPWed, [8998-49] S11
 Melo, Miguel [8961-92] SPTue
 Melo, Suzanne A. S. [8964-45] SPTue
 Melville, C. David [8927-18] S4, [8936-27] S6
 Melzer, Andreas [8935-55] S12
Melzer, Jeffrey E. [8938-16] S4
 Memmolo, Pasquale [8947-46] S11, [8947-57] S13
 Mena, Pablo V. [8991-35] S8
 Menabuoni, Luca [8930-51] SPSun, [8930-52] SPSun
 Ménaert, Bertrand [8959-59] S14
 Mencias, Arianna [8930-51] SPSun
Mendez Aguilar, Emilia M. [8952-24] S6
 Méndez Martínez, Francisco [8980-42] S11
Mendez, Alexis SC981
 Méndez, Bianchi [8987-16] S3
 Mendez, Martin O. [8947-14] S3
 Mendonça, Cleber Renato [8964-50] SPTue, [8964-64] SPTue, [8969-23] SPTue, [8969-24] SPTue, [8970-12] S3, [8973-5] S1, [8976-4] S1, [8983-8] S2
 Mendoza, Edgar A. [8993-71] S14
 Mendrick, Mark C. [8986-65] S14
 Meneghesso, Gaudenzio [8986-59] S11, [9003-48] S11
Meneghini, Matteo [8986-59] S11, [9003-48] S11
 Menezos, Sylvie [8988-23] S5, [8990-36] S7, [8995-12] S3, [8995-2] S1
 Meng, Bo [8980-49] S12
 Meng, Hsin-Fei [8983-57] SPWed, [8983-58] SPWed
 Meng, Huaiyu C. [8990-9] S2
 Meng, Lingfei [8992-30] SPWed
 Meng, X. [8994-3] S1
 Meng, Zhuoxian [8943-50] S8
 Menicucci, Nicolas C. [8997-15] S6
 Mennea, Paolo L. [8968-8] S2, [8974-56] S9
 Menneteau, Mathilde [8947-53] S12
 Menon, Rajesh [8969-17] S3, [8969-17] S5
 Menon, Vinod M. 8996 Program Committee
Menoni, Carmen S. [8933-23] S6, [8954-4] S1, [8973-13] S3
 Mensah, Lawrence B. [8931-13] S3, [8931-6] S2, [8956-3] S1
 Menyayev, Yulian [8943-31] S5
Menyuk, Curtis R. [8971-2] S1
 Menzel, Ralf [8948-72] SPSun, [8960-53] S14
 Mercan, Tanju [8937-40] SPSun
 Mercatelli, Raffaella [8948-57] S9, [8972-22] S6
 Merchant, Nipun [8947-1] S1
Mercier, Jeanne [8928-32] SPSat
 Merdasi, Adel [8973-24] SPTue
 Mereuta, Alexandru [8966-14] S4
 Merghem, Kamel [8993-9] S1
 Mergo, Pawel [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-44] S9, [9009-12] S6
 Meristoudi, Anastasia [8983-18] S4
 Merk, Vivian [8955-7] S2
 Merkel, Markus [8963-18] S5
 Merkl, Jan-Philip [8955-67] SPSun
 Mermet, Frédéric [8967-29] S11, [8970-15] S12, [8970-15] S4
 Mermut, Ozzy [8935-46] S10, [8938-5] S1, [8945-16] S4
Merola, Francesco [8947-46] S11, [8947-57] S13
 Merolla, Jean-Marc L. [8997-13] S6
 Merrill, Daniel [8942-35] S9
 Merritt, Charles D. [9002-47] S11
 Merten, André [8977-6] S2
 Meruva, Seshadri [8961-111] SPTue
 Merzlyak, Yevgeny A. [8966-33] SPTue
 Mesh, Michael [8991-10] S3
 Meshew, Greg [8993-55] S10
 Messaddeq, Younès [8954-8] S2, [8982-31] S6, [8982-56] SPWed, [8994-73] SPWed
 Messaoudi, Hamza [8972-17] S5
 Messinger, Scott R. [8981-25] S7, [8981-27] S7
 Messerly, Michael J. [8961-28] S7
 Metaferia, Wondwosen Tilahun [8989-3] S1
 Metivier, Pauline [9002-22] S5
 Metz, Peter [8990-37] S7
 Metzger, Coby [8943-128] SPSun
 Metzner, Sebastian [8986-32] S6, [8986-73] S15, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed
 Meunier, Michel [8947-19] S4, [8957-33] S7, 8967 Program Committee, 8972 Conference Chair, 8972 S3 Session Chair, [8972-7] S2, [8972-9] S2
 Meurent, Sophie [8986-34] S7
 Meusel, Jens [8965-28] S6
 Mews, Alf B. 8955 S6 Session Chair, [8955-44] S10, [8996-8] S2
 Mexis, Meletios [8986-8] S2
 Meyaard, David S. [9003-16] S3
 Meyer, Charles R. [8980-78] SPWed, [8993-28] S5
 Meyer, Dirk [8943-142] SPSun
 Meyer, Heiko [8949-6] S2, [8972-6] S2
Meyer, Jerry R. [8981-40] S11, 8993 Program Committee, 9002 Program Committee, 9002 S10 Session Chair, [9002-47] S11
 Meyer, Raymond E. [8935-32] S7
 Meyer, Stefan [8974-57] S9
Meyer, Stephanie A. [8950-30] S8
 Meyer, Tobias [8926-133] S4, [8928-5] S2, [8940-7] S2, [8948-6] S1, [8972-18] S5
 Meza Narvaez, Pablo F. [8953-20] SPSun
 Meza, Daphne [8928-16] S4
 Mezzapesa, Francesco P. [8968-6] S2
 Mhalla, Taghrid [8968-4] S1
 Mhibik, Ouassama [8966-13] S4
Mhlanga, Thandeka I. [8999-19] S4
Mi, Zetian [8986-41] S8, 8996 Program Committee, 8996 S3 Session Chair, [8996-1] S1, [9003-5] S2
 Miao, Xiongying [8931-28] S5
Miccio, Lisa [8947-46] S11, [8947-57] S13
 Michael, Christopher P. [8965-24] S5
 Michael, Stephan [8980-54] S14
 Michalak, Gregory J. [8936-4] S1
 Michau, Vincent [8978-11] S4
 Michel, Gregory [8947-2] S1
Michel, Jürgen [8960-3] S1, SC817
 Michelson, Georg [8930-17] S4
 Michel-Triller, Robert [8963-30] S7
 Michler, Peter [8966-23] S7
 Micova, Julia [8997-2] S3, [8997-2] S7
Middlebrook, Christopher T. [8988-36] S8, [8991-3] S1
 Midolo, Leonardo [8984-34] S9, [8993-17] S3
 Midorikawa, Katsumi [8967-8] S10, [8967-8] S5, [8976-17] S4
Mielke, Michael M. [8961-22] S5, 8972 Program Committee, 8972 S6 Session Chair
 Miftakhudinov, D. [8965-22] S5
 Migacz, Justin V. [8930-35] S8
 Migdall, Alan L. 8997 Program Committee, [8997-12] S5
 Miglo, Alexander [9001-13] S3
 Miguel Sanchez, Javier [8997-29] S11
 Miguez, Maria L. [8964-46] SPTue
 Mihara, Toshiyuki [8994-65] SPWed
 Miida, Yusuke [8943-107] S16
 Mikami, Osamu [8991-39] S9
 Mikel, Brestislav [8941-50] SPMon
 Mikhailov, Eugeny E. [8998-34] S8, [8998-51] S11
 Mikhailov, Vitaly [8984-5] S1
 Mikhaylov, Alexander [8956-34] S9, [8956-35] S9
 Miki, Norihisa [8975-4] S1
 Mikkelsen, Jared C. [9007-3] S3
 Mikroulis, Spiros 9007 Program Committee
 Mikryukov, Alexey S. [8967-47] SPTue
 Milan, Riccardo [8987-82] SPWed
 Milana, Silvia [8966-31] SPTue, [8966-5] S2
 Milanese, Daniel [8961-72] SPTue
 Milani?, Matija [8926-27] S7, [8926-29] S7, [8936-1] S1, [8941-34] S9, [8941-37] SPMon, [8947-16] S4
 Milanovic, Veljko 8977 Program Committee
 Mildren, Richard P. [8959-12] S3, [8964-17] S4, [8964-36] S8, [8968-23] S5
 Miles, Alexander A. [8979-6] S5, [8991-26] S6
 Milione, Giovanni [8940-5] S1, [8999-12] S3, [8999-18] S4, [8999-22] S5, [8999-24] S5, [8999-33] S7, [8999-35] S7
 Milioiu, Amalia [8982-64] SPWed
 Milivojevic, Biljana [8990-37] S7
 Miller, Alistair Allen [8991-34] S8
 Miller, Alyssa J. [8927-41] S10, [8927-54] S13, [8927-55] S13, [8927-56] S13, [8934-12] S2, [8934-57] S9
 Miller, Alyssa J. [8927-36] S9
 Miller, Andy [8961-68] SPTue
 Miller, Benjamin L. 8933 Conference Chair, 8933 S3 Session Chair, 8933 S6 Session Chair, [8933-3] S1
 Miller, Dianne M. [8935-36] S8
 Miller, Donald T. 8930 Program Committee, 8930 S2 Session Chair, 8930 S7 Session Chair, [8930-41] S9, [8930-42] S9
 Miller, Harold C. [8960-70] SPTue
 Miller, Joann [8931-3] S1, [8931-9] S2
 Miller, John [8938-38] S8
 Miller, Michael [8966-15] S5
 Miller, Reginald [8984-37] S10
 Milligan, Erin D. [8955-38] S8
 Mills, Arthur [8948-77] SPSun
 Mills, Ben [8976-16] S4
 Mills, Robert [8935-74] SPSun
 Milner, Thomas E. [8926-78] S16, [8926-95] S19, [8952-40] S10
Milord, Laurent [8999-47] S10
 Milori, Debora [9003-68] SPWed
 Milster, Thomas D. [8974-11] S3
 Milton, Graeme W. [8970-8] S2
 Milton, Harry E. [9004-14] S4
 Mimun, Lawrence C. [8956-38] SPSun
Min, Wei [8948-22] S4, [8948-76] SPSun, [8956-16] S4
 Minai, Limor [8972-10] S3
 Minamide, Hiroaki [8964-9] S2
Minamikawa, Takeo [8935-67] SPSun, [8939-26] S5
Miñano, Juan Carlos [9003-2] S1
 Minely, John D. 8961 Program Committee, 8961 S15 Session Chair, [8961-30] S8
 Mingaleev, Sergei [8980-61] SPWed
 Mingareev, Ilya [8968-32] S15, [8968-32] S7, [8970-24] S6, [8970-24] S9
 Mini, Enrico [8955-45] S10
 Miniewicz, Andrzej 8983 S7 Session Chair, [8983-21] S5, [8983-31] S7
 Minneman, Michael P. [8934-2] S1
 Mino-Kenudson, Mari [8927-54] S13, [8927-55] S13, [8934-57] S9
 Mintarov, Sergey A. [8965-25] S5
 Mintert, Florian [8997-16] S6
 Minzioni, Paolo [8976-21] S5
Miranda, Anderson F. S. [8932-39] SPSun
 Miranda, Miguel [8972-21] S6
 Miranda, Rajesh C. [8953-12] S3
 Miresles, José [8973-28] SPTue
Miri, Mohammad-Ali [8980-51] S13
 Mirim, Denilson C. [8972-52] S13, [8972-52] S8
 Miroshnichenko, Andrey E. [8994-41] S11, [8994-67] SPWed
Mirov, Sergey B. [8959-15] S4, [8959-62] S14, [8959-63] S14
Mirzaaghai, Amin [8935-57] S12
 Mirzaei Zarendi, Soroush [8927-16] S4
 Mishchik, Konstantin [8974-4] S1
 Mishima, Tetsuya D. [8993-36] S7
 Mishin, Alexander S. [8950-37] SPSun
 Mishina, Natalia M. [8956-36] S9
 Mishra, Ashok Kumar 8956 Program Committee
 Mishra, Madhusmita [8933-7] S2
 Mishra, Satyendra K. [8938-46] SPSun, [8987-74] SPWed, [8987-75] SPWed, [8987-77] SPWed
 Misiakos, Konstantinos [8976-35] S7, [8976-44] S9
 Misiewicz, Jan [8955-60] SPSun, 8993 Program Committee
 Misoguti, Lino [8964-46] SPTue, [8964-64] SPTue
 Misra, Abha [8982-80] SPWed
 Missaggia, Leo J. [8965-20] S5
 Missinne, Jeroen [8954-26] S6, [8991-38] S9
 Missotten, Tom [8930-33] S7
 Missous, Mohamed [8985-26] S6
 Mita, Seiji [8986-31] S6
 Mitchell, C. [8989-12] S5
Mitchell, Claire A. [8949-31] S7, [8972-12] S3
 Mitchell, Gregory S. [8937-39] SPSun
Mitin, Vladimir [8993-80] S16
Mitra, Thomas [8965-32] S7, [8965-34] S7
 Mitranki, Anna [8955-66] SPSun
 Mitrofanov, Oleg [8938-16] S4, 8993 Program Committee, [8993-47] S9, [8993-49] S9, [8993-83] S17
 Mitsuhashi, Kenji [8943-182] SPMon, [8943-224] SPTues
Mitsuhashi, Tatsuki [8972-4] S1
 Mitsuya, Kota [8988-11] S3
 Mitsuyama, Hiroshi [8965-1] S1
 Mittag, Anja [8947-30] S6, [8947-31] S6
 Mittal, Vinita [8988-55] S10
 Mittar, Shweta [8952-26] S7
 Mittler, Sylvia [8957-18] S4
 Mitus, Antoni C. 8983 Program Committee, [8983-21] S5
 Mitzner, Wayne A. [8927-38] S10
 Miura, Hiromasa [8947-7] S2
 Miura, Kiyotaka [8967-11] S10, [8967-11] S5
Miura, Masahiro [8930-7] S2
 Miura, Taisuke [8959-26] S6, [8959-29] S7, [8959-75] SPTue
 Miyagi, Mitsunobu [8938-6] S2
 Miyake, Hideto 8986 Program Committee, [8986-68] S14

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Miyamoto, Kenji [9007-11] S5
Miyamura, Norihide [8978-6] S2
Miyayama, Noriaki [8959-24] S6, [8959-27] S7
Miyato, Taizo [8963-31] S8, [8967-18] S9, [8967-19] S9
Miyawaki, Mamoru [8961-53] S12
Miyazaki, Hideki [8974-51] S8
Miyazawa, Kazuya [8933-22] S6
Mizaikoff, Boris 8957 Program Committee
Mizeikis, Vyngantas [8974-23] S6
Mizokami, Yasuaki [8987-10] S2
Mizrahi, Amit [8991-21] S5
Mizuguchi, Yoshinori [8947-62] S14
Mizumoto, Tetsuya [8988-11] S3
Mizuno, Jun [8986-30] S6
Mizushima, Toshiro [8961-122] SPTue
Mizutani, Takashi [8982-24] S5
Mnaymneh, Khaled [8989-18] S6
Mo, Jianhua [8934-44] S7, [8934-5] S1
Moazzzei, Mojtaba [8974-37] SPTue
Mocek, Tomás [8959-26] S6, [8959-29] S7, [8959-75] SPTue, [8960-31] S4, [8960-31] S8, [8965-7] SPTue
Mocella, Vito [8994-49] S12, [8995-14] S4
Moché, Christian [8976-37] S8
Mochizuki, Akihiro 9005 Program Committee
Mochizuki, Shoichi [8994-65] SPWed
Modotto, Daniele [8960-1] S1
Moe, Craig G. [8986-65] S14
Moebius, Michael G. [8964-66] SPTue
Moen, Erick [8941-57] S12, [8941-58] S12
Moench, Holger [8966-15] S5, [9001-14] S3
Moerl, Klaus W. [8972-22] S6
Moerner, William E. [8950-16] S4, [8950-19] S5, [8950-29] S7, [8950-3] S1
Moffatt, Lauren T. [8926-6] S1, [8945-7] S2
Moffitt, Lorissa [8927-10] S3
Moffitt, Lorissa A. [8927-11] S3
Moffitt, Paul R. [8964-38] S9
Moger, Julian J. [8948-44] S7
Moghadam, Hassan G. [8935-46] S10
Mogharabi, Kian [8951-12] S3
Moghimi, Mohammad J. [8977-7] S2
Mohamed El Hady, Alaa Eldin S. [8934-125] SPMon
Mohamed, Fathi H [8971-1] S1
Mohammad Pour, Hooman [8930-24] S6
Mohammed, Edris M. [8991-14] S4
Mohammed, Omar F. [8987-65] S13
Mohan, Nishant [8934-95] SPMon
Mohan, Swati [8971-17] S3
Mohanty, Samarendra K. 8928 Conference Chair, 8928 S15 Session Chair, 8928 S17 Session Chair, 8928 S19 Session Chair, [8928-100] S20, [8928-86] S16, [8928-89] S17, [8928-90] S18, [8928-93] S18, [8928-97] S19, [8947-87] SPMon, [8954-7] S2, [8979-24] S2, [8979-24] S8
Mohar, Dilbahar [8926-83] S17
Mohideen, Umar [8947-75] SPMon
Mohler, Kathrin J. [8930-32] S7
Mohnkern, Lee [8964-39] S9
Mohrbacher, Christina [8931-40] S8
Mohseni, Hooman [8993-90] S18, [9000-26] S5
Mohseni, Parsian Katal [8994-8] S2
Moiseev, Alexander A. [8934-108] SPMon, [8950-45] SPSun, [8950-47] SPSun
Moiyadi, Aliasgar V. [8928-7] S2
Mojahed, Diana [8927-57] S13
Mojahedi, Mohammad [8957-33] S7
Mok, Jin-Myoung [8996-28] SPWed
Mok, Kelvin [8928-32] SPSat
Mokhnu, Olexy [8965-16] S4
Molardi, Carlo [8961-97] SPTue, [8985-14] S3
Molavi, Behnam [8951-3] S1
Molesky, Sean Joseph [8984-36] S10, [8984-37] S10
Molin, Stéphanie [9004-16] S4
Molina-Fernández, Iñigo [8995-30] S8, [8995-38] S10
Molinari, Michael 8987 S2 Session Chair, [8987-9] S2
Molina-Terriza, Gabriel [8954-17] S4
Moll, Florian [8971-3] S1, [8971-7] S1
Möller, Max [8972-14] S4
Moloney, Jerome V. 8966 Conference Chair, 8966 S1 Session Chair, [8966-12] S4, [8966-21] S6, [8966-32] SPTue, [8966-8] S3, [9003-37] S13, [9003-37] S9
Molpeceres, Carlos [8968-30] S15, [8968-30] S7, [8968-33] S15, [8968-33] S7
Molter, Daniel [8985-23] S5
Mompert, Jordi [8960-61] S16
Monastyrskiy, Grygorii [9002-45] S10
Monavarian, Morteza [8986-20] S4, [8986-77] SPWed, [8986-82] SPWed, [9003-65] SPWed
Monberg, Eric M. [8938-15] S3
Moncorgé, Richard [8972-26] S6
Mondal, Suman B. [8936-25] S6, [8936-26] S6
Moneim, Nabil A. [8938-28] S6, [8938-29] S6
Monem Haghdoost, Zahra [8949-7] S2
Mongillo, Marco [8926-73] S15
Monifi, Faraz [8960-25] S6
Monmayrant, Antoine [8988-51] S11, [8993-8] S1
Monnier Bourdin, Dominique [8992-25] S6
Monozslai, Balazs [8964-59] SPTue, [8985-11] S3
Monro, Tanya M. [8938-30] S6, [8951-38] SPMon, [8957-24] S5, [8957-25] S5, [8987-42] S8
Monroy, Eva 8986 S7 Session Chair, [8986-39] S8, [8986-40] S8
Monroy, Guillermo L. [8926-118] S1, [8926-119] S1, [8935-39] S8, [8935-48] S10, [8935-75] SPSun, [8942-28] S7
Monsees, Barbara [8943-157] SPMon
Monserud, Nils C. [8949-20] S4, [8954-4] S1
Montagne, Jean-Eucher [8962-16] S5
Montant, Sébastien [8984-49] S13
Montealegre, M. Angeles [8970-23] S6, [8970-23] S9
Monteiro, Andreia [8947-83] SPMon, [8947-85] SPMon
Monteiro, Juliana S. [8932-15] S3, [8932-16] S3, [8932-39] SPSun, [8932-41] SPSun
Monteiro, Paola K. [8932-27] S5
Monteiro, Teresa [8987-16] S3, [8987-39] S8
Montenegro, Lisa M. [8942-17] S4
Monteville, Achille [8961-78] SPTue
Montiel i Ponsoda, Joan Jesus [8982-30] S6
Montoya, John A. [8985-59] SPWed, [8994-45] S11
Moodie, Karen L. [8931-36] S7
Moody, Baxter [8986-64] S14
Moody, Galan [8984-22] S6
Mookherjea, Shayam [8998-36] S8
Moon, Jungho [8978-20] S6
Moon, Kiwon [8985-7] S2, [8985-8] S2
Moon, Yong-Tae 8986 Program Committee
Moor, Kamila [8939-1] S1
Moore, David S. [8993-59] S12
Moore, Jeremy [8999-6] S2
Moore, Ronald B. [8943-13] S2, [8943-93] S14
Moore, Sean W. [8961-38] S9
Moorhouse, Colin J. [8972-51] S13, [8972-51] S8
Moraine, Jérôme [8961-78] SPTue
Morais Smith, Cristiane [8981-5] S2
Morais, Paulo C. 8954 Program Committee, [8954-14] S4
Morais, Tercio L. [8926-77] S15
Morales, Jennifer [8933-8] S3
Morales, Miguel [8968-30] S15, [8968-30] S7, [8968-33] S15, [8968-33] S7
Morales-Cruzado, Beatriz [8941-24] S6
Morante, Joan Ramón [8987-11] S2
Morasso, Carlo F. [8939-15] S3, [8954-5] S2, [8957-6] S2
More, Karren L. [8969-5] S1, [8969-6] S1
Moreau, Julien [8957-16] S4, [8957-28] S6
Moreau, Vanessa [8962-19] SPTue
Moreel, Loise [8988-5] S1
Moreels, Iwan [8996-20] S6
Moreno, Wilfrido A. [8975-22] S4
Moretti, Adriana Fernandes [8951-43] SPMon
Morgado, Antonio Miguel [8930-28] S7, [8932-21] S4, [8948-83] SPSun
Morgan, Janet [8931-21] S4
Morgan, Philip B. [9004-14] S4
Morgan, Stephen P. 8936 Program Committee
Morgner, Uwe [8972-21] S6
Morgounova, Ekaterina [8943-14] S3, [8943-194] SPTues
Mori, Yojiro [9008-1] S1
Mori, Yusuke [8986-2] S1
Morier-Genoud, François [8984-31] S9
Morin, Franck [8961-50] S12, [8961-52] S12
Morino, Eric [8992-16] S4
Morishita, Tomohiro [8986-6] S1
Morita, Koji [9009-19] S7
Morita, Ryuji [8999-31] S7
morita, toshimasa [8962-24] SPTue
Morito, Ken [8990-47] S9
Moriwaki, Retsu [9004-19] SPWed
Moriyama, Lilian Tan [8931-37] S7, [8931-50] SPMon, [8931-51] SPMon, [8941-42] SPMon
Mørk, Jesper [8993-16] S3, [8995-19] S5, [8998-45] S10
Morkoc, Hadis 8986 Conference Chair, 8986 S1 Session Chair, 8986 S15 Session Chair, [8986-20] S4, [8986-48] S9, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed, [8986-83] SPWed, [9003-65] SPWed
Morkoetter, Stefanie [9002-35] S8
Moros, Maria [8955-48] S10
Moroshkin, Peter [9000-9] S2
Morozova, Natalia V. [8975-24] SPTue
Morrill, Waldirene B. B. [8928-72] SPMon
Morris, Michael D. 8926 Conference CoChair, 8939 Program Committee
Morrison, William A. [8947-20] S4
Morsellino, Giuseppe [8990-40] S8
Morshed, Muhammad M. [8987-83] SPWed
Mortensen, N. Asger [8998-5] S1
Morthier, Geert 8980 S4 Session Chair, [8980-30] S8
Mortimer, Kevin D. [8963-25] S6
Morton, Jonathan A. S. [8981-10] S3, [9000-7] S2
Morvan, Loic [8966-19] S6, [8985-17] S4, [8985-43] S9
Mosavi, Neloofar [8971-2] S1
Mosberger, Martin [8971-21] S4
Moschim, Edson [9008-5] S4, [9008-5] S5
Moser, Christophe [8938-41] S8, [8943-9] S2, [8949-7] S2, [8952-5] S2, [8981-31] S8
Moser, Hansruedi [8963-13] S3, [8963-13] S7, [8965-33] S7
Moser, Marko [8955-20] S5
Moser, Michael [8965-26] S6
Moser, Philip [9001-10] S2, [9001-2] S1
Moser, Regina [8972-38] S9
Moser, Richard [8928-6] S2
Moshegov, Nikolay [8965-22] S5
Mosing, Alexander [8976-22] S5
Mosk, Allard P. [8978-18] S6, [8998-41] S9, [8999-38] S8, [9003-47] S11
Moskalyuk, Sergey A. [8967-47] SPTue
Moskovtseva, Alexandra D. [8947-22] S4
Moss, Steven C. [8965-3] S1, [8981-43] S11, [8986-49] S9
Mosse, Alexander C. [8943-21] S4
Mosse, Charles A. [8943-24] S4
Mostaço-Guidolin, Leila B. [8940-10] S2, [8948-74] SPSun, [8948-82] SPSun
Mota, Alessandro Damiani [9003-68] SPWed
Motamedi, M. Edward Symposium Committee
Motamedi, Massoud [8941-3] S1
Moteji, Hiroshi [8964-35] S8
Moth-Poulsen, Kasper [8957-26] S6
Motmans, Filip [8970-23] S6, [8970-23] S9
Motoyama, Mayumi [8928-20] S5
Motta, Danilo A. [8936-39] SPSun
Mottay, Eric P. [8961-16] S4, [8961-20] S5, [8961-50] S12, [8961-51] S12, [8961-52] S12, [8964-58] SPTue, 8972 Program Committee, 8972 S5 Session Chair, [8972-24] S6, [8972-26] S6, [8972-56] SPTue
Mou, Chengbo [8984-5] S1
Mou, Shin [8993-84] S17
Mou, Yun [8949-1] S1
Moudarik, Tarik [8987-33] S7
Moulton, Peter F. 8961 Program Committee, 8961 S14 Session Chair
Mounaix, Patrick [8993-47] S9
Mousavi, Mahta [8936-7] S2
Mousavi, S. Hossein [8985-36] S8
Mouskeftaras, Alexandros [8972-44] S10, [8972-44] S5
Mowbray, Andrew [8993-55] S10
Moy, Wesley [8926-23] S5
Mozenson, O. [8990-32] S6
Mrongovius, Martina L. 9006 Program Committee
Mthunzi, Patience [8944-19] S4
Mu, Jian [8959-80] SPTue
Mu, Richard [8969-21] S4, [8969-21] S6
Mu, Xiaodong [8959-5] S2
Mueckstein, Raimund [8993-47] S9
Mueller, Alexandra [8979-11] S6
Muellner, Paul [8933-4] S2
Muendel, Martin H. 8961 Program Committee
Muffoletto, Daniel [8931-21] S4
Mugnier, Alain [8961-78] SPTue, [8961-88] SPTue
Mujat, Mircea [8930-44] S9, [8934-82] S12
Mukai, David [8927-40] S10
Mukherjee, Jayanta [8981-58] SPWed
Mukherjee, Tamal 8973 Program Committee
Mukhopadhyay, Sabyasachi [8942-20] S4
Müllen, Klaus [8950-1] S1
Müller, André [9002-7] S2
Müller, Arnaud [8928-84] S16
Müller, Kai [8994-40] S11, [8996-4] S1
Müller, Knut [8986-19] S4
Müller, Marcus [8986-21] S4, [8986-73] S15, [8986-80] SPWed
Müller, Tobias [8960-59] S15, [8965-33] S7
Müllerová, Jarmila [8995-38] S10
Mulvaney, Paul 8955 Program Committee, [8993-25] S4
Mun, JungHo [8941-55] S11
Mun, OkMi [8969-26] SPTue
Muneeb, Muhammad [8989-24] S7, [8993-42] S8
Munemasa, Yasushi [8971-28] S5
Mungan, Carl E. [8961-1] S1
Münzer, Karl [8947-45] S11, [8947-6] S1
Munk, Alexander [8959-53] S12
Muñoz, Pascual [8989-4] S1
Munoz, Philip A. [8994-47] S12, [8994-76] SPWed
Munoz-Martin, David [8968-33] S15, [8968-33] S7
Munro, Elizabeth A. [8982-76] SPWed
Munro, Ian H. [8927-7] S2
Munro, Peter R. T. [8934-45] S7, [8934-48] S7, [8946-29] S6, [8949-9] S2
Munsch, Mathieu [8993-16] S3
Münzenberg, Markus [8984-40] S11
Mura, Giovanna [8986-59] S1
Murai, Kensuke [8994-65] SPWed
Murakami, Kenzi 8927 Program Committee
murakami, yoshihisa [8982-42] S8
Murakowski, Janusz A. [8983-45] S10, [8985-30] S7, [8985-45] S10, [9007-24] S8
Murakowski, Maciej [8974-12] S4, [8983-45] S10
Muralinaidu, Radhakrishnan [8940-20] S4

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Murali, Martin [8967-43] S15, [8967-43] S7
Muramatsu, Mayu [8963-31] S8, [8967-18] S9
Muranaka, Hidenobu [8991-16] S4
Muranishi, Nanae [8939-26] S5
Muraoka, Yuki [8967-54] SPTue
Murashima, Kiyotaka [8926-69] S14
Muraviov, Sergey V. [8961-56] S13
Murawski, Michal [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-44] S9, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
Murdza, Randal A. [8934-3] S1
Murgu, Septimiu D. 8927 Program Committee, 8927 S13 Session Chair
Murinda, Shelton [8938-38] S8
Muro, Eleonora [8955-13] S3
Muroi, Tetsuhiko [9006-15] S3
Murphy, Daniel V. [8971-29] S5, [8971-32] S5
Murphy, J. Anthony 8985 Program Committee, 8985 S11 Session Chair, 8985 S9 Session Chair
Murphy, Mary [8954-11] S3, [8954-31] SPMon
Murphy, Robert J. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
Murphy, Roberto Stack [8975-22] S4
Murphy, Sean [8992-1] S1
Murphy, Timothy H 8928 S12 Session Chair, [8928-49] S10
Murphy, Timothy H. 8928 Program Committee
Murray, Andrea K. [8951-34] SPMon
Murray, Todd W. [8943-199] SPTues
Murthy, Avinash [8955-29] S7
Murty, M. V. Ramana 9001 Program Committee
Murua Escobar, Hugo [8972-13] S3, [8972-6] S2
Murugan, Ganapathy S. [8988-8] S2
Murzagulova, Kunzaz [8956-12] S3
Musevich, Igor [8960-41] S11
Musgraves, J. David [8974-12] S4, [8988-5] S1
Musick, Joshua D. [8941-18] S5
Mussot, Arnaud [8961-76] SPTue
Mustapha, Siti Aisyah [9005-20] S2
Mustecaplioglu, Ozgur [8993-94] SPWed
Mutlu, Mehmet [8995-4] S2
Mutyal, Nikhil N. [8952-13] S4, [8952-33] S9
Muyo, Gonzalo [8945-14] S4
Myara, Mikhael [8966-11] S8, [8966-29] S8
Mycek, Mary-Ann 8927 S4 Session Chair, 8935 Program Committee, [8935-80] SPSun
Myers, James F. [8993-84] S17
Myers, Jeffrey N. [8943-70] S11
Myers, Roberto C. [8996-10] S3
Myers, Stephen A. [8996-21] S6
Myoung, NoSoung [8969-26] SPTue
Myrtus, Christian [8927-44] S11, [8943-55] S8
Myrzakozha, Diyas [8939-1] S1
Mysliwiec, Jaroslaw 8983 Program Committee, [8983-31] S7
Myung, Seungjae [8927-26] S6
- N**
- Na, Byung Hoon [8977-9] S3
Na, Neil [8990-38] S8, [8990-6] S1
Nabavi, Sayyed [8928-84] S16
Nabiev, Igor R. 8955 S11 Session Chair, [8955-28] S6, [8955-37] S8, [8981-37] S9
Nadeau, Jay L. 8955 Program Committee
Nadeau, Kyle P. [8952-21] S6
Nader Esfahani, Nima [8987-4] S1, [8993-14] S2, [8993-84] S17
Naderi, Shadi A. [8964-67] SPTue
Nadkarni, Seemantini K. 8926 S20 Session Chair, [8926-66] S13, [8926-89] S18, [8926-97] S20, [8926-98] S20, [8935-58] S12, [8938-33] S7, [8942-6] S1, 8946 Program Committee, 8946 S7 Session Chair, [8946-32] S7, [8946-33] S7
Nadot, Annemarie [8952-17] S5
Nadtochenko, Viktor A. [8969-22] S4, [8969-22] S6
Nadvoretskiy, Vyacheslav V. [8943-27] S4
Naeem, Muhammad Azhar [8988-52] S11, [8990-44] S8
Naehle, Lars [8993-44] S8
Naemura, Takeshi [8979-12] S6
Nafee, Noha [8954-18] S5
Nagai, Akiko [8969-27] SPTue
Nagai, Shoh [8992-30] SPWed
Nagai, Takeharu [8948-64] S11, [8949-54] S11
Nagai, Toru [8962-4] S2
Nagakura, Toshiaki [8935-52] S11
Nagamatsu, Kentaro [8986-54] S11
Nagano, Shigenori [8961-115] SPTue
Nagao, Ryo [8926-72] S14
Nagao, Yuta [9006-49] SPWed
Nagaoka, Hiroki [8962-4] S2
Nagaoka, Masahiro [8938-31] S7
Nagaoka, Ryuji [8962-4] S2
Nagar, Saurabh [8987-84] SPWed
Nagashima, Kazuya [9001-3] S1
Nagashima, Toru [8986-64] S14
Nagata, Tomohisa [8947-51] S12
Nagel, Moritz [9000-14] S3
Nagi, Richie S. [8933-21] S6
Nagisetty, Siva Sankar [8959-75] SPTue
Nagli?, Peter [8926-29] S7
Nago, Hajime [8986-51] S10
Nagy, Gyula [8988-39] S8
Nahas, Amir [8926-24] S6, [8934-69] S11, [8943-185] SPMon, [8946-2] S1
Naidoo, Darryl [8960-52] S14, [8999-54] SPWed
Naik, Gururaj V. [8994-3] S1
Naik, Rajesh R. [8983-48] S11
Nair, Greshma [8994-69] SPWed
Naito, Michio [8987-22] S5
Najafi Sohi, Ali [8977-19] S4
Najda, Stephen P. [8986-58] S11
Najiminaini, Mohamadreza [8954-3] S1, [8957-18] S4
Najmaei, Sina [8984-2] S1
Nakada, Sho [8951-35] SPMon
Nakahara, Sumio [9006-51] SPWed
Nakai, Kazuki [8967-21] S9
Nakaji, Haruo [8936-18] S7
Nakajima, Hideaki [8980-17] S4
Nakajima, Takahito [8931-12] S3
Nakamura, Daisuke 8967 S12 Session Chair, [8967-52] SPTue, [8967-54] SPTue, 8970 S4 Session Chair, [8987-10] S2, [8987-78] SPWed, [8987-79] SPWed
Nakamura, Kentaro 8946 Program Committee
Nakamura, Takahiro [9010-5] S3
Nakamura, Takahiro [8969-9] S2
Nakamura, Tetsuya [8926-74] S15, [8941-15] S4
Nakano, Hitoshi [8967-21] S9
Nakano, Koki [8938-52] SPSun
Nakano, Motohiro [8994-65] SPWed
Nakano, Yoshiaki [9003-52] SPWed
Nakao, Shihomi [8967-54] SPTue
Nakao, Takaya [9004-7] S2
Nakata, Hidetaka [8948-47] S8
Nakata, Leticia S. [8926-77] S15
Nakata, Yoshiki 8967 Conference Chair, 8967 S1 Session Chair, 8967 S15 Session Chair, [8967-54] SPTue, 8968 S7 Session Chair, 8969 S3 Session Chair
Nakazawa, Isao [8971-28] S5
Nakazawa, Masataka 9009 Program Committee
Nalcioğlu, Orhan [8947-34] S2, [8947-34] S8
Nallappan, Kathirvel [8985-24] S6, [8985-25] S6
Nalpanitidis, Konstantinos [8985-23] S5
Nam, Ahhyun S. [8934-55] S8
Nam, Hyeonsoo [8926-100] SPSun
Nam, Ji-Yeon [8987-95] S6
Nam, Jutack [8934-36] S6
Nam, Ki Tae [8950-40] SPSun, [8952-29] S8
Nam, Ki-Bum 8986 Program Committee
Nam, Seung Yun [8943-100] S15, [8943-103] S15
Nam, Stephanie A. [8942-15] S4
Nam, Sung Hyun [8977-15] S4
Namiq, Medya Fouad [8976-16] S4
Namita, Takeshi [8952-45] SPSun
Nammabat, Soha [8983-13] S4
Nan, Xiaolin [8950-26] S7
Nanishi, Yasushi 8986 Conference Chair, 8986 S4 Session Chair, [9003-6] S2
Nankivil, Derek [8930-18] S4, [8934-13] S3, [8934-23] S4
Nannen, Ekaterina [9003-9] S2
Nanri, Hiroto [9008-10] S7
Napierala, Marek [8961-117] SPTue, [8961-118] SPTue, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
Napoli, Mariana F. [8973-5] S1
Narasimhan, Srinivasa G. [8979-25] S6
Narayana Murthy, V. B. [8952-48] SPSun
Narazaki, Aiko [8967-18] S9
Nardi, Andrijo B. [8931-49] SPMon
Narducci, Frank A. 8998 Conference Chair, [8998-58] S13
Närhi, Mikko [8964-26] S6
Narimanov, Evgenii E. [8994-3] S1
Nariyama, Tatsuya [8967-21] S9
Narmontas, Pranas [9006-4] S1
Narsipur, Sriram [8935-59] S12
Nascimento, Adriano R [8964-45] SPTue
Nash, Kelly L. [8943-99] S15, [8955-49] S11
Näsiliä, Antti [8977-13] S3, [8977-27] S6, [8992-10] S3
Nasilowski, Tomasz [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-44] S9, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
Nasirivanaki, Mohammadreza [8934-112] SPMon, [8943-219] SPTues, [8943-94] S14
Nasouri, Babak [8932-6] S1
Natale, Andrea [8943-3] S1
Natarajan, Lalgudi V. [9004-24] S3
Nathan, Vaidya 8993 Program Committee
Natrella, Michele [8993-47] S9
Nau, William H. [8926-46] S10
Naumann, Dieter 8939 Program Committee
Nava, Giovanni [8976-21] S5
Navara, Christopher [8941-60] S12
Navarro Y Garcia, Fabrice P. [8947-53] S12
Navarro-Cia, Miguel [8938-16] S4, [8993-47] S9
Nawashiro, Hiroshi [8928-19] S5
Nawata, Kouji [8964-9] S2
Naylor, Jack A. [8959-35] S8, [8959-44] S10
Naylor, David A. [8985-52] S11
Naylor, Mark F. 8944 Program Committee, 8944 S2 Session Chair, [8944-5] S2
Nazabal, Virginie [8938-3] S1, [8994-33] S9
Nazarenko, Svetlana V. [8998-49] S11
Nazaretski, Evgeny [8975-25] S2
Nazarkin, Mikhail Yu [8994-74] SPWed
Nazemi, Elnaz [8935-65] SPSun
Nazemosadat, Elham [8964-57] SPTue
Ndao, Sidy [8968-27] S6
Ndong, Gérald [8990-46] S9
Neagu, Liviu P. [8967-3] S1, [8967-3] S3
Neal, William R. [9003-43] S11
Nechache, Riad [8969-18] S4, [8969-18] S6
Neculaes, Bogdan [8941-59] S12
Nedelcu, Alexandru [8993-39] S7
Nedeljkovic, Milos [8989-12] S5, [8993-42] S8
Nedji, Jaroslav [8954-4] S1
Nedosekin, Dmitry A. [8943-31] S5
Needles, Andrew [8943-120] SPSun
Néel, Delphine [8986-8] S2
Neel, Victor A. [8940-28] S6, [8941-53] S11
Neels, Antonia [8975-17] S3, [8975-8] S2
Neergaard-Nielsen, Jonas Schou [8997-31] S11
Negoița, Viorel [8959-31] S7, [8965-27] S6
Negru?iu, Meda-Lavinia L. [8929-22] SPSun, [8934-11] SPMon
Nehal, Kishwer S. [8926-14] S3
Neidrauer, Michael T. [8935-56] S12
Neil, Mark A. A. [8950-25] S6
Neitz, Marcel [8991-15] S4
Neizvestnykh, Elena A. [8926-104] S21
Nekarda, Jan [8967-41] S14
Nelsen, Bryan L. [8997-27] S10
Nelson, Christopher E. [8934-70] S11
Nelson, Leonard Y. [8927-18] S4, [8929-3] S1, [8936-27] S6, [8945-5] S1
Nelson, Robert L. 8983 Program Committee
Nemec, Michal [8929-8] S2, [8959-72] SPTue, [8959-77] SPTue, [8959-78] SPTue
Nemec, Petr [8994-33] S9
Nemeth, Sheila Coyne [8930-16] S4
Nemova, Galina A. [9000-16] S4, [9000-17] S4, [9000-25] SPWed
Nemukhin, Alexander V. [8950-17] S4
Nenstiel, Christian [8986-26] S5, [8986-42] S8, [8987-6] S2
Neogi, Arup [8994-12] S4
Neri, Alberto [8930-52] SPSun
Neshatian, Mehmoosh [8955-14] S4
Neshtev, Dragomir N. [8994-41] S11, [8994-67] SPWed, [8999-11] S3
Nesi, Gabriella [8939-30] S6
Nesladek, Milo? [8997-2] S3, [8997-2] S7
Nett, Ralf [8968-29] S6
Netti, Paolo A. [8947-46] S11, [8947-57] S13
Netzel, Carsten [9003-25] S6
Neu, Walter [8952-4] S1
Neubert, Sebastian [8987-60] S12
Neudecker, Sabine [8939-28] S5, [8939-35] S6
Neuenschwander, Beat 8967 Conference Chair, 8967 S14 Session Chair, [8967-10] S10, [8967-10] S5, [8967-25] S10
Neugroschl, Daniel [8961-94] SPTue, [8990-5] S1
Neuhaus, Kai [8935-10] S3, [8942-9] S2, [8951-5] S1
Neumann, A. [8993-71] S14
Neumann, Benjamin [8961-75] SPTue
Neumann, Christiane [8976-12] S3, [8976-14] S3, [8976-8] S2
Neumann, Jörg [8961-105] SPTue, [8961-116] SPTue, [8961-87] SPTue
Neumann, Norbert [8977-26] S6, [8995-18] S5
Neves, Armando J. [8987-39] S8
Neves, Marilene [8947-21] S4
Neves-Petersen, Maria Teresa 8950 Program Committee
Neveu, Sophie [8988-14] S3
Newberry, Richard [8973-1] S1
Newell, Raymond T. [8993-18] S3
Newman, Dava [8975-3] S1
Newman, Michael [8971-24] S4
Neys, Kristiaan 9004 Conference CoChair, [9004-6] S2
Nezhad, Maziar Pourabdollah [8989-7] S10, [8989-7] S3
Ng, Alan M. C. [8987-85] SPWed
Ng, See Khee [8928-33] SPSat
Ng, Tien Khee [8986-15] S3, [8986-37] S7, [9003-28] S6
Ng, Tony C. [8949-12] S3
Ng, Yip Hang [8987-68] S1
Ngah, Lutfi A. [8997-35] S8
Ngcobo, Sandile S. [8944-19] S4, [8960-55] S15, [8960-56] S15, [8960-68] SPTue
Ngezahayo, Anaclot [8941-49] S8
Ngo, Phong, Linh [8975-2] S1
Ngo, Thong [8987-29] S6
Nguyen, Can [8926-119] S1
Nguyen, Dan Trung [8961-68] SPTue, [9000-20] S5
Nguyen, Freddy T. [8947-12] S3
Nguyen, Hai Son [8997-28] S10
Nguyen, Hieu P. [9003-5] S2
Nguyen, Hue M. [8981-36] S9
Nguyen, Jane [8955-38] S8
Nguyen, Khanh H. [8976-5] S1
Nguyen, Kytai T. [8943-46] S7, [8956-14] S3

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Nguyen, Minh 8993 Program Committee
Nguyen, Nam [8961-53] S12
Nguyen, Peter [8939-29] S5
Nguyen, Phuc Van [8926-47] S10, [8926-60] SPSat
Nguyen, Quyen [8939-27] S5
Nguyen, Thanh [8926-145] S7
Nguyen, Theinam [8926-116] S24
Nguyen, The-Quyen [8935-25] S5
Nguyen, Thien An [8999-12] S3, [8999-22] S5, [8999-24] S5, [8999-33] S7
Nguyen, Thu Ahn [8945-7] S2
Nguyen, Thu-Mai [8934-29] S5, [8943-34] S5, [8946-6] S2
Nguyen, Thuy T. [8926-58] SPSat, [8926-59] SPSat, [8941-20] S5
Nguyen, Trung Hau [8926-60] SPSat
Ni, Betty [8934-68] S10
Ni, Chaoying [8974-12] S4
Ni, Karl S. [8990-21] S4, [8990-24] S4
Ni, Xiaohui 8940 Program Committee
Ni, Yingjie [8941-22] S6
Niazi, Kayvan R. [8972-15] S4
Nic Chormaic, Sile G. [8960-17] S4, [8960-67] SPTue
Nichita, Norica [8958-12] S3
Nicholls, Stephen J. [8951-38] SPMon
Nicholson, Dawn M. [8929-15] S4, [8929-16] S4
Nicholson, Jeffrey W. [8961-27] S7
Nickdel, Mohammad B. [8935-2] S1, [8940-16] S4
Nickel, Norbert H. [8987-19] S4
Nickerson, Andrew K. [8950-26] S7
Nicolau, Dan V. 8947 Conference Chair, 8947 S11 Session Chair, 8947 S12 Session Chair, 8947 S13 Session Chair, [8947-44] S11, 8954 Conference Chair, 8954 S4 Session Chair, 8954 S5 Session Chair, 8954 S6 Session Chair, 8954 S7 Session Chair, 8954 Track Chair, [8954-15] S4, 8955 Track Chair, 8956 Track Chair, 8957 Track Chair, 8958 Track Chair
Nicoletti, Sergio [8988-24] S6, [8988-26] S6, [8993-43] S8
Nicolson, Susan C. [8942-17] S4
Nicouil, Matthieu [8967-38] S14
Nie, Bai [8948-9] S1
Nie, Craig D. [8961-77] SPTue
Nie, Gelay [8955-29] S7
Nie, Shuming 8957 Program Committee
Nieder, Jana B. [8984-54] S14
Niedre, Mark J. 8937 S4 Session Chair, [8937-17] S3, [8937-18] S4, [8937-41] SPSun
Niehoerster, Thomas [8948-49] S8
Nielsen, Michael P. [8984-17] S4, [8984-7] S2
Nielsen, Peter Carøe [8980-6] S2
Nielsen, Tim 8937 Program Committee
Niemasz, Jasmin [8993-31] S6
Niemenen, Timo A. [8999-9] S2
Nieri, Paola [8956-29] S8
Nierlich, A. [8926-141] S6
Nieschke, Kathleen [8947-30] S6, [8947-31] S6
Niesel, Thalke [8977-35] SPTue
Niesler, Fabian B. [8970-11] S3
Nieto Garcia, Daniel [8968-2] SPTue
Nieuwland, Rienk [8939-2] S1, [8952-6] S2
Nieva, Patricia [8977-19] S4, [8980-77] SPWed, [8980-8] S2, [8982-39] S8
Nieweglowski, Krzysztof [8991-4] S1
Nigar, Ezra [8927-7] S2
Niino, Hiroyuki [8963-31] S8, 8967 Program Committee, [8967-18] S9, [8967-19] S9
Nioka, Hirohiko [8948-41] S7
Nikitichev, Daniil I. [8943-21] S4, [8943-24] S4
Nikkhah, Hamdam [8988-18] S4
Nikodem, Michal P. [8982-9] S2
Nikol, Hans 9003 Program Committee, 9003 S1 Session Chair
Nikolsky, Aleksandr [9009-25] SPWed
Nikumb, Suwas [8973-17] S4, [8973-20] S5
Nilsen Neto, Luiz [8932-33] S7
Nilsson, Hans-Erik [8938-48] SPSun, [8982-79] SPWed
Nilsson, Johan [8961-82] SPTue, SC748
Nimmo, Michael [8981-36] S9
Ning, Cun-Zheng 8980 Program Committee, 8980 S5 Session Chair, [8980-15] S4
Ning, Nannan [8937-35] SPSun
Niparko, John [8926-122] S1
Nippert, Felix [8986-26] S5
Nirschl, Anna [8986-26] S5
Nishi, Kenichi [9002-3] S1
Nishi, Taiji [8945-9] S3
Nishida, Kohji [8930-50] SPSun
Nishida, Takehiro [8965-1] S1
Nishida, Tsutomu [8935-52] S11
Nishidate, Izumi [8928-19] S5, [8928-22] S5, [8928-47] S9, [8928-79] SPMon, [8938-52] SPSun
Nishihara, Hiromi [8986-30] S6
Nishihara, Masato [9008-3] S2
Nishii, Wataru [9006-50] SPWed
Nishikawa, Kazutaka [8948-47] S8
Nishimura, Akihiko [8963-35] S6, [8963-35] S9, [8963-7] S2, [8968-36] SPTue
Nishimura, Takahiro [8935-52] S11, [8954-24] S6
Nishino, Michiteru [8967-17] S9
Nishino, Shigeru [8943-117] SPSun
Nishio, Yukinobu [8974-30] SPTue
Nishioka, Michele A. [8932-19] S4, [8932-24] S5, [8932-27] S5
Nishioka, Norman S. 8927 Program Committee, [8927-10] S3, [8927-11] S3, [8927-2] S1, [8934-8] S2, [8935-5] S11
Nishishita, Naoki [8947-51] S12
Nishiwaki, Shiro [8967-43] S15, [8967-43] S7
Nishiyama, Akira [8936-3] S1, [8951-35] SPMon, [8951-36] SPMon
Nishiyama, Isa [9004-2] S1
Nishizaka, Takayuki [8947-52] S12
Nirkowski, Arthur [8934-14] S3
Nitta, Naotaka [8945-9] S3
Niu, Chengcheng [8943-127] SPSun
Niu, Hanben [8948-86] SPSun
Nizamoglu, Sedat [8958-11] S3
Njel, Christian [8981-51] S13
Nkanta, Julie E. [9007-8] S4
Noakes, David E. [8935-35] S8
Nobili, Stefania [8955-45] S10
Noblet, Yoann [8980-11] S3
Nobre dos Santos, Marines [8929-19] SPSun
Noculak, Agnieszka [8955-60] SPSun
Noda, Susumu 8994 Program Committee, [9002-34] S8, [9002-54] S12
Noda, Toshihiko [8928-20] S5, [8933-22] S6, [8974-17] S5
Noelke, Christian [8963-20] S5
Noell, Wilfried [8977-23] S5
Noeske, Axel [8965-18] S4
Noga, Janusz [8967-47] SPTue
Nogales, Emilio [8987-16] S3
Nogami, Jun [8968-1] S1
Noguchi, Takushi [8987-72] SPWed
Nogueira, Marcelo S. [8931-50] SPMon
Nogues, Claude [8983-20] S5
Noh, Gwang Myung [8926-150] SPSat
Noh, Hyeong-Uk [8935-70] SPSun
Noh, Miso [9003-69] SPWed
Noh, T. W. [8987-95] S6
Noharet, Bertrand [8992-26] S6
Noji, Hiroyuki [8933-22] S6
Nolan, Daniel A. [8999-12] S3, [8999-22] S5, [8999-24] S5, [8999-33] S7, [8999-35] S7
Nolan, Ryan M. [8926-118] S1, [8926-119] S1, [8935-39] S8, [8935-48] S10, [8935-75] SPSun, [8942-28] S7
Nold, Johannes [8961-31] S8
Nolte, David [8942-35] S9, [8952-23] S6, [9006-10] S2, SC1054
Nolte, Ingo [8972-13] S3
Nolte, Stefan [8961-89] SPTue, 8967 S5 Session Chair, [8967-40] S14, 8972 Conference Chair, 8972 S10 Session Chair, [8972-34] S8, [8972-40] S9, [8972-45] S11, [8972-45] S6, [8972-49] S13, [8972-49] S8, SC743
Noojin, Gary D. [8941-19] S5, [8941-8] S3
Noordmans, Herke Jan [8941-4] S2
Nordquist, Robert E. [8944-17] S4, [8944-29] SPMon, [8944-5] S2, [8944-7] S2
Nordrum, Ivar Skjåk [8941-34] S9
Nordstrom, Robert J. 8936 Program Committee, 8936 S5 Session Chair, 8945 Conference Chair, 8945 S5 Session Chair
Norin, Lars [8982-30] S6, [8982-59] SPWed
Norris, Ryan C. [8982-39] S8
Norton, Andrew P. [8978-12] S4
Norton, Dennis [8993-53] S10
Norwood, Robert A. [8948-14] S2, [8960-20] S5, [8974-52] S8, [8979-6] S5, [8982-23] S5, 8983 Program Committee, [8983-13] S4, [8991-24] S6, [8991-26] S6, [8996-41] S5
Nosi, Daniele [8948-57] S9
Noskov, Nikolay V. [8926-104] S21
Notake, Takashi [8964-9] S2
Notomi, Masaya 8994 Program Committee
Nouailhetas, Viviane L. A. [8926-106] S21
Nouzi, Farouk [8935-53] S11, [8937-42] SPSun
Novack, Ari [8990-1] S1
Novák, Jakub [8959-44] S10, [8959-49] S11
Novak, Michael [8926-118] S1, [8926-119] S1
Novák, Ondřej [8959-29] S7, [8959-75] SPTue
Novikova, Irina 8998 Program Committee, [8998-51] S11
Novoa Fernández, David [8984-49] S13
Novozhylv, Pavel B. [8959-10] S3
Ntziachristos, Vasilis [8927-17] S4, [8935-5] S1, 8937 Program Committee, 8943 Program Committee, 8943 S15 Session Chair, 8943 S5 Session Chair, [8943-147] SPSun, [8943-49] S8, [8943-85] S13, [8943-87] S13
Nuccitelli, Richard 8941 Program Committee, [8941-56] S1
Nunes dos Santos, Jean [8932-20] S4, [8932-38] SPSun, [8932-44] SPSun
Nunn, Joshua [8998-18] S4
Nunoue, Shinya [8986-51] S10
Nunzi Conti, Gualtiero 8960 Program Committee, 8960 S10 Session Chair, [8960-7] S2, 8988 Conference Chair, 8988 S6 Session Chair, [8988-39] S8, [8988-71] SPWed
Nunzi, Jean-Michel 8983 Program Committee
Nurmikko, Arto V. [9002-5] S1
Nussbaumer, Bernhard [8959-8] S3, [8965-31] S7
Nussinov, Zohar [8949-56] SPMon
Nuster, Robert [8943-126] SPSun, [8943-186] SPMon, [8943-208] SPTues, [8943-220] SPTues, [8943-90] S13
Nutsch, Andreas [8987-88] SPWed
Nuttall, Alfred L. 8928 Program Committee
Nyberg, Lena [8948-28] S5
Nyga, Piotr [8957-23] S5
Nyk, Marcin [8983-20] S5
Nylik, Jonathan [8949-31] S7
Nys, Inge [9004-6] S2
-
- O
O'Donnell, Matthew 8943 S11 Session Chair, 8943 S5 Session Chair, [8943-156] SPMon
Oaida, Bogdan V. [8971-31] S5
Oak, Chulho [8926-150] SPSat
Obara, Go [8967-46] SPTue, [8967-5] S2, [8967-5] S4, [8972-54] SPTue
Obara, Minoru [8967-5] S2, [8967-5] S4
Obata, Toshiyuki [8986-64] S14
Obeid, Patricia [8947-53] S12
Ober, Raimund J. 8949 Program Committee, 8949 S10 Session Chair
Obi, Hiroshi [8926-69] S14
Obliosca, Judy M. [8950-46] SPSun
Oboza, Jozef V. [8968-13] S3
- O'Brien, Christine Mary** [8935-22] S5, [8939-23] S4
O'Brien, Dominic C. 9007 S5 Session Chair, [9007-14] S6, 9009 S5 Session Chair
O'Brien, Emily C. [8933-24] SPSun
O'Brien, Nada A. 8992 Program Committee, 8992 S2 Session Chair, [8992-2] S1
Ocañao, J. L. [8972-63] SPTue
Ocelik, Vaclav [8968-13] S3
O'Connor, Ian [8988-23] S5
O'Connor, Shawn P. [8961-71] SPTue
Oda, Katsuya [9010-18] S6, [9010-18] S7
Oda, Motoki [8928-23] S6
Oda, Sumihisa [9004-13] S4
Oda, Takahiro [9004-22] SPWed
O'Dell, Dakota [8976-41] S9
Oden, Patrick I. Symposium Committee
O'Donnell, Matthew [8934-29] S5, 8943 Program Committee, [8943-119] SPSun, [8943-34] S5, [8943-75] S11, [8946-6] S6
O'Driscoll, Ian [9002-13] S3
Oechsner, Andreas [8963-18] S5
Oehler, Andreas E. [8959-40] S10
Oelckers, Stefan [8930-36] S8
Oermann, Michael [8961-45] S11
Oesterling, Ingo [8950-1] S1
O'Faolain, Liam [8990-11] S3, [8990-7] S2, [8991-18] S5, [8995-21] S6
Offenhausser, Andreas [8928-96] S19
Offerhaus, Herman [8948-91] SPSun
Offrein, Bert-Jan 8991 Program Committee, 8991 S8 Session Chair
Ofir, Shay [8930-38] S8
Ofuji, Taihei [8987-78] SPWed
Ogata, Tadanori [8947-3] S2
Ogata, Tomonari [9004-21] SPWed, [9004-22] SPWed
Ogawa, Emiyu [8926-74] S15, [8941-15] S4, [8941-21] S5, [8941-30] S8, [8941-31] S8
Ogawa, Hiroyo [9007-10] S5
Ogawa, Kensuke [8990-34] S7
Ogawa, Mikako [8931-38] S8
Ogawa, Takayo [8959-56] S13
Oghalai, John S. [8934-32] S5
Ogihara, Sho [8974-30] SPTue
Ogihara, Yuki [9006-28] S6
Ogiwara, Akifumi [9004-17] S4, [9004-19] SPWed, [9004-23] SPWed
Ogle, Brenda M. [8947-65] S14
Oglesbee, Robert A. [8948-34] S6
Ogudo, Kingsley Aisaboluokpea [8990-20] S4, [8991-7] S2
Ogunlade, Olumide [8943-101] S15, [8943-61] S9
Ogura, Yusuke [8954-24] S6
Oh, Christian M. [8928-78] SPMon, [8934-43] S7, [8952-22] S6
Oh, Geum-Yoon [8980-35] S9
Oh, Hye-Keun [8974-7] S2
Oh, JungHwan [8926-47] S10, [8926-60] SPSat
Oh, Jungtaek [8943-71] S11
Oh, Min-Cheol 8988 Program Committee, [8988-49] S11, [8988-60] SPWed, [8988-61] SPWed, [8988-69] SPWed, [9005-19] SPWed
Oh, Sang Ho [8986-17] S4
Oh, Sang-Hyun [8990-35] S13
Oh, Seong-Woo [9004-9] S3
Oh, Seung Jae [8952-9] S2
Oh, Seung-Jong [9003-60] SPWed
Oh, Tae Su [8986-10] S2, [8986-43] S8
Oh, Wang-Yuhl [8926-88] S18, [8926-89] S18, [8926-94] S19, [8926-99] SPSun, [8934-40] S6, [8934-87] SPMon
Oh, Young-Jae [8958-4] S1
Oh, Youngjin [8947-52] S12, [8954-13] S3
Oh, Yujin [8935-62] S12
Oh, Hara, Evan C. [8987-34] S1
Ohara, Yuichi [9006-35] S7
Ohashi, Masaharu [9009-10] S5
Ohashi, Mitsuo [8928-27] SPSat
Ohishi, Yasutake 8982 Program Committee, [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-62] SPWed, [8982-63] SPWed, [8982-70] SPWed, [8982-71] SPWed

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Ohlander, Samuel J. [8939-29] S5
 Ohlmeyer, Hannah [8938-14] S3
 Ohmi, Masato [8934-118] SPMon
 Ohno, Kenichi [8997-3] S3, [8997-3] S7
 Ohno, Yuko [8935-52] S11, [8954-24] S6
 Ohno, Yutaka [8982-24] S5
 Ohta, Jun [8928-20] S5, [8933-22] S6, [8974-17] S5
 Ohta, Taisuke [8994-45] S11
 Ohta, Yasumi [8928-20] S5
 Ohtani, Keita [8993-3] SKey
 Ohtani, Kiyoshi [8939-1] S1
 Ohtsuka, Minoru [8990-47] S9
 Ojovan, Silvya M. [8997-2] S3, [8997-2] S7
 Okabe, Ryo [9008-13] S7
 Okada, Akiko [8986-30] S6
 Okada, Shuji 8983 Program Committee
Okada, Tatsuo [8967-52] SPTue, [8967-54] SPTue, 8987 Program Committee, [8987-10] S2, [8987-78] SPWed, [8987-79] SPWed
 Okada, Yoshitaka [8981-23] S6
 Okajima, Akiko [8980-68] SPWed, [8983-25] S6, [8983-52] SPWed
 Okamoto, Atsushi [8997-6] S4, [8997-8] S4
 Okamoto, Hiroyuki [8994-31] S8
 Okamoto, Toshihiro [8994-31] S8
 Okano, Kazunori [8948-71] SPSun
 Okano, Masato [8974-30] SPTue
 Okawa, Shinpei [8943-137] SPSun, [8943-154] SPMon, [8943-214] SPTues
 Okazaki, Shigetoshi [8948-60] S10
 Oketani, Ryojoke [8950-41] SPSun, [8957-30] S7
 Okhotnikov, Oleg G. [8959-47] S11, [8966-14] S4, [8966-4] S2, [8980-59] SPWed
 Okishev, Andrey V. [8959-61] S14
 Oklu, Rahmi [8934-59] S9
 Okoshi, Masayuki 8967 S12 Session Chair, [8967-26] S11, 8970 S4 Session Chair
 Okrimchuk, Andrey G. [8938-18] S4
 Oksanen, Jani [8980-2] S1, [8980-34] S9
 Oktyabrsky, Serge [9002-63] S14
 Okubo, Kaito [9006-48] SPWed
 Okuda, Wataru [8928-7] SPMon
 Okumura, Ryojoke [8977-11] S3
 Okumura, Tadashi [9010-18] S6, [9010-18] S7
 Okuno, Toshiaki [8926-69] S14
 Okur, Serdal [8986-20] S4, [8986-77] SPWed, [8986-81] SPWed, [9003-65] SPWed
 Okuyama, Fumio [9006-35] S7
 Olarte, Omar E. [8978-10] S4
 Olausson, Christina B. [8961-39] S9
 Olbricht, Benjamin C. [8983-44] S10, [8983-45] S10
 Olde Riekerink, Mark B. [8973-21] S5
Oldenburg, Amy L. [8927-43] S11, [8934-35] S6, [8935-45] S9, 8946 Program Committee, 8946 S7 Session Chair, [8952-38] S10
 Oldham, Kenn R. [8927-31] S1, [8927-31] S8
 Olds, William J. [8939-9] S2
 Oleinick, Nancy L. 8931 Program Committee
 Oleinikov, Vladimir Alexandrovich [8955-37] S8
 Olejnik, Maria [8957-22] S5
 Olesberg, Jonathon T. [8993-53] S10
 Olesen, Oline V. [8979-22] S2, [8979-22] S8, [8979-3] S3
 Olesiak-Banska, Joanna [8955-11] S3, [8983-20] S5
 Olikar, Benjamin Q. [8962-10] S3
 Oliva, Esther [8931-13] S3, [8956-3] S1
 Olivares-Pérez, Arturo [9006-38] SPWed, [9006-41] SPWed, [9006-43] SPWed, [9006-44] SPWed, [9006-45] SPWed, [9006-46] SPWed, [9006-54] SPWed, [9006-55] SPWed
 Olive, D. Michael 8956 Program Committee
 Oliveira, Enos [8930-53] SPSun
 Oliveira, Michael C. [8928-50] S10
 Oliveira-Filho, Ronaldo A. [8947-69] SPMon
 Olivier, M. [8959-57] S13
 Olivier, Melinda [8994-33] S9
Olivier, Scot S. 8978 Program Committee
 Olivier, Ségolène [8990-36] S7
 Olivo, Malini C. [8943-161] SPMon
 Olowinsky, Alexander [8968-31] S15, [8968-31] S7, [8968-40] SPTue
 Olson, Craig 8992 Conference Chair, 8992 S3 Session Chair
 Olson, Don [9002-50] S12
Omar, Murad [8943-49] S8
 Omenetto, Fiorenzo Gabriele [8958-1] SKey, [8974-7] S2
 Omran, Haitham [8977-28] S6
 Omrane, Badr [8973-19] S4
 On, Vincent [8928-95] S19
O'Neal, Patrick D. 8951 S6 Session Chair, [8951-27] S6, [8955-27] S6
Ong, Yi Hong [8926-18] S4, [8940-17] S4, [8940-3] S1
 Ongole, Ravikiran [8940-21] S4
 Ongstad, Andrew P. [9002-42] S9
 Onigbanjo, Quam [8926-112] S23
 Onishchukov, Georgy [8964-19] S5
 Onken, Jane [8952-28] S7
 Ono, Bruno [8931-51] SPMon
 Ono, Hirotaka [9009-21] S8
 Ono, Takahito [8994-15] S4
 Onodera, Noriaki [8985-39] S8
 Onomura, Masaaki [8986-70] S15
 Onuseit, Volkher [8967-16] S13, [8967-16] S8, [8967-20] S9
Ooi, Boon S. [8986-15] S3, [8986-37] S7, [9002-1] S1, [9003-28] S6
 Oonk, Johannes [8973-21] S5
 Opalevs, Dmitrijs [8964-1] S1
 Opitz, Jörg L. [8956-26] S6
 Oppeneer, Peter M. [8984-40] S11
Oraevsky, Alexander A. 8943 Conference Chair, 8943 S1 Session Chair, 8943 S3 Session Chair, 8943 SAwd Session Chair, [8943-112] SPSun, [8943-18] S3, [8943-223] SPTues, [8943-27] S4, [8943-4] S15, [8943-99] S15
 Orbe Nava, Luis Jorge [8993-43] S8, [9002-59] S13
 Orcutt, Jason S. [8990-9] S2
 Ordóñez-Padilla, Manuel Jorge [9006-43] SPWed, [9006-44] SPWed, [9006-54] SPWed
 O'Reilly, Sylvain [9009-14] S6
 Orenstein, Meir [8998-4] S1
 Orioux, Adeline [8997-34] S4
 Orishich, Anatoly M. [8963-34] S8
 Orlova, Anna G. [8943-193] SPTues, [8952-27] S7, [8956-36] S9
 Ornatowski, Wojciech [8955-38] S8
Oron, Ram [8967-55] SPTue
 Orozco Guillen, Eber E. [8949-66] SPMon
 Orozco-Muñoz, Rosa Elena [9006-38] SPWed, [9006-55] SPWed
 Orringer, Daniel A. [8948-24] S4
 Orsel, Joke [8954-26] S6
Orsinger, Gabriel V. [8955-52] S11
Ortega, Tiago [9003-68] SPWed
 Ortega-Moñux, Alejandro [8995-30] S8, [8995-38] S10
 Ortega-Quijano, Noé [8941-12] S3
 Orthaus, Sandra [8949-56] SPMon
 Ortiz, Roy M. [8938-15] S3
 Ortiz, Sophie [8988-26] S6
 Ortiz-Gutiérrez, Mauricio [9006-38] SPWed, [9006-43] SPWed, [9006-54] SPWed, [9006-55] SPWed
 Ortiz-Neria, David I. [8963-37] SPTue
 Ortmaier, Tobias [8926-138] S6
 Ortmann, Uwe [8936-19] S4
 Ortolani, Michele [8985-58] SPWed
 Orwin, Elizabeth J. [8934-100] SPMon
 Osaka, Yasu 8968 Program Committee
 Osanlou, Ardeshir [9006-14] S3, [9006-24] S5, [9006-25] S5
 Osellame, Roberto 8968 Program Committee, [8968-17] S4, [8968-20] S4, [8970-25] S7, [8970-7] S2, [8972-31] S8, [8972-33] S8, [8976-21] S5, [8976-48] S10
 Osgood, Richard M. [8990-23] S4, [8993-42] S8
 Oshika, Tetsuro [8934-60] S9
 Oshikane, Yasushi [8994-65] SPWed
 Oshima, Yasuhiro [8947-51] S12
Oshima, Yusuke [8947-7] S2
 Osiko, Vyacheslav V. [8959-77] SPTue
Osinski, Marek 8955 Conference Chair, 8955 S1 Session Chair, [8955-18] S4, [8955-38] S8, 8980 Conference Chair, [8980-29] S7, [8980-41] S11, [8980-44] S11, 8981 Program Committee
Osoorio, Cecilia [8926-38] S8
 Ossikovski, Razvigor [8990-46] S9
 Ostatochnikov, Vladimir A. [8941-39] SPMon
Osten, Wolfgang [8949-17] S4
Ostendorf, Andreas [8952-3] S1, [8955-6] S2, [8957-14] S4, [8960-16] S4, [8963-2] S1, 8967 Program Committee, 8967 S8 Session Chair, 8968 Program Committee, [8968-29] S6, 8972 S13 Session Chair, [8972-39] S9, [8999-49] S10
 Ostendorf, Ralf [8977-6] S2, [8993-57] S12
 Oster, Cornelius [8933-23] S6
 Ostermann, Johannes [8955-67] SPSun
 Ostroverkhova, Oksana [8983-60] SPWed
 Ostrowski, Anastasia K. [8943-6] S1
Ostrowski, Lukasz [8961-126] SPTue, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
 O'Sullivan, Ciara K. 8976 Program Committee
 O'Sullivan, Créidhe 8985 Conference Chair, [8985-42] S9
 Ota, Yasutomo [9002-33] S8
 Otero, Nerea [8967-31] S12, [8967-31] S4, [8970-15] S12, [8970-15] S4
Othman, Mohamed A. K. [8980-45] S12
Otomo, Akira 8983 Program Committee, [8983-42] S10, [8988-10] S2
 O'Toole, Peter [8947-71] SPMon
 Otsuji, Taiichi [8993-80] S16
 Otsuka, Yoichi [8947-11] S2
Ott, Daniel [8959-54] S12, [8965-16] S4, [8966-13] S4, [8982-36] S7
 Ott, Julian [8974-27] S7
 Otto, Ceas [8939-15] S3
 Otto, Cornelis [8939-2] S1
Otto, Hans-Jürgen 8961 Program Committee, [8961-31] S8, [8961-55] S13, [8961-79] SPTue, [8961-84] SPTue
 Otto, Thomas [8977-12] S3
Otugen, M. Volkan [8960-18] S4
Ouchen, Fahima [8983-48] S11
 Ouellet, Samuel [8994-44] S11
Ouellette, Olivier [8927-20] S5, [8992-5] S2
 Ouerdane, Youcef [8971-13] S2
 Ougazzaden, Abdallah [8987-33] S7
 Ouimet, Bruno [8943-181] SPMon
 Oustinov, Dimitri [8984-41] S11
 Overmeyer, Ludger [8963-29] S7
 Overmiller, Brock M. [8983-45] S10, [8985-30] S7
 Ovsyannikov, Sergey V. [8975-24] SPTue
 Ovtchinnikov, Alexander [8965-22] S5
 Owari, Hiroshi [8974-36] SPTue
 Owen, Drew [8976-10] S3
 Owens, Nathan [8989-12] S5
 Owrutsky, Jeffrey C. [8984-18] S4, 8996 Program Committee, [8996-24] S7
 Owsik, Jan A. [8967-47] SPTue
 Oyebola, Olusola [8982-66] SPWed
 Ozaki, Masanori 9004 Conference Co-Chair, [9004-7] S2
 Ozaki, Shigenori [8947-51] S12
 Ozanam, Cécile [8993-6] SKey
 Ozbay, Baris [8950-30] S8
Ozbay, Ekmele 8993 Program Committee, 8993 S7 Session Chair, [8993-63] S13, 8994 Program Committee, [8995-4] S2
Ozcan, Aydogan [8933-21] S6, [8936-32] S7, [8949-15] S4, 8951 S3 Session Chair, [8951-12] S3, [8954-10] S3, [8974-9] S3, 8982 Program Committee
Özcan, Meriç [9006-34] S7
 Ozdemir, Sahin Kaya [8960-25] S6
 Ozeki, Yasuyuki [8947-11] S2
 Ozen, Metin 8973 Program Committee
 Ozga, Katarzyna [8969-25] SPTue
 Özgür, Umit 8986 Program Committee, [8986-20] S4, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed, [8986-83] SPWed, [9003-65] SPWed
 Ozkan, Cengiz Sinan [8994-63] S15
 Ozkan, Mihrimah [8994-63] S15
 Ozturk, Mehmet S. [8937-28] SPSun, [8937-29] SPSun

P

- P. da Silva, Edson [9008-17] S8
 P., Praveen [8947-61] S13
 Paajaste, Jonna [8966-24] S7
 Paasch, Uwe [8926-10] S2
 Pabœuf, David [8966-9] S3
Pace, Seth [8962-18] S5
 Pachaiappan, Rekha [8935-24] S5
 Pacheco, Marcos Tadeu [8926-36] SPSun, [8935-77] SPSun
 Pacheco, Shaun [8936-31] S7
 Pacher, Tamara [8968-24] S5, [8976-3] S1
 Padalkar, Mugdha [8926-112] S23
 Padera, Timothy P. [8934-51] S8
Padgett, Miles J. 8999 Program Committee, [8999-43] S9, [8999-53] SPWed
 Padilla, Willie [8982-18] S4, [8985-59] SPWed
Padilla-Vivanco, Alfonso [8949-66] SPMon
 Paek, Seung Hwan [8972-41] S9
 Pagano, Roberto [8990-27] S5, [8990-40] S8, [8990-42] S8
 Pagare, Sandeep [8926-147] S7
 Pagnozzi, Alex [8927-50] S12
 Pahl, Uli [8965-15] S4
 Pahlevianezhad, Hamid [8927-34] S9
 Pai, Chao-Yu [9003-24] S5
 Pai, Keerthilatha M. [8940-21] S4
 Paie, Petra [8968-17] S4, [8968-20] S4, [8976-21] S5, [8976-48] S10
 Paiella, Roberto [8980-28] S7
 Paik, Seung-ho [8928-0] SPMon
Paik, Young Hun [8954-19] S5, [8993-46] S8, [8994-35] S9, [8996-31] SPWed
Pain, Frederic [8928-87] S16
 Painchaud, Yves [8988-20] S5
 Painter, Oskar J. [8997-21] S8
 Pailantes, Domas [8972-42] S9
 Paire, Myriam 8981 S13 Session Chair, [8981-33] S8, [8981-8] S2
 Paius, Cristina M. [8958-12] S3
 Päiväsari, Kimmo [8967-14] S12, [8967-14] S7
 Pakalapati, Rajeev T. [9003-39] S10
Pak, Bishnu P. 9008 Program Committee, [9008-18] S9
 Pal, Rahul [8937-10] S2
 Pal, Rajan [8973-14] S3, [8973-2] S1
 Pala, Irina R. [8984-18] S4
 Pala, Nezh [8985-4] S1
 Palanchoke, Ujwol [8994-34] S9
 Palanisami, Akilan [8931-13] S3, [8956-3] S1
 Palankar, Raghavendra [8954-22] S5
Palanker, Daniel V. 8930 Program Committee, 8930 S7 Session Chair, [8930-39] S8
 Palaras, Alexander [8926-149] SPSun
 Palawong, Kunakorn [8949-55] SPMon
 Palazzo, Laurent [8935-41] S9
 Palermo, Samuel [8991-19] S5
 Palmer, Darwin 8999 Program Committee, [8999-50] S10
 Palka, Norbert [8973-26] SPTue
 Palla, Andrew D. [8962-15] S4, [8962-9] S3
 Palled, Siddanna [8940-31] S6
 Pallmann, Wolfgang P. [8966-17] S5
 Palmer, Scott G. [8935-9] S3
Palmieri, Luca [9009-15] S6
 Palomares, Emilio J. [8955-2] S1
 Palomo, Rebecca [8932-33] S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Paltauf, Günther** 8943 Program Committee, 8943 S12 Session Chair, 8943 S8 Session Chair, [8943-126] SPSun, [8943-186] SPMon, [8943-208] SPTues, [8943-220] SPTues, [8943-90] S13
- Paluch, Shir [8928-37] S7
- Paluchowski, Lukasz A.** [8926-27] S7, [8926-7] S1, [8936-1] S1, [8947-16] S4
- Palui, Goutam [8955-10] S3, [8955-24] S5, [8955-67] SPSun
- Palumbo, Gianfranco [8963-8] S2
- Pamin, Sirko [8963-29] S7
- Pan, Chao [8993-61] S12
- Pan, Ci-Ling** 9004 Program Committee
- Pan, Dipanjari [8943-197] SPTues
- Pan, Hui-Te [8983-57] SPWed
- Pan, Jiaoping [8990-50] SPWed
- Pan, Leiting [8944-20] SPMon
- Pan, Leo L. [8943-183] SPMon
- Pan, Liang** [8967-6] S3, [8967-6] S5
- Pan, Mengshu [9003-13] S3
- Pan, Wei [9008-9] S7
- Pan, Wei [8993-83] S17
- Pan, Xiaoping [8986-10] S2, [8986-43] S8
- Pan, Yingtian [8928-45] S9, 8934 Program Committee
- Pan, Zeyu** [8991-40] S9
- Pan, Zhongqi 9009 S6 Session Chair, [9009-5] S4
- Panajotov, Krassimir 9001 Program Committee
- Pancheri, Lucio [8982-37] S7
- Pande, Paritosh [8926-131] S4, [8947-14] S3
- Pandey, Kiran [8940-18] S4
- Pandey, Raviv [8962-14] S4
- Pandey, Ravindra K. 8931 Program Committee, [8943-15] S3
- Pandorf, Hélliton [8928-72] SPMon
- Pandya, Aditya** [8938-51] SPSun
- Paniagua-Dominguez, Ramon [8996-12] S4
- Panigrahi, Prasanta K. [8942-20] S4
- Panigrahi, Prasanta K. [8952-25] S7
- Panjehpour, Masoud 8993 S13 Session Chair
- Pannala, Sreekanth [8969-3] S1
- Pant, Mamta [8939-19] S3
- Pant, Shilpa [8947-42] S10
- Pantola, Chayanika [8940-18] S4
- Pantzas, K. [8987-33] S7
- Paolasini, Steven [8967-36] S13
- Papadopoulos, Ioannis N. [8938-41] S8, [8943-9] S2
- Papaioannou, Sotirios [8982-64] SPWed, [8991-33] S8
- Papakonstantinou, Ioannis [8943-24] S4
- Papasouliotis, George [8986-7] S2
- Papastergiou, Georgios [9009-16] S7
- Papathanassiou, Athanasios [8970-17] S12, [8970-17] S4
- Papautsky, Ian 8976 Program Committee
- Papay, Joel A.** [8930-46] SPSun
- Pappalardo, Alfio [8990-39] S8
- Paproski, Robert J. [8943-67] S10, [8943-74] S11
- Paques, Michel [8930-11] S3
- Paquet, Carl [8988-20] S5
- Paquette, Anne [8931-21] S4
- Paradis, Norman [8951-19] S4
- Paraguassu, Gardênia M. [8932-43] SPSun, [8932-44] SPSun
- Paraíso, Taofiq K. [8984-31] S9
- Parak, Wolfgang J. [8933-4] S2, 8955 Conference Chair, [8955-17] S4, [8955-53] S12
- Paranjpe, A. [8986-7] S2
- Pardo, Fabrice [8981-51] S13, [8982-20] S4, [8993-23] S4
- Pardo, Julian [8955-53] S12
- Pareige, Christelle [8961-78] SPTue, [8961-88] SPTue
- Parel, Jean-Marie 8930 Program Committee, 8930 S3 Session Chair, 8930 S8 Session Chair, [8930-29] S7
- Parillaud, Olivier [9002-51] S12
- Parilov, Evgueni [8980-70] SPWed, [8983-54] SPWed
- Parisi, Antonino [8990-40] S8, [8990-41] S8, [8990-43] S8
- Parizoto, Nivaldo [8932-30] S6
- Parizotto, Nivaldo Antonio [8926-22] S5
- Park, B. Hyle [8928-2] S1, [8928-43] S8, [8928-46] S9, [8928-50] S10, [8928-78] SPMon, [8934-43] S7, [8952-22] S6
- Park, Byeong-Gon [8992-14] S3
- Park, Chang-Young [8977-9] S3
- Park, Cheolmin [8983-11] S3
- Park, Chungyun [8950-24] S6, [8950-40] SPSun
- Park, Dong-Han [8928-80] SPMon
- Park, Doo-Jae [8984-44] S12
- Park, Eun-Kee [8926-150] SPSat
- Park, Gun-Sik 8941 Program Committee
- Park, Hae-Seok [8977-15] S4
- Park, Hong-Gyu [9002-37] S8
- Park, Hyeon-Cheol [8927-13] S3, [8977-1] S1, [8977-1] S8
- Park, Hyeong Ju [8938-50] SPSun, [8949-62] SPMon
- Park, Hyeong Soo [8986-75] SPWed
- Park, Hyeong-Ryeol [8985-56] SPWed
- Park, Hyo-Hoon** 8991 Program Committee
- Park, Hyunjoon [8946-23] S5
- Park, Ik Gon [8982-50] SPWed
- Park, In-Su [8932-42] SPSun
- Park, Jae Seok [8938-50] SPSun, [8949-62] SPMon
- Park, Jeong-Woo [8985-7] S2, [8985-8] S2
- Park, Jesung [8926-131] S4, [8934-32] S5, [8935-37] S8
- Park, Ji Ho [8934-40] S6, [8952-29] S8
- Park, Ji Hyun** [9004-30] SPWed, [9004-32] SPWed
- Park, Jihoon [8949-61] SPMon
- Park, Jimin [8950-40] SPSun
- Park, Jinhyoung [8943-178] SPMon
- Park, Ji-Sub [9004-9] S3
- Park, Jongbok [8968-38] SPTue
- Park, Jongchul [8961-94] SPTue, [8990-5] S1
- Park, Joo Hyun [8934-120] SPMon
- Park, Joongseo 9003 Program Committee
- Park, Joonhan [8980-67] SPWed
- Park, Joong-Man [8975-23] S4
- Park, Jun Hyuk [9003-27] S6
- Park, Jung Ho [8988-59] SPWed
- Park, Jung-Hoon [8950-40] SPSun
- Park, Jusang [8987-38] S8
- Park, Kibeom [8934-131] SPMon, [8934-132] SPMon
- Park, Kwan Seob [8949-60] SPMon
- Park, Kyeongsun [8926-99] SPSun
- Park, Kyung Hyun [8985-5] S2, [8985-55] SPWed, [8985-7] S2, [8985-8] S2
- Park, Kyung-Woo [9004-9] S3
- Park, Mi Kyoung [8990-29] S6
- Park, Min-Kyu [9004-9] S3
- Park, Myoung Jin [8957-34] S7
- Park, Namkyoo [8957-34] S7, [8985-18] S4
- Park, Q-Han [8984-14] S3, [8984-30] S8
- Park, Sang-Gil [8985-6] S2
- Park, Sangshik [8934-124] SPMon
- Park, Sangwoo [8962-23] SPTue
- Park, Seung-Han [8994-71] SPWed, [8996-28] SPWed
- Park, Seung-Jung [8926-88] S18
- Park, Si-Hyun [9003-66] SPWed
- Park, Soo Goan [8986-75] SPWed
- Park, Sun-Joo [8983-40] S9
- Park, Taejin [8926-94] S19, [8934-40] S6
- Park, Teahoon [8983-56] SPWed
- Park, Won Hyun [8992-14] S3
- Park, Yong-Hwa** 8977 Conference Chair, 8977 S2 Session Chair, [8977-9] S3
- Park, YongKeun** [8943-202] SPTues, [8946-23] S5, [8950-24] S6, [8950-40] SPSun, [8952-29] S8
- Park, Young-Soo [8991-8] S2
- Parks, Joshua W. [8988-40] S9
- Parol, Frederic [8971-6] S1
- Paronyan, Marina H. [8942-16] S4
- Parot, Vicente** [8935-51] S11
- Parsley, Margaret A. [8943-179] SPMon
- Parsy, François [8988-14] S3
- Partel, Stefan [8968-24] S5, [8976-3] S1
- Parthiban, Sujeeth [8939-29] S5
- Pasang, Timotius [8973-8] S2
- Paschalis, Eleftherios P. 8926 Program Committee
- Paschen, Timo [8984-43] S11
- Paschke, Katrin [8965-47] SPTue, [8965-8] S2, [9002-9] S2
- Paschotta, Rüdiger** SC818, SC860, SC931
- Pashaie, Ramin [8928-91] S18, [8934-126] SPMon, [8941-26] S7
- Pashakhanloo, Farhad [8948-80] SPSun
- Pashkin, Alexej [8964-8] S2
- Pasiskevicius, Valdas [8966-4] S2
- Pasqualucci, Carlos A. [8935-77] SPSun
- Passow, Thorsten [9003-33] S7
- Pasternak, Iwona [8961-81] SPTue
- Pastorelli, Francesco [8984-54] S14
- Pataca, Daniel M. [8964-45] SPTue
- Patch, Sarah K. [8943-98] S1
- Patel, Ankit H. [8930-44] S9, [8934-82] S12
- Patel, Ankitkumar N. [9008-16] S8
- Patel, Darayas N. [8982-75] SPWed
- Patel, Dinesh [8973-13] S3
- Patel, Jasbir N. [8973-19] S4
- Patel, Jigarkumar S. [9008-16] S8
- Patel, Pranav M. [8926-83] S17, [8934-79] S12
- Patel, Rakesh [8940-1] S1, [8940-28] S6, [8940-8] S2
- Paterson, Carl [8946-20] S5
- Paterson, Dan [8980-78] SPWed
- Pathak, Rajiv [8965-36] S8
- Pathiraja, Pubudu N. J. [8935-15] S4
- Pati, Gour S.** 8998 Program Committee, [8998-57] S13
- Patil, Ajeetkumar** [8940-21] S4
- Patil, Chetan A.** [8934-70] S11
- Patimisco, Pietro [8993-30] S5, [8993-70] S14, [8993-74] S15
- Patonay, Gabor** 8956 Program Committee, 8956 S2 Session Chair, [8956-28] S8
- Patterson, Brian D. [8961-38] S9
- Patterson, Jean L. [8988-40] S9
- Patterson, Michelle [8943-181] SPMon
- Patterson, Steven G. [8962-14] S4, [8965-18] S4, [8965-45] SPTue, [8965-49] SPTue
- Patting, Mathias [8936-19] S4, [8948-49] S8, [8950-8] S2
- Patton, Brian R. [8949-41] S9, [8978-14] S5
- Patway, Nurmohammed [8949-37] S8, [8949-39] S8, [8949-40] S8
- Patzelt, Alexa [8942-12] S2
- Pau Vizzaino, Jose Luis 8987 S8 Session Chair, [8987-55] S10
- Paukert, Martin [8928-92] S18
- Paul, Justin R.** [8966-12] S4
- Paul, Sujoy [9001-6] S2
- Paulsen, Keith D.** [8928-8] S3, [8928-9] S3, [8937-13] S3, [8951-20] S5
- Paulsen, Rasmus Reinhold [8979-22] S2, [8979-22] S8
- Paulus, Gerhard G. [8972-14] S4
- Pauporté, Thierry 8987 Program Committee, 8987 S11 Session Chair, [8987-48] S11, [8987-57] S10, [8987-80] SPWed
- Pavinatto, Felipe José [8983-8] S2
- Pavlidis, Dimitris 8993 Program Committee
- Pavlikov, Anton I. [8950-37] SPSun
- Pavlova, Ina P. [8951-15] S4
- Pavone, Francesco Saverio [8926-3] S1, [8926-73] S15, 8928 Program Committee, 8928 S11 Session Chair, [8928-57] S12, [8939-30] S6, 8946 Program Committee, 8946 S5 Session Chair, [8946-19] S5, 8948 S1 Session Chair, [8948-16] S3, [8948-6] S1, [8950-43] SPSun
- Pawlik, Grzegorz** [8983-21] S5
- Pawlik, Krzysztof [8983-20] S5
- Pawlik, Susanne [8965-26] S6
- Pawlowski, Michal E. [8951-15] S4
- Pax, Paul H. [8961-28] S7
- Paxton, Alan H.** 8960 Conference Chair, 8960 S13 Session Chair, [8960-70] SPTue
- Payne, David N.** [8961-24] S6, [8990-7] S2
- Pays-Volard, David [8973-9] S3
- Payusov, Alexey S. [8965-25] S5, [9001-10] S2
- Peacock, Anna C. [8990-7] S2, [8993-42] S8
- Peale, Robert E.** [8993-14] S2
- Peceli, Davorin [8983-3] S1
- Pedersen, Christian** [8964-13] S3, [8964-52] SPTue, [8964-55] SPTue, [8964-56] SPTue, [8992-28] S6, [8992-6] S2
- Pederson, Christopher G. [8992-2] S1
- Pederzoli, Cecilia [8982-12] S3
- Pedley, R. Barbara [8943-196] SPTues, [8943-61] S9
- Pedraza, Francisco [8956-7] S2
- Pedraza, Francisco J. [8956-24] S6
- Pedreira Ramalho, Luciana Maria [8932-43] SPSun, [8932-44] SPSun, [8932-7] S1
- Pedrini, Giancarlo [8949-17] S4
- Peele, John R. [8961-71] SPTue
- Peens-Hough, A. [9008-24] S10
- Peeters, Sara [8943-227] SPSun, [8943-228] SPSun
- Pei, Dongni [8931-28] S5
- Pei, Yanbo [8943-46] S7
- Peigné, Arnaud [9004-16] S4
- Peise, Jan [8999-46] S10
- Pekkan, Kerem [8953-6] S2
- Pelaz, Beatriz [8933-4] S2, [8955-34] S8, [8955-53] S12
- Pelc, Jason S. [8997-20] S8
- Peleg, Ophir [8965-21] S5
- Pelegati, Vitor B. [8947-21] S4, [8948-100] SPSun, [8948-12] S2, [8948-48] S8, [8948-51] S8, [8948-55] S9, [8996-26] S7, [8996-32] SPWed
- Pelekanos, Nikolaos T. [8955-66] SPSun, [8986-39] S8
- Pelivanov, Ivan M. [8943-119] SPSun, [8943-156] SPMon, [8943-34] S5, [8943-75] S11
- Pellacani, Paola [8954-5] S2
- Pelle, Fabienne [8987-48] S11
- Pellegrino, Joseph G. 8993 Program Committee
- Peller, Joseph A.** [8926-37] SPSun
- Pelletier, François [8988-20] S5
- Pelletier, Martin [8988-20] S5
- Pelli, Stefano [8988-39] S8
- Pello, Josselin [8988-21] S5
- Pelouard, Jean-Luc [8981-33] S8, [8981-51] S13, [8982-20] S4, [8993-23] S4
- Pelucchi, Emanuele [8997-33] SPWed
- Pelz, Lawrence [8985-37] S8
- Peña Delgado, Adrián F. [8934-47] S7, [8940-6] S1, [8942-24] S5
- Pence, Isaac J.** [8935-33] S7, [8939-27] S5
- Pendry, John B. 8994 S9 Session Chair, [8994-36] S10, [8994-37] S10
- Peng, Bo [8960-25] S6
- Peng, Chengcheng [8983-62] SPWed
- Peng, Chi-Cheng [8985-20] S5
- Peng, Haowei [8987-14] S3
- Peng, Jin-Long [8985-20] S5
- Peng, Lilei L. [8936-30] S7, [8948-68] S11, [8948-90] SPSun, [8950-21] S5, [8953-2] S1
- Peng, Qian [8928-11] S3
- Peng, Tong [8949-63] SPMon, [8949-64] SPMon, [8949-65] SPMon
- Peng, Xiang** [8961-22] S5
- Peng, Xiao [8948-86] SPSun
- Peng, Xiaoyuan [8959-74] SPTue
- Peng, Yiwei [8980-57] S14
- Peng, Zhen [8991-19] S5, [8991-42] S10, [8991-42] S9
- Penney, Trevor B. [8928-21] S5
- Penninck, Lieven [9004-6] S2
- Penninckx, Denis [8992-25] S6
- Pennings, Lars [8967-25] S10
- Penty, Richard W. [8991-12] S3, 9002 Program Committee
- Peppers, Jeremy M. [8959-15] S4, [8959-62] S14
- Pera, Vivian E.** [8937-18] S4, [8937-41] SPSun
- Perakis, Ilias E. [8984-42] S11

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Pereira, Mara H. C. [8926-76] S15
 Pereira, Maria Isabela A. [8955-61] SPSun
 Pereira, Michelle B. M. [8948-48] S8
 Pereira, Milton [8963-23] S6
 Pereira, Nayara S. [8926-106] S21
 Pereira, Silvania F. [8987-13] S2
 Pereira, Stephen P. [8931-23] S5, [8931-36] S7
 Péré-Laperne, Nicolas 8993 Program Committee
 Perelman, Lev T. 8952 Program Committee, 8952 S1 Session Chair
 Perenon, Rémi [8939-13] S2, [8939-4] S1
 Peres, M. [8987-16] S3
 Peretti, Jacques [8986-69] S15
 Peretti, Romain [8993-22] S4
 Peretto, Lorenzo [8930-12] S3
 Pérez Mayen, Leonardo [8956-32] S8
 Perez, Camilo [8943-119] SPSun, [8943-75] S11
 Perez, Florent [8984-41] S11
 Perez, Jean-Philippe [8993-39] S7, [8993-40] S7
 Perez, Joseph [8974-50] S8
 Perez, Marta [8955-53] S12
Pérez-Cortés, Mario Mario [9006-54] SPWed
 Pérez-Galacho, Diego [8995-30] S8
 Perez-Gutierrez, Francisco G. [8941-24] S6
Perez-Sanchez, Grehthel G. [8963-37] SPTue, [8964-60] SPTue, [9007-9] S4, [9010-8] S4
 Pergande, Daniel [8933-6] S2
Periasamy, Ammasi 8947 Track Chair, 8948 Conference Chair, 8948 SKey Session Chair, 8948 Track Chair, 8949 Track Chair, 8950 Track Chair, 8951 Track Chair, 8952 Track Chair, 8953 Track Chair
Perillo, Evan P. [8950-2] S1, [8950-46] SPSun
 Perinbam, K. [8940-31] S6
 Perinot, Andrea [8968-28] S6
Perkins, Jeffrey J. [8993-18] S3
 Perkins, William [8926-46] S10, [8926-51] S10
 Perlin, Piotr [8986-23] S5, [8986-25] S5, [8986-56] S11, [8986-57] S11, [8986-60] S11, [9002-18] S4
 Pernu?, Franjo [8936-41] SPSun
 Peroz, Christophe [8974-6] S2, [8988-16] S4
Perram, Glen P. [8962-6] S2, [8962-7] S2
 Perraud, S. [8981-7] S2
 Perren, Matthew [8981-58] SPWed
 Perretti, J. [9003-35] S12, [9003-35] S8
Perry, Joseph W. [8983-3] S1
 Perry, Seth W. [8948-7] S1
 Persano, Stefano [8955-50] S11
 Persichetti, Gianluca [8976-24] S5, [8976-40] S9, [8988-41] S9
 Pertsch, Thomas [8994-67] SPWed
 Pervak, Vladimir [8982-72] SPWed
 Pesala, Bala [8985-24] S6, [8985-25] S6
 Peschel, Thomas [8967-40] S14
 Pestana, Noah [8937-18] S4
 Petelin, Andrej [8964-53] SPTue
Peterka, Darcy [8928-66] S14, [8928-81] S15
 Petermann, Klaus [8988-19] S4, [9009-13] S6
 Peternella, Fellipe G. [9010-13] S4, [9010-13] S5
 Peters, Achim [9000-14] S3
Peters, David W. [8994-45] S11
 Peters, Kyle [8983-60] SPWed
 Peters, Marius [8980-39] S10, [8981-47] S12
 Peters, Matthew [8965-6] S2
 Peters, Nicholas S. [8926-71] S14, [8935-2] S1
 Petersen, Eliot B. [8961-1] S1, [8961-127] SPTue
 Petersen, Ian R. [8993-59] S12
 Petersen, Iver [8926-133] S4
 Petersen, Paul Michael [8964-3] S1, [8964-5] S1, [8972-19] S5
 Petersen, Sidsel R. [8961-104] SPTue
 Peterson, Lindsay M. [8934-52] S8, [8953-10] S3, [8953-15] S4
 Peterson, Rita D. 8964 Program Committee, 8964 S8 Session Chair, 8964 S9 Session Chair
 Petit, Vincent [8961-30] S8
 Petit, Yannick G. [8959-59] S14, [8969-12] S1, [8969-12] S3, [8974-3] S1, [8974-4] S1, [8996-28] SPWed
 Petite, Stephane [8984-49] S13
 Pettigas, Daniel [8962-16] S5
Petkie, Douglas T. [8973-1] S1
Petkovsek, Rok [8961-109] SPTue, [8961-85] SPTue
 Petrecca, Kevin [8928-32] SPSat
 Petrich, Wolfgang 8939 Conference Chair, 8939 S6 Session Chair, [8939-28] S5, [8939-35] S6
 Petrik, Péter [8987-13] S2, [8987-88] SPWed
 Petropoulos, Periklis [9009-11] S6
 Petrosky, James [8982-28] S6
 Petrou, Panagiota [8976-35] S7, [8976-44] S9
 Petrov, Andrey [8943-111] SPSun, [8943-179] SPMon, [8943-32] S5, [8943-33] S5
 Petrov, Irene Y. [8943-111] SPSun, [8943-179] SPMon, [8943-32] S5, [8943-33] S5
 Petrov, Valentin P. [8964-11] S3, [8964-41] S9
 Petrov, Yuriy Y. [8943-111] SPSun, [8943-179] SPMon, [8943-32] S5, [8943-33] S5
 Petrova, Elena V. [8943-27] S4
 Petrovic, Ljubica [8931-7] S2, [8947-3] S1
Petruccione, Francesco [8999-53] SPWed
 Petruzzelli, Vincenzo [8988-51] S11
 Petryayeva, Eleonora [8955-30] S7
 Petzold, Silke [8986-73] S15, [8986-80] SPWed
 Peyser, Michael [8938-17] S4
Peyghambarian, Nasser N. [8948-14] S2, [8961-53] S12, [8961-70] SPTue, [8979-6] S5, [8982-23] S5, [8991-24] S6, [8991-26] S6
Peyrone, Thibault [8997-24] S9
 Peyvast, Negin [9002-3] S1
 Pezze, Luca [8999-46] S10
 Pfeifer, T. Joshua [8928-3] S1, [8930-43] S9, 8936 Conference CoChair, 8936 S7 Session Chair, [8936-2] S1, [8936-22] S5
 Pfeiffer, Loren N. [8997-27] S10
 Pfeiffer, Tom [8934-7] S2
 Pfeiffer, Walter 8984 Program Committee, 8984 S9 Session Chair, [8984-24] S7
 Pfeister Latham, Nicole [8982-18] S4
 Pflester, Nicole [8982-21] S4
 Pfister, Olivier [8997-15] S6
 Pfitzner, Dieter [8963-26] S6
Pflaum, Christoph [8959-65] S14, [8959-67] SPTue, [8981-48] S12
 Pflieger, Wilhelm 8968 Program Committee, 8968 S5 Session Chair, [8968-11] S3, [8968-21] S5, [8968-22] S5, [8968-5] S1
 Pflueger, Silke 8963 Program Committee, 8963 S5 Session Chair
 Pflügl, Christian J. 9002 S14 Session Chair, [9002-55] S13
 Phan Huy, Kien [8997-13] S6
 Phan, Anh-Hoang [9006-36] S7
 Philippose, Usha [8974-31] SPTue
 Philipov, Philip [8926-14] S6
 Philippe, Fabrice [8980-55] S14
 Philipps, Simon [8981-15] S4
 Phillipose, Usha [8974-37] SPTue
 Phillips, Christopher R. [8964-69] S7
 Phillips, Jamie D. [8995-20] S5
 Phillips, Kasey C. [8967-56] SPTue
Phillips, Kevin G. [8947-5] S1
 Phillips, Matthew R. [8987-6] S2
Phillips, Ronald 8971 Program Committee
 Phillips, Stephen [8933-21] S6
 Phillips, William [8926-14] S3
Phippis, Jennifer E. 8926 S19 Session Chair, [8926-95] S19
 Pian, Qi [8937-32] SPSun
 Piana, Angelo [8990-40] S8
Piao, Daqing [8936-16] S4
 Piao, Meilan [9006-53] SPWed
 Piao, Yanling [9006-29] S6
 Piatkowski, Lukasz [8984-54] S14
 Piccardo, Marco [8986-69] S15, [9003-35] S12, [9003-35] S8
 Picciolini, Silvia [8954-5] S2
 Piccoli, Riccardo [8961-72] SPTue, [8982-29] S6
 Pickwell-MacPherson, Emma 8941 Program Committee
 Picolet d'Hahan, Nathalie [8947-53] S12
 Picraux, Samuel Thomas [8984-29] S8
 Piecuch, Martin [8984-24] S7
 Pierce, Robert [8971-24] S4
 Pierret, Aurélie [8986-34] S7
 Piercinski, Kamil [8966-14] S4
 Pierzchalski, Arkadiusz [8947-30] S6, [8947-31] S6
 Piestun, Rafael 8978 Program Committee
 Pietro, Patimisco [8993-73] S15
 Pietrzak, Agnieszka [8965-28] S6
 Pionzonka, Ines [8986-26] S5
 Pifferi, Antonio [8937-24] SPSun, [8945-18] S5
 Pigazzi, Alessio [8927-16] S4
 Piglosiewicz, Bjoern [8984-44] S12
 Pignatari, Chiara [8939-15] S3, [8955-68] SPSun
 Pilar, Jan [8960-31] S4, [8960-31] S8, [8965-7] SPTue
 Pilat, Zdenek [8947-58] S13, [8960-40] S10
 Pillet, Gregoire [8966-19] S6, [8966-20] S6, [8985-43] S9
 Piltz, Joachim [8947-30] S6
 Pimenov, Aleksandr [8980-12] S3
 Pimenov, Sergei [8967-10] S10, [8967-10] S5, [8969-28] S1, [8969-28] S3
 Pimpinelli, Nicola [8939-30] S6
 Pina-Hernandez, Carlos A. [8974-6] S2
 Pinfildi, Carlos Eduardo [8932-19] S4, [8932-22] S4, [8932-23] S5, [8932-24] S5, [8932-25] S5, [8932-26] S5, [8932-29] S6, [8932-31] S6, [8932-33] S7
Pinheiro, Antônio Luiz B. [8932-15] S3, [8932-16] S3, [8932-20] S4, [8932-38] SPSun, [8932-39] SPSun, [8932-41] SPSun, [8932-43] SPSun, [8932-7] S1
 Pinheiro, João Páscoa [8932-21] S4
 Pinho, Sonia L. C. [8955-22] S5
 Pini, Alessandro [8948-57] S9
Pini, Roberto [8926-3] S1, 8930 Program Committee, 8930 S8 Session Chair, [8930-51] SPSun, [8930-52] SPSun, [8955-45] S10
 Pinsard, Emmanuel [8971-13] S2
 Pinto, Maurizio [8990-40] S8
Pinto, Nathali C. [8926-76] S15, [8926-77] S15
 Pioletti, Dominique [8952-5] S2
 Piontek, Derrick [8938-5] S1
 Piper, James A. [8959-12] S3
 Piper, Mario [8927-44] S11
 Piprek, Joachim [8965-44] S2, 8980 Program Committee, [8980-1] S1, 8986 Conference CoChair, 8986 S11 Session Chair, 8986 S12 Session Chair, [8986-72] S15, 9003 S8 Session Chair, [9003-10] S3
Piqué, Alberto 8967 Program Committee, 8967 Track Chair, 8968 Program Committee, 8968 Track Chair, [8968-21] S5, [8968-5] S1, 8969 Track Chair, 8970 Conference Chair, 8970 S5 Session Chair, 8970 Track Chair, [8970-3] S1, 8973 Track Chair, 8974 Track Chair, 8975 Track Chair, [8980-25] S6
 Piqueras, J. [8987-16] S3
 Piqueras, Juan [8987-55] S10
Pirayesh, Hamidreza [8973-10] S3
Pircher, Michael [8930-8] S2, [8930-9] S2, [8934-21] S4, [8934-58] S9, [8934-80] S12
Pires de Sousa, Marcelo V. P. [8932-17] S4
Pires Santos, Gustavo M. [8932-15] S3, [8932-16] S3, [8932-39] SPSun, [8932-41] SPSun
Pires, Layla [8931-10] S2, [8931-37] S7, [8931-50] SPMon, [8931-51] SPMon, [8947-60] S13, [8948-79] SPSun
 Pires, Leonardo [8976-12] S3
Pirnstill, Casey W. [8951-39] SPMon, [8951-6] S2
 Pirozzi, Nicole M. [8934-75] S11, [8953-16] S4
 Pirzio, Federico [8959-41] S10
 Pispas, Stergios [8983-18] S4
Pissadakis, Stavros [8960-42] S11, [8982-11] S3
 Pí?tora, Jaromír [8988-13] S3
 Pitris, Costas [8934-110] SPMon, [8934-114] SPMon, [8951-14] S3
 Pittroff, Wolfgang [8965-40] S8, [9002-53] S12
 Pitwong, Richard C. [8988-3] S1, 8991 Program Committee, 8991 S9 Session Chair, [8991-34] S8
 Pitz, Greg A. [8962-3] S1, [8962-7] S2
Piyawattanametha, Wibool 8927 Program Committee, 8977 Conference Chair
Plaipichit, Suwan [9006-7] S2
 Plakott, Siddarth [8945-2] S1
 Plana, Robert 8987 Program Committee
 Planat-Chrétien, Anne [8937-24] SPSun, [8937-25] SPSun, [8952-12] S3
 Plant, David V. 8989 Program Committee, [8989-13] S5, [9010-15] S5, [9010-15] S6
 Plapler, Helio [8926-106] S21
 Platte, Frank [8985-23] S5
 Plech, Anton [8972-34] S8
 Pleros, Nikos [8982-64] SPWed, [8982-7] S1, [8990-14] S3, [8990-22] S4, [8990-8] S2, [8991-23] S6, [8991-33] S8, [8991-36] S8
 Pleshko, Nancy [8926-112] S23
 Pliis, Elena [8996-21] S6
 Ploschner, Martin [8972-2] S1, [8999-26] S6
 Plötner, Marco [8961-31] S8
 Plumley, John B. [8955-18] S4, [8955-38] S8
 Png, Ching Eng Jason [8980-53] S13, 8990 Program Committee, 8990 S8 Session Chair, [8990-35] S7
 Pochet, Michael [8982-28] S6
 Pocholle, Jean-Paul [8993-78] S16, [8998-56] S12
 Poddar, Raju [8930-30] S7
Podhorodecki, Artur P. [8955-60] SPSun
Podoleanu, Adrian Gh. [8929-22] SPSun, 8934 Program Committee, [8934-112] SPMon, [8934-113] SPMon, [8934-115] SPMon, [8934-20] S3
 Pogrebnyakov, Alexej V. [8974-25] S6
Pogue, Brian W. [8926-28] S7, 8931 Program Committee, 8931 S4 Session Chair, [8931-18] S4, [8931-23] S5, [8931-26] S5, [8931-31] S6, [8931-36] S7, [8931-39] S8, 8937 Program Committee, [8937-13] S3, 8952 Program Committee, [8956-6] S2
 Poh, Catherine F. [8935-19] S4
 Poher, Vincent [8935-34] S7
 Pohl, Johannes [8935-21] S5, [9000-14] S3, [9002-7] S2, [9002-9] S2
 Pohl, Ralph [8967-32] S12, [8967-32] S4
 Poitras, Daniel [9002-40] S9
 Pokhrel, Madhab Madhab [8956-38] SPSun
 Poletti, Francesco [8988-65] SPWed
Poliak, Juraj [8941-12] S3
 Poliakov, Igor V. [8963-33] S8
 Pollakowski, Beatrix [8987-88] SPWed
 Polleux, Jean-Luc [8990-20] S4, [8991-7] S2
 Pollnau, Markus 8959 Program Committee
 Polly, Stephen J. [8981-4] S1
 Polo, Ester [8955-34] S8
 Polyakov, Aleksandr [8974-6] S2
 Pomerantzeff, Pablo M. A. [8926-76] S15
 Pompa, Pier Paolo [8955-50] S11
 Pomplun, Jan [8980-60] SPWed, [8988-19] S4, [8988-54] SPWed

INDEX OF PARTICIPANTS

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Ponce, Fernando [9002-16] S4
Pongchalee, Pornthep [8949-55] SPMon
Pongratz, Thomas [8926-137] S6, [8926-49] S10, [8926-50] S10, [8926-53] S11, [8928-13] S4
Ponomareva, Natalia G. [8952-27] S7
Pons, Thomas [8947-47] S11, [8955-13] S3
Ponte, Matthew R. [8983-14] S4
Ponticorvo, Adrien [8926-4] S1
Ponting, Bennett [8959-2] S1
Poole, Kristin M. [8934-70] S11
Pooler, Eric S. [8961-30] S8
Poon, Andrew W. 8960 Program Committee, 8989 Program Committee, 8990 Program Committee
Poon, Joyce K. S. [9007-3] S3
Popa, Daniel [8966-31] SPTue, [8966-5] S2
Pope, Timothy D. [8935-46] S10
Popescu, Ada-Simona [8985-35] S8
Popescu, Traian [8993-82] S17
Popov, Viacheslav [8993-80] S16
Popovic, Milos A. [8991-47] S2
Popp, Jürgen [8926-133] S4, [8928-5] S2, 8939 Program Committee, 8939 S4 Session Chair, [8939-5] S1, [8940-7] S2, [8948-6] S1, [8951-28] S6, [8951-29] S6, [8957-10] S3, [8972-18] S5
Poprawe, Reinhart [8967-30] S11
Porro, Giampiero [8976-24] S5
Porro, Juan Antonio [8972-63] SPTue
Porte, Henri [8991-18] S5
Portella-Oberli, Marcia [8984-31] S9
Posadas, Agham S. [8987-29] S6
Posporis, Andreas [8982-15] S3
Postava, Kamil [8988-13] S3
Potapkin, Boris [8941-59] S12
Potasek, Mary J. [8980-70] SPWed, [8983-54] SPWed
Potcoava, Mariana C. [8939-18] S3
Potma, Eric O. 8948 S7 Session Chair, [8948-102] SPSun, [8948-33] S6, [8948-66] S11, [8948-84] SPSun
Potsaid, Benjamin M. [8927-30] S7, [8930-32] S7, [8934-1] S1, [8934-22] S4
Poturaj, Krzysztof [8982-44] S9, [9009-12] S6
Potyrailo, Radislav A. [8958-5] S1
Poulernard, Sylvain [8971-6] S1
Poulet, Patrick [8935-14] S4, [8935-38] S8, [8935-68] SPSun
Poulin, Isaac P. [8997-14] S6
Poulin, Michel [8988-20] S5
Pourrezaei, Kambiz 8928 Program Committee, [8941-25] S6
Pourroy, Genevieve [8935-68] SPSun
Poutous, Menelaos K. [8959-58] S13, [8968-35] SPTue, 8974 Program Committee, [8982-35] S7
Pouysegur, Julien [8972-24] S6
Povarnitsyn, Mikhail [8969-4] S1
Považay, Boris [8938-17] S4, [8938-47] SPSun, [8939-10] S2
Povinelli, Michelle L. 8960 Program Committee, [8998-8] S2
Powell, Samuel [8943-176] SPMon
Powers, Peter E. [8933-2] S1, 8964 Program Committee, [8985-3] S1
Powis, Simon [8939-6] S1
Poxon, Ian [8951-34] SPMon
Poza, Jose M. 8975 Program Committee, [8990-30] S6
Pozzi, Antonio [8934-92] SPMon
Pozzo, Danilo C. [8943-119] SPSun, [8943-75] S11
Prabhu, David [8926-96] S19
Prabhu, Vijendra [8926-5] S1, [8929-2] S1, [8932-11] S2, [8932-28] S6
Pradhan, Asima [8940-18] S4, [8940-40] SPTue, [8942-20] S4, [8952-25] S7
Prado, Rodrigo P. [8932-22] S4
Prakasa Rao, Aruna [8939-20] S4
Pranowicz, Alina [8965-7] SPTue
Prasad, A. V. S. S. [8975-5] S4
Prasad, Narasimha S. 8959 Program Committee, 8959 S5 Session Chair, 8959 S6 Session Chair
Prasad, Paras N. 8954 Program Committee, 8954 Track Chair, [8954-33] SPMon, 8955 Track Chair, 8956 Track Chair, 8957 Track Chair, 8958 Track Chair
Prasankumar, Rohit P. [8984-29] S8
Praska Rao, Anna [8935-24] S5
Pratap, Rudra [8975-5] S4
Prataveira, Sebastião [8931-37] S7, [8940-30] S6, [8940-39] SPTue, [8940-41] SPTue, [8947-86] SPMon, [8948-79] SPSun, [8999-12] S3
Prather, Dennis W. 8974 Program Committee, [8974-12] S4, [8980-76] SPWed, [8983-44] S10, [8983-45] S10, [8985-30] S7, [8985-40] S8, [8985-45] S10, [9007-24] S8
Praveen Kumar, Velupa [8967-37] S13
Praveen, Bavishna B. [8935-55] S12, [8939-21] S4, [8939-6] S1
Preble, Edward A. [8986-1] S1
Preece, Daryl C. [8999-9] S2
Preihs, Christian [8926-84] S17
Preise, Dina [8944-12] S3
Presser, Nathan [8965-3] S1, [8986-49] S9
Preston, Kyle J. [8934-14] S3
Preza, Chrysanthé 8949 Program Committee, 8949 S2 Session Chair, [8949-26] S5, [8949-37] S8, [8949-39] S8, [8949-40] S8
Prezgot, Daniel [8996-34] SPWed
Price, Hillel B. [8935-45] S9
Price, Kirk [8961-66] SPTue, [8965-12] S3, [8965-46] S2
Price, Randi S. [8983-29] S7
Priest, Allen [8993-59] S12
Priestley, Rodney D. [8968-25] S6
Prins, M. W. J. [8954-26] S6
Prinz, Adrian [8968-24] S5, [8976-3] S1
Priolkar, Kaustubh [8982-40] S8, [8987-93] SPWed
Prior, Ian A. [8955-21] S5, [8955-69] SPSun
Privatov, Valeriy A. [8926-104] S21
Priya, Mallika [8943-143] SPMon
Prjonskaia, Olga V. [8983-3] S1
Prochnow, Oliver [8972-21] S6
Proennecke, Stephan [8976-50] SPTue
Proise, Florian [8981-51] S13
Prokes, Sharika M. [8984-18] S4
Pröll, Johannes [8968-11] S3, [8968-21] S5, [8968-22] S5, [8968-5] S1
Prosperi, Davide 8955 S4 Session Chair, [8955-57] S12, [8955-68] SPSun
Prost, Matthias [8990-46] S9
Protasenko, Vladimir V. [8986-66] S14
Prough, Donald S. [8943-111] SPSun, [8943-179] SPMon, [8943-32] S5, [8943-33] S5
Proulx, Christian [8975-2] S1
Proulx, Christophe [8928-84] S16
Provencal, Daniel [8938-5] S1
Provino, Laurent [8961-78] SPTue, [8982-16] S3
Pruneri, Valerio [8982-17] S4
Pryamikov, Andrey D. [8961-17] S4
Pryanikova, Tatiana I. [8952-27] S7
Pryde, Geoff J. [8997-11] S5
Pryor, Craig E. [8996-29] SPWed
Prziwarka, Thomas [9002-14] S3
Psaila, Nicholas D. [9009-16] S7
Psaltis, Demetri [8938-41] S8, [8943-9] S2
Psycharakis, Stylianos [8955-43] S9
Pu, Yang [8926-109] S22, [8926-110] S22, [8926-116] S24, [8926-110] S24, [8926-116] S24, [8926-110] S24
Session Chair, [8940-11] S3, [8940-30] S6, [8940-39] SPTue, [8940-40] SPTue, [8940-41] SPTue, [8940-42] SPTue
Puc, Gabe S. [8938-15] S3
Pucci, Annemarie [8939-28] S5, [8939-35] S6
Pucetaite, Milda [8939-38] SPSun, [8957-7] S2
Puckett, Matthew [8980-81] S8, [8989-7] S10, [8989-7] S3
Pude, Frank [8967-30] S11
Puente, Norma P. [8936-42] SPSun
Puget, Renaud [8992-16] S4
Pugh, Edward N. [8930-4] S1, [8930-40] S9, [8934-25] S4, [8934-73] S11
Puglisi, Roberto [8938-42] S8, [8947-46] S11
Pukstad, Brita S. [8926-7] S1
Pulka, Markus [8965-47] SPTue
Pumberger, Matthias [8943-140] SPSun
Pupeza, Ioachim [8961-5] S2
Pura, Paulina [8961-126] SPTue
Puretzy, Alex A. [8969-3] S1, [8969-5] S1, [8969-6] S1
Pureur, David [8961-78] SPTue, [8961-88] SPTue
Puricelli, William [8927-11] S3, [8934-8] S2
Purlys, Vytautas [8974-23] S6
Purushothaman, Gopathy [8928-83] S15
Pusino, Vincenzo [8960-39] S10
Puszka, Agathe [8937-24] SPSun, [8937-25] SPSun, [8952-12] S3
Putney, Jeffrey [8955-48] S10, [8935-75] SPSun
Puzikov, Vyacheslav M. [8959-78] SPTue
Pyragius, Tadas [8988-4] S1
Pysz, Dariusz [8964-23] S6, [8964-29] S7, [8964-31] S7
Pyun, Jeffrey [8983-13] S4
-
- Q**
- Qarehbaghi, Reza [8973-6] S2
Qazi, Faiza Munir [8928-39] S7, [8932-37] S7
Qi, Feng [8964-9] S2
Qi, Hangfei [8954-10] S3
Qi, Ji [8933-19] S5, [8939-12] S2, [8942-10] S2
Qi, Ji [8935-29] S6
Qi, Jinyi [8926-86] S17
Qi, Shuhong [8944-11] S3
Qi, Wei [8951-36] SPMon
Qi, Wenjuan [8926-87] S17, [8934-31] S5, [8946-26] S6
Qi, Xiaoli [8928-73] SPMon
Qi, Xiaoli [8928-29] SPST
Qi, Zhengqiong John [8973-25] SPTue
Qian, Ruobing [8952-30] S8
Qian, Wei [8990-18] S4, [9010-11] S4, [9010-11] S5
Qian, Yuan [8944-26] SPMon, [8956-37] S9
Qiao, Pengfei [8980-13] S4
Qiao, Sha [8956-37] S9
Qiao, Xin [8993-14] S2
Qijie, Wang [8995-11] S3
Qin, Gang [8968-26] S6
Qin, Jia [8934-50] S8, [8942-32] S8, [8942-33] S8
Qin, Jun [8980-36] S9
Qin, Kun [8933-5] S2
Qin, Lingsong [8944-28] SPMon
Qin, Wan [8948-105] SPSun, [8949-68] SPMon
Qiu, Chuan Kai [8960-54] S14
Qiu, Feng [8983-46] S10
Qiu, Jianjun [8948-73] SPSun, [8951-4] S1
Qiu, Jijun [8993-37] S7
Qiu, Jing hui [8985-34] S7
Qiu, Wentao [8988-35] S8
Qiu, Ying [9009-1] S2
Qiu, Yueming [8993-53] S10
Qiu, Zhen [8927-31] S1, [8927-31] S8
Qu, Jianan Y. 8935 Program Committee
Qu, Junle 8948 Program Committee, [8948-86] SPSun, [8948-93] SPSun
Qu, Tianliang [8998-54] S12
Qu, Weijuan [8959-74] SPTue
Qu, Xing-Hua [8949-68] SPMon
Quakenbush, Tim [8971-24] S4
Quan, Tingwei [8928-56] S11, [8928-74] SPMon
Quan, Ying yao [8944-21] SPMon
Quan, Yuhua [8935-62] S12
Quarles, Gregory J. 8959 Track Chair, 8960 Track Chair, 8961 Track Chair, 8962 Track Chair, 8963 Track Chair
Quatrevalet, Mathieu [8959-20] S5
Queirós, Daniel [8943-85] S13
Queirós, Raquel [8938-53] SPSun, [8957-20] S4
Queiroz Santos, Wesley [8954-29] S7
Queiser, Marco [8991-13] S3
Queney, Benoit [8942-14] S4
Quenzer, Hans-Joachim [8977-4] S2
Quercioli, Franco [8948-57] S9, [8972-22] S6
Quéré, Fabien [8972-28] S7
Quijano, Elena G. [8927-10] S3, [8934-8] S2
Quinn, Kyle P. [8947-45] S11, [8947-6] S1, [8948-67] S11
Quintana, Hope [8983-50] S11
Quintana, Joel [8982-45] S9, [8988-68] S10, [8992-17] S4
Quintard, Ludovic [8964-58] SPTue
Quirin, Florian [8967-38] S14
Quirin, Sean [8928-66] S14
Quirk, Bryden C. [8935-60] S12
Quirk, Kevin J. [8971-20] S4, [8971-34] S5
Quiroz-Campean, Griselda [8936-42] SPSun
Quitsch, Wolf A. [8980-21] S5
-
- R**
- R, Prathibha [8947-61] S13
Ra, Young-Sik [8997-16] S6
Raabe, Christian [8990-37] S7
Raabe, Dierk [8986-19] S4
Rabah, Danny [8940-19] S4
Rabin, Bryan [8984-5] S1
Rabinsky, Emily [8927-15] S4
Rabizadeh, Shahrooz [8972-15] S4
Rabot, Olivier [8943-209] SPTues
Raciukaitis, Gediminas 8967 Program Committee, [8967-44] S15, [8967-44] S7
Rademacher, Georg [9009-13] S6
Rademeyer, Pieter [9005-5] S1
Radhakrishnan, Harsha [8934-64] S10, [8934-71] S11
Radic, Stojan [8964-20] S5
Radke, André [8970-10] S3, [8970-11] S3, [8974-27] S7
Radosevich, Andrew J. [8952-13] S4, [8952-14] S4, [8952-33] S9
Radtke, Carsten P. [8976-14] S3
Radu, Andreea [8957-10] S3
Radziunas, Mindaugas [8980-12] S3
Rafailov, Edik U. [8935-9] S3, [8936-11] S3, [8959-40] S10, [8960-61] S16, [8964-4] S1, [8966-18] S5, [8986-79] SPWed
Rafailov, Ilya E. [8935-9] S3
Raghavachari, Ramesh 8936 Conference Chair, 8936 S3 Session Chair, 8945 Program Committee, 8947 Program Committee, 8956 Conference Chair, 8956 S6 Session Chair, 8956 S7 Session Chair, 8997 S3 Session Chair
Ragosta, Nicholas [8976-7] S2
Rahbar, Mona [8976-11] S3
Rahimi, Nhasim [8981-63] SPWed
Rahimi, Zhabiz [8981-48] S12
Rahimi-Iman, Arash [8966-21] S6, [8993-7] S1
Rahman, Faiz [8990-44] S8
Rai, Prabin [8950-29] S7
Rainò, Gabriele [8996-20] S6
Raisky, Oleg [8965-22] S5
Raizada, Rashika [8927-34] S9, [8927-35] S9
Rajabhandharaks, Danop [8926-55] S11, [8926-58] SPST, [8926-59] SPST, [8941-20] S5
Rajadhayaksha, Milind 8926 Program Committee, 8926 S5 Session Chair, [8926-11] S3, [8926-12] S3, [8926-13] S3, [8926-14] S3, [8926-15] S3, [8934-82] S12, 8940 Program Committee
Rajagopal, Abhejit [8981-50] S1
Rajagopal, Jayaraj [8927-47] S11
Rajan, Siddharth [8986-46] S10
Rajaram, Narasimhan [8947-4] S1
Rajasekaran, Ramu [8940-15] S3
Rajeswari, Ramireddy [9003-61] SPWed
Rajan, Justin Rajesh [8943-59] S9, [8943-80] S12
Rajkumar, Vineeth [8943-61] S9
Rajput, Padmesh [8932-2] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Rajta, István [8988-39] S8
 Raju, Reddy [8965-6] S2
Rakich, Peter T. [8964-18] S4
 Rakovich, Yury P. [8955-37] S8
 Rakuljic, George A. [8961-1] S1, [8961-127] SPTue
 Ralchenko, Viktor G. [8969-28] S1, [8969-28] S3
 Rale, Pierre [8981-23] S6
 Ram, Rajeev Jagga [8990-9] S2
 Ram, Surinder [8979-11] S6
Ramachandran, Siddharth 8961
 Conference Chair, 8961 S6 Session Chair
 Ramalho, Maria José Pedreira [8932-43] SPSun, [8932-44] SPSun
 Raman, Ashok [8981-42] S11
 Ramanathan, Shriram [8987-23] S5
Ramanujam, Nirmala [8935-6] S2, [8936-23] S6, [8947-4] S1
 Ramaz, François [8943-23] S4, [8943-44] S7, [8989-22] S7
 Ramdane, Abderrahim [8993-9] S1
Ramella-Roman, Jessica C. 8926
 Program Committee, 8926 S8
 Session Chair, [8926-6] S1, [8936-22] S5, [8938-27] S6, 8941 Program Committee, 8941 S9 Session Chair, [8945-7] S2
Ramesham, Rajeshuni Symposium Committee, 8975 Conference Chair, 8975 S2 Session Chair, 8975 S4 Session Chair, [8975-18] S3
 Ramezani, Maziar [8973-8] S2
 Ramirez, Dora P. [8947-60] S13
 Ramirez-San-Juan, Julio C. [8926-38] S8, [8942-5] S1, [8952-24] S6
 Ramkhalawon, Roshita [8949-38] S8
Ramme, Mark [8968-32] S15, [8968-32] S7
 Ramos-Garcia, Rubén [8942-5] S1, [8952-24] S6
 Ramponi, Roberta [8968-17] S4, [8968-19] S4, [8972-31] S8, [8972-33] S8, [8976-21] S5
 Ran, Guangzhao [8990-50] SPWed
 Ranasinghesagara, Janaka C. [8948-66] S11
 Rand, Stephen C. [8961-77] SPTue
Randenberg, Lise Lyngnes 8926
 Program Committee, 8926 S4
 Session Chair, [8926-27] S7, [8926-29] S7, [8926-7] S1, [8936-1] S1, [8941-34] S9, [8947-16] S4
 Randula, MD. Antonin [8941-50] SPMon
 Randila, Anithi [8955-43] S9
 Range, Christian [8986-61] S12, [8986-61] S8
 Rangra, Kamaljit [8973-15] S3
 Rani, Samta [8938-46] SPSun
Ranji, Mahsa [8936-4] S1
Rank, Elisabeth [8936-14] S3
 Ranta, Sanna [8966-24] S7, [8966-28] S4
 Rao, Bin [8943-41] S6, [8943-52] S8
 Rao, Hemonth G. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
 Rao, Narayana R. [8982-12] S3
 Rao, Rahul [8969-1] S1
 Rao, Satish Bola Sadashiva [8926-5] S1, [8932-11] S2, [8932-28] S6, [8935-72] SPSun, [8943-143] SPMon
 Rao, Yi [8995-17] S3, [9008-6] S5, [9008-6] S6
 Rapala-Virtanen, Tarja [8991-37] S9
 Rapp, Bastian E. [8976-12] S3, [8976-14] S3, [8976-8] S2
 Rapp, Stephan [8972-38] S9
 Rappaport, Noam [8965-21] S5
 Raptis, Ioannis [8976-35] S7, [8976-44] S9
 Raptis, Yiannis S. [8967-28] S11
 Rasakanthan, Janarthanan [8934-15] S3
 Rashed, Dara B. [8926-144] S7, [8934-128] SPMon
 Rashid, Mohammad J. [8986-8] S2
 Rasigade, Gilles [8990-36] S7
 Raskar, Ramesh [8935-50] S11
 Rasmussen, Jens C. [9008-3] S2
 Rasmussen, Thomas P. [8980-6] S2
 Rasoulof, Amin [8964-15] S4, [8964-16] S4
 Rass, Jens [8986-67] S14, [9003-25] S6, [9003-29] S6
 Ratcliff, Christopher [8981-20] S5, [8981-41] S11
 Ratelle, Olivier [8994-44] S11
 Rath, Detlef [8955-7] S2, [8955-9] S2
 Ratliff, Timothy [8948-23] S4
 Ratnadurai Giridharan, Shivakeshavan [8928-98] S20
 Ratnakaran, Y. [8961-119] SPTue
 Ratto, Fulvio [8955-45] S10
 Rattunde, Marcel [8938-32] S7, [8966-27] S8
 Rau, Ileana 8983 Program Committee, 8983 S4 Session Chair, [8983-10] S3, [8983-49] S11
 Rauch, Jean-Yves [8988-35] S8
 Raukas, Madis [9003-4] S1
 Rausch, Stefan [8972-21] S6
 Rauscher, Sabine [8930-9] S2, [8934-58] S9
 Raut, Sangram [8950-51] SPSun
 Rauter, Patrick [9002-43] S10
 Rautiainen, Jussi [8966-14] S4
 Ravikumar, Abhilash [8980-47] S12
 Ravikumar, M. [8940-31] S6
 Ravindran, Sidharth [8990-12] S3
 Ravnik, Miha 9004 S2 Session Chair, [9004-10] S3
 Rawal, Swati [8998-10] S2
 Rawlings, Brandon [8991-14] S4
 Rawlins, Wilson Terry 8962 Program Committee, 8962 S3 Session Chair, [8962-2] S1, [8962-5] S2
 Ray, Aditi [8926-58] SPSat, [8926-59] SPSat, [8941-20] S5
 Ray, Krishanu 8957 Program Committee, 8957 S5 Session Chair
 Ray, Partha [8935-48] S10, [8935-75] SPSun
 Ray, Satadru [8943-143] SPMon
 Ray, Shaumik [8985-24] S6, [8985-25] S6
 Ray, Soumya [8926-91] S18
 Rayno, Francisco M. [8947-26] S5
Razami, Marjan [8946-35] SPSun
Razansky, Daniel [8943-139] SPSun, [8943-147] SPSun, [8943-174] SPMon, [8943-20] S3, [8943-213] SPTues, [8943-28] S5, [8943-57] S9, [8943-85] S13
 Razavi, Seyyed Farhad [8928-95] S19
Razghi, Manijeh 8987 Program Committee, 8987 S7 Session Chair, [8987-33] S7, [8987-47] S9, [8987-86] SPWed, [8987-91] SPWed, [8987-97] SPWed, [8989-1] Skey, 8993 Conference Chair, 8993 S1 Session Chair, 8993 S11 Session Chair, 8993 S12 Session Chair, 8993 S16 Session Chair, 8993 S5 Session Chair, 8993 S9 Session Chair, 8993 Skey Session Chair, [8994-5] S2
 Razskazovskaya, Olga [8982-72] SPWed
 Razzaq, Muhammad Y. [8955-19] S4
 Rea, Edward C. [8961-35] S9
 Reader-Harris, Peter J. [8957-8] S2, [8993-24] S4
 Ream, Stan 8963 Program Committee, 8963 S9 Session Chair, 8970 S6 Session Chair
 Reaspud, Marc [8955-16] S4
 Rebane, Aleksander K. [8956-34] S9, [8956-35] S9, [8983-27] S7, [8983-28] S7, [8983-29] S7, 8997 Program Committee
 Rech, Bernd [8987-60] S12
 Rech, Ivan [8950-42] SPSun, [8993-92] S18
 Rechmann, Peter 8929 Conference Chair, 8929 S2 Session Chair, 8929 S3 Session Chair, [8929-5] S1
 Reddy, Kavya [8943-56] S9
 Reddy, M. Ramasubba [8952-48] SPSun
 Redmond, Robert W. [8958-11] S3
Reed, Graham T. [8989-12] S5, 8990 Conference Chair, 8990 S1 Session Chair, 8990 S2 Session Chair, [8990-13] S3, [8990-7] S2, [8991-18] S5
 Reed, Jason C. [8982-8] S2, [8988-42] S9, [8993-85] S17
 Reese, Jeff [8935-22] S5
 Regan, Caitlin [8926-38] S8
 Regar, Evelyn [8926-89] S18, [8926-93] S19
 Reger, Johann [8978-1] S1
 Register, Janna K. [8935-23] S5, [8957-5] S2, [8958-10] S3
 Rehbock, Christoph [8941-49] S8, [8955-7] S2, [8955-9] S2
 Rehm, Robert [8993-31] S6
 Rehman, Atiq [8935-50] S11
 Rehman, Shakil [8948-65] S11
 Reich, Aina [8996-8] S2
 Reich, Christoph [8986-67] S14, [9003-25] S6, [9003-29] S6
 Reichard, Maria [8930-1] S1
 Reichel, J. [8993-78] S16
Reichel, Steffen [8982-51] SPWed
 Reichelt, Matthias [8984-52] S14
 Reichert, Matthew C. [8983-3] S1
 Reichert, Thomas [8947-30] S6
 Reichert, Thorsten [8996-4] S1
 Reichmann, Lutz [8936-33] S8
 Reilly, Michael [8940-22] S5
 Reimer, Michael E. [8997-33] SPWed
 Reiner, Roman [8970-11] S3
Reinhardt, Colin [8971-14] S3
 Reinig, Marc R. [8978-15] S5
 Reinlein, Claudia [8978-1] S1, [8978-3] S1
 Reischel, Ingolf [8936-33] S8
 Reita, Valérie [8981-7] S2
 Reithmaier, Günther [8996-4] S1
 Reithmaier, Johann P. 9002 Program Committee, 9002 S3 Session Chair
Reithmeier, Eduard [8977-31] S7
 Reitzenstein, Stephan [8993-7] S1
 Reitzig, Manuela [8956-26] S6
 Rek?tyte, Sima [8972-60] SPTue, [8972-61] SPTue
 Rembielinska, Anna Z. [8967-47] SPTue
 Rempel, David [8982-76] SPWed
 Remund, Stefan [8938-47] SPSun
 Ren, Fanghui [8933-18] S5, [8983-5] S1, [8991-29] S7
Ren, Haohui [8983-62] SPWed, [8983-63] SPWed
 Ren, He [8982-77] SPWed
 Ren, Hongwen [9005-2] S1
 Ren, Liqiang [8944-16] S4, [8944-30] SPMon
Ren, Wei [8993-70] S14
 Ren, Wenqi [8935-17] S4, [8937-5] S1
 Ren, Xiaoyang [8926-136] S5
 Renaud, Cyril C. [8985-43] S9, [8988-25] S6, [8993-47] S9
 Renaud, Philippe [8951-32] SPMon
 Rendina, Ivo [8938-42] S8, [8994-49] S12, [8999-40] S8
 Renger, Jan [8984-54] S14
Renkoski, Timothy E. [8935-1] S1
 Renna, Lucio [8990-40] S8
 Renner, Michael [8970-10] S3
 Reno, John L. [8993-13] S2, [8993-49] S9
 Renversez, Gilles [8994-33] S9
 Renyung, Zhang [8982-79] SPWed
 Renz, Marc [8948-50] S8, [8950-28] S7
 Reparatur, Juan S. [8987-11] S2
Requena, Michelle B. [8926-35] SPSun, [8931-41] SPMon, [8931-45] SPMon, [8931-49] SPMon
 Rerucha, Simon [8992-32] SPWed
 Resch-Genger, Ute 8955 S8 Session Chair, [8955-20] S5, [8956-23] S5
 Reshef, Orad [8964-66] SPTue, [8994-47] S12, [8994-76] SPWed
 Reshotko, Miriam R. [8991-14] S4
 Residori, Stefania [8998-29] S6, [9004-16] S4
 Resink, Steffen G. [8943-162] SPMon
 Resmerita, Elena [8958-12] S3
 Resneau, Patrick [9002-51] S12
 Resnick, Paul J. 8973 Conference Chair, 8973 S2 Session Chair, 8973 S4 Session Chair, [8973-12] S3
 Ressel, Peter [9002-7] S2
Restaino, Sergio R. 8978 Program Committee, [8978-4] S1
 Restrepo, Diego [8950-30] S8
 Retterer, Scott T. [8933-5] S2
 Rettner, Charles T. [8997-3] S3, [8997-3] S7
 Reumers, Veerle [8947-51] S12
 Reuter, Rolf [8997-5] S3, [8997-5] S7
 Reutsky-Gefen, Inna [8928-99] S20
 Réveret, François [8986-8] S2
Reyes Sanchez, Jesus Ivan [8963-37] SPTue
 Reyes, Claudio E. [8953-20] SPSun
 Reyes, Darwin [8945-17] S5
 Reynaud, François [8964-51] SPTue
 Reynolds, James [8946-31] S7
 Reynolds, John R. 8983 S9 Session Chair, [8983-33] S8
 Reynolds, Mark [8929-15] S4
 Reynolds, Mitch [8961-66] SPTue
Reynolds, Scott [8989-12] S5
 Reynolds, Tess [8951-38] SPMon
 Rey-Stolle, Ignacio [8981-20] S5
 Rezende Martins, Emiliano [8974-13] S4, [9002-10] S2
Rhee, Chung-Ku 8926 Program Committee, 8926 S1 Session Chair, [8926-12] S1
 Rhee, Ji Yeah [8982-25] S5, [8984-57] SPWed
 Rhee, Jiyeah [8985-56] SPWed
 Rhoades, Ryan [8984-53] S14
 Rhodes, Michelle [8972-27] S7
 Rhonehouse, Dan L. [8961-68] SPTue, [9000-20] S5
 Rhy, Hee Yeal [9008-22] S10
 Rial, Nathaniel S. [8945-1] S1
 Ribeiro, Martha S. [8932-18] S4
 Ribeiro, Rogério Tavares [8955-61] SPSun
 Ribeiro, Sidney J. [8973-5] S1
 Ribet-Mohamed, Isabelle [8993-34] S6
 Ribot, Emeline [8955-22] S5
 Riccardi, Suzannah L. [8951-19] S4
 Ricci, Marc [8987-76] SPWed
 Rice, Colin E. W. [8956-12] S3
 Rice, Photini S. [8936-8] S2, [8956-20] S5
 Rice, Tyler B. [8952-21] S6
 Rich, Jeremy M. [8948-26] S4
 Rich, Ryan M. [8950-51] SPSun
 Richard, Cyrille [8982-40] S8, [8987-93] SPWed
Richards, Bryce S. [8981-10] S3, [8981-9] S3, [9000-7] S2
 Richards, David R. [8948-101] SPSun
Richards-Kortum, Rebecca R. 8947
 Conference CoChair, [8951-15] S4
 Richardson, Christopher J. K. [9002-41] S9
 Richardson, Craig B. [8993-18] S3
 Richardson, David J. [8943-158] SPMon, [8961-33] S8, [9009-11] S6
 Richardson, Jacob J. [8987-34] S1
 Richardson, James B. [8942-11] S2, [8947-54] S12, [8947-80] SPMon
Richardson, Kathleen A. [8974-12] S4, [8974-25] S6, [8988-5] S1, [8991-27] S6
Richardson, Martin C. [8959-45] S11, [8961-112] SPTue, [8964-43] S9, [8964-54] SPTue, [8968-32] S15, [8968-32] S7, [8970-24] S6, [8970-24] S9
 Richardson, Martin J. 9006 Program Committee, 9006 S5 Session Chair, [9006-21] S5, [9006-22] S5, [9006-23] S5
 Richardson, Thomas [8935-42] S9
 Riches, Andrew C. [8939-21] S4
 Richner, Thomas J. [8928-91] S18
Richter, Andre [8980-61] SPWed, [9009-6] S4
 Richter, Christiana [8984-39] S10, [8985-21] S5
 Richter, Claus-Peter [8926-141] S6, 8928 Program Committee, [8928-103] S8, [8928-104] S8
 Richter, Heike [8942-12] S2
 Richter, Sören [8972-34] S8
 Richter, Thomas [8964-19] S5
 Richter, U. [8941-49] S8
 Ricles, Laura M. [8943-103] S15
 Ridge, Jeremy S. [8929-3] S1
 Ridsdale, Andrew [8937-8] S2
 Riechert, Henning [8986-29] S6
 Rieck, Andreas [8988-2] S1
 Riedi, Jérôme [8971-6] S1
 Riedi, Sabine S. [8985-13] S3
 Riedl, Michael [9001-4] S1
 Riedo, Eliso [8987-67] S13

INDEX OF PARTICIPANTS

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Riedrich-Möller, Janine [8994-19] S1, [8994-19] S5
- Riegel, Harald [8963-18] S5
- Riehle, Matthias [8946-21] S5
- Riesenberg, Rainer [8951-10] S3
- Riezman, Howard [8948-84] SPSun
- Righini, Christian [8935-14] S4
- Righini, Giancarlo C.** [8960-7] S2, [8972-22] S6, 8982 Program Committee, [8982-12] S3, [8988-39] S8
- Rightsell, Chris [8956-38] SPSun
- Rigler, Martin [8986-31] S6
- Rigo, Cesare F. [9001-1] S1
- Rigual, Nestor R. [8926-140] S6, [8931-46] SPMon
- Rimke, Ingo** [8948-40] S7, [8964-11] S3
- Rindorf, Lars [8976-31] S7
- Ring, Sven [8987-60] S12
- Ringel, Steven A. 8981 S2 Session Chair, [8981-20] S5, [8981-41] S11, [8986-47] S9
- Rioux, David [8947-19] S4
- Ripken, Tammo** [8926-124] S2, [8928-42] S8, [8935-20] S4, [8941-13] S4, [8949-6] S2, [8972-6] S2
- Rishi, Deepak [8943-82] S12, [8943-83] S12
- Rissanen, Anna** [8977-30] S7, [8992-10] S3
- Rissin, David M. [8935-32] S7
- Rissing, Lutz [8973-4] S1
- Rissons, Angélique [8971-6] S1
- Ristic, Jelena [8986-55] S11
- Ritchie, David A. [8985-50] S11, [8985-51] S11, [8993-73] S15
- Ritsch, Helmut [8999-5] S2
- Ritsch-Marté, Monika 8949 Program Committee, 8949 S8 Session Chair, [8978-2] S1, 8999 Program Committee, 8999 S10 Session Chair, [8999-5] S2
- Ritter, Joe [8971-23] S4
- Ritter, Sarah C. [8951-42] SPMon, [8951-8] S2
- Rittman, Dylan R. [8993-59] S12
- Rivalin, Pierrette [8990-36] S7
- Rivera, Antonio C. [8955-18] S4
- Rivera, Sara [8955-48] S10
- Rivera-Manrique, Solange Ivette [8941-28] S7
- Rivero-Baleine, Clara A. [8974-25] S6
- Riviere, Christophe [8938-5] S1
- Rivoire, Kelley [8997-20] S8
- Riza, Mehdi N. [8930-10] S3
- Riza, Nabeel A.** [8930-10] S3, [8967-51] SPTue
- Riziotis, Christos [8964-61] SPTue, [8982-15] S3, [8983-18] S4
- Rizo, Philippe [8935-14] S4
- Rizvi, Imran** 8931 S3 Session Chair, [8931-13] S3, [8931-6] S2, [8931-7] S2, [8956-3] S1
- Rizzi, Angela [8986-21] S4
- Roach, William P.** 8941 Program Committee, 8941 S4 Session Chair, 8941 Track Chair, 8942 Track Chair, 8943 Track Chair, 8944 Track Chair, 8945 Track Chair, 8946 Track Chair, [8966-32] SPTue
- Robert, Yannick [9002-51] S12
- Roberts, Alison [8972-12] S3
- Roberts, Brian [8981-49] S12
- Roberts, David W. [8928-8] S3, [8928-9] S3, [8951-20] S5
- Roberts, Deniz [8993-28] S5
- Roberts, Philipp [8930-8] S2
- Roberts, William Thomas [8971-22] S4, [8971-34] S5
- Robertson, Brian [9005-4] S1
- Robertson, Claudia S. [8943-33] S5
- Robertson, Martin E. [8934-1] S1
- Robertus, Jan Lukas [8943-29] S5
- Robillart, Bruno [8961-114] SPTue
- Robin, Craig A.** 8961 Program Committee, 8961 S2 Session Chair, [8961-2] S1, [8961-67] SPTue
- Robin, Thierry [8961-72] SPTue, [8971-13] S2, [8982-29] S6
- Robin, Thierry** [8985-38] S8
- Robins, Marthony [8952-28] S7
- Robinson, Alan M. [8928-103] S8
- Robinson, Bryan S. [8971-29] S5
- Robinson, Dominic J. [8952-7] S2
- Robinson, Joshua A. [8985-15] S4
- Robinson, Simon [8943-195] SPTues
- Robinson, Travis V. R. [8980-66] S1
- Robles, Francisco E.** [8949-22] S5, [8952-34] S9
- Roblyer, Darren M.** [8936-20] S4
- Rocca, Jorge J. [8933-23] S6, [8954-4] S1
- Roch, Teja [8968-10] S3
- Rocha, João [8955-22] S5
- Rocha, Licínio [8958-12] S3
- Rocha, Yesenia [8947-15] S3
- Roche, Santiago [8973-6] S2
- Rochford, Jonathan [8956-8] S2
- Rockwell, Benjamin A.** [8941-19] S5, [8941-8] S3
- Rode, Andrei V. 8967 Program Committee
- Rödel, Christian [8972-14] S4
- Rodin, Vladislav [9006-40] SPWed
- Rodrigo, Peter John L. [8992-28] S6, [8992-6] S2
- Rodrigues, Joana [8987-16] S3, [8987-39] S8
- Rodrigues, Lidiany K. [8929-19] SPSun
- Rodrigues, Silvia M. [8984-4] S1
- Rodriguez Gonzalez, Eugenio [8957-32] S7
- Rodriguez, Annette [8956-24] S6
- Rodriguez, Carissa L.R.** [8928-43] S8, [8928-46] S9
- Rodriguez, Jean-Baptiste [8981-64] S13, [8993-34] S6, [8993-42] S8
- Rodriguez, Jorge [8970-23] S6, [8970-23] S9
- Rodriguez, Ruben [8956-25] S6
- Rodriguez, Suset [8942-18] S4
- Rodriguez, Tânia T. [8932-43] SPSun, [8932-44] SPSun
- Rodriguez, Vincent [8974-3] S1
- Rodriguez-Diaz, Eladio [8926-127] S3, [8926-132] S4, [8926-134] S4
- Rodriguez-Esquerre, Vitaly Felix [8980-50] S13, [8980-52] S13, [8988-67] SPWed
- Rodriguez-Juarez, Rocio [8941-50] S10
- Roe, Anna W. 8928 Conference CoChair, 8928 Program Committee
- Roehlicke, Tino [8948-94] SPSun
- Roehner, Markus [8963-27] S7, [8968-14] S3
- Roelkens, Gunther [8988-21] S5, [8989-24] S7, [8990-23] S4, [8993-42] S8, 8995 Program Committee
- Roesch, Markus [9002-20] S5, [9002-26] S6
- Roethlingshoefer, Tobias [8964-19] S5
- Roff, Robert [8965-27] S6, [8965-29] S6
- Rogatkin, Dimitrii A. [8936-11] S3
- Roger, Charles [8981-7] S2
- Rogers, David J. 8987 Conference Chair, 8987 S10 Session Chair, 8987 S11 Session Chair, [8987-33] S7, [8987-47] S9, [8987-86] SPWed, [8987-91] SPWed, [8987-97] SPWed
- Rogers, Derek [8926-123] S2
- Rogers, John A. 8958 Conference Chair, 8958 SKey Session Chair, [8958-7] S2, [8958-9] S2, 8974 Program Committee, [8976-103] SPLEN
- Roh, Kwangdong [9002-5] S1
- Roh, Sookyong [8977-15] S4
- Rohde, Barukh [8941-33] S9
- Rohling, Robert N. [8943-183] SPMon
- Rohrbach, Daniel J. [8931-21] S4, [8931-46] SPMon, [8943-192] SPTues
- Roitner, Heinz [8943-90] S13
- Rojas, Miguel M. [8994-16] S4
- Rolling, Bernhard [8988-64] SPWed
- Rollison, Debra R. [8996-24] S7
- Rolland, Jannick P.** [8934-127] SPMon, 8936 Program Committee, 8936 S8 Session Chair, [8936-37] S8, [8936-9] S2, SC1122
- Rölle, Thomas [9006-1] S1
- Rollins, Andrew M.** [8926-91] S18, [8926-96] S19, [8928-38] S7, 8934 Program Committee, 8934 S7 Session Chair, [8934-52] S8, [8934-62] S9, [8934-77] S12, 8953 Conference Chair, [8953-10] S3, [8953-15] S4, [8953-7] S2, [8953-8] S2
- Rollins, Keith 9005 Program Committee
- Rolly, Brice [8950-12] S3
- Romano, Cédric [8961-78] SPTue
- Romano, Silvia [8994-49] S12, [8995-14] S4
- Romano, Valerio** [8967-10] S10, [8967-10] S5, [8967-43] S15, [8967-43] S7
- Romanov, Gleb [8998-51] S11
- Romanowski, Marek [8955-52] S11
- Romeo, Robert C. [8978-4] S1
- Römer, Friedhard [8986-61] S12, [8986-61] S8
- Römer, Gert-Willem R. [8967-32] S12, [8967-32] S4, [8967-49] SPTue, [8968-13] S3
- Romero, Mary Jacqueline [8999-43] S9
- Romero, Orlando S.** [8981-63] SPWed
- Romero, Oscar [8965-26] S6
- Romero, Pablo M. [8967-31] S12, [8967-31] S4, [8970-15] S12, [8970-15] S4
- Romero-Méndez, Ricardo [8941-24] S6
- Rominger, Volker [8963-26] S6, [8963-6] S2
- Rominu, Mihai [8929-22] SPSun
- Ronchi, Paola [8939-15] S3
- Rong, Haisheng** 8990 Program Committee, 8990 S7 Session Chair, 9002 Program Committee, 9002 S7 Session Chair
- Ronhovde, Peter [8949-56] SPMon
- Rooney, Niall [8954-31] SPMon
- Roop, Ray M.** Symposium Committee
- Roord, Austin SC702
- Rorrer, Gregory L. [8933-18] S5
- Rosales, Daniel [8986-20] S4
- Rosales, Ricardo [8993-9] S1
- Rosa-Ribeiro, Rafaela [8948-12] S2
- Rosas, Georgina G. [8975-22] S4
- Rosei, Federico** [8969-18] S4, [8969-18] S6
- Rosen, Jennifer E. 8926 Program Committee, [8926-127] S3, [8926-132] S4, [8926-134] S4
- Rosenauer, Andreas [8986-19] S4
- Rosenberg, Mireille [8927-10] S3, [8927-11] S3, [8934-8] S2
- Rosenberger, Albert T. [8998-38] S9
- Rosenbusch, Peter [8993-78] S16
- Rosenfeld, Eikana [8930-14] S3
- Rosenfeld, Liat [8976-39] S8
- Rosenthal, Amir [8943-147] SPSun, [8943-85] S13
- Rosenthal, Eben L. [8926-128] S3
- Rosenwaks, Salman [8962-11] S3, [8962-8] S3
- Rosiewicz, Alex [8982-4] S1
- Rosin, Miriam [8935-19] S4
- Roskos, Hartmut G. [8985-58] SPWed
- Rosner, Mordechai [8938-32] S7
- Rossari, Susanna [8939-30] S6
- Rossi, Francesca [8986-59] S11
- Rossi, Francesca [8926-3] S1, [8930-51] SPSun, [8930-52] SPSun
- Rossi, Giuliano [9003-68] SPWed
- Rossin, Victor [8965-6] S2
- Rostami, Shermineh [8964-15] S4, [8964-62] SPTue
- Rostovtsev, Yuri 8998 Program Committee, [8998-25] S6
- Rotenberg, Nir [8984-51] S14
- Rotenreich, Ygal [8930-14] S3, [8930-37] S8, [8930-55] SPSun
- Rotermund, Fabian [8966-4] S2
- Roth, Bernhard [8945-10] S3, [8977-31] S7
- Roth, Caleb C. [8941-57] S12, [8941-58] S12, [8941-61] S12
- Roth, Michael [8988-64] SPWed
- Roth, Stephan 8963 Program Committee, 8963 S8 Session Chair, 8967 Conference Chair, 8967 S10 Session Chair, 8967 S7 Session Chair, 8972 S12 Session Chair
- Rothardt, Jan [8961-49] S12
- Rothardt, Manfred [8961-73] SPTue, [8982-44] S9, [8982-5] S1
- Rothman, Johan [8993-40] S7
- Rotich, E. K. [9008-24] S10
- Rotter, Thomas J. [8981-63] SPWed, [8982-21] S4
- Roudas, Ioannis 9009 Program Committee
- Roufied, Mohamed-Said [8990-17] S3
- Rouillard, Yves [8993-72] S15
- Rouleau, Christopher M. [8969-3] S1, [8969-5] S1, [8969-6] S1
- Rousakis, Emmanouil [8926-2] S1
- Rouse, Andrew R. [8927-9] S2
- Rousseau, Clément [8934-90] SPMon
- Rousset, Matthieu** [8982-13] S3, [8994-11] S3
- Roussignol, Philippe [8984-32] S9
- Rouvier, Anne [8993-40] S7
- Rouvillos, Stéphane [8977-36] S2
- Roux, Philipp Stefanus [8999-28] S6, [8999-34] S7, [8999-43] S9, [8999-44] S9, [8999-45] S9
- Roux, Frederic [8981-7] S2
- Roux, Stéphane [8946-2] S1
- Rovati, Luigi** 8930 Program Committee, 8930 S2 Session Chair, [8930-12] S3, [8951-1] S1
- Rowe, Steven M. [8927-12] S3, [8927-45] S11, [8927-57] S13
- Rowen, Eitan E. [8961-60] S14, [8964-2] S1
- Röwert-Huber, Hans-Joachim [8940-7] S2
- Rowlands, Christopher J. [8948-20] S3
- Rowley, Mark I. [8949-12] S3
- Rox, Anderson R. [8948-32] S5
- Roy Mahapatra, D.** [8926-114] S23, [8933-7] S2, [8980-47] S12, [8994-10] S3
- Roy, Bernard [8971-6] S1
- Roy, Carl [8954-8] S2
- Roy, Hemant K. [8952-33] S9
- Roy, Madhusudan [8943-163] SPMon
- Royer, François 8988 Program Committee, 8988 S8 Session Chair, [8988-14] S3
- Royn, Arnaud [8974-3] S1, [8974-4] S1
- Royson, Badrinath [8953-3] S1
- Royston, Thomas J. [8946-10] S3, [8946-16] S4
- Rozgov, Ivan I. [8954-16] S4
- Rozhin, Aleksey G. [8984-5] S1
- Rozinek, Sarah C.** [8941-29] S8
- Ruan, Yinlan [8987-42] S8
- Rubahn, Horst-Günter [8983-22] S5
- Rube, Martin [8935-55] S12
- Rubelman, Peter A. [8929-16] S4
- Rubino, Pierangela [8930-52] SPSun
- Rubinsztein-Dunlop, Halina H.** 8999 Program Committee, 8999 S7 Session Chair, [8999-9] S2
- Rubio Mercedes, Cosme Eustaquio [8988-67] SPWed
- Rudawski, Piotr [8972-21] S6
- Rudge Barbosa, Felipe** [9008-5] S4, [9008-5] S5
- Rudloff, Dirk [8977-21] S5
- Rudnicka, D. [8987-93] SPWed
- Rudnitski, Florian [8955-33] S7
- Rudolph, Andreas [9003-21] S5
- Rudolph, Daniel [9002-35] S8
- Rudolph, Larry [9010-10] S4
- Rudy, Charles W.** [8964-30] S7
- Rudyk, Victor P. [8969-25] SPTue
- Rueck, Angelika C. 8948 Program Committee, 8948 S9 Session Chair, [8948-46] S8
- Ruehm, Adrian [8948-46] S8
- Ruellan, Mathieu [8971-6] S1
- Ruettiger, Steffen [8936-19] S4, [8950-8] S2
- Rugar, Daniel [8997-3] S3, [8997-3] S7
- Ruggeri, Alessandro [8993-89] S18
- Ruggeri, Marco [8930-29] S7
- Rühl, Eckart [8942-12] S2
- Rühh, Adrian [8926-50] S10, [8928-13] S4
- Ruiz Prado, Myke Rolan [8980-43] S11
- Ruiz, Blanca [8964-53] SPTue, [8985-11] S3, [8985-12] S3
- Ruiz, David [8993-59] S12
- Ruiz, Eduardo [8987-55] S10
- Rumala, Yisa [8999-12] S3, [8999-24] S5, [8999-36] S7
- Rumi, Mariacristina [9004-24] S3
- Rumpf, Raymond C.** 8974 Conference Chair
- Rung, Stefan [8967-24] S10
- Rungsuwan, Rakchanok [8984-41] S11
- Runyan, Raymond B. [8942-29] S7
- Ruppert, Claudia [8984-9] S2

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Ruppik, Stefan [8961-36] S9, [8961-75] SPTue
 Ruprecht, Aiko K. [8992-11] S3
 Rury, Aaron [8960-33] S9
 Rus, Bedrich [8959-35] S8, [8959-44] S10, [8959-49] S11, [8962-17] S5
 Ruske, Florian [8987-60] S12
 Russ, Simone [8972-25] S6, [8972-40] S9
 Russbuedt, Peter [8959-30] S7
 Russell, Philip St. John [8961-26] S7, [8964-28] S7
 Russier-Antoine, Isabelle [8983-7] S2, [8984-3] S1
 Russo, Sheila [8930-51] SPSun
 Rust, W. [9008-24] S10
 Rusu, Anca [8958-12] S3
 Rüter, Christian E. [8982-52] SPWed
 Rutledge, John C. [8950-50] SPSun
 Rutz, Frank [8993-31] S6
 R??ka, Filip [8939-25] S5
 Ryabko, Maxim [8994-60] S15
 Rybalovsky, Andrey A. [8961-41] S10
 Ryckeboer, Eva [8989-24] S7, [8993-42] S8
 Ryder, Christian Peter [8980-6] S2
 Rylander, Henry Grady [8952-40] S10
 Rylander, Marissa Nicole 8941 Program Committee
 Rypma, Roger L. SC977
 Rytz, Daniel [8959-60] S14
 Ryu, Geun-Hwan [9003-56] SPWed
Ryu, Han-Cheol [8985-55] SPWed, [8985-7] S2
 Ryu, Han-Youl [9003-56] SPWed
 Ryu, SeonYoung [8975-12] SPTue
 Ryu, SuHo [8947-9] S2, [8949-5] S1
 Ryykin, Shanti [8939-17] S3
 Ryzhii, Victor [8993-80] S16

S

S., Henning [8967-48] S14
 Saadany, Bassam [8977-16] S4, [8977-24] S6
Saager, Rolf B. [8926-31] S7, [8931-21] S4
 Saavedra, Genaro [8949-39] S8, [8949-40] S8
Sabat, Ribal Georges G. [9006-5] S1
 Sabella, Alexander [8959-12] S3
 Sabella, Stefania [8955-50] S11
 Sabino, Luis G. [8931-8] S2
 Sablinskas, Valdas [8939-38] SPSun, [8957-7] S2
 Sabourdy, David [8962-16] S5
 Sabourin, Nicaulas [8990-32] S6
Sabry, Yasser M. [8934-125] SPMon, [8977-16] S4, [8977-24] S6, [8977-28] S6
 Sacconi, Leonardo [8928-57] S12, [8948-16] S3
 Sacher, Wesley D. [9007-3] S3
 Sachsenheimer, Kai [8976-8] S2
 Sackrow, Marcus [8936-19] S4
 Sadeghi, Kayvan [8933-21] S6
 Sadek, Mohamed [8977-28] S6
 Sadetsky, Gregory [8948-99] SPSun
 Sadi, Toufik [8980-2] S1, [8980-34] S9
 Sadwick, Laurence P. 8985 Conference Chair, 8985 S1 Session Chair, 8985 S10 Session Chair, 8985 S2 Session Chair, 8985 S3 Session Chair, 8985 S5 Session Chair, 8985 S8 Session Chair
 Saeedkia, Daryoosh [8985-26] S6
 Saegusa-Beercoft, Emi [8940-25] S5
 Saerchen, Emanuel [8941-14] S4
 Saetchnikov, Anton V. [8952-3] S1, [8957-14] S4
 Saetchnikov, Vladimir A. [8952-3] S1, [8957-14] S4
 Safi, Malak [8955-24] S5
 Sagawa, Misuzu [9010-18] S6, [9010-18] S7
 Sagnes, Isabelle [8966-11] S8, [8966-19] S6, [8966-20] S6, [8966-29] S8, [8990-46] S9, [8997-28] S10
 Saha, Ratan K. [8943-163] SPMon
 Saha, Shantanu [8987-84] SPWed
 Sahai, Erik [8927-7] S2
 Sahin, Dondu [8993-17] S3, [8993-19] S3, [8993-20] S3
 Sahlberg, Anna-Lena [8964-52] SPTue

Sahraei, Nasim [8981-47] S12
 Sahu, Aditi [8926-147] S7, [8939-14] S3
 Sahu, Jayanta K. [8961-82] SPTue, [8982-15] S3, 9009 S7 Session Chair, [9009-11] S6
 Sahu, Ravi P. [8926-39] S8
 Saïda, Takashi 9008 Program Committee, 9008 S9 Session Chair, 9010 Program Committee
 Saika, Makoto [8961-115] SPTue
 Saiki, Toshiharu [8954-6] S2
 Sailor, Michael J. 8933 Program Committee
 Saito, Kenichi [8930-8] S2
 Saito, Kenta [8948-64] S11, [8949-54] S11
 Saito, Shin-ichi [9010-18] S6, [9010-18] S7
 Saitoh, Kunimasa 9009 Program Committee, [9009-2] S3
 Sajithlal, Gangadharan [8935-73] SPSun
 Sakabe, Masayo [8956-4] S1
 Sakad'ic, Sava [8928-4] S1
 Sakai, Wataru [8983-26] S6, [8983-51] SPWed
 Sakakura, Masaaki 8967 S11 Session Chair, [8967-11] S10, [8967-11] S5
 Sakamoto, Taiji [9009-2] S3
 Sakamoto, Yoshihiro [8956-4] S1
 Sakamoto, Yuji [9006-27] S6, [9006-28] S6, [9006-35] S7, [9006-42] SPWed
 Sakharov, Alexey V. [8986-79] SPWed
 Saklayan, Nabihah [8972-1] S1, [8972-53] SPTue
 Sakoda, Kazuaki [8974-51] S8
 Sakr, Hesham [8938-28] S6
 Sakurai, Ryo 9004 Program Committee, 9005 Program Committee
 Sakurai, Takashi [8928-31] SPSat
 Sakurai, Toshimitsu [8959-27] S7
 Salama, Maurice [8929-16] S4
 Salamo, Gregory J. 8996 Program Committee
 Salas, Pedro [8956-25] S6
 Salas-Garcia, Irene [8941-12] S3
 Salas-Ramirez, Kaliris [8940-30] S6
Salazar-Hermenegildo, Noemi [8952-24] S6
 Salcudean, Septimiu E. [8943-183] SPMon
 Sale, Terry E. [9001-1] S1
 Saleem, Muhammad Rizwan [8974-58] S9
 Saleh, Khaldoun [8960-4] S1, [8985-49] S10
Saleh, Reema [8956-30] S8
 Salehi, Hamideh [8939-17] S3, [8947-23] S5
Salehi, Hassan S. [8943-110] SPSun
 Salem, Hakeem [8943-192] SPTues
 Salgado-Verduzco, Marco Antonio [9006-54] SPWed, [9006-55] SPWed
 Salganskii, Mikhail Yu [8961-29] S7
 Salik, Ertan [8938-38] S8
 Salikhov, Khafiz M. [8982-46] S9
 Salin, François [8959-21] S6
 Salina, Ana Carolina G. [8927-48] S12
 Saliou, Fabienne [8980-43] S11
 Sall, E. G. [8959-48] S11
 Salloom, Hussein T. [8938-26] S5
 Salminen, Noora [8991-2] S1
 Salo, Daniel [8940-23] S5
 Salomon Garcia, Jesus I. [8957-32] S7
Salter, Patrick [8967-13] S12, [8967-13] S7, [8968-3] S1, [8974-29] S7
 Salvadori, Elio [9009-16] S7
 Salvenmoser, Willi [8943-142] SPSun
 Salzenstein, Patrice [8985-49] S10
 Samad, Ricardo E. [8972-52] S13, [8972-52] S8
 Samarkin, Vadim [8960-51] S13
 Samek, Ota [8939-25] S5
 Sam-Giao, Diane [8986-8] S2
Samkoe, Kimberley S. [8926-28] S7, [8931-26] S5, [8931-36] S7, [8931-39] S8, [8956-6] S2
Samok, Marek J. [8955-11] S3, [8983-20] S5
 Samokhvalov, Pavel S. [8955-28] S6, [8981-37] S9
 Samora, Sally [8989-20] S6
 Sampaio, Fernando J. P. [8932-15] S3, [8932-16] S3

Sampaleanu, Alexander [8943-35] S6, [8943-82] S12, [8943-83] S12
 Sampaolo, A. [8993-73] S15
 Sampat, Sid [8981-17] S4
Sampathkumar, Ashwin [8940-25] S5, [8943-104] S15, [8943-89] S13
Sampson, David D. 8927 Program Committee, [8927-50] S12, [8934-45] S7, [8934-48] S7, [8934-6] S1, [8934-83] S12, [8935-49] S10, [8935-60] S12, 8946 Conference Chair, 8946 S1 Session Chair, 8946 SREM Session Chair, [8946-12] S4, [8946-29] S6, [8946-3] S1, [8946-5] S2, [8949-9] S2
 Sams, Robert L. [8993-60] S12
 Samsonov, Alexander M. [9006-17] S4
 Samuel, Edmund P. [8982-71] SPWed
Samuel, Ifor D. W. [8983-47] S11, [9002-10] S2
 Samuels, Joshua [8935-56] S12
 Samuelson, Sean R. [8934-92] SPMon
 San Román, Julio [8984-49] S13
 Sanai, Nader [8928-16] S4
 Sanchez, Isabel [8968-30] S15, [8968-30] S7
 Sanchez, Luis [8991-36] S8
 Sanchez, Martin [8938-38] S8
 Sanchez, Nancy [8993-70] S14
 Sanchez-Dehesa, José [8994-14] S4
 Sanchez-Garcia, Miguel A. [8996-2] S1
 Sanchez-Gil, Jose A. [8996-12] S4
Sanchez-Lara, Rafael [8980-42] S11
 Sanchis, Pablo [8991-36] S8
 Sandali, Otman [8930-34] S8
 Sandana, Vinod Eric 8987 Program Committee, 8987 S12 Session Chair, [8987-33] S7, [8987-47] S9, [8987-69] S13, [8987-86] SPWed, [8987-91] SPWed, [8987-97] SPWed, [8993-77] S16
 Sandell, Lisa L. [8953-1] S1
 Sanders, Barry C. [8997-14] S6
 Sanders, Melinda [8935-25] S5, [8948-56] S9
 Sanders, Melinda [8943-5] S1
 Sanders, Nicolai H. [8964-55] SPTue, [8964-56] SPTue
 Sanders, Simon [9003-9] S2
 Sandford-Richardson, Elizabeth [9006-22] S5
 Sandner, Thilo [8977-3] S2
 Sandrian, Michelle Gabriele [8943-142] SPSun
 Sanfilippo, Delfo N. [8990-27] S5, [8990-40] S8, [8990-41] S8, [8990-42] S8
Sanghera, Jasbinder S. [8959-58] S13, [8961-57] S13, [8968-35] SPTue, [8982-35] S7
 Sangla, Damien [8959-21] S6
 Sann, Sharon B. [8928-84] S16
 Sansoni, Linda [8972-31] S8, [8972-33] S8
 Santacruz-Vázquez, Claudia [9006-45] SPWed, [9006-46] SPWed
 Santacruz-Vazquez, Veronica [9006-45] SPWed
 Santagata, Sandro [8948-24] S4
 Santangelo, Maria Francesca [8990-27] S5
 Santato, Clara [8983-9] S3
 Santhanam, Parthiban [9000-6] S2
 Santio, Freddie [8978-4] S1
 Santinelli, Andrea [8972-33] S8
 Santini, Benedetta [8955-68] SPSun
 Santori, Charles [8994-21] S2, [8994-21] S6, 8997 Conference Chair, [8997-20] S8, [8997-26] S10
 Santoro, Ylenia [8927-16] S4
 Santos, Andre B. O. [8939-41] SPSun
 Santos, Beate Saegesser [8955-61] SPSun, [8955-62] SPSun
 Santos, José Luis [8957-20] S4
 Santos, Laila S. [8932-7] S1
 Santos, Luis [8999-46] S10
 Santos, M. B. [8993-36] S7
 Santos, Paulo V. [8989-4] S1
 Sanvitto, Daniele [8997-26] S10
 Sapiens, Noam [9010-10] S4
 Sarakinos, Andreas [9006-3] S1
 Saravanamuttu, Kalaichelvi [8983-14] S4
 ?arbot, Martin [8992-32] SPWed

Sardar, Dhiraj Kumar [8943-99] S15, [8956-24] S6, [8956-38] SPSun, [8956-7] S2
 Sarder, Pinaki [8931-52] SPMon, [8948-78] SPSun, [8949-56] SPMon, [8956-43] S4
 Saremi, Bahar [8956-21] S5
 Sargent, D. [8962-13] S4
Sariciftci, Niyaz Serdar 8983 Program Committee
 Sarimollaoglu, Mustafa [8943-31] S5
 Sarkar, MitradEEP [8957-28] S6
 Sarker, Md. Samiul Islam [8969-9] S2
 Sarkisov, Sergey S. [8982-75] SPWed
 Sarma, Jay [8994-6] S2
 Sarney, Wendy L. [8993-51] S10
 Sarunic, Marinko V. [8930-40] S9, [8934-25] S4, [8934-74] S11, [8934-91] SPMon, [8934-93] SPMon
 Sarwar, A.T.M. Golan [8996-10] S3
 Sarzala, Robert P. [8966-16] S5
 Sarzynski, Marcin [8986-25] S5
Sasa, Shigehiko [8987-45] S9
 Sasagawa, Kiyotaka [8928-20] S5, [8933-22] S6, [8974-17] S5
 Sasaki, Hisayuki [9006-33] S7
 Sasaki, Minoru [8977-29] S7
 Sasaki, Satoshi [8987-45] S9
Sasaki, Wakao [9001-20] SPWed, [9008-10] S7
 Sasaki, Yuzo [8934-103] SPMon
 Sasikumar, Anup [8986-47] S9
 Sasmal, Saptarshi [8985-25] S6
 Saso, Srdjan [8935-35] S8
 Sasorov, Pavel [8988-16] S4
 Sass, Andrea [8943-140] SPSun
 Sass, Anne [9000-9] S2
 Satake, Toshiaki [8991-17] S4
 Sathe, Priyanka P. [8940-13] S3
 Satira, Zachary A. [8948-38] S7
 Sato, Hidetoshi [8938-39] S8, [8939-1] S1, [8939-24] S5, [8939-39] SPSun, [8951-24] S5, [8951-25] S5
 Sato, Hiroki K. [8987-27] S6
 Sato, Kazuhide [8931-12] S3
 Sato, Keigo [8961-8] S2
 Sato, Ken-ichi 9007 Program Committee, [9008-1] S1
 Sato, Kenji [8961-43] S10
 Sato, Makoto [8930-8] S2
 Sato, Manabu [8928-22] S5, [8928-47] S9
 Sato, Mika [8928-42] S8
 Sato, Ryota [8943-154] SPMon
 Sato, Shunichi [8928-19] S5, [8928-22] S5, [8928-79] SPMon, [8938-52] SPSun, [8941-10] S3
 Sato, Shunichi [8969-9] S2
 Sato, Tadateki [8967-18] S9
 Sato, Toshiaki [8961-115] SPTue
 Sato, Yasuaki [8983-4] S1
 Sato, Yuji [8967-21] S9, [8969-27] SPTue
 Sato, Yukio [8987-36] S7
 Satoh, Shuya [8947-11] S2
 Satou, Akira [8993-80] S16
 Satter, Mahbub [9002-16] S4
 Sattler, Bettina [8961-31] S8
 Sattmann, Harald [8934-2] S1
 Satyamoorthy, Kapaettu [8935-72] SPSun
 Satyan, Naresh [8961-1] S1, [8961-127] SPTue
 Saucedo-Carvajal, Angel [8973-28] SPTue
 Sauer, Markus [8948-49] S8
 Sauer, Markus 8950 Program Committee
 Sauk, Jenny S. [8927-2] S1
 Saunders, Christobel M. [8946-3] S1
 Saunter, Christopher D. [8976-32] S7, [8978-8] S3
 Saupé, Ray [8977-12] S3
 Sauvage, Sébastien [8990-46] S9
 Sauvage, Vincent [8935-35] S8
 Savage-Leuchs, Matthias P. [8961-62] S15
 Savanier, Marc [8993-6] SKey
 Savarimuthu, Wilfred Prasanna [8935-24] S5, [8940-2] S1
 Savchenkov, Anatoly A. [8960-38] S10
 Savell, Alexander [8950-25] S6
 Savenko, Ivan G. [8993-7] S1
 Savignon, Daniel J. [8989-14] S5

INDEX OF PARTICIPANTS

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Savitsky, Alexander P.** [8950-17] S4
Savostyanov, Georgy V. [8956-40] SPSun
Savvidis, Pavlos [8986-39] S8
Sawa, Masanori [8938-39] S8, [8951-23] SPMon
Sawant, Rupa R. [8926-136] S5
Sawant, Sharada [8939-14] S3
Sawhney, Monsum [8932-32] S7
Sayago, Jonathan J. [8983-9] S3
Sayed El-Ahl, Mohammed Hamza [8935-71] SPSun
Sayegh, Samir I. [8930-54] SPSun
Sayinc, Hakan [8961-105] SPTue, [8961-87] SPTue
Säynätöki, Antti [8982-23] S5
Saytashev, Ilyas [8948-87] SPSun, [8948-9] S1
Sberveglieri, Giorgio [8987-82] SPWed
Scaggs, Michael J. 8960 Program Committee, [8960-30] S4, [8960-30] S8
Scalari, Giacomo [8984-13] S3, [8985-13] S3, [8993-3] SKey, [9002-20] S5, [9002-26] S6
Scalia, Giusy [9004-29] SPWed, [9004-30] SPWed, [9004-31] SPWed, [9004-32] SPWed
Scalora, Michael [8994-62] S15, [8994-66] SPWed
Scamarcio, Gaetano [8993-73] S15, [8993-74] S15
Scaraggi, Michele [8968-6] S2
Scarcella, Carmelo [8993-89] S18
Scarcelli, Giuliano 8946 Program Committee, 8946 S3 Session Chair, [8946-11] S3
Scaroni, Patrizia [8930-52] SPSun
Scarpa, Marina [8954-28] S7
Schaaaf, Peter [8955-35] S8
Schabacker, Charles R. [8993-18] S3
Schab-Balcerzak, Ewa [8983-21] S5
Schad, Sven-Silvius [8959-25] S6, [8959-31] S7, [8965-27] S6
Schade, Lukas [8986-59] S11
Schaeffer, Ronald D. SC689
Schafer, Rachel [8937-11] S2
Schäfer, Sebastian [8996-8] S2
Schäfers, J. [8929-28] SPSun
Schaffer, Chris B. 8972 Program Committee, 8972 S4 Session Chair, SC743
Schalck, Robert SC1114
Schanze, Kirk S. [8983-29] S7
Scharber, Markus Clark [8975-15] S3
Scharf, Toralf [8974-53] S8, [8977-25] S6
Schattka, Bernhard J. [8948-74] SPSun
Scheffel, Andy [8982-27] S6
Scheiman, David [8981-27] S7
Scheiman, James Michael [8935-80] SPSun
Schejter, Adi [8928-99] S20, [8948-75] SPSun
Schell, Andreas W. [8993-86] S17
Scheller, Maik [8966-12] S4, [8966-21] S6
Scheller, Torsten [8963-30] S7
Scheltens, Frank J. [8983-38] S9
Schenk, Desirée [8956-11] S3
Schenk, Harald Symposium Committee, 8977 Program Committee, 8977 S5 Session Chair, [8977-3] S2, [8977-6] S2
Schenke-Layland, Katja [8948-52] S9
Schenkman, Kenneth A. [8945-12] S3
Schepler, Kenneth L. 8964 Program Committee, 8964 S3 Session Chair, 8964 S8 Session Chair, 8964 S9 Session Chair
Scherer, Axel 8994 Conference Chair, 8994 S2 Session Chair, [8994-1] S1
Scherer, Kyle [8940-22] S5
Scherman, Daniel [8982-40] S8, [8987-93] SPWed
Scheuer, Jacob [8994-42] S11, 8998 Program Committee, [8998-17] S4, [8998-48] S11
Scheuermann, Julian [8993-44] S8
Schiabel, Homero [8930-47] SPSun
Schiek, Manuela [8983-22] S5
Schihart, Mark T. [8954-33] SPMon
Schilcher, Kurt [8970-6] S2
Schilling, Christian [8966-27] S8
Schimpke, Tilman [9003-17] S4
Schindler, Philipp C. [9009-8] S4
Schittny, Robert [8970-8] S2
Schiumarini, Domitilla [8957-6] S2
Schizas, Constantin [8952-5] S2
Schlachter, Florian [8995-18] S5
Schlachter, Simon [8927-2] S1
Schlaepfer, Isabel [8939-18] S3
Schleipen, Jean [8954-26] S6
Schleunitz, Arne [8974-5] S2
Schlösser, Michael [8959-20] S5
Schlosser, Peter J. [8966-9] S3
Schlott, Kerstin [8941-17] S5
Schmauss, Bernhard [8930-17] S4, [8964-19] S5
Schmetterer, Leopold [8934-27] S4
Schmid, Jens 8988 Program Committee, 8988 S5 Session Chair, [8990-32] S6, [8995-30] S8, [8995-38] S10
Schmid, Wolfgang [9003-21] S5
Schmidt, Berthold [8965-29] S6
Schmidt, Bradley S. [8934-14] S3
Schmidt, Christian [8964-8] S2
Schmidt, Christopher [8971-7] S1
Schmidt, Frank [8980-60] SPWed, [8980-7] S2, 8988 Program Committee, [8988-19] S4, [8988-54] SPWed
Schmidt, Gordon [8986-21] S4, [8986-73] S15, [8986-80] SPWed
Schmidt, Holger [8974-15] S4
Schmidt, Holger [8988-40] S9, 8990 Program Committee, 8990 S5 Session Chair
Schmidt, Jan-Uwe [8977-21] S5
Schmidt, Markus A. [8961-26] S7, [8964-28] S7
Schmidt, Morgan S. [8941-8] S3
Schmidt, Oliver G. 8933 Program Committee
Schmidt, Slawa [8984-44] S12
Schmidt-Erfurth, Ursula [8930-8] S2, [8934-58] S9
Schmidtke, Christian [8955-67] SPSun
Schmidtke, Katharine [8991-34] S8
Schmitz, Nicole [8943-142] SPSun
Schmitt, Michael [8926-133] S4, [8928-5] S2
Schmitt-Sody, Andreas [8964-15] S4
Schmitz, Johannes [8993-31] S6
Schmocker, Andreas [8952-5] S2
Schmogrow, Rene M. [9009-8] S4
Schneider, Christian [8984-24] S7
Schneider, Christian [8993-7] S1
Schneider, Garrett J. [8980-76] SPWed, [8985-30] S7, [8985-45] S10, [9007-24] S8
Schneider, Hans Christian 8980 S11 Session Chair, [8980-54] S10
Schneider, Maja [8928-69] SPMon, [8928-70] SPMon
Schneider, Marc [8954-18] S5, [8955-56] S12
Schneider, Ralf [8955-20] S5
Schneider, Stephan [8965-34] S7
Schneider, Thomas [8998-32] S7
Schnell, Joscha [9002-35] S8
Schnell, Oliver [8928-13] S4
Schnitzer, Mark J. 8927 Program Committee
Schnitzler, Claus [8959-43] S10
Schoenau, Thomas [8950-13] S3
Schoenfeld, Winston V. 8974 Conference Chair, 8974 S5 Session Chair, [8987-54] S10
Scholz, Ferdinand [8986-32] S6, [8986-73] S15, [8986-9] S2
Scholz, Matthias [8964-1] S1
Scholz, Tobias [8963-2] S1
Schomaker, Markus [8972-6] S2
Schönau, Steffi [8987-60] S12
Schoonover, Robert W. [8943-215] SPTues, [8943-224] SPTues
Schöps, Benjamin [8972-39] S9
Schor, Paulo [8930-53] SPSun
Schörmann, Jörg [8986-42] S8
Schotter, Jörg [8933-4] S2
Schötz, Gerhard [8961-40] S10
Schow, Clint L. [8991-32] S8
Schowalter, Leo J. [8986-65] S14
Schowalter, Marco [8986-19] S4
Schrader, Sigurd K. [8972-17] S5
Schraml, Konrad [8994-29] S8, [8994-40] S11
Schränk, Franz [8933-4] S2
Schreiber, Thomas [8961-31] S8, [8961-5] S2, [8961-64] S15, [8961-89] SPTue, [8968-34] SPTue
Schrenk, Bernhard [9009-17] S7
Schrenk, Werner [9002-23] S5
Schreuer, Caspar [9004-6] S2
Schriempf, J. Thomas 8962 Conference Chair
Schrimpf, Ronald D. [8986-47] S9
Schrittwieser, Stefan [8933-4] S2
Schróder, Henning 8991 Conference Chair, 8991 S1 Session Chair, [8991-13] S3, [8991-15] S4
Schroeder, Matthias [8965-28] S6
Schroeder, Thies [8935-23] S5, [8958-10] S3
Schroetzlmair, Florian [8926-137] S6
Schróter, Anja [8972-39] S9
Schubert, Colja [8964-19] S5
Schubert, E. Fred 9003 Program Committee, 9003 S3 Session Chair, [9003-16] S3, [9003-31] S7, [9003-38] S13, [9003-38] S9, [9003-49] SPWed, SC052
Schubert, Martin [8996-7] S2
Schuele, Georg 8930 Program Committee, 8930 S4 Session Chair, 8930 S8 Session Chair
Schuett, Casey [8959-7] S3
Schuetz, Christopher A. [8985-30] S7, [9007-24] S8
Schüle, Wolfgang [8959-25] S6
Schulein, Robert T. [8971-32] S5
Schuleri, Karl H. [8948-80] SPSun
Schuler-Sandy, Theodore [8996-21] S6
Schultz, Emmanuelle [8939-13] S2, [8939-4] S1
Schultz, Michael [8928-42] S8
Schulz, Daniel S. [8961-39] S9
Schulz, Florian [8972-39] S9
Schulz, Ingo [8976-22] S5
Schulze, Christian [8999-34] S7
Schulzen, Axel [8960-50] S13
Schulz-Hildebrandt, Hinnerk [8927-44] S11
Schumacher, Stefan [8984-32] S9
Schunemann, Peter G. 8964 Program Committee, 8964 S8 Session Chair, [8964-38] S9, [8964-39] S9, [8964-40] S9, [8964-41] S9, [8964-43] S9, [8993-28] S5
Schuster, Benjamin S. [8927-57] S13
Schuster, Kay [8960-42] S11, [8961-74] SPTue, [8972-22] S6
Schuster, Kurt J. [8941-8] S3
Schutz-Kuchly, Thomas [8970-15] S12, [8970-15] S4
Schwab, Peter [8942-17] S4
Schwaiger, Stephan [8986-32] S6
Schwallier, Patrick [8967-9] S10, [8967-9] S5, [8968-37] SPTue
Schwartz, David [8939-27] S5
Schwartz, Jon A. [8955-27] S6
Schwartz, Sylvain [8993-78] S16, [8998-56] S12
Schwarz, Ariel [8979-9] S6
Schwarz, Casey M. [8974-25] S6
Schwarz, Thomas [8966-15] S5
Schwarz, Ulrich T. 8986 Program Committee, [8986-59] S11, [9002-15] S3, [9002-17] S4, [9002-19] S4
Schwarzbäck, Thomas [8966-23] S7
Schwarzer, Clemens [9002-23] S5
Schwarzer, Malte [8971-3] S1
Schwaten, Tino [8977-21] S5
Schwefel, Harald G. L. [8960-9] S2
Schweiger, Gustav [8952-3] S1, [8957-14] S4, [8960-16] S4, [8999-49] S10
Schweitzer, Hagen [8977-34] SPTue
Schwob, Catherine [8993-82] S17, [8996-37] SPWed
Schwödiauer, Reinhard [8975-15] S3
Schwuchow, Anka [8982-27] S6
Sciaccia, Beniamino [8957-24] S5
Sciancalepore, Corrado [8993-22] S4, [8995-12] S3, [8995-2] S1
Sciarrino, Fabio [8972-31] S8, [8972-33] S8, [8999-16] S4
Scintilla, Leonardo Daniele 8963 Program Committee, 8963 S7 Session Chair, [8963-32] S8, [8963-8] S2
Scire, Carlotta [8990-39] S8
Scire, Sergio [8990-39] S8
Sciuto, Emanuele Luigi [8990-27] S5
Scofield, Adam 8996 S4 Session Chair, [8996-3] S1
Scolaro, Loretta [8934-83] S12, [8935-60] S12
Scotognella, Francesco [8968-17] S4
Scott, Andrew M. [8961-3] S1
Scott, Nicholas J. [8964-51] SPTue
Scully, Stephen P. [8985-42] S9
Seamons, Brandon C. [8929-16] S4
Sears, R. Bryan [8931-13] S3, [8956-3] S1
Seassal, Christian [8999-47] S10
Seaver, M. M. [8971-36] S4, [8971-38] S5, [8971-39] S5
Sebag, Jerry 8930 Program Committee
Sebastian, Jürgen [8965-28] S6
Sebbah, Patrick [8993-8] S2
Seddighian, Pegah [8990-18] S4, [9010-11] S4, [9010-11] S5
Seddon, Angela B. 8938 Program Committee, 8938 S1 Session Chair, [8938-28] S6, [8938-29] S6
See, William A. [8943-98] S1
Seeds, Alwyn J. [8993-47] S9, [9002-30] S7
Seefeldt, Michael [8948-72] SPSun
Seekell, Kevin C. [8957-29] S6
Seeton, Roger [8943-111] SPSun, [8943-32] S5
Seevaratnam, Subaagari [8938-25] S5
Seffer, Oliver [8963-1] S1
SeGall, Marc [8960-50] S13, [8982-36] S7
Seger, Kai [8966-4] S2
Seghilani, Mohamed [8966-11] S8
Segonds, Patricia [8959-59] S14
Seibel, Eric J. [8927-15] S4, [8927-18] S4, [8929-3] S1, 8936 Program Committee, [8936-27] S6, [8941-23] S6, [8945-5] S1, [8976-28] S6
Seidel, David J. [8960-32] S9, [8960-35] S9
Seideman, Tamar [8964-62] SPTue
Seifert, Andreas [8947-79] SPMon
Seifert, Eric [8946-14] S4
Seifert, Hans J. [8968-22] S5, [8968-5] S1
Seifert, Mario [8977-26] S6, [8995-18] S5
Seifert, Martin [8961-7] S2
Seitz, Berthold [8930-28] S7, [8931-27] S5
Seitz, Oliver [8974-50] S8
Seki, Miyoshi [8990-47] S9
Seki, Munetoshi [8987-32] S12
Sekine, Daisuke [9004-15] S4
Sekwao, Samwel [8993-81] S16
Sela, Gali [8928-37] S7, [8928-44] S9
Selb, Juliette J. [8928-34] SPSat
Seletskiy, Denis V. [8964-8] S2, [8966-2] S1, [8984-25] S7, [8984-38] S10, 9000 Conference Chair, [9000-1] S1, [9000-4] S1
Sell, Alexander [8984-40] S11
Sella, Valéria R. G. [8926-106] S21
Sellahi, Mohamed [8966-11] S8
Sellars, Matthew J. 8997 Program Committee
Selleri, Stefano [8938-26] S5, [8961-14] S4, [8961-97] SPTue, [8985-14] S3
Sellés, Julien [8986-24] S5
Selvan, Subramanian Tamil 8955 Program Committee
Selvaraj, Vevek [8971-7] S1
Selvah, David [8988-3] S1, [8988-6] S1
Sem, K. P. [8950-52] S8
Semenova, Elizaveta S. [8996-5] S1, [8996-7] S2
Semenova, Irina V. [8947-22] S4, [9006-17] S4
Semjonov, Sergey L. [8961-80] SPTue
Semond, Fabrice [8986-24] S5, [8986-8] S2
Semtsiv, Mykhaylo P. [9002-45] S10, [9002-62] S14
Senatorov, Andrei K. [8961-29] S7, [8961-80] SPTue

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Senellart, Pascale [8980-18] S5
 Senesky, Debbie G. [8975-6] S2
 Senger, Frank [8977-8] S2
 Senoh, Takanori [9006-33] S7
 Senpan, Angana [8943-197] SPTues
 Senthil Murugan, Ganapathy [8960-21] S5, [8960-43] S11, [8988-55] S10
 Sentis, Marc L. [8972-44] S10, [8972-44] S5
 Seo, Eunsung [8984-28] S8
 Seo, Howon [8944-14] S3, [8947-29] S6, [8947-81] SPMon
 Seo, Hyunwoong [8987-35] S7
 Seo, Jun Gyu [8982-50] SPWed
 Seo, Minah [8984-29] S8
 Seo, Min-Kyo [9002-37] S8
 Seo, Min-Woong [8947-39] S9
 Seo, Na Jin [8936-4] S1
 Seo, Sungyong [8981-60] SPWed
 Seo, Tae Seok [8996-25] S7
 Seo, Yeong-Hyeon [8927-13] S3
Seong, Tae-Yeon 8986 Program Committee, [9003-20] S5
 Sepehr, Reyhaneh [8947-70] SPMon
 Serpino, Rimas [9006-4] S1
 Serafino, Michael Joseph [8926-131] S4
 Sereda, Alexandra [8957-16] S4, [8957-28] S6
 Serey, Xavier [8976-41] S9
 Sergeev, Oleg [8967-50] SPTue
 Sergeeva, Ekaterina A. [8956-36] S9
 Sergeant, Sylvain [8986-8] S2
 Sergeyeve, Sergey V. [8984-5] S1
Serpenguzel, Ali 8989 Program Committee
 Serra Coromina, Pere 8967 Program Committee
 Serra, Francesca [8970-7] S2
 Serrão, Nelson F. [8926-76] S15
 Serreze, Harvey B. [9003-43] S11
 Serunjogi, Solomon M. [8980-31] S8
 Servois, Vincent [8943-23] S4
 Sery, Mojmir [8992-31] SPWed
 Serz, Mojmir [8939-25] S5
 Seshadria, Meruva [8961-119] SPTue
 Sessler, Jonathan L. [8926-84] S17
 Setälä, Tero [8999-23] S5, [8999-52] SPWed
 Seurin, Jean-Francois 9001 Program Committee, [9001-13] S3
 Seva Bala Sundaram, Rumitha [8968-31] S15, [8968-31] S7
 Severová, Patricie [8959-26] S6, [8959-29] S7, [8959-75] SPTue
 Sexton, Kristian J. [8931-31] S6
 Seyed Sadr, Mohamad [8928-32] SPSat
 Sezbec, Herve [8955-22] S5
 Sha, Shuang [8944-28] SPMon
Shabahang, Soroush [8982-77] SPWed, [8982-78] SPWed
 Shabo, Ivan [8935-3] S1
Shademan, Azad [8935-79] SPSun
Shadgan, Babak [8926-45] S9, [8927-58] S13, 8951 Program Committee, 8951 S1 Session Chair, [8951-3] S1
 Shafiee, Houran [9004-20] SPWed
 Shafiqha, Roshanak [8990-18] S4, [9010-11] S4, [9010-11] S5
 Shafik, Ayman [8991-19] S5
 Shafir, Noam [8963-41] S4, [8963-41] S8
 Shafirstein, Gal [8926-140] S6
 Shah, Anant [8943-195] SPTues
Shah, Lawrence [8959-45] S11, [8961-112] SPTue, [8964-43] S9, [8964-54] SPTue, [8968-32] S15, [8968-32] S7
 Shah, Nupur [8926-147] S7
 Shah, Yash D. [8985-50] S11
 Shahnin, Shiva [8996-41] S5
Shahriar, Selim M. 8997 Program Committee, 8998 Conference Chair, [8998-12] S3, [8998-17] S4, [8998-22] S5, [8998-28] S6, [8998-48] S11, [8998-52] S12, [8998-55] S12
 Shahrjardi, Davood [8987-59] S12
 Shaikh, Afnan Q. [8956-26] S6
 Shaikh, Rubina S. [8940-13] S3
 Shaipanich, Tamimas [8927-35] S9
Shaked, Natan T. [8949-29] S6, [8949-50] S10, [8949-51] S10
 Shakfa, Mohammad Khaled [8966-21] S6
 Shakhova, Natalia M. 8934 Program Committee, [8952-27] S7, [8956-36] S9
 Shakir, Sami A. [8961-35] S9
 Shalaby, Mohamed Y. [8977-28] S6
Shalae, Vladimir M. [8950-48] SPSun, [8957-23] S5, [8994-3] S1
Shalaginov, Mikhail Y. [8994-3] S1
 Shalev, Ronny Y. [8926-91] S18, [8926-96] S19
 Shamay, Moshe [8965-21] S5
 Shamir, Yariv [8963-41] S4, [8963-41] S8
 Shams Mousavi, S. Hamed [8957-13] S3
 Shane, Janelle C. [8980-82] SPWed
 Shankar, Ashwin [8975-6] S2
 Shankar, Raji [8993-76] S16
 Shanker, Aamod [8949-27] S6
 Shannon, John H. [8938-9] S2
 Shao, J. [9002-48] S11
 Shao, Linbo [8960-15] S4
 Shao, Peng [8943-135] SPSun, [8943-175] SPMon, [8943-67] S10, [8943-93] S14
Shao, Pengfei [8935-16] S4, [8935-18] S4, [8937-14] S3
Shao, Qi [8931-16] S3, [8943-14] S3, [8943-194] SPTues
 Shao, Xia S. [8943-59] S9
 Shao, Xiaole [8951-8] S2
 Shao, Xiumei [8982-83] SPWed
 Shao, Yonghong [8948-105] SPSun, [8948-93] SPSun
 Sharan, Anurag [8926-5] S1
 Sharif, Faisal [8926-10] SPSun
 Sharif, Seyed Ata [8926-31] S7
 Sharikova, Anna V. [8926-135] S5, [8931-35] S7
 Sharma, Akshdeep [8973-15] S3
 Sharma, Anshuman [8943-56] S9
 Sharma, Enakshi Khular [8957-15] S4, [8980-74] SPWed, [8988-62] SPWed
 Sharma, Giriraj K. [8926-143] S7, [8926-145] S7
 Sharma, Manu [8952-10] S3
 Sharma, Suchinder [8982-40] S8, [8987-93] SPWed
 Sharples, G. J. [8941-63] S10
 Shastri, Anujit [8990-37] S7
 Shastri, Kal [8990-37] S7
 Shatilova, Ksenia V. [8929-9] S2
Shaw, Brandon [8959-3] S1, [8959-58] S13, 8961 Conference CoChair, 8961 S11 Session Chair, [8961-57] S13, [8968-35] SPTue, [8982-35] S7
 Shaw, Matthew D. [8971-20] S4, [8971-34] S5
 Shaw, Noah [8935-74] SPSun
 Shchegrov, Andrei V. 8964 Program Committee, 8964 S1 Session Chair
 Shchennikov, Vladimir V. [8975-24] SPTue
 Shchennikov, Vsevolod V. [8975-24] SPTue
 Shcherbakov, Alexander [8994-60] S15
 Shcherbakov, Evgenii M. [8942-23] S5
 Shcherbatko, Igor [8991-8] S2
 Shchslavskiy, Vladislav I. [8948-45] S8
 Shchukin, Vitaly A. [8965-25] S5
Shea, Herbert R. 8975 Conference Chair, 8975 S3 Session Chair, [8975-17] S3, [8975-8] S2
 Sheaff, Clay [8943-164] SPMon
Shechter, Revital [8943-128] SPSun
 Shegai, Timur [8957-26] S6
 Sheibani, Nader [8947-70] SPMon
 Sheik-Bahae, Mansoor [8966-2] S1, [8966-3] S1, [8984-25] S7, [8984-38] S10, 9000 Conference Chair, [9000-1] S1, [9000-18] S5, [9000-19] S5, [9000-4] S1
 Sheikhzadeh, Fahime [8945-6] S2
 Shekel, Eyal [8963-41] S4, [8963-41] S8
 Shekunova, Uliya G. [8926-104] S21
 Sheldakova, Julia [8960-51] S13
 Shelnutt, John A. [8983-50] S11
 Shelton, Abigail H. [8983-29] S7
Shelton, Ryan L. [8926-118] S1, [8926-119] S1, [8935-39] S8, [8935-75] SPSun, [8942-28] S7, [8953-17] S4
 Shelykh, Ivan A. [8993-7] S1
 Shemelya, Corey [8982-18] S4, [8982-21] S4
 Shemer, Amir [8979-9] S6
Shemonski, Nathan D. [8934-42] S7, [8934-67] S10, [8935-39] S8, [8935-48] S10, [8935-75] SPSun, [8942-28] S7, [8946-27] S6
 Shen, Chengpin [8947-63] S14
 Shen, Chen-Hung [8986-53] S10
 Shen, Hao [8980-27] S7
 Shen, Kai [8993-46] S8
 Shen, Kun-Ching [8986-14] S3, [9003-24] S5, [9003-26] S6
Shen, Li [8993-42] S8
 Shen, Mengzhe [8948-103] SPSun
 Shen, Qing [8987-62] S12
 Shen, Shuwei [8945-8] S2
 Shen, Shyh-Chiang [9002-16] S4
 Shen, Thomas Shunrong [9007-2] S2
 Shen, Yihui [8948-22] S4
 Shen, Yiwen [8972-43] S10, [8972-43] S5
 Sheng, Xiaoye [8934-74] S11
 Shenoy, Bhamy Maithry [8980-47] S12
 Shenoy, Devanand K. 8983 Program Committee
 Shenoy, Mahesh [8928-7] S2
 Shepherd, David P. [8959-40] S10
 Shepherd, Douglas P. [8950-2] S1
 Shepherd, John A. [8937-38] SPSun
 Shepherd, Luke [8994-6] S2
 Sher, Ifat [8930-14] S3, [8930-37] S8, [8930-55] SPSun
 Sher, Meng-Ju [8967-5] S2, [8967-5] S4
 Shernyakov, Yuri M. [8965-25] S5
 Sherwood, Mark H. [8997-3] S3, [8997-3] S7
 Sherwood-Droz, Nicolás [8934-14] S3
 Shestakova, Irina A. [8961-41] S10
 Sheu, Jinn-Kong [9003-8] S2
 Sheykin, Yuri [8947-25] S5
Shi, Ce [8960-27] S6
 Shi, Honglan [8950-35] SPSun
 Shi, Kaifeng [8980-20] S5, [8980-37] S9, [8980-48] S12, [9010-14] S5, [9010-14] S6
 Shi, Lei [8934-50] S8, [8942-32] S8, [8942-33] S8
Shi, Linda Z. [8947-15] S3
Shi, Lingyan [8926-110] S22, [8926-116] S24, [8940-39] SPTue
 Shi, Lishen [9006-24] S5
 Shi, Riyi [8956-11] S3
 Shi, Rui [8942-22] S5, [8951-33] SPMon
 Shi, Shouyuan [8980-76] SPWed, [8983-44] S10, [8983-45] S10, [8985-40] S8, [9007-24] S8
 Shi, Wei [8961-70] SPTue, 8964 Program Committee
Shi, Wei [8943-67] S10
 Shi, Wei [9010-15] S5, [9010-15] S6
 Shi, Yaocheng [8988-29] S7, [8988-47] S10
 Shi, Yi-Wei [8938-21] S4, [8938-6] S2
 Shi, Yong [8975-25] S2
 Shi, Zhen Dong [8960-54] S14
 Shi, Zhisheng [8993-37] S7
 Shia, Kevin [8934-13] S3
 Shieh, Chen-Yu [8986-78] SPWed
 Shigesato, Yuzo [8987-5] S4
 Shih, Cheng-Yu [8969-6] S1
 Shih, Ishiang [9003-5] S2
 Shih, Ming [8965-27] S6
 Shih, Pei-Ying [8986-53] S10, [9003-30] S7
Shih, Wei-Chuan [8928-83] S15, [8933-19] S5, [8939-12] S2, [8942-10] S2, [8951-13] S3, 8957 Program Committee
 Shiino, Masato [8991-16] S4
 Shilyagin, Pavel A. [8934-108] SPMon, [8934-123] SPMon
 Shilyagina, Natalia [8934-123] SPMon
 Shim, Hyunwook [9003-16] S3
 Shim, Jong-In 8986 Program Committee, 8986 S14 Session Chair, [8986-62] S13, [8986-62] S9
 Shim, Young Bo [8948-15] S2, [8985-48] S10
 Shimada, Takuichirou [8941-10] S3
 Shimamoto, Hiroshi [8982-81] SPWed
 Shimamura, Kiyoshi [8987-16] S3, [8987-49] S11
 Shimazaki, Natsumi [8941-21] S5
 Shimizu, Atsushi [8956-4] S1
 Shimizu, Hisashi [8967-46] SPTue, [8967-5] S2, [8967-5] S4, [8972-54] SPTue
 Shimizu, Hitoshi [9001-3] S1
 Shimizu, Koichi [8952-45] SPSun
 Shimizu, Yo [9004-7] S2
Shimogaki, Tetsuya [8967-52] SPTue, [8967-54] SPTue, [8987-10] S2, [8987-78] SPWed, [8987-79] SPWed
Shimotsuma, Yasuhiko [8967-11] S10, [8967-11] S5
 Shimura, Daisuke [8990-47] S9
 Shimura, Yosuke [8993-42] S8
 Shin, Dongmyung [8983-55] SPWed, [9005-18] SPWed
 Shin, Dong-Sig [8972-41] S9
 Shin, Dong-Soo [8986-62] S13, [8986-62] S9
 Shin, Haijin [8983-56] SPWed
 Shin, In Hee [8938-50] SPSun, [8949-62] SPMon
 Shin, Jeon-Soo [8954-13] S3
 Shin, Jonghwa [8950-40] SPSun
 Shin, Jun Geun [8930-22] S5
 Shin, Seon Ae [8952-29] S8
 Shin, Yong [8990-29] S6
 Shin, Yong Seung [8934-131] SPMon, [8934-132] SPMon
 Shinohara, Hidetoshi [8986-30] S6
 Shinohara, Takuya [8970-16] S12, [8970-16] S4
 Shinonaga, Togo [8969-27] SPTue
 Shinozuka, Machiko [8941-21] S5
 Shiohara, Yuh [8967-17] S9
 Shiomi, Masashi [8940-10] S2, [8948-74] SPSun, [8948-82] SPSun
Shipp, Dustin W. [8952-30] S8
 Shirakawa, Akira 8961 Program Committee, 8961 S1 Session Chair, [8961-4] S1, [8961-8] S2
 Shiratani, Masaharu [8987-35] S7
 Shirokova, Olesia M. [8950-47] SPSun
 Shishehchi, Sara [8980-28] S7
 Shishkin, Yevgeniy [8986-1] S1
 Shishkov, Milen [8927-2] S1
 Shivananjappa, Nanda [8926-110] S22
 Shkurinov, Alexander Pavlovich [8941-53] S11
 Shochat, Ariel [8928-18] S5
 Shoham, Shy 8928 Program Committee, 8928 S9 Session Chair, [8928-37] S7, [8928-44] S9, [8928-99] S20, [8948-75] SPSun
Shoji, Satoru [8950-41] SPSun, [8957-30] S7, [8974-2] S1, [8974-24] S6, [8974-45] SPTue, [8974-46] SPTue
 Shoji, Yasushi [8981-23] S6
 Shoji, Yuya [8988-11] S3
Shokri Kojori, Hossein [8954-19] S5, [8994-35] S9, [8996-31] SPWed
 Shori, Ramesh K. 8959 Conference Chair, 8959 S1 Session Chair, 8959 S2 Session Chair, [8961-77] SPTue
 Short, Michael A. [8939-3] S1, [8939-33] S6
 Shorte, Spencer L. [8947-53] S12
 Shortt, Kevin [8971-7] S1
Shoval, Asaf [8940-24] S5
 Shrekenhamer, David [8985-59] SPWed
 Shrestha, Sebina [8926-131] S4
 Shribak, Michael I. [8949-47] S10
 Shridhar, E. [8928-7] S2
 Shtafir, Mark 9009 Program Committee
 Shterengas, Leon [8993-51] S10, [9002-38] S9
 Shternin, Peter S. [8948-62] S10
 Shu, Qi-Ze [8966-26] S8
 Shuai, Yichen [8994-8] S2, [8995-32] S8
 Shubin, Ivan 9008 S4 Session Chair, 9010 Program Committee, 9010 S5 Session Chair
 Shubin, Nicholas [8941-52] S10
 Shui, Ying-Bo [8943-153] SPMon
 Shuliatyev, Alexei S. [8994-74] SPWed
 Shulika, Oleksiy V. [8972-30] S7
 Shulyatyev, Victor B. [8963-34] S8
 Shum, Anderson H. C. [8947-49] S11
 Shumilov, Dmytro [8950-4] S1, [8950-51] SPSun
 Shun, Sato [8951-35] SPMon
Shunaev, Vladislav [8956-41] SPSun
 Shung, Koping Kirk [8926-79] S16, [8926-83] S17, [8926-87] S17, [8934-79] S12, [8943-178] SPMon, [8943-212] SPTues, [8946-26] S6
 Shupp, Jeffrey W. [8926-6] S1, [8945-7] S2
 Shvets, Gennady B. [8957-11] S3, [8985-36] S8, [8993-66] S13

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Si, Ting [8937-19] S4, [8937-21] S4, [8956-10] S2, [8956-18] S4, [8956-42] SPSun, [8976-27] S6
- Sibbett, Wilson [8959-40] S10
- Sibik, Juraj [8985-50] S11
- Sibony, Mathilde [8926-61] S12
- Sicchieri, Leticia B. [8947-83] SPMon, [8947-85] SPMon
- Siddaramaiah, Manjunath** [8935-72] SPSun
- Siddiqui, Meena** [8934-105] SPMon, [8934-85] SPMon
- Sidorin, Yakov 8985 Track Chair, 8988 Program Committee, 8988 S3
Session Chair, 8988 Track Chair, 8989 Track Chair, 8990 Track Chair, 8991 Track Chair, 8992 Track Chair
- Sidorov, Viktor V. [8935-9] S3
- Siebrits, R. [9008-24] S10
- Sieck, Alexander [8993-31] S6
- Siedeck, Vanessa [8926-137] S6
- Siegel, Peter H. 8941 Program Committee
- Siegel, Thomas [8984-46] S12
- Sielaff, Hendrik [8948-53] S9
- Siemens, Mark E. [8984-22] S6
- Siepmann, Ortwin [8967-50] SPTue
- Sierra, Heidy [8926-15] S3
- Sigler, Chris A.** [9002-56] S13
- Sigmund, Ole [8980-6] S2
- Sigrist, Markus [8993-68] S14
- Sik, Hervé [8993-39] S7
- Sikkel, Markus B. [8926-71] S14, [8935-2] S1
- Sikkens-van de Kraats, Janine W. [8935-61] S12
- Sikocinski, Pawel [8959-26] S6, [8965-7] SPTue
- Siler, Martin [8939-25] S5, [8999-3] S1, [8999-8] S2
- Sills, Alec C. [8966-30] S8
- Sills, Dana [9000-1] S1
- Silva, Cosmo Mariano [9003-53] SPWed
- Silva, Daniel L. [8969-24] SPTue
- Silva, Erika C. R. [8932-31] S6
- Silva, James Richard [8964-44] SPTue
- Silva, Juares G.** [8999-13] S3
- Silva, Luciano [8946-17] S4
- Silva, Marina Medeiros A. [8947-69] SPMon
- Silva, Mônica N. [8947-83] SPMon, [8947-85] SPMon
- Silva, Rui F. [8987-39] S8
- Silveira, Fabricio Luiz [8926-36] SPSun, [8935-77] SPSun
- Silveira, Landulfo [8926-36] SPSun, [8932-20] S4, [8932-38] SPSun, [8935-77] SPSun, [8941-38] SPMon, [8951-43] SPMon
- Silver, Mark [8959-37] S9
- Silverman, Ronald H. [8943-104] S15
- Silvestri, Ludovico** [8948-16] S3
- Sim, Jeong-Eun [8928-65] S13
- Sima, Chaotan [8968-8] S2
- Simakov, Nikita [8961-45] S11, [8982-1] S1
- Simandoux, Olivier [8943-9] S2
- Simanek, Eric E. [8950-51] SPSun
- Simeone, Diane [8935-80] SPSun
- Simmonds, Paul J. [8981-24] S6, [8996-22] S6
- Simon, Anne-Catherine [8939-13] S2, [8939-4] S1
- Simon, Brett A. [8943-1] S1
- Simon, Carole [8931-27] S5, [8931-40] S8
- Simon, Jacob C. [8929-12] S3, [8929-24] SPSun, [8929-25] SPSun
- Simon, Jean-Jacques [8994-57] S14
- Simone, Charles B.** [8931-33] S6
- Simoni, Francesco [8968-19] S4
- ?imonyte, Ieva [8993-45] S8, [9002-39] S9
- Simoyama, Takasi [8990-47] S9
- Simozrag, Bouzid [8993-43] S8
- Simpson, Douglas G. [8935-75] SPSun
- Simpson, Emma R.** [8984-46] S12
- Simpson, Jonathan [8951-9] S2
- Simpson, Miriam C. [8935-49] S10
- Simpson, Stephen H. [8999-30] S6, [8999-7] S2
- Sin, Don D. [8927-37] S9
- Sin, Jay-u [8928-80] SPMon
- Sin, Yongkun [8965-3] S1, [8981-43] S11, [8986-49] S9
- Sinar, Dogan [8973-17] S4, [8973-20] S5
- Sinatra, Fulvia [8990-27] S5
- Sinclair, Hugo G. [8950-25] S6
- Sinclair, Michael B. [8994-53] S13
- Sinclair, William [8990-32] S6
- Sincore, Alex M. [8961-112] SPTue
- Sinescu, Cosmin** [8929-22] SPSun, [8934-115] SPMon
- Singe, C. Christian [8934-6] S1
- Singer, Jonathan [8961-94] SPTue, [8990-5] S1
- Singer, Kenneth D. 8983 Program Committee
- Singh Selopal, Gurpreet [8987-82] SPWed
- Singh, Anu [8983-1] S1
- Singh, Garima [8978-7] S2
- Singh, Haobijam Johnson [8994-69] SPWed
- Singh, Kanwarpal [8927-14] S3
- Singh, Kanwarpal [8927-12] S3
- Singh, Kristi M. [8983-48] S11
- Singh, Manmohan [8930-3] S1
- Singh, Mohan [8935-29] S6
- Singh, S. P. [8926-148] S7
- Singh, Seema [8947-50] S12
- Singh, Vijay Raj [8949-25] S5
- Singh-Moon, Rajinder P.** [8926-102] SPSun, [8951-41] SPMon
- Singleton, Briana** [8982-28] S6
- Sinha, Raju** [8985-4] S1
- Sinha, Ravindra Kumar** [8998-10] S2
- Sinhoff, Volker R. [8960-59] S15
- Sinsuebphon, Nattawut [8937-37] SPSun
- Sinton, David David [8958-15] S4
- Sintov, Yoav [8963-41] S4, [8963-41] S8
- Sipe, John E. [8993-21] S3
- Sipes, Donald [8961-112] SPTue, [8961-39] S9, [8971-11] S2
- Siracusa, Domenico [9009-16] S7
- Sirbu, Alexei** [8966-14] S4, [8966-16] S5
- Siriani, Dominic F. [9001-17] S4
- Sirikhham, Adisorn [8935-64] SPSun
- Sirleto, Luigi [8938-42] S8
- Sirtori, Carlo 8993 S3 Session Chair, [8993-4] SKey, [8993-41] S7, [8997-34] S4
- Sirutkaitis, Valdas** [8972-42] S9
- Sisken, Laura [8968-32] S15, [8968-32] S7
- Sit, Wesley W. [8934-37] S6
- Sital, Shivani [8957-15] S4
- Sitar, Zlatko [8986-27] S5, [8986-31] S6, [8986-64] S14
- Sitbon, Gary [8947-47] S11, [8955-13] S3
- Sittinger, Volker [8987-60] S12
- Sivakumar, Manickam [8969-11] S2
- Siwak, Nathan P.** [9002-41] S9
- Siwicki, Bartlomiej [8964-23] S6
- Skaat, Alon [8930-14] S3
- Skabara, Peter [9002-10] S2
- Skala, Melissa C.** [8934-37] S6, [8934-70] S11, [8936-13] S3, [8942-30] S7, [8947-1] S1, [8948-56] S9
- Skidmore, Jay [8965-6] S2
- Skolski, Johann Z. [8968-13] S3
- Skorucak, Jelena [8976-36] S8
- Skorupski, Krzysztof [8982-44] S9, [9009-12] S6
- Skrypnik, Alexei V. [8929-9] S2
- Slaa, Jared [8982-76] SPWed
- Slaoui, Abdelilah [8970-15] S12, [8970-15] S4
- Slavinskis, Nerijus [8959-23] S6
- Sleasman, Tim [8985-59] SPWed
- Slepchenko, Mikhail M. [8956-39] SPSun, [8956-40] SPSun, [8956-41] SPSun
- Slepkov, Aaron D. [8937-8] S2
- Slezák, Ondrej [8960-31] S4, [8960-31] S8
- Slezak, Paul [8943-186] SPMon
- Slipchenko, Mikhail N. [8948-34] S6
- Sloan, Mark A. [8941-54] S11, [8941-64] S10
- Sloan, Megan [8978-16] S5
- Sloane, Bonnie F. [8931-1] S1
- Slocum, Michael A. [8981-28] S7
- Slowikowski, Mateusz [8982-47] S9, [8982-82] SPWed
- Slussarenko, Sergei [8999-12] S3, [8999-24] S5
- Slutsky, Inna [8948-45] S8
- Slyvchuk, Yuri I. [8954-16] S4
- Small, David [8993-55] S10
- Smalley, Daniel [9006-30] S7
- Smalley, Joseph S. T. [8980-81] S8, [8980-82] SPWed
- Smalyukh, Ivan I. 9004 Program Committee, SC790
- Smerzi, Augusto [8999-46] S10
- Smetanin, Igor V. [8986-57] S11
- Smillie, Marc W.** [8959-37] S9
- Smirnov, Vadim [8961-7] S2, [8963-16] S4, [8963-16] S8, [8965-16] S4
- Smit, Meint K. [8988-21] S5
- Smith, Arlee V. [8961-63] S15
- Smith, Brian C. [8992-19] S4
- Smith, David D. 8998 Program Committee, [8998-27] S6
- Smith, David R. [8985-59] SPWed
- Smith, Gary D. [8948-89] SPSun
- Smith, Gary M. [8965-20] S5
- Smith, Gennifer T. [8933-9] S3, [8945-13] S4
- Smith, George W. [8948-89] SPSun
- Smith, Gordon [8948-104] SPSun
- Smith, Ian J.** [8981-44] S12
- Smith, J. R. [8935-35] S8
- Smith, Jesse J. [8961-63] S15
- Smith, Jessica M. [8955-15] S4
- Smith, Mark A. [8961-3] S1
- Smith, Michael S. D. [8948-74] SPSun
- Smith, Nicholas Isaac [8948-64] S11, [8949-54] S11
- Smith, Peter G. R. [8974-56] S9, [9002-8] S2
- Smith, Peter G. R. [8968-8] S2, [8982-15] S3, [8988-38] S8
- Smith, Philip G. [8948-19] S3
- Smith, Thomas [8928-6] S2
- Smith, William A. [8942-11] S2, [8947-54] S12, [8947-80] SPMon
- Smith, William P. [8938-4] S1
- Smolin, Andrew G. [8948-62] S10
- Smolyakov, Gennady A. [8955-18] S4, [8955-38] S8, [8980-41] S11, [8980-44] S11
- Smowton, Peter M.** 9002 Conference Chair, [9002-13] S3
- Smrz, Martin [8959-29] S7, [8959-75] SPTue
- Smyth, Hugh D. [8955-18] S4
- Smyth, Neil [8955-25] S6
- Snavely, Nicholas [8937-3] S1
- Snok, David W. [8997-27] S10
- Snuderl, Matija [8928-6] S2
- Snyder, Chloe E. [8974-43] SPTue
- Snyman, Lukas W.** [8990-20] S4, [8991-7] S2
- So, Byung Hwy [8927-23] S6
- So, Jimmy Bok Yan [8939-22] S4
- So, Peter T. C. 8927 Program Committee, 8927 S6 Session Chair, [8946-22] S5, [8947-12] S3, [8947-63] S14, 8948 Conference Chair, 8948 S8 Session Chair, [8948-20] S3, [8948-21] S3, [8948-69] S11, [8949-25] S5, [8949-28] S6, [8952-39] S10, [8956-19] S5
- Soares de Lima Filho, Elton [9000-17] S4, [9000-25] SPWed
- Soares, Luiz Guilherme P. [932-20] S4, [8932-38] SPSun, [8932-39] SPSun, [8932-41] SPSun
- Soares, Tânia Benetti [8947-21] S4
- Soavi, Francesca [8983-9] S3
- Sobiesierski, Angela [9002-13] S3
- Sobol, Emil Naumovich [8932-40] SPSun, [8942-23] S5
- Sobon, Grzegorz J. [8959-52] S12, [8961-81] SPTue, [8964-23] S6, [8964-31] S7, [8964-65] SPTue
- Söderberg, Per G. 8930 Conference Chair, 8930 S9 Session Chair, [8930-56] S4
- Sodnik, Zoran 8971 Program Committee, [8971-29] S5, [8971-3] S1, [8971-33] S5
- Soeda, Yukinobu [8991-39] S9
- Soehartono, Alana [8934-126] SPMon
- Soeratman, C. Linda R. [8938-39] S8
- Soetikno, Brian T. [8943-180] SPMon, [8943-212] SPTues
- Soh, Daniel B. 8961 Program Committee, [8961-38] S9
- Sohler, Wolfgang [8982-52] SPWed
- Soibel, Alexander** [8993-33] S6
- So-In, Chakchai 9007 Program Committee
- Sojka, Bartlomiej [8955-60] SPSun
- Sojka, Lukasz [8938-28] S6
- Sokolov, Eugene [8980-61] SPWed
- Sokolov, Konstantin V. [8955-46] S10, [8955-47] S10, [8957-11] S3
- Sokolov, Konstantin V.** [8943-70] S11, [8955-29] S7, [8956-15] S4
- Sokolov, Viktor [8988-66] SPWed
- Sokolovski, Sergei G.** [8935-9] S3, [8936-11] S3
- Sokolovskii, Grigori S. [8960-61] S16, [8964-4] S1
- Sokolowski-Tinten, Klaus 8967 Program Committee, 8967 S13 Session Chair, [8967-34] S10, [8967-38] S14
- Solba, Stian A. [8988-43] S9, [8988-66] SPWed
- Soleimani, Nazila [8959-2] S1
- Soler Penades, Jordi** [8989-12] S5
- Solgaard, Olav [9010-16] S5, [9010-16] S6
- Soliz, Peter 8930 Program Committee, 8930 S5 Session Chair, 8930 S9 Session Chair, [8930-16] S4
- Solynshkov, Dimitry [8997-28] S10
- Solomon, Wayne C. [8962-15] S4
- Soltani, Saba [8980-79] SPWed
- Soltani, Soheil** [8960-27] S6, [8980-5] S2
- Solzbacher, Florian [8928-82] S15
- Som, Madhura [8956-13] S3
- Soma, Venugopal Rao** [8972-62] SPTue
- Somanas, Isra [8968-27] S6
- Somers, André [8986-55] S11
- Somesfalean, Gabriel [8952-18] S5
- Somoza, Alberto [8982-12] S3
- Son, Byung-Hee [9007-12] S5
- Son, Hyukun [9003-50] SPWed
- Son, Joo-Hiuk** 8941 Program Committee
- Son, Sung Jin [9003-66] SPWed
- Son, Taehwang [8954-30] SPMon
- Son, Taeyoon [8949-61] SPMon
- Son, Yong-Hwan [9007-22] S7
- Sone, Cheolsoo [9003-16] S3
- Sones, Collin L. [8976-16] S4
- Song, Cheol [8938-37] S8
- Song, Danny Y. [8943-149] SPMon
- Song, Eunjoo [8944-14] S3, [8947-29] S6, [8947-81] SPMon
- Song, Hyuna** [8928-65] S13, [8928-80] SPMon
- Song, Hyun-Woo [8935-70] SPSun
- Song, In Seok [8930-2] S1
- Song, Jae Ho [9008-22] S10
- Song, Jaejung [8934-36] S6
- Song, Jiangxin [8960-45] S11
- Song, Jin-Joo** 8984 Conference Chair
- Song, Junfeng [8990-29] S6
- Song, Liang [8943-7] S2
- Song, Miyeoun [8927-26] S6
- Song, Seok-Ho [8995-24] S6, [8995-39] S10
- Song, Shaoli [8943-19] S3
- Song, Shaozheng [8934-29] S5, [8946-6] S2
- Song, Sheng [8944-32] SPMon, [8944-33] SPMon
- Song, Wei [8943-97] S14
- Song, Wentao [8943-71] S11
- Song, Yanrong [8961-121] SPTue
- Song, Yi [8993-76] S16
- Song, Young Min [8958-9] S2
- Song, Young Sik [8927-23] S6, [8947-68] SPMon
- Song, Yuncheng [8997-1] S2, [8997-1] S6
- Sonnleitner, Matthias [8999-5] S2
- Sono, Tiyane J. [8964-61] SPTue
- Soomro, Amna R. [8927-10] S3, [8927-11] S3, [8934-8] S2
- Sorba, Lucia [8985-32] S7
- Sorbara, Luigina [8930-25] S6

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Sordillo, Laura A.** [8926-109] S22, [8926-116] S24, [8940-30] S6
Sordillo, Peter P. [8926-109] S22
Soref, Richard [8984-6] S2, 8991 Program Committee
Sorel, Marc [8960-39] S10
Sorensen, Thomas Just [8951-9] S2
Sorenson, Christine [8947-70] SPMon
Sorg, Brian S. 8942 Program Committee
Sorge, Jason B. [8943-13] S2
Sorgente, Donato [8963-8] S2, [8968-6] S2
Sorger, Volker J. 8984 S4 Session Chair, [8984-6] S2
Soria, Silvia [8948-57] S9, [8960-7] S2, [8972-22] S6, 8988 S10 Session Chair, [8988-71] SPWed
Sorin, Wayne V. [8995-29] S8
Sorokin, Evgeni [8959-47] S11
Sorokina, Irina T. [8959-47] S11, [8961-47] S11
Sosa-Vargas, Lydia [9004-7] S2
Soskin, Marat S. 8999 Conference CoChair
Soskind, Yakov G. 8992 Conference Chair, 8992 S5 Session Chair, [8992-12] S3, SC1071, SC1121
Soteropoulos, Carol E. [8960-23] S5
Soto-Astorga, Rocio P. [8943-21] S4
Sotor, Jaroslaw Z. [8959-52] S12, [8961-81] SPTue, [8964-23] S6, [8964-31] S7, [8964-65] SPTue
Sotrop, Juergen [8967-33] S12, [8967-33] S4, [8972-38] S9
Sottile, Alberto [9000-2] S1
Souhaité, Aurélie [8990-36] S7
Souliantica, Katerina [8933-4] S2, [8955-16] S4
Sounas, Dimitrios [8994-46] S12
Sourati, Jamshid [8926-12] S3, [8926-13] S3
Sousa Rodrigues, Phamilla G. [8926-35] SPSun
Sousa, João Manuel [8961-92] SPTue
South, Fredrick A. [8935-48] S10, [8935-75] SPSun
Southard, Jeffrey [8926-68] S13, [8926-85] S17
Souza Azevedo, Rebeca [8926-130] S4
Souza, Glauco [8931-8] S2
Souza, Samuel T. [8947-84] S13
Souza, Wellington S. [8928-112] SPMon
Sowa, Michael G. [8940-10] S2, [8948-74] SPSun, [8948-82] SPSun
Spaeth, Justinian P. [8963-28] S7
Spagnolo, Nicolò [8972-31] S8
Spagnolo, Vincenzo 8993 Program Committee, [8993-30] S5, [8993-70] S14, [8993-73] S15, [8993-74] S15
Spalenska, Josef W. [8987-46] S4
Spanard, Jan-Marie [9003-46] S11
Spangler, Charles W. 8931 S8 Session Chair, [8931-11] S3
Spanier, Jonathan 8996 Program Committee
Spann, John Y. [8991-21] S5
Sparks, Hugh [8927-7] S2
Spatharakis, Christos [8991-11] S3, [9009-17] S7, [9009-4] S4
Speck, Jim [8986-47] S9, [8986-52] S10, [8986-69] S15, [9003-35] S12, [9003-35] S8
Spector, Alexander A. [8946-24] S5
Spellmeyer, Neal W. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
Spence, Thomas G. [8993-59] S12
Spencer, Melissa [8941-53] S11
Spencer, Richard G. [8926-112] S23
Sperling, Ralph A. [8955-70] S7
Spiegl, Matthias [8994-40] S11
Spielmann, Christian 8984 S13 Session Chair, [8984-45] S12
Spigulis, Janis [8937-20] S4
Spillane, Sean M. [8998-52] S12
Spillman, Darold [8942-28] S7
Spinelli, Luis [8966-26] S8
Spira, Michal [8997-2] S3, [8997-2] S7
Spirin, Vasily V. [8961-102] SPTue
Spitler, Ryan [8932-45] SPSun
Spolitiz, Sandis [9008-11] S7
Sprague, Robert A. 9005 Program Committee
Sprenger, Thorsten [8985-23] S5
Spring, Andrew Mark [8983-46] S10
Spring, Bryan Q. [8931-13] S3, [8931-53] SPMon, [8931-54] SPMon, [8956-3] S1
Springeling, Geert [8934-7] S2, [8943-29] S5
Springer, André [8963-1] S1
Spuch-Calvar, Miguel [8955-66] SPSun
Spyropoulou, Maria [8982-7] S1
Squirer, Jeffrey A. [8967-12] S11, [8967-12] S6, [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6
Squirrell, Jayne M. [8947-65] S14
Sraiki, G. [8987-93] SPWed
Sreedhar, Hari [8939-19] S3
Sridhara, Aadiya [9001-1] S1
Sridharan, Arun Kumar [8961-28] S7
Srinivasan, Kartik [8997-30] S11
Srinivasan, Meera [8971-20] S4, [8971-34] S5
Srinivasan, Pradeep 8974 Program Committee
Srinivasan, Pratul P. [8930-21] S5
Srinivasan, Samuel Raj [8929-2] S1
Srinivasan, Vivek J. [8928-36] S7, [8934-64] S10, [8934-71] S11, [8934-88] SPMon
Srisungthitsunti, Pornsak [8967-3] S1, [8967-3] S3
Srivastava, Anand [9007-15] S6, [9008-23] S10
Srivastava, Atul K. 9007 Program Committee, 9007 S1 Session Chair, 9007 S3 Session Chair, 9008 Conference Chair, 9008 S1 Session Chair, 9008 S10 Session Chair, 9008 S3 Session Chair, 9009 Program Committee, 9009 S1 Session Chair, 9009 S3 Session Chair, 9010 Conference Chair, 9010 S1 Session Chair, 9010 S3 Session Chair
Srivastava, Sangeeta [8988-62] SPWed
Srivastava, Vishal [8934-133] SPMon
Srivatsan, Avinash [8943-15] S3
Sroka, Ronald 8926 Program Committee, 8926 S10 Session Chair, [8926-137] S6, [8926-49] S10, [8926-50] S10, [8926-53] S11, [8928-13] S4
Srungrarap, Maurya [8974-43] SPTue
St. Hilaire, Sophie [8943-181] SPMon
St. Lawrence, Keith [8941-44] SPMon, [8956-6] S2
St. Marie, Luke R. [8934-101] SPMon
Stabile, Ripalta [8991-41] S10, [8991-41] S3
Stachon, Axel [8931-40] S8
Stachs, Oliver [8930-1] S1
Stadellmann, Tim O. [8993-31] S6
Staforelli, Juan Pablo [8953-20] SPSun
Stahl, Mathieu [8987-63] S12
Stahl, Richard [8947-51] S12
Stahl, Thomas [8943-196] SPTues
Staines, Stephen E. [9002-8] S2
Staley, Jacob W. [8943-43] S7
Stamatiadis, Christos [8988-19] S4
Stambaugh, Corey [8995-25] S7
Stan, Radu V. [8926-28] S7
Stanciu, George A. [8948-106] SPSun
Stanciu, Stefan G. [8948-106] SPSun
Stanczyk, Szymon [8986-23] S5, [8986-56] S11, [8986-60] S11
Standish, Beau A. [8938-25] S5, [8972-36] S8
Staninec, Michal [8929-12] S3, [8929-26] SPSun
Staniszewski, Kevin [8947-70] SPMon
Stankiewicz, Romuald [8986-5] S1
Stankovic, S. [8989-12] S5
Stanley, Ross P. [8974-14] S4, [8994-28] S8, 9003 Program Committee, 9003 S11 Session Chair
Stannowski, Bernd [8987-60] S12
Stapleton, Dean [8962-14] S4
Starbuck, Andrew [8967-27] S11
Starikov, Sergey N. [9006-40] SPWed
Stark, Daniel [8945-17] S5
Stark, Daniel [8936-29] S7, [8945-15] S4
Stark, Ethan [9003-17] S4
Starkey, Jean R. [8931-11] S3
Starman, LaVern A. [8973-18] S4
St-Arnaud, Karl [8928-15] S4, [8928-32] SPSat
Staske, R. [8965-7] SPTue
Statham, Andrew E. [8945-11] S3
Stattin, Martin [9001-9] S2
Staude, Isabelle [8994-41] S11, [8994-67] SPWed
Steckenreiter, Verena [8967-48] S14
Steckl, Andrew J. [8983-48] S11, 9005 Program Committee
Steel, Michael [8988-12] S3, [8997-35] S8
Steenbergen, Elizabeth H. [8993-32] S6
Steenbergen, Wiendelt 8943 Program Committee, 8943 S16 Session Chair, 8943 S4 Session Chair, [8943-162] SPMon, [8943-209] SPTues, [8943-26] S4, [8943-43] S7, [8979-23] S2, [8979-23] S8
Steenhusen, Sönke [8991-5] S1
Stefanutti, Renan [8983-8] S2
Stefenscau, Roxana A. [8928-98] S20
Steger, Mark D. [8997-27] S10
Steidl, Charles [8932-5] S1
Steigerwald, Kristin [8926-92] S19
Stein, Aaron G. [8973-13] S3
Steinberg, Idan [8943-165] SPMon
Steiner, Gerald [8939-38] SPSun
Steiner, Ingo [8965-32] S7
Steiner, Myles A. [8981-38] S10
Steiner, Patrick [8938-17] S4
Steinle, Tobias R. J. [8964-14] S3
Steinmann, Andy [8964-14] S3
Steinmetz, Alexander [8959-46] S11
Steinmeyer, Günther [8966-24] S7, [8972-27] S7
Stelling, Daan [8974-13] S4, [8995-21] S6
Stenberg, Petri Antero [8994-11] S3
Stepak, Bogusz D. [8968-39] SPTue, [8968-9] S2, [8973-26] SPTue
Stepanenko, Yuriy [8956-34] S9
Stepanov, Dmitrii [8961-45] S11
Stepanov, Stanislav [8991-10] S3
Stepien, Ryszard [8964-23] S6, [8964-29] S7, [8964-31] S7
Stepniewski, Grzegorz [8964-29] S7, [8982-82] SPWed
Stapp, Herbert [8926-142] S7, [8926-146] S7, [8926-149] SPSun, [8926-44] S9, 8928 Program Committee, [8928-13] S4, [8948-46] S8, [8951-18] S4
Steranka, Frank M. [9003-41] S10
Sternborg, Henricus J. C. M. 8926 Program Committee, 8926 S5 Session Chair, [8952-7] S2
Sterk, Jonathan [8989-20] S6
Stern, Liron [8998-3] S1
Sternemann, Elmar [8984-26] S7
Steven, Philipp [8930-36] S8
Stevens, Ben J. [8994-6] S2
Stevens, Oliver AC [8939-32] S6
Stevens, Paul [8991-34] S8
Stevens, Timothy W. [8926-107] S21
Stewart, Errol E. [8931-36] S7
Stewart, Jason B. 8977 Program Committee
Stewart, Neil Z. [8935-9] S3, [8936-11] S3
Stick, Daniel L. [8989-20] S6
Stickler, Daniel [8992-13] S3
Stiebig, Helmut [8984-24] S7
Stief, Christian G. [8926-44] S9, [8926-49] S10
Stieglitz, Thomas 8976 Program Committee
Stifter, David [8964-47] SPTue
Stilgoe, Alex B. [8999-9] S2
Stiller, Birgit [8964-19] S5
Stilson, Christopher [8973-14] S3, [8975-14] S3
Stinkovski, Alina [8999-39] S8
Stivala, Salvatore [8990-40] S8, [8990-41] S8, [8990-43] S8
Stock, Johannes W. [8963-28] S7
Stock, Karl [8926-103] S21
Stock, Volker [8977-12] S3
Stockman, Mark I. 8984 Program Committee, SC727
Stöferle, Thilo [8996-20] S6
Stöhr, Detlef [8965-34] S7
Stoian, Razvan 8967 Program Committee, [8967-3] S1, [8967-3] S3, [8967-37] S13, 8968 Program Committee
Stoica, Georgiana [8955-2] S1
Stoichita, Catalin [8948-106] SPSun
Stokinger, Thomas [8975-15] S3
Stolberg, Klaus [8963-27] S7, [8968-14] S3
Stolen, Rogers H. [8961-25] S6
Stölmacker, Christoph [9003-29] S6
Stolow, Andrei A. [8938-4] S1
Stolow, Albert [8937-8] S2
Stoltzfus, Caleb [8956-35] S9, [8983-28] S7
Stolz, Wolfgang [8966-8] S3, [9002-31] S7, [9002-6] S2
Stolze, Mareike [8972-55] SPTue
Stolzenberg, Christian [8959-25] S6
Stone, Bryan D. [8991-35] S8
Stone, Greg [8982-52] SPWed
Stone, Nicholas 8939 Program Committee
Stone, Robert J. [8991-21] S5
Stoner, Christine H. [8961-24] S6
Stoof, H. T. C. [8987-31] S6
Stoppa, David [8982-37] S7
Stöppler, Christian [8964-41] S9
Storm, Mark [8961-11] S3
Storaiuolo, Daniela [8987-28] S6
Stothard, David M. [8964-10] S3
Stothers, Lynn [8926-45] S9
Stöttinger, Sven [8950-1] S1
Stout, Brian [8950-12] S3
Stover, John C. SC1003
Stover, Robert [8955-29] S7
Stoyanov, Danail [8935-35] S8
Stoyanov, Nikolay D. [8982-46] S9
Strachan, Clare J. [8948-91] SPSun
Strackee, Simon D. [8937-27] SPSun
Strain, Michael J. [8960-39] S10
Strassburg, Martin [8986-26] S5, 9003 Conference CoChair, [9003-17] S4
Strasser, Gottfried [9002-23] S5, [9002-24] S6
Strata, Piergiorgio [8928-57] S12
Straube, Hilmar [8936-33] S8
Straubinger, Robert M. [8951-41] SPMon
Strauss, Uwe 8986 S10 Session Chair, [8986-55] S11, [9002-15] S3
Streekstra, Geert J. [8937-27] SPSun
Streets, Aaron M. [8948-97] SPSun, [8948-98] SPSun
Strelow, Christian [8996-8] S2
Streshinsky, Matthew [8990-1] S1
Streubel, Klaus P. 8965 Track Chair, 8966 Track Chair, 8980 Track Chair, 8986 S13 Session Chair, 8986 Track Chair, 9001 Track Chair, 9002 Track Chair, 9003 Conference Chair, 9003 S9 Session Chair, 9003 Track Chair
Strickland, Diana [8994-61] S15
Strickland, Sidney [8938-24] S5
Striener, Christopher C. 8933 Program Committee
Strikwerda, Andrew C. [8984-48] S13, [8993-50] S9
Stringasci, Miriam M. D. [8941-42] SPMon
Strixino, Susana Trivinho [8947-86] SPMon
Stroh, Eric M. [8943-12] S2, [8943-127] SPSun, [8943-222] SPTues
Strohschein, Kristin [8943-140] SPSun
Stroj, Sandra [8968-24] S5, [8976-3] S1
Strojnik, Marija 8993 Program Committee
Strola, Samy Andrea [8939-13] S2, [8939-4] S1
Strotkamp, Michael [8959-53] S12
Strougov, Nikolay [8965-22] S5
Strübing, Christian [8984-24] S7
Strupinski, Wolodzimierz [8961-81] SPTue
Strupler, Mathias [8926-123] S2, [8926-126] S3, [8928-15] S4, [8937-7] S2, [8937-9] S2, [8945-16] S4
Studier, Hauke [8948-54] S9
Stuerwald, Stephan [8936-34] S8
Stuhler, Jürgen [8964-1] S1
Stupmann, Kirstin [8951-31] SPMon
Sturek, Michael [8943-63] S10
Sturiale, Alessandro [8939-30] S6
Sturk, Auguste [8939-2] S1, [8952-6] S2
Sturm, Chris [8997-28] S10
Sturmann, Judit [8964-51] SPTue
Stursa, Jan [8997-2] S3, [8997-2] S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Stürzbecher, Lorenz [8974-57] S9
Stutzki, Fabian [8961-46] S11, [8961-55] S13, [8961-58] S13, [8961-79] SPTue, [8961-84] SPTue
Stypula, Yolanda [8952-33] S9
Su, Bertram [8948-50] S8
Su, Chia-Ying [8986-36] S7, [8986-53] S10
Su, Erica [8926-145] S7, [8934-96] SPMon
Su, Guangyao [8994-75] SPWed
Su, Jing-Wei [8941-35] S9, [8952-32] S8
Su, Junwei [8974-8] S2
Su, Min-Ying [8937-42] SPSun
Su, Ping-Jung [8947-65] S14
Su, Richard [8943-18] S3, [8943-223] SPTues, [8943-27] S4
Su, Tung-Yu [8950-41] SPSun, [8957-30] S7
Su, Yu-Chuan 8973 Program Committee
Su, Yu-Ting [9003-18] S4
Subbaraman, Harish [8990-16] S3, [8990-28] S5, [8991-40] S9
Subhash, Hreesh M. [8934-104] SPMon, [8934-107] SPMon, [8934-111] SPMon, [8934-34] S5, [8934-90] SPMon, [8935-10] S3, [8942-9] S2, [8943-161] SPMon, [8943-2] S1, [8951-5] S1, [8954-11] S3, [8954-31] SPMon
Subochev, Pavel V. [8943-193] SPTues
Subramaniam, Balachandrar [8943-1] S1
Subramanian, Hariharan [8947-41] S10, [8947-5] S1, [8952-8] S3
Subramanian, Kaushik G. [8972-8] S2
Subramanyam, Guru [8983-48] S11
Suchalkin, Sergey [9002-38] S9
Sudheendran, Narendran [8953-3] S1
Sudheendran, Narendran [8934-89] SPMon, [8953-12] S3, [8953-5] S1
Sudkamp, Helge M. [8934-19] S3, [8953-14] S3
Sudlow, Gail P. [8936-25] S6, [8948-78] SPSun
Suematsu, Katsuki [8991-16] S4
Suemune, Ikuo 8980 Program Committee, 8980 S3 Session Chair, [8980-17] S4
Suen, James Y. [8943-31] S5
Sugawa, Yoshihiko [8934-118] SPMon
Sugawara, Hiroshi [8961-122] SPTue
Sugawara, Mitsuru [9002-3] S1
Sugawara, Yasuhiko [8956-4] S1
Suggs, Laura J. [8943-100] S15, [8943-103] S15
Sugimoto, Yoshimasa [8974-51] S8
Sugioka, Koji [8960-45] S11, 8967 Program Committee, [8967-7] S10, [8967-7] S5, [8967-8] S10, [8967-8] S5, 8968 Program Committee, 8972 S8 Session Chair, [8976-17] S4
Sugita, Atsushi [8983-4] S1
Sugita, Mitsuro [8930-8] S2, [8934-80] S12
Sugiura, Yohei [8986-13] S3
Sugiyama, Kenji [8970-14] S3
Sugiyama, Masakazu 8981 Program Committee, [8981-23] S6
Sugiyama, Norikazu [8947-62] S14
Sugiyama, Satoshi [8930-50] SPSun
Sugiyama, Takahiro [9002-34] S8, [9002-54] S12
Sugiyama, Teruki [8983-19] S5
Sugiyama, Tomohiko [9003-14] S3
Suh, Jeong [8972-41] S9
Suh, Jin-Suck [8956-9] S2
Suh, Minah [8928-65] S13, [8928-80] SPMon
Suh, Myung-Whan [8926-121] S1
Suhariadi, Iping [8987-35] S7
Suhri, Christian [8945-10] S3
Sui, Zhan [8962-21] SPTue
Sujatha, Narayanan Unni [8952-48] SPSun
Sujecki, Sławomir [8938-28] S6, [8938-29] S6
Sukhanova, Alyona [8955-37] S8
Sukharenko, Vitaly [8982-48] SPWed
Sukhoivanov, Igor A. [8972-30] S7
Sukhorukov, Andrey A. [8998-46] S10
Sukuta, Sydney [8960-69] SPTue, SC972
Sulai, Yusufu N. [8978-13] S4
Sulc, Jan [8929-8] S2, [8959-72] SPTue, [8959-73] SPTue, [8959-77] SPTue, [8959-78] SPTue
Suleski, Thomas J. Symposium Committee, 8974 Program Committee, 8974 S7 Session Chair, SC454
Sullivan, David J. [8935-7] S3
Sullivan, Michael N. [8962-3] S1
Sun, Tze Chien [8981-35] S9
Suman, Rakesh [8947-71] SPMon
Sumetsky, Misha [8960-44] S11, [8998-42] S9
Summitt, Chris [8974-11] S3
Sumpf, Bernd [8935-21] S5, [8964-5] S1, [8972-19] S5, [9002-7] S2
Sun, C. [8967-32] S12, [8967-32] S4
Sun, C. J. [8986-7] S2
Sun, Cheng [8935-74] SPSun, [8943-116] SPSun, [8943-118] SPSun, [8943-130] SPSun, [8943-145] SPSun, [8943-151] SPMon, [8943-152] SPMon, [8958-17] S4, [8967-6] S3, [8967-6] S5
Sun, Chi-Kuang 8984 Program Committee, [8985-20] S5
Sun, Conroy [8956-2] S1
Sun, Duxin [8943-133] SPSun
Sun, Greg [8984-10] S3, [8995-36] S9
Sun, Handong [8960-13] S3
Sun, Hao [9006-10] S2
Sun, Hongwei [8974-8] S2
Sun, Hui [8941-16] S4
Sun, Jianfeng [8965-42] SPTue
Sun, Meng [8981-24] S6, [8996-22] S6
Sun, Minghao [8952-46] SPSun
Sun, Mingming [8985-53] S11, [9009-23] S8
Sun, Minjie [8990-35] S7
Sun, Ren [8954-10] S3
Sun, Rong [8983-22] S5
Sun, Shulin [8995-36] S9
Sun, Tianbo [8977-14] S4, [8995-26] S7, [8995-8] S2, [8998-40] S9
Sun, Victoria [8960-14] S4
Sun, Xiaochen [8991-27] S6
Sun, Xiaoguang [8938-55] S2
Sun, Xiaohan [8985-53] S11, [8993-61] S12, [9009-23] S8
Sun, Xiaoli [8959-18] S5
Sun, Yang [8943-127] SPSun
Sun, Yi [8987-45] S9
Sun, Yiwen [8947-72] SPMon
Sun, Yunlong [8928-26] S6, [8932-8] S1
Sun, Zhipei [8966-31] SPTue, [8966-5] S2
Sunaga, Yoshinori [8928-20] S5
Sunakawa, Haruo [8986-30] S6
Sunar, Ulas [8931-21] S4, [8931-46] SPMon, [8943-192] SPTues
Sundaram, Ravi S. [8966-31] SPTue, [8966-5] S2
Sundaram, Subramanian [8987-33] S7
Sundares, Mukta [9001-13] S3
Sunder, Sanjay [8990-37] S7
Sundgren, Petrus [9003-21] S5
Sung, Chi-Hun [8988-61] SPWed
Sung, Gee-Young [8977-20] S5
Sung, I Hui [8973-22] S5
Sung, Kung-Bin [8941-35] S9, [8952-32] S8
Sung, N. H. [8987-95] S6
Sung, Shijun [8941-49] SKey
Sung, Yongjin [8947-12] S3
Sunku, Sreedhar [8972-62] SPTue
Suntivich, Jin [8967-56] SPTue
Suntsov, Sergiy [8982-52] SPWed
Suomalainen, Soile [8966-24] S7
Surendra Babu, S. [9003-61] SPWed
Suresh Kumar, Murugesan [8940-2] S1
Surhariadi, Iping [8987-1] S1
Suri, Ashish [8982-80] SPWed
Surya, Charles C. [8987-85] SPWed
Suryaputra, Stephen [9008-8] S6, [9008-8] S7
Suski, Tadek [8986-23] S5, [8986-25] S5, [8986-56] S11, [8986-57] S11, [8986-60] S11
Susumu, Kimihiro [8955-31] S7
Sutanto, Erick [8933-13] S4
Sutedja, Tom Gani [8927-42] S10
Suter, Melissa J. 8927 Conference Chair, 8927 Program Committee, 8927 S11 Session Chair, [8927-36] S9, [8927-41] S10, [8927-54] S13, [8927-55] S13, [8927-56] S13, [8934-12] S2, [8934-57] S9
Sutherland, Richard 9004 Program Committee
Sutkus, Kestutis 8940 Program Committee
Suto, Hiroshi [8928-47] S9
Sutter, Dirk H. [8959-22] S6, [8972-25] S6
Suwa, Yuji [9010-18] S6, [9010-18] S7
Suzuki, Hiroaki [8928-23] S6
Suzuki, Kenji [8971-28] S5
Suzuki, Masahiro [8941-27] S7
Suzuki, Masaya [9005-14] S3
Suzuki, Satoru [8936-3] S1, [8951-35] SPMon, [8951-36] SPMon
Suzuki, Takenobu [8982-55] SPWed, [8982-56] SPWed, [8982-57] SPWed, [8982-62] SPWed, [8982-63] SPWed, [8982-70] SPWed, [8982-71] SPWed
Suzuki, Tomofumi [8977-11] S3
Suzuki, Toshihiko [8928-23] S6
Suzuki, Toshihito [9001-3] S1
Suzuki, Yo [8951-36] SPMon
Suzuki, Yuta [8943-167] SPMon, [8943-187] SPMon, [8943-45] S7
Svanberg, Sune [8952-18] S5
Svensson, Stefan P. 8993 S12 Session Chair, [8993-51] S10
Swain, Jason E. [8948-89] SPSun
Swain, Robert [8961-45] S11
Swaminathan, Krishna 9008 Program Committee, 9008 S5 Session Chair, 9010 S6 Session Chair
Swartzlander, Grover A. 8999 Program Committee, [8999-30] S6
Swatowski, Brandon W. [8988-36] S8
Sweeney, Stephen J. [8981-58] SPWed, [8988-44] S10, [9002-6] S2
Swift, George Peter [8941-63] S10
Swift, Simon [8933-1] S4, [8933-11] S4
Swillam, Mohamed A. [8981-65] SPWed, [8982-19] S4, [8988-33] S7, [8991-30] S7, [8994-31] S8
Swinkels, Milo Y. [8984-34] S9
Syed, Saba H. [8953-19] S4
Sygletos, Stylianos [9009-16] S7
Symonds, Clementine [8980-18] S5
Synowicki, Ron A. SC1113
Syrvatka, Vasyil Ja [8954-16] S4
Sysoliatyn, Alexey [8941-39] SPMon, [8980-59] SPWed
Syu, Yu-Cheng [8995-13] S4
Szameit, Alexander 8972 Program Committee
Szczepan, Rolf [9002-23] S5
Szentmary, Nora [8931-27] S5
Szep, Attila A. 8983 Program Committee
Szkulmowski, Maciej [8934-94] SPMon
Szlapa, Ewa [8983-21] S5
Szmulowicz, Frank 8996 Conference Chair, 8996 S7 Session Chair
Sznitko, Lech [8983-21] S5, [8983-31] S7
Szostkiewicz, Lukasz [8982-44] S9, [8982-47] S9, [8982-82] SPWed
Szu, Jenny I. [8928-43] S8, [8928-46] S9
Szukalski, Adam [8983-31] S7
Szulczewski, Michael [8949-44] S9
Szustakiewicz, Konrad [8968-9] S2
Szymanski, Michal [8961-117] SPTue, [8961-118] SPTue, [8961-126] SPTue, [8982-44] S9, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
Szymczyk, Patrycja [8968-39] SPTue

Ta, Van Duong [8960-13] S3
Taalat, Rachid [8993-34] S6
Tabarangao, Joel T. [8937-8] S2
Tabata, Hitoshi [8987-32] S12
Tabatabaei, Nima [8926-108] S22, [8927-19] S5, [8927-2] S1, [8927-29] S7, [8927-4] S1, [8927-5] S1
Tabiryan, Nelson V. 9004 Program Committee
Tabor, Alethea [8943-196] SPTues
Tabor, Christopher E. 8983 Conference Chair, 8983 S8 Session Chair, [8983-38] S9
Tabor, H. [8990-32] S6
Taccheo, Stefano [8961-72] SPTue, [8972-22] S6, [8982-29] S6, 8988 Program Committee
Tack, Klaas [8974-21] S5
Tada, Kazuhiro [8983-24] S6
Tadayon, Mohammad Amin [8983-32] S7
Tafoya, Jason [8961-112] SPTue, [8961-39] S9, [8971-11] S2
Tafoya, Tiffany B. [8962-7] S2
Tafur Monroy, Idelfonso [8999-14] S3, [9007-7] S4, 9008 Program Committee, 9008 S6 Session Chair, 9010 S7 Session Chair
Tagaya, Akihiro [9004-15] S4, [9004-20] SPWed
Tagaya, Akihiro [8983-16] S4, [9004-13] S4
Taghizadeh, Mohammed R. [8964-29] S7
Taguchi, Natsuo [8974-2] S1
Taha, Hesham [8939-11] S6, [8988-64] SPWed, [8992-24] S5, [8999-39] S8, [9006-16] S4
Tahara, Tahei [8950-9] S2
Tahraoui, Abbas [8989-4] S1
Tai, Keigo [9006-27] S6
Tai, Stephen [8943-136] SPSun
Taillon, Yves [8967-23] S10
Taima, Tetsuya [8983-37] S9
Taira, Kenji 8936 Program Committee
Taira, Shinichi [8971-28] S5
Tajima, Jumpei [8986-51] S10
Tajimi, Daiki [8986-13] S3
Takada, Akira [8961-115] SPWed
Takada, Junya [8926-48] S10
Takagi, Ryosuke [8987-17] S3
Takahama, Ademer [8926-130] S4
Takahara, Tomoo [9008-3] S2
Takahashi, Atsushi [8996-9] S3
Takahashi, Hideya [8935-52] S11
Takahashi, Kenjiro [8967-21] S9
Takahashi, Kohshin [8983-37] S9
Takahashi, Kouki [8938-6] S2
Takahashi, Mei [8926-74] S15, [8941-15] S4, [8941-30] S8, [8941-31] S8
Takahashi, Minokazu [9004-7] S2
Takahashi, Toshihiro [8928-47] S9
Takai, Hiroshi [9002-4] S1
Takaki, Yasuhiro [9006-26] S6
Takaku, Hiroyuki [8938-6] S2
Takamatsu, Tetsuro [8935-67] SPSun, [8939-26] S5, [8943-117] SPSun
Takamoto, Hisayoshi [8948-60] S10, [8949-11] S3
Takaoka, Toshimitsu [8974-36] SPTue
Takasaka, Shigehiro [9008-20] S9
Takasawa, Taisi [8997-39] S9
Takahashi, Yuzuru [8974-11] S3
Takauchi, Tetsuya [8986-35] S7, [8986-6] S1
Takayama, Yoshihisa [8971-28] S5
Takeda, Maki [8935-52] S11
Takehara, Hironari [8928-20] S5, [8933-22] S6
Takehara, Tetsuo [8935-52] S11
Takekawa, Shunji [8964-12] S3, [8964-34] S8
Takemasa, Keizo [9002-3] S1
Takemoto, Masashi [8947-51] S12
Takemoto, Ryo [8980-17] S4
Takemoto, Takashi 9010 Program Committee, 9010 S4 Session Chair, [9010-12] S4, [9010-12] S5
Takemura, Mitsutaka [8977-11] S3
Takenaka, Hideki [8971-28] S5
Taketani, Akinori [8938-39] S8, [8951-24] S5, [8951-25] S5
Takeuchi, Shigeki [8997-17] S7
Takida, Yuma [8964-9] S2
Takigawa, Shinichi [8986-54] S11
Takiguchi, Koichi [9009-3] S3
Takiguchi, Yu [8949-11] S3
Tal, Eran [8964-2] S1
Talanov, Anton E. [8956-40] SPSun
Taliath, Sachin S. [8928-98] S20
Taliath, Sneha [8939-14] S3
Talbot, Clifford Basil [8926-71] S14, [8935-2] S1, [8940-16] S4
Talkington, Desmond [8934-102] SPMon

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Tam, Joshua [8948-32] S5
 Tam, Man Chun Alan [8930-5] S1
 Tamaki, Ryo [8981-23] S6
 Tamaoki, Yoshinori [8959-24] S6, [8959-27] S7
 Tamboli, Adele C. [8981-6] S2
 Tamborini, Davide [8993-93] S18
Tamborski, Szymon [8934-94] SPMon
 Tameev, Alexey R. [8981-37] S9
 Tan, Bien-Keem [8935-4] S1
 Tan, Bingyao [8930-5] S1
 Tan, Bo [8969-11] S2
 Tan, Dawn T. [8989-7] S10, [8989-7] S3
 Tan, Joel W. Y. [8943-96] S14
 Tan, Joel W. Y. [8926-113] S23
 Tan, Jun [8991-46] SPWed, [8991-9] S2
 Tan, Khay M. [8927-36] S9
 Tan, Reamey P. [8955-16] S4
 Tan, Shaoyang [8965-48] SPTue
 Tan, Si-Hui [8997-14] S6
 Tan, Weihong 8957 Program Committee
Tan, Xiaodi [9006-6] S1
 Tan, Xiaodong [8928-103] S8, [8928-104] S8
 Tan, Yafang [8933-13] S4
Tanabe, Setsuhisa 8982 Program Committee, [8987-15] S3
 Tanabe, Tetsuya [8948-47] S8
 Tanaka, Hidekazu [8987-52] S11
 Tanaka, Kentaro [8926-96] S19
 Tanaka, Koichiro 8941 Program Committee
 Tanaka, Masato [8926-69] S14, [8935-43] S9
 Tanaka, Ryoosuke [8948-81] S2
 Tanaka, Tooru [8987-12] S2
 Tanaka, Toshiaki 9008 Program Committee, 9008 S7 Session Chair, [9008-3] S2
 Tanaka, Yu [8990-47] S9
 Tanbun-Ek, Tawee [8965-36] S8
 Tandon, Rahul 8926 Program Committee, 8926 S22 Session Chair, [8926-105] S21, [8926-107] S21
 Tanese, Dmitrii [8997-28] S10
 Tang, Dora T.-Y. [8947-48] S11
 Tang, Guichen [8949-33] S7
 Tang, Heng-Jing [8982-83] SPWed
Tang, Hin Long [8927-27] S7
 Tang, Jialei [8960-45] S11
 Tang, Jieyuan [8992-9] S2
 Tang, Kang-Tsao [9007-26] SPWed
 Tang, L. [9002-48] S11
 Tang, Liang [8956-38] SPSun
 Tang, Matthew Y. H. [8947-49] S11
 Tang, Mengxing [8946-13] S4
 Tang, Mingchu [9002-30] S7
 Tang, Peter T. [8989-28] S8
 Tang, Qingqong [8928-58] S12, [8948-88] SPSun
 Tang, Rui [8931-52] SPMon
 Tang, Shuo [8943-183] SPMon, [8948-103] SPSun, [8948-77] SPSun
 Tang, Sindy K. Y. 8976 Program Committee, 8976 S6 Session Chair, [8976-39] S8
 Tang, Tingting [8980-36] S9
 Tang, Yang [9000-5] S2
 Tang, Zhuoqi [8938-28] S6
 Tani, Kazuki [9010-18] S6, [9010-18] S7
 Tanida, Jun [8954-24] S6
 Tanifuji, Tadatashi [8941-27] S7
 Tanigaki, Toshihide [8985-39] S8
 Taniguchi, Hirokazu [8960-63] S16, [8961-43] S10
 Taniguchi, Yu [9003-52] SPWed
 Tanikawa, Yukari [8945-18] S5, [8945-9] S3
 Tankam, Patrice [8936-9] S2
 Tankam, Hans J. [8947-24] S5
 Tannert, Sebastian [8936-19] S4, [8948-94] SPSun, [8950-8] S2
 Tansu, Nelson 9002 Program Committee
 Tanter, Mickael [8943-185] SPMon, [8946-2] S1
Tanyeri, Melikhan M. [8976-13] S3
 Tanzi, Rudolph E. [8934-75] S11, [8953-16] S4
 Tanzilli, Sébastien [8997-35] S8
 Tao, Chao [8943-217] SPTues
Tao, Guangming [8982-14] S3, [8982-77] SPWed, [8982-78] SPWed
 Tao, Li [8990-50] SPWed
 Tao, Xiaodong [8978-12] S4
 Tao, Yuankai K. [8927-30] S7
 Tao, Zhenning [9008-3] S2
 Tapetado, Alberto [8990-9] S2
 Tarango, Melissa [8941-62] SPSun
 Tarasenko, Oleksandr [8992-26] S6
 Tarazona, A. [8989-12] S5
 Tarde, Christian [8968-22] S5
 Targowski, Grzegorz [8986-23] S5, [8986-56] S11, [8986-60] S11
 Tarhan, Mehmet C. [8950-32] S8
Tarnok, Attila 8947 Conference CoChair, 8947 S14 Session Chair, [8947-30] S6, [8947-31] S6, 8956 Program Committee
 Tasaka, Shigeru [8983-4] S1
 Täschler, Dominik [8938-17] S4
 Tashiro, Takayoshi [9007-11] S5
 Tassano, John B. [8961-28] S7
Tatam, Ralph P. [9002-8] S2
 Tatavarti, Rao [8981-4] S1
 Tathireddy, Prashant [8928-82] S15
 Tatini, Francesca [8926-3] S1, [8955-45] S10
 Tatla, Taran [8927-7] S2
 Taton, Andrew 8957 Program Committee
 Tatum, Jim A. [9001-11] S3
 Taudt, Christopher [8935-69] SPSun, [8961-106] SPTue, [8961-125] SPTue, [8963-39] SPTue, [8975-9] S2
 Taunay, Thierry F. [8938-15] S3
 Tavakoli, Behnoosh [8943-166] SPMon, [8943-198] SPTues, [8943-201] SPTues
 Tavast, Miki [8966-28] S4
 Tay, Jian Wei [8943-167] SPMon, [8943-42] S7, [8943-45] S7
 Taylor, Antoinette J. [8984-29] S8
 Taylor, James Roy [8940-33] S7
 Taylor, Jonathan P. [8978-8] S3
 Taylor, Luke R. [8943-47] S7, [8943-53] S8
 Taylor, Rebecca E. 8983 Program Committee
 Taylor, Richard J. E. [8994-6] S2
 Taylor, Robin [8946-31] S7
 Taylor, Russell H. [8926-122] S1, [8943-166] SPMon, [8943-198] SPTues, [8943-216] SPTues
 Taylor, Ulrike [8955-7] S2, [8955-9] S2
 Taylor, Zachary D. [8941-49] SKey, 8985 Program Committee, 8985 S5 Session Chair, 8985 S6 Session Chair, [8985-16] S4
 Taysing-Lara, Monica [8995-8] S2
 Tazawa, Masato [9004-17] S4
 Tcherniavskaja, Elina A. [8952-3] S1, [8957-14] S4
 Tchernycheva, Maria [8987-57] S10
 Tchoul, Maxim [9003-4] S1
 Tchivaleva, Lioudmila [8926-32] S7
 Tearney, Guillermo J. 8926 Conference Chair, 8926 S13 Session Chair, [8926-80] S16, 8927 Conference Chair, [8927-1] S1, [8927-10] S3, [8927-11] S3, [8927-12] S3, [8927-14] S3, [8927-19] S5, [8927-2] S1, [8927-21] S5, [8927-29] S7, [8927-4] S1, [8927-45] S11, [8927-47] S11, [8927-5] S1, [8927-52] S12, [8927-57] S13, 8934 Program Committee, 8934 S6 Session Chair, [8934-78] S12, [8934-8] S2, [8943-1] S1
 Techel, Anja 8963 Program Committee
 Tedoradze, Marine G. [8981-37] S9
Tegegne, Zerihun G [8991-7] S2
 Teh, Ming [8939-22] S4
 Teh, Peh Siong [8961-33] S8
Teichman, Joel M. 8926 Program Committee, 8926 S11 Session Chair
Teigell Beneitez, Nuria [8954-26] S6
 Teissier, Roland [8993-27] S5
 Tekin, Tolga 8975 Program Committee, [8990-22] S4, [8991-23] S6
 Telkkälä, Jarkko [8965-35] S8
 Teller, Franklin [8935-68] SPSun
 Temiz, Yuksel [8976-36] S8
 ten Brummelaar, Theo A. [8964-51] SPTue
Tenderenda, Tadeusz [8961-126] SPTue, [8982-44] S9, [8982-47] S9, [8982-82] SPWed, [9009-12] S6
Teng, Chu-Hsiang [8996-14] S4, [8996-16] S5, [8996-17] S5, [9003-64] SPWed
 Tenório, Denise P. L. A. [8955-62] SPSun
Tepper, Michal [8940-24] S5
 Terada, Jun [9007-11] S5
 Terada, Takaya [8963-35] S6, [8963-35] S9, [8963-7] S2
Terakawa, Mitsuhiro [8941-10] S3, [8967-46] SPTue, [8967-5] S2, [8967-5] S4, [8970-16] S12, [8970-16] S4, [8972-4] S1, [8972-54] SPTue
 Terakawa, Susumu [8947-39] S9, [8948-60] S10, [8949-11] S3
 Teranishi, Toshiharu [8943-154] SPMon
 Terashima, Wataru [8993-15] S2
 Terpelov, Dmitry A. [8934-108] SPMon
 Terranova, Brandon [8994-39] S10
 Terroux, Marc [8985-35] S8
 Terstappen, Leon W. M. M. [8939-15] S3
 Tervo, Jani [8977-33] SPTue, [8999-23] S5, [8999-52] SPWed
 Teslovich, Nikola C. [8953-6] S2
 Tessier, Gilles [8989-22] S7
 Tessier, Renana [8965-21] S5
 Testa, Genni [8976-24] S5, [8976-40] S9, [8988-41] S9
 Tetsuyama, Norihiro [8987-78] SPWed, [8987-79] SPWed
 Teubert, Jörg [8986-42] S8
 Teubl Ferreira, Fernando [8979-16] S7
Teupner, Anne [9003-2] S1
 Thakor, Nitish V. 8928 Conference Chair, 8928 S16 Session Chair
 Thangaraj, Mridhula [8943-58] S9
 Thangavel, R. [8982-43] S8
 Thankiah, Sudaharan [8950-52] S8
 Thapa, Rajesh [9000-20] S5
 Theeg, Thomas [8961-105] SPTue, [8961-116] SPTue
Thesen, Michael J. [8949-34] S7, [8949-69] SPMon
 Theiss, Jesse [8996-13] S4
 Theodorakos, John [8967-28] S11
 Theodoropoulos, Catherine [8943-120] SPSun
 Thepass, Gijs [8930-26] S6
 Theuer, Frauke [8961-89] SPTue
 Thiant, Jan [8950-7] S2
 Thiberville, Luc 8927 Program Committee
 Thidé, Bo [8999-10] S3
 Thiel, Michael [8970-10] S3, [8970-11] S3, [8970-8] S2, 8974 Program Committee, 8974 S6 Session Chair, [8974-27] S7
 Thielen, Philip [8984-24] S7
 Thieme, Björn [8971-30] S5
 Thomas, Benjamin [8978-16] S5
Thomas, Dennis [8942-1] S1
 Thomas, Fabrice [8992-16] S4
 Thomas, Jens Ulrich [8967-12] S11, [8967-12] S6, [8972-45] S11, [8972-45] S6, [8972-46] S11, [8972-46] S6, SC1087
 Thomas, Nicholas [8988-36] S8
 Thomas, Nicole [8997-1] S2, [8997-1] S6
 Thomas, P. [8989-12] S1
Thomas, Robert J. 8941 Conference Chair, 8941 Program Committee, 8941 S3 Session Chair, 8941 S6 Session Chair, 8941 S7 Session Chair, [8941-18] S5, [8941-19] S5, [8941-8] S3
Thomas, Sandrine J. [8978-5] S2
 Thombansen, Ulrich [8963-22] S6, [8963-23] S6
 Thompson, Alex J. [8947-48] S11
 Thompson, David J. [8990-7] S2
 Thompson, Gary [8941-58] S12
Thompson, Gary L. [8941-57] S12
Thompson, Kevin P. SC1122
 Thompson, Mark [8972-51] S13, [8972-51] S8
 Thompson, Robert J. [8993-83] S17
 Thomson, Darren B. [8987-1] S1
 Thomson, David J. [8989-12] S5, [8990-13] S3, [8990-35] S7, [8991-18] S5
 Thoreson, Mark D. [8957-23] S5
 Thoulon, Pierre-Yves [8987-76] SPWed
 Thouvenin, Olivier [8928-63] S13
 Thrall, Michael J. [8947-33] S1, [8947-33] S7
 Thrane, Lars 8953 Program Committee, 8953 S4 Session Chair, [8953-4] S1
 Thurecht, Kristofer J. [8939-9] S2
 Tian, Feng [8977-17] S4, [8977-18] S4
 Tian, Hong [8948-82] SPSun
 Tian, Jianguo [8960-19] S5
Tian, Jie [8935-31] S7, [8935-66] SPSun, [8937-22] S4, [8937-35] SPSun, [8941-22] S6, [8956-5] S1
 Tian, Mengkun [8969-5] S1
 Tian, Xueping [8961-70] SPTue
 Tian, Yunxian [8948-103] SPSun
Tian, Zhaobing [8996-21] S6
 Tibbals, Jeff [8965-46] S2
 Tibbits, Glen F. [8934-74] S11
 Tice, Bradley S. [8958-21] SPSun, [8958-22] SPSun, [9009-24] SPWed
Tichauer, Kenneth M. [8926-28] S7, [8931-26] S5, [8931-36] S7, [8956-6] S2
 Tichy, Malte C. [8997-16] S6
 Tidemand-Lichtenberg, Peter [8964-13] S3, [8964-52] SPTue, [8964-55] SPTue, [8964-56] SPTue
Tidrow, Meimei 8993 Program Committee
 Tiedemann, Daniela [8955-7] S2
 Tien, Alan [8946-3] S1
 Tien, Ching-Ho [9003-26] S6
 Tigelaar, Hendrik J. H. [8973-21] S5
 Tigges, Chris P. [8989-20] S6
 Tignon, Jerome [8984-32] S9, [8984-41] S11, [8993-11] S2, [9002-27] S6
 Tihan, Gratiela [8983-49] S17
 Tijerina, Amanda J. [8941-19] S5
 Tijssen, Peter [8973-21] S5
Tilbury, Karissa B. [8948-4] S1, [8948-5] S1
 Tilma, Bauke W. [8966-10] S3, [8966-17] S5, [8966-22] S6, [8966-7] S2
 Tilton, Michael [9002-42] S9
 Timerman, Dmitriy [8931-15] S3, [8931-53] SPMon, [8931-54] SPMon, [8943-60] S9
 Timm, Ulrich [8951-31] SPMon
 Timmerman, Richard J. [8938-9] S2
 Timoshchuk, Mary [8929-3] S1
Timoshina, Polina A. [8951-33] SPMon
 Timotjevich, Branislav D. [8974-14] S4, [8994-28] S8
 Tinarelli, Roberto [8930-12] S3
Ting, David Z. [8993-33] S6
 Ting, Monica [8940-9] S2
 Ting, Pei-Hsien [8943-155] SPMon
 Tinguely, Jean-Claude [8988-43] S9, [8999-4] S1, [8999-48] S10
Tinne, Nadine [8941-13] S4
 Tisa, Simone [8993-93] S18
 Täschler, Joseph G. [8981-40] S11
 Tison, Guillaume [8961-76] SPTue
 Tisserand, Stéphane [8943-209] SPTues
 Titkov, Ilya E. [8986-79] SPWed
 Titova, Lyubov V. [8941-50] S10, [8984-36] S10, [8984-37] S10
Tittel, Frank K. [8993-14] Session Chair, [8993-70] S14
Titterton, David H. 8959 Program Committee, 8959 S12 Session Chair, 8959 S13 Session Chair
 Tiwald, Thomas E. SC1113
 Tizei, Luiz [8986-34] S7
 Tjoa, Tjoson [8934-96] SPMon
 Tjon Kon Fat, Elisa M. [8947-24] S5
 Tkachenko, Georgiy V. [8999-27] S6
 Tkaczyk, Stanislaw W. [8969-25] SPTue
Tkaczyk, Tomasz S. 8936 Program Committee, [8936-17] S4, [8951-15] S4, SC012
 Toberer, Eric S. [8981-6] S2
 Tobisch, Tim [8938-14] S3
 Tobita, Seiji [8950-32] S8
 Toda, Yasunori [8999-31] S7
 Todorov, Yanko 8993 S4 Session Chair, [8993-41] S7
 Todt, René [8965-26] S6
 Todt, Ulrich [8977-3] S2
 Tofail, Syed A. M. [8948-106] SPSun
 Togan, Emre [8997-29] S11
 Toita, Masato [8986-65] S14
 Tokoro, Hiroki [8983-61] SPWed
 Tokranov, Vadim [9002-63] S14

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Tokuda, Takashi [8928-20] S5, [8933-22] S6, [8974-17] S5
Tokumasu, Fuyuki [8936-29] S7
Tolmachev, Yuri A. [8984-27] S7
Tolstik, Nikolai [8959-47] S11
Tolstykh, Gleb P. [8941-62] SPSun
Tom, Henry [8929-14] S3, [8929-24] SPSun, [8929-27] SPSun
Tomasino, A. [8990-41] S8
Tomasunas, Rolandas [8970-9] S2
Tomatsu, Nobuhiro [8930-8] S2
Tombelli, Sara [8935-30] S7, [8956-29] S8, [8976-24] S5, [8988-71] SPWed
Tomes, Matthew R. [8976-33] S7, [9000-8] S2
Tomihari, Yasuhiro [8964-35] S5
Tomimura, Suely [8926-76] S18, [8926-77] S15
Tomita, Akihisa [8997-6] S4, [8997-8] S4
Tomkos, Ioannis [9009-16] S7
Tomm, Jens W. [8965-2] S1, [9002-52] S12
Tondiglia, Vincent P. [9004-24] S3, [9004-4] S1
Tondusson, Marc [8959-60] S14
Tonelli, Francesco [8939-30] S6
Tonelli, Mauro 9000 Program Committee, [9000-2] S1
Tong, Dedi [8934-76] S11, [8935-47] S10
Tong, Nguyen Ba [8993-72] S15
Tong, Qingping [8937-14] S3, [8951-22] S5
Tong, Tangji [8953-11] S3
Tong, Trong V. [8986-18] S4
Tong, Tuan H. [8982-57] SPWed, [8982-63] SPWed, [8982-71] SPWed
Tong, Zhi [8964-20] S5
Tonn, Jörg-Christian [8928-13] S4
Tonosaki, Shozo [8926-69] S14, [8935-43] S9
Ton-That, Cuong [8987-6] S2
Toomey, Joshua P. [8980-11] S3
Topala, Florin Ionel [8929-22] SPSun, [8934-115] SPMon
Topart, Patrice [8975-13] S3
Topley, Rob P. [8989-12] S5, [8990-7] S2
Topol, Igor [8954-35] SPMon, [8983-28] S7
Torchilin, Vladimir [8926-136] S5
Torchio, Philippe [8987-76] SPWed
Török, Peter [8946-20] S5
Torok, Valeria [8938-30] S6
Toronov, Vladislav 8928 Program Committee, 8928 S8 Session Chair, 8942 Program Committee, [8942-36] S9
Torrance, Lesley [8972-12] S3
Torrent, Daniel 8994 S3 Session Chair, [8994-14] S4
Torres, Ignacio [8968-30] S15, [8968-30] S7
Torres, Juan P. 8999 Program Committee
Torres, Sergio N. [8953-20] SPSun
Torres-Mapa, M. L. [8941-49] S8
Tortiglione, Claudia 8955 Program Committee
Tortora, Paolo [8955-57] S12
Tortschanoff, Andreas [8976-53] SPTue
Torzicky, Teresa [8930-9] S2, [8934-80] S12
Tosca, M. C. [8955-68] SPSun
Toshiyoshi, Hiroshi Symposium Committee
Tosi, Alberto [8937-24] SPSun, [8945-18] S5, [8993-89] S18, [8993-93] S18
Tosic, Ivana [8992-30] SPWed
Toth, Cynthia A. [8930-19] S5, [8930-35] S8
Tóth, Géza [8999-46] S10
Toth, Milos [8970-21] S5
Touch, Joe [9008-8] S6, [9008-8] S7
Touloupakis, Eleftherios [8970-17] S12, [8970-17] S4
Toupin, Perrine [8938-40] S8, [8982-16] S3
Tourbot, Gabriel [8986-34] S7
Tournié, Eric 8993 Conference CoChair, 8993 S1 Session Chair, [8993-42] S8
Toxqui Quilit, Carina [8949-66] SPMon
Toxqui-Lopez, Santa [9006-38] SPWed, [9006-41] SPWed, [9006-45] SPWed, [9006-46] SPWed, [9006-55] SPWed
Toyoda, Seiji [8934-103] SPMon
Toyoshima, Morio 8971 Program Committee, [8971-28] S5
Tozburun, Serhat [8934-105] SPMon, [8934-85] SPMon
Tracy, Erin [8931-46] SPMon
Tracy, Joseph B. [8927-43] S11, [8934-35] S6, [8952-38] S10
Träger, Frank 8969 Conference Chair, 8969 S2 Session Chair
Trammell, Susan R. [8926-37] SPSun, [8935-40] S8
Trampert, Achim [8996-2] S1
Tran, Quyen [8947-65] S14
Tran, Trung Nghia [8952-45] SPSun
Tranberg, Karl-Goran 8944 Program Committee
Tranca, Denis E. [8948-106] SPSun
Tränkle, Günther [8935-21] S5, [8965-17] S4, [9002-12] S3, [9002-14] S3, [9002-53] S12, [9002-7] S2
Trasischker, Wolfgang [8930-9] S2, [8934-80] S12
Traub, Martin [8959-53] S12, [8965-11] S3, [8965-19] S4, [8965-30] S7
Trautmann, Susanne [8950-13] S3
Traversa, Enrico [8987-65] S13
Traverso, Giovanni [8935-51] S11
Travis, Taryn E. [8926-6] S1
Traxler, Lukas [8936-14] S3
Trebin, Rick [8972-27] S7, SC746
Tredicucci, Alessandro [8984-35] S10
Treeby, Bradley E. [8943-173] SPMon
Trela-McDonald, Natalia [8963-12] S3, [8963-12] S7
Tremblay, Eric J. [8981-31] S8
Trenkler, Daniela [8977-21] S5
Tresoldi, Cristina [8939-15] S3
Treu, Julian [9002-35] S8
Treich, Georg [8965-27] S6, [8965-29] S6
Triana, Brian [8935-79] SPSun
Tribuzi, Vinicius [8970-12] S3
Tricarico, Luigi [8963-8] S2
Trichas, Emmanuil [8986-39] S8
Trico, Michaël [8947-32] S6
Triebel, Peter [8936-33] S8
Triggs, Graham [8974-13] S4
Trindade, Antonio Jose [8974-20] S5
Trinite, Virginie [8993-34] S6, [8993-43] S8
Trinkunas, Augustinas [8993-45] S8, [9002-39] S9
Tripathi, Markandey M. [8935-58] S12, [8946-32] S7, [8946-33] S7
Tripathi, Sandeep N. [8987-77] SPWed
Triplett, Gregory E. [8980-78] SPWed, [8993-28] S5
Triscone, Jean-Marc [8987-28] S6
Trivedi, Sudhir B. [8959-66] S14, [8982-66] SPWed, [9000-23] SPWed
Trivellin, Nicola [9003-48] S11
Trocchi, Mariano [9002-57] S13, [9002-61] S14
Troester, Melissa A. [8934-35] S6
Trofimov, Igor E. [9002-63] S14
Troidou, Kalliopi [8955-43] S9
Trolés, Johann [8938-3] S1, [8938-40] S8, [8982-16] S3
Tromberg, Bruce J. Symposium Chair, [8927-16] S4, [8936-17] S4, [8941-7] S2, [8948-59] S10, 8952 Program Committee, [8952-21] S6
Trono, Cosimo [8935-30] S7, [8956-29] S8, [8976-24] S5, [8988-71] SPWed
Tropper, Anne C. 8966 Program Committee, 8966 S5 Session Chair
Trottier, Troy A. [9003-41] S10
Trottmann, Matthias [8926-44] S9, [8926-49] S10
Trojanova-Wood, Maria A. [8941-18] S5
Trubenko, Pavel A. [8965-22] S5
Trudel, Andrée-Anne [8982-31] S6
Trujillo, J. Roberto [8931-32] S6
Tsai, Chun-Chin [9003-58] SPWed
Tsai, Din Ping [8957-31] S7, [8995-36] S9
Tsai, Hung-Kuei [8957-31] S7
Tsai, Pei-I [8933-16] S5, [8936-5] S1, [8976-47] S10
Tsai, Shou-Kuan [8976-38] S8
Tsai, Tsung-Han [8927-30] S7, [8934-1] S1
Tsai, Tsung-Hua 8926 Program Committee, 8926 S6 Session Chair, [8939-3] S1
Tsai, Yu-Lin [8981-3] S1, [9003-12] S3
Tsalach, Adi [8943-128] SPSun
Tsampoula, Xanthi [8972-3] S1
Tsapris, Nicolas [8955-40] S9
Tsatourian, Veronika [8984-5] S1
Tsatulnikov, Andrei F. [8986-79] SPWed
Tschekalinskij, Wladimir [8994-56] S14
Tse, Yuen Chi [8984-32] S9
Tsen, Kong-Thon 8984 Conference Chair
Tseng, Chih-Kuo [8990-38] S8
Tseng, Chih-Wei [8990-6] S1
Tseng, Hsin-Lun [8990-6] S1
Tseng, Hsiu-Yang [8976-11] S3
Tseng, Hung-Yu [8957-27] S6
Tseng, Jen-Chieh [8956-8] S2
Tseng, Ming Lun [8957-31] S7
Tseng, Po-jung M. [8935-53] S11
Tseng, Ricky J. [8991-14] S4
Tseng, Shih [8998-12] S3, [8998-22] S5, [8998-28] S6
Tseng, Snow H. [8949-24] S5, [8949-30] S6, [8952-15] S4
Tsia, Kevin K. [8927-27] S7, [8947-49] S11, [8947-78] SPMon, [8948-25] S4
Tsieng, Roger Y. [8928-84] S16
Tsiouki, Diane [8926-98] S20
Tsiminis, Georgios [9002-10] S2
Tsin, Andrew [8956-24] S6
Tsiokos, Dimitris M. [8990-8] S2
Tstonev, Dobroslov [9007-1] S1
Tsoukalas, Dimitris [8967-28] S11
Tsu, Raphael [8995-41] S10
Tsubakimoto, Koji [8959-27] S7
Tsuboi, Yasuyuki [8967-2] S1, [8967-2] S3
Tsu, Ying Y. [8984-36] S10, [8984-37] S10
Tsuji, Hiroyuki [8971-28] S5
Tsuji, Kenichiro [8985-39] S8
Tsuji, Masaharu [8969-10] S2
Tsuji, Shinji 9002 Program Committee
Tsuji, Takeshi [8969-10] S2
Tsuji, Masahiko [8935-52] S11
Tsuji, Kiyokazu [9009-2] S3
Tsuahara, Mutsumi [8954-6] S2
Tsukamoto, Katsutoshi 9007 Conference Chair, 9007 S4 Session Chair, 9007 S7 Session Chair, [9007-11] S5, [9007-4] S4
Tsukamoto, Masahiro [8967-21] S9, [8969-27] SPTue
Tsukamoto, Yu [9006-48] SPWed
Tsur, Limor [8928-99] S20
Tsutsumi, Naoto [8983-24] S6, [8983-26] S6, [8983-51] SPWed
Tsybouski, Dmitri [8943-4] S15, [8943-9] S15
Tsytsarev, Vassiliy [8928-58] S12
Tu, Charnag-Gan [8986-36] S7, [9003-34] S7
Tu, Haohua [8934-65] S10
Tu, Li-Wei 9003 Conference Chair
Tu, Xuecou [8985-31] S7
Tu, Yi-Chou [8934-38] S6, [8957-27] S6
Tu, Zhijuan [8982-32] S7
Tuchin, Valery V. 8930 Program Committee, 8930 SPSun Session Chair, 8934 Conference Chair, 8934 S12 Session Chair, 8942 Conference Chair, [8942-16] S4, 8944 Program Committee, [8951-33] SPMon, [8955-59] SPSun
Tuchina, Elena S. [8942-16] S4, [8955-59] SPSun
Tucker-Schwartz, Jason M. [8934-37] S6
Tuennermann, Andreas Symposium Chair, [8959-46] S11, [8961-21] S5, [8961-31] S8, [8961-46] S11, [8961-48] S12, [8961-49] S12, [8961-5] S2, [8961-55] S13, [8961-58] S13, [8961-64] S15, [8961-73] SPTue, [8961-79] SPTue, [8961-84] SPTue, [8961-89] SPTue, [8967-40] S14, [8968-34] SPTue, [8972-18] S5, [8972-34] S8, [8978-1] S1, [8995-10] S3, [8995-3] S1
Tukker, Teus W. [9003-47] S11
Tulinska, Jana [8955-60] SPSun
Tulkki, Jukka [8980-2] S1, [8980-34] S9
Tullis, Iain C. [8935-15] S4
Tullis, Iain D.C. [8949-12] S3
Tumminelli, Richard P. [8961-30] S8
Tumursukh, B. [8941-49] S8
Tunç, Burcu [8941-47] SPMon, [8941-48] SPMon
Tung, Yen Chun [8973-22] S5
Tunnell, James W. [8952-10] S3
Tünnermann, Henrik [8961-116] SPTue
Tuohiniemi, Mikko [8977-13] S3, [8977-27] S6, [8977-30] S7
Tur, Moshe [8998-31] S7
Turbin, Pascal [8967-23] S10
Turchetto, Paola [8932-31] S6
Turchin, Ilya V. [8937-26] SPSun, [8943-193] SPTues, [8952-27] S7
Turcinkova, Dana [8993-3] SKey
Turcotte, Raphael [8948-99] SPSun
Turci, Hakan E. [8989-2] S1
Turek, John J. [8942-35] S9, [8952-23] S6
Turgeon, Danielle K. [8927-15] S4
Turitsyn, Sergei K. [8984-5] S1
Turkmen, Mustafa [8975-21] S4, [8976-52] SPTue
Turnbull, Graham A. [9002-10] S2
Turner, George W. [8965-20] S5
Turner, Jake B. [8943-174] SPMon, [8943-20] S3
Turner, Kevin P. [8928-3] S1
Turner, Timothy L. [8930-41] S9, [8930-42] S9
Turpin, Alejandro [8960-61] S16
Turunen, Jari [8964-26] S6, [8974-58] S9, [8999-23] S5, [8999-52] SPWed
Tuzson, Bela [8993-68] S14
Twa, Michael D. [8930-3] S1, [8946-7] S2
Twardowska, Magdalena A. [8957-22] S5
Tweedle, Michael F. [8935-16] S4
Twieg, Robert J. [8950-29] S7
Tyazhev, Aleksey [8964-41] S9
Tyc, Tomas [8999-26] S6
Tzameret, Adi [8930-37] S8
Tzeranis, Dimitrios S. [8947-63] S14, [8956-19] S5

U

Uchida, Giichiro [8987-35] S7
Uchugonova, Aisada [8930-28] S7, [8947-55] S12, 8948 S3 Session Chair, [8948-3] SKey, [8948-43] S7, [8948-52] S9
Udway, Kevin [8986-1] S1
Uebel, Patrick [8961-26] S7
Ueda, Jumpei [8987-15] S3
Uehara, Tomoyuki [8985-39] S8
Ueno, Takahiro [8926-69] S14, [8935-43] S9
Uesugi, Kenjiro [8986-51] S10
Ughi, Giovanni Jacopo J. [8926-80] S16, [8926-92] S19
Uhring, Wilfried [8935-38] S8
Ulanovsky, Michael Vladimirov [8967-47] SPTue
Ulanski, Jacek [8983-10] S3
Ulliac, Gwenn [8988-35] S8
Ulloa-Castillo, Antonio N. [8964-47] SPTue
Uluc, Nasire [8952-16] S4
Ulvila, Ville S. [8964-69] S7
Umbuzeiro, Gisela A. [8948-100] SPSun
Umeyama, Shinji [8928-27] SPSat, [8928-28] SPSat
Umehawa, Toshimasa [9002-4] S1
Umhofer, Udo [8967-24] S10
Umnikov, Andrey A. [8961-41] S10
Unger, Andreas [8965-38] S8, [8965-5] S1
Unger, Sonja [8961-74] SPTue, [8982-27] S6, [8982-5] S1
Ungrapatanin, Jesada [8977-20] S5
Unlu, Mehmet Burcin [8943-190] SPTues, [8952-16] S4
Uno, Kazuyuki [8929-20] SPSun
Uno, Shin-nosuke [8950-32] S8

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Unterhuber, Angelika** [8939-10] S2, [8964-5] S1, [8972-19] S5
 Unterrainer, Karl [9002-24] S6
 Unwin, Paul S [8970-4] S1
 Upadhiyaya, Raghav [8928-93] S18
 Upendra Kumar, Kagola [8954-29] S7, [8996-33] SPWed
 Upton, Melissa P. [8941-23] S6
 Urano, Yasuteru [8950-32] S8, 8956 Program Committee, 8956 S5 Session Chair, [8956-33] S9, [8956-4] S1
 Urata, Ryohei [9010-1] S1
 Urayama, Shiro [8940-26] S5
 Urbach, Benayahu [8963-41] S4, [8963-41] S8
Urbach, Paul [8987-13] S2
 Urban, Arne [8986-21] S4
 Urbanek, Wolfram [8961-66] SPTue, [8965-12] S3
 Urbani, Andrea [8926-73] S15
 Urbanski, Lukasz [8973-13] S3
 Urbas, Aaron [8945-1] S1
 Urboniene, Vidita [8939-38] SPSun
 Uribe-Patarroyo, Néstor [8926-90] S18, [8934-10] S2, [8934-97] SPMon
 Urino, Yutaka [9010-5] S3
 Urness, Adam C. [8974-1] S1
 Usami, Noritaka [8964-47] SPTue
 Usechak, Nicholas G. [8982-28] S6
Ushiba, Shota [8974-2] S1, [8974-24] S6, [8974-45] SPTue, [8974-46] SPTue
 Usman, Anwar [8983-19] S5
 Usuga Castaneda, Mario A. [8999-14] S3
 Usui, Akira [8986-30] S6
 Usuki, Tatsuya [9010-5] S3
 Utéza, Olivier P. [8972-44] S10, [8972-44] S5
Utzing, Urs 8935 Program Committee, 8935 S11 Session Chair, [8935-1] S1, [8953-9] S2, [8956-22] S5
 Uusimaa, Petteri [8965-33] S7
 Uvin, Sarah [8993-42] S8
 Uzal, Francisco A. [8928-11] S3
 Uzeda, Virginia [8932-44] SPSun
- V**
- V., Unnikrishnan N. V. [8940-21] S4
 Vabbinna, Phani Kiran [8985-4] S1
 Vacas-Jacques, Paulino [8927-2] S1, [8934-78] S12
Vacca, Giacomo [8992-1] S1
 Vachon, Martin [8990-32] S6, [8995-38] S10
 Vagionas, Christos [8991-33] S8, [8991-36] S8
 Vahala, Kerry J. [8960-37] S10
 Vahlsing, Thorsten [8951-7] S2
 Vainio, Markku M. [8964-69] S7
 Vakoc, Benjamin J. [8926-89] S18, [8934-105] SPMon, [8934-51] S8, [8934-55] S8, [8934-85] SPMon, [8935-51] S11, [8942-15] S4
Valdes, Pablo A. [8928-32] SPSat, [8928-8] S3, [8928-9] S3, [8931-31] S6, [8951-20] S5
 Valdez, Aurora Espinoza [8936-42] SPSun
 Valentini, Paola [8955-50] S11
 Valim, Niksa [8937-17] S3
 Vallee, Fabrice 8984 Program Committee
 Vallee, Real [8961-44] S11
 Valley, George C. [8985-37] S8
 Vallières-Riendeau, Marie-Claude [8928-9] S3
 Valligatita, Sreeramulu [8982-12] S3
 Vallini, Felipe [8980-82] SPWed
 Valmorra, Federico [8985-13] S3
 Valsesia, Andrea [8954-5] S2
 Valtr, Miroslav [8992-31] SPWed
 Valvo, Giuseppina [8990-40] S8, [8990-42] S8
 Vamvakas, Vasilis [8967-28] S11
 van Asperena, Niek [8936-12] S3
 van Beusekom, Heleen M. M. [8926-89] S18
 Van Campenhout, Joris [8993-42] S8
 Van Cott, Elizabeth M. [8935-58] S12
Van Daele, Peter 8991 Program Committee, 8991 S2 Session Chair, [8991-38] S9, 9007 Program Committee
 van Dam, Gooitzen M. [8935-5] S1
 van de Burgt, Yoeri [8969-2] S1
Van de Giessen, Martijn [8927-16] S4
 van Delft, Falco C. M. [8947-44] S11, [8954-15] S4
 van den Berg, Aafke A. [8997-33] SPWed
 van den Berg, Albert 8976 Program Committee, 8976 S3 Session Chair, [8976-20] S5
 van den Berg, Johannes Hans [8990-30] S6
 van den Berg, Pim J. [8943-209] SPTues
 van den Born, Marlies [8935-61] S12
 van den Dungen, Frank A. M. [8935-61] S12
 Van Der Lee, Alexander Marc [8966-15] S5
 van der Lugt, Aad [8943-29] S5
 van der Pol, Edwin [8939-2] S1, [8952-6] S2
 van der Sanden, Boudewijn P. J. [8947-53] S12
 van der Steen, Antonius F. [8926-82] S17, [8926-93] S19, [8934-7] S2, [8934-99] SPMon, [8943-29] S5, [8943-79] S12
 van der Tol, Jos J. G. M. [8988-21] S5
 Van der Veen, Albert J. [8926-57] S11, [8929-10] S3, [8935-61] S12, [8936-12] S3, [8936-21] S5, [8941-4] S2
 van der Wijngaart, Wouter [8976-6] S2
 van Dijk, Frederic [8988-25] S6
 Van Duyn, Richard P. 8957 Program Committee
 van El, Benno [8945-11] S3
Van Haute, Desiree F. [8955-8] S2
 van Hemert, Jano I. [8945-14] S4
 Van Hoe, Bram [8991-38] S9
 van Hulst, Niek F. [8984-54] S14
 van Lange, A. J. [8987-31] S6
van Leeuwen, Ton G. [8934-56] S8, [8937-27] SPSun, [8939-2] S1, [8941-32] S9, [8942-26] S7, [8947-8] S2, [8952-17] S5, [8952-6] S2
 van Niekerk, Dirk [8935-36] S8
 van Niekerk, Jaco [8976-45] S10
 van Niekerk, Pieter [8976-45] S10
 Van Orden, Derek A. [8991-21] S5
 van Putten, Elbert G. [8978-18] S6
 van Soest, Gijs 8926 Program Committee, 8926 S18 Session Chair, [8926-82] S17, [8926-89] S18, [8926-93] S19, [8934-7] S2, [8934-99] SPMon, [8943-29] S5, [8943-79] S12, 8946 Program Committee
 Van Steenberghe, Geert [8954-26] S6, [8991-38] S9
 Van Stryland, Eric W. [8983-3] S1
 van Veldhoven, René P.J. [8984-34] S9
 van Velthoven, Mirjam E. J. [8930-33] S7
 Van Vlack, Cole [8963-25] S6
 VanderLaan, Donald [8943-73] S11
 Vandertop, Peter W. P. [8936-12] S3
 Vandervelde, Thomas E. [8981-11] S3, [8981-64] S13, [8982-18] S4, [8982-21] S4
 Vandewalle, Nicolas [8938-49] SPSun
 Vanholsbeeck, Frédérique [8933-1] S4, [8933-11] S4
 Vanmaekelbergh, Daniel [8981-5] S2
 Vanmeerbeek, Geert [8947-51] S12
 Vanna, Renzo [8939-15] S3, [8954-5] S2, [8957-6] S2
 VanNess, Richard [8930-16] S4
 Vanneste, Christian [8993-8] S1
 Vannier-Santos, Marcos André V. [8932-15] S3, [8932-16] S3, [8932-39] SPSun, [8932-41] SPSun
 van't Oever, Ronny [8973-21] S5
 vanwollegheem, Mathias [8988-13] S3
 Varas, Stefano [8982-12] S3
 Varchi, Greta [8956-29] S8
Vargas, Gracie [8937-10] S2
 Vargis, Elizabeth [8935-22] S5
 Varma, Vishal [8939-29] S5
 Varone, Antonio [8947-45] S11, [8947-6] S1
 Varpula, Aapo [8992-10] S3
 Varshney, Arushi [8951-32] SPMon
 Varshney, Charul [8987-75] SPWed
 Varshney, Ravendra K. [9008-18] S9
 Varssano, David [8938-32] S7
 Vasa, Parinda [8984-8] S2
 Vasanelli, Angela [8993-41] S7
 Vasconcelos, Rebeca M. [8932-43] SPSun, [8932-7] S1
Vasefi, Fartash 8947 S8 Session Chair, [8947-17] S4, [8947-18] S4, [8947-88] SPMon, 8979 S2 Session Chair
 Vashanova, Ksenia A. [8965-25] S5
 Vashdi, Guy [8961-60] S14
 Vasilakaki, Marianna [8955-43] S9
 Vasilenkova, Tatiana V. [8950-45] SPSun, [8950-47] SPSun
 Vasilyev, Arseny [8961-1] S1, [8961-127] SPTue
 Vasilyev, Michael 8964 Program Committee, 8964 S5 Session Chair, 8964 S6 Session Chair, [8964-21] S5, [8997-22] S8, [9009-7] S4
 Vasireddi, Ramakrishna [8933-7] S2
 Vasyutinskii, Oleg S. [8947-22] S4, [8948-62] S10
 Vaughan, Melville B. [8944-6] S2
Vaupel, Andreas [8959-45] S11
 Vaurette, Francois [8988-13] S3
 Vaz, Alex [8947-4] S1
Vázquez García, Carmen [8990-9] S2
 Vázquez, Rebeca Martínez [8968-17] S4
Vazquez-Villa, Alexis [8936-35] S8
 Veber, Philippe [8959-59] S14, [8959-60] S14
 Vecchio, Gianfranco [8990-39] S8
 Vedunova, Maria V. [8950-47] SPSun
 Venkamp, Ryan J. [8981-44] S12
 Veerasubramanian, Venkatakrishnan [9010-15] S5, [9010-15] S6
 Vehmas, Tapani [8990-14] S3, [8990-2] S1, [8990-3] S1, [8990-4] S1
 Veiga, Manoel [8936-19] S4, [8948-94] SPSun
 Veis, Martin [8954-21] S5
 Veit, Peter [8986-21] S4, [8986-73] S15, [8986-80] SPWed
 Vela, Deborah [8926-95] S19
 Velasco, Aitor V. [8995-38] S10
 Velez Mejia, Maximiliano [8942-18] S4
 Velho, Paulo Eduardo Ferreira [8947-21] S4
 Veli, Muhammed [8974-9] S3
 Velicka, Martynas [8957-7] S2
 Velizhanin, Kirill A. [8971-4] S1, [8996-18] S5
 Vellekoop, Ivo M. [8979-23] S2, [8979-23] S8
 Velmiskin, Vladimir V. [8961-41] S10
 Velten, Andreas [8935-50] S11, [8949-44] S9, [8964-15] S4
 Venettacci, Simone [8970-28] S7
 Veniali, Francesco [8970-28] S7
 Venkat, Narayanan [8983-48] S11
 Venkatakrishnan, Krishnan [8969-11] S2
 Venkatapathi, Murugesan [8994-69] SPWed
 Venkataraj, Selvaraj [8981-47] S12
 Venkatasubramani, T. L. [9008-24] S10
Venkatesan, Jambunathan [8959-26] S6
 Vennégues, Philippe [8986-33] S7, [8986-50] S10
 Venter, Petrus J. [8990-19] S4, [9005-5] S1
 Ventura, Liliane [8926-34] SPSun, [8930-47] SPSun, [8930-48] SPSun, [8930-49] SPSun
 Venugopalan, Priyamvada [8993-95] SPWed
 Venugopalan, Vasana [8948-66] S11, [8952-21] S6
Venus, George B. [8959-54] S12, [8961-7] S2, [8962-1] S1, [8965-16] S4, [8966-13] S4, [8982-36] S7
 Vera, Alice [8964-39] S9
 Verbeek, J. [8929-28] SPSun
 Verdaasdonk, Rudolf M. 8926 Program Committee, 8926 S9 Session Chair, [8926-57] S11, [8929-10] S3, [8935-61] S12, 8936 Program Committee, 8936 S1 Session Chair, [8936-12] S3, [8936-21] S5, [8941-4] S2, [8941-9] S3
 Verdant, Arnaud [8989-22] S7
 Verdun, Horacio [8961-10] S3
 Veres, Istvan Attila [8943-65] S10
 Veres, Miklós [8988-39] S8
 Verhaegen, Marc [8947-19] S4
 Verley, Jason C. [8967-27] S11
 Verma, Jai K. [8986-66] S14
 Verma, Roli [8992-7] S2, [8992-8] S2
 Vermeer, Koenraad A. [8930-26] S6, [8930-33] S7, [8934-44] S7, [8979-19] S1, [8979-19] S7
 Vernier, Paul Thomas 8941 Program Committee, [8941-56] S12
 Veronis, Georgios [8988-30] S7
 Versteegh, Marijn A. M. [8987-31] S6, [8997-33] SPWed
 Verstuylt, Steven [8989-24] S7
 Vandier, Jean [8937-4] S1
 Verwaal, Nanko [8994-56] S14
 Veseli, Skender [8974-14] S4
 Vethake, Thilo [8965-27] S6
 Vetrovec, John [8959-13] S4, [8959-76] SPTue
 Vetschera, Paul [8934-21] S4
Vettenburg, Tom [8949-31] S7, [8972-3] S1
 Veverkova, MD Lenka [8941-50] SPMon
 Vézy, Cyrille [8949-53] S11
 Viana, Bruno [8959-57] S13, [8982-40] S8, 8987 Program Committee, 8987 S13 Session Chair, [8987-48] S11, [8987-57] S10, [8987-93] SPWed
 Viana, Carlos [8990-20] S4, [8991-7] S2
 Viburys, Zydrunas [8972-42] S9
 Vicario, Carlo [8964-59] SPTue, [8985-11] S3
 Vicet, Aurore [8993-72] S15
 Vidal, Cynthia [8955-35] S8
 Vidal, Felix [8970-23] S6, [8970-23] S9
 Vidal, Julien [8981-14] S4
 Vidal, Xavi [8954-17] S4
 Videv, Stefan [9007-1] S1
 Vidovič, Luka [8926-29] S7, [8941-37] SPMon
 Viegas, Diana [8957-20] S4
 Viegas, Jaime [8974-16] S4, [8980-31] S8
 Viehland, Christian [8934-23] S4
 Vieira, Elzo Everton [8951-43] SPMon
 Vieira, Tércio A. [9006-20] S4
 Vieira-Damiani, Gislaire [8947-21] S4
 Viehl, Philippe [8935-41] S9
Vienola, Kari V. [8979-19] S1, [8979-19] S7
 Vierheilg, Clemens [8986-55] S11
 Viheriala, Jukka [8982-7] S1
Vijaya, Ramaro [8964-68] SPTue
Vijayraghavan, Karun [9002-25] S6
 Viktorovitch, Pierre 8995 Program Committee, 8995 S6 Session Chair, [8995-12] S3, [8995-2] S1, [8999-47] S10
Villa Manriquez, Fabian [8949-66] SPMon
 Villanga, Mark Jayson M. [8999-50] S10
 Villares, Gustavo F. [9002-20] S5, [9002-21] S5
 Villas Boas, Paulino [9003-68] SPWed
Villeneuve, Alain [8972-20] S5, 8992 Program Committee, 8992 S6 Session Chair, [8992-22] S5
 Villiger, Martin L. [8926-89] S18, [8926-90] S18, [8927-55] S13, [8927-56] S13, [8934-10] S2, [8934-57] S9, [8934-59] S9, [8934-97] SPMon, [8936-36] S8, [8938-22] S4, [8938-23] S5
 Villora, Encarnación García [8987-16] S3, [8987-49] S11
 Vinarsky, Vladimir [8927-47] S11
 Vinkent, Benjamin [8993-42] S8
Vincenti, Maria A. [8994-62] S15, [8994-66] SPWed
 Vincetti, L. [8994-9] S3
 Vincetti, Luca [8985-14] S3
 Vinet, Eric [9002-51] S12
 Vinjimore Kesavan, Srikanth [8947-53] S12
 Vinogradova, Anastasia A. [8998-49] S11
 Vinter, Borge [8986-33] S7
 Virally, Stephane [8964-22] S6
 Viraphong, O. [8959-59] S14

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Virgili, Tersilla [8968-17] S4
Viserò, Marius C. [8927-40] S10
Vishnevsky, Dmitry [8997-28] S10
Vishnubhatia, Krishna Chaitanya [8968-17] S4, [8968-19] S4, [8968-28] S6
Vishwanath, Karthik [8926-17] S4, [8933-40] SPSun
Visser, C. W. [8967-32] S12, [8967-32] S4
Viswanath, Anjitha [8971-5] S1
Viswanathan, Nirmal K. 8999 Program Committee, [8999-21] S5
Vitelli, Chiara [8972-31] S8
Viti, Leonardo [8985-32] S7
Vitiello, Miriam S. [8985-32] S7, [8985-51] S11, 8993 Program Committee, 8993 S7 Session Chair, [8993-12] S2, [8993-73] S15
Vitkin, I. Alex [8926-43] S9, [8935-28] S6, [8952-1] S1, [8952-25] S7
Vitrant, Guy [8969-14] S2, [8969-14] S4
Vivas, Marcelo G. [8964-64] SPTue, [8969-23] SPTue, [8969-24] SPTue
Vivero-Escoto, Juan L. [8931-34] S7
Viveros, L. [8993-71] S14
Vivien, Laurent [8988-23] S5, [8990-17] S3, [8990-36] S7
Vizbaras, Augustinas [8993-45] S8, [9002-39] S9
Vizbaras, Kristijonas [8993-45] S8, [9002-39] S9
Vladimirov, Andrei G. [8980-12] S3
Vo, Sonny [8995-29] S8
Vocanson, Francis [8969-14] S2, [8969-14] S4
Vo-Dinh, Tuan 8934 Track Chair, 8935 Conference Chair, 8935 S1 Session Chair, 8935 S2 Session Chair, 8935 S3 Session Chair, 8935 Track Chair, [8935-13] S4, [8935-23] S5, [8935-8] S2, 8936 Track Chair, 8937 Track Chair, 8938 Track Chair, 8939 Track Chair, 8940 Track Chair, 8957 Conference Chair, 8957 S1 Session Chair, 8957 S4 Session Chair, [8957-2] S1, [8957-5] S2, [8958-10] S3, 8972 Track Chair, 8976 Track Chair
Vodopyanov, Konstantin L. [8961-59] S14, 8964 Conference Chair, 8964 S4 Session Chair, 8964 S7 Session Chair, [8964-30] S7, [8964-43] S9, [8964-6] S2, 8993 Program Committee, 8993 S16 Session Chair, [8993-2] SKey, SC1012
Voelkel, Reinhard [8974-14] S4
Voelz, David G. SC1080
Vogel, Alfred 8941 Program Committee, [8955-33] S7, 8972 Program Committee
Vogel, Steven S. 8948 Program Committee
Vogelgesang, Ralf [8984-16] S4
Vogelsang, Jan [8984-44] S12
Vogeser, Michael [8926-137] S6, [8951-18] S4
Vogl, Anton [9003-21] S5
Vogler, Marko [8974-5] S2
Vogler, Nadine [8940-7] S2
Vogler, Uwe [8974-14] S4
Vogt, William [8949-44] S9
Voigtländer, Christian [8961-89] SPTue
Voigtmann, Peter [8930-17] S4
Voisin, Pierre [8955-22] S5
Vojnovic, Borivoj [8935-15] S4, [8949-12] S3
Volet, Nicolas [8966-14] S4, [9001-16] S4
Volgger, Veronika [8926-142] S7, [8926-146] S7, [8926-149] SPSun, [8934-96] SPMon
Volk, Martin [8955-21] S5, [8955-69] SPSun
Volkmer, Andreas [8940-40] S7
Vollmer, Frank [8960-15] S4, [8960-22] S5
Volodin, Boris L. [8939-34] S6
Voloshko, Andrey [8969-4] S1
Volpi, Azzurra [9000-2] S1
Volpi, Davide [8935-15] S4
Volz, Kerstin [9002-6] S2
Volz, Peter [8948-40] S7
Vomiero, Alberto [8987-82] SPWed
Vomir, Mircea [8993-56] S10
von Edlinger, Michael [8993-44] S8
von Freyhold, Nikolas [8968-14] S3
von Freymann, Georg [8970-10] S3, 8974 Conference Chair, 8974 S1 Session Chair, 8974 S9 Session Chair, [8974-28] S7, [8985-23] S5
von Grafenstein, Lorenz [8961-5] S2
von Gunten, Marc [8992-2] S1
von Maydell, Karsten [8967-50] SPTue
von Wantoch, Thomas [8977-5] S2, [8977-8] S2
Voronova, Olga [8941-39] SPMon
Vorontsov, Mikhail A. [8971-8] S1, [8971-9] S1
Vörös, Márton [8981-13] S4
Vos, Willem L. [8978-18] S6, [8998-41] S9, [8999-38] S8, [9003-47] S11
Vosburg, Kirby [8927-41] S10
Voss, Michael [8965-34] S7
Vozda, Vojtech [8954-21] S5
Voznyy, Oleksandr [8969-19] S4, [8969-19] S6
Vrabec, Tina [8928-35] S7
Vrancic, Christian [8939-28] S5
Vu, Tania Q. 8955 Program Committee
Vuckovic, Jelena [8996-19] S6
Vuillet, Nathalie [8990-36] S7
Vukobratovich, Daniel SC014
Vuletic, Vladan [8997-24] S9
Vullev, Valentine I. [8956-30] S8
Vuong, Barry [8935-60] S12
Vurgafman, Igor [8981-40] S11, [9002-47] S11
Vusirikala, Vijay [9007-23] S8
Vyas, Khushi K. [8947-41] S10
Vyhldal, David [8959-78] SPTue
Vyrskinos, Costas [8991-36] S8
Vyrskinos, Konstantinos [8991-33] S8
-
- W**
- Waag, Andreas [8980-27] S7, [8987-63] S12
Waasem, Niklas [8964-33] S8
Wabnitz, Heidrun 8945 Program Committee, [8945-18] S5
Wabnitz, Stefano [8960-1] S1
Wabra, Stefan [9001-4] S1
Wachsmann-Hogiu, Sebastian 8940 Program Committee, 8947 Program Committee
Wachulak, Przemyslaw W. [8949-20] S4
Wada, Kenji [8936-3] S1, [8951-35] SPMon, [8951-36] SPMon
Wada, Naoya [9009-19] S7
Wada, Osamu [9002-3] S1
Wada, Satoshi [8959-56] S13, [8964-34] S8
Wada, Yuki [8934-118] SPMon
Wadams, Robert C. [8983-38] S9
Waddie, Andrew J. [8964-29] S7
Waddup, James [8965-35] S8
Wadsworth, William J. [8948-39] S7
Waechter, Christoph A. 8988 Program Committee
Waegli, Philip [8993-68] S14
Wageeh, Amr [8988-63] SPWed
Wagner, Alexander [8987-63] S12
Wagner, Bernd [8977-5] S2
Wagner, Joachim [8938-32] S7, [8966-27] S8, [8977-6] S2, [8986-59] S11, [8993-57] S12, [9002-17] S4, [9002-19] S4, [9003-33] S7
Wagner, Markus R. [8987-11] S2
Wagner, Michael [8977-21] S5
Wagnières, Georges A. 8935 Program Committee
Wahl, Michael [8936-19] S4, [8948-94] SPSun
Wahl, Sebastain [8990-20] S4
Wahlbrink, Thorsten [8933-4] S2
Waichman, Karol [8962-11] S3, [8962-8] S3
Wakaki, Moriaki [8982-42] S8, [8987-72] SPWed, [9005-17] S4
Wakama, Norimitsu [8974-17] S5
Wakunami, Koki [9006-33] S7
Walasik, Wiktor [8994-33] S9
Walawaikar, Sameer [8994-1] S1
Walczak, Jaroslaw [8966-16] S5
Walczak, Karl A. [8988-36] S8
Walczakowski, Michal [8973-26] SPTue
Walczuk, Joanna [8967-47] SPTue
Waldbaur, Ansgar [8976-14] S3
Waldmann, Torsten A. [8992-10] S3
Waldow, Michael [8933-4] S2
Walecki, Peter [8975-7] S2
Walker, Alexandre W. [8981-21] S6
Walker, Dennis E. [8993-84] S17
Walker, Duncan [8963-12] S3, [8963-12] S7
Walker, Ezekiel [8994-16] S4
Walker, Mark A. [8983-54] SPWed
Wall, Tomas [8988-40] S9
Wallace, B. [9008-24] S10
Wallace, John [8971-24] S4
Waller, Erik H. [8970-10] S3, [8974-28] S7
Waller, Laura [8949-27] S6
Walling, Les [8935-32] S7
Wallmeroth, Klaus [8959-31] S7
Walsh, Alex J. [8936-13] S3, [8947-1] S1, [8948-56] S9
Walsh, Connor [8943-192] SPTues
Walsh, Joseph T. [8941-2] S1
Walsh, Michael J. [8939-19] S3, [8939-29] S5
Walsh, Ryan [8933-8] S3
Walters, Robert J. 8981 Program Committee, [8981-15] S4, [8981-2] S1, [8981-27] S7, [8981-38] S10, [8981-40] S11
Walther, Julia [8926-120] S1
Walther, Martin [8993-31] S6
Walther, Meik [8931-27] S5
Walvick, Ronn P. [8992-12] S3
Walze, Günther [9006-1] S1
Wan, Cao [8985-31] S7
Wan, Hanlin [8943-94] S14
Wan, Peng [8959-4] S1, [8961-19] S5
Wan, Wenbo [8936-38] SPSun, [8937-23] SPSun
Wan, Xiaoyang [8948-90] SPSun, [8953-2] S1
Wan, Zhe [8954-10] S3
Wandell, Michael [8935-7] S3
Wang, Alan X. [8933-18] S5, [8983-5] S1, [8991-29] S7
Wang, Alex [8926-125] S3, [8926-143] S7, [8926-145] S7, [8926-79] S16, [8934-96] SPMon
Wang, Anle [8944-28] SPMon
Wang, Baishi SC1020
Wang, Baojun [8988-53] SPWed, [8990-50] SPWed
Wang, Benquan [8950-34] SPSun
Wang, Bin [8963-40] SPTue
Wang, Bingqing [8952-40] S10
Wang, Bo [8961-70] SPTue
Wang, Bo [8937-35] SPSun
Wang, Buguo [8987-1] S1, [8987-37] S7
Wang, Chang-Han [8974-18] S5, [8993-87] S17
Wang, Chaojian [8951-22] S5
Wang, Chen [8935-74] SPSun, [8958-17] S4
Wang, Cheng [8943-108] S16
Wang, Cheng [8964-48] SPTue, [8980-40] S11, [8980-56] S14, [8980-71] SPWed
Wang, Chengao [8966-3] S1
Wang, Chiachi [8961-91] SPTue
Wang, Chih-Hao [8961-101] SPTue
Wang, Chih-Ming [8995-36] S9
Wang, Cong [8974-34] SPTue, [8974-38] SPTue
Wang, Danhua [8964-16] S4
Wang, Danni [8927-8] S2, [8949-13] S3, [8956-13] S3
Wang, Ding [8993-51] S10
Wang, Dong [8955-35] S8
Wang, Donglin [8934-92] SPMon
Wang, Fei [8948-82] SPSun
Wang, Fengwen [8953-18] S4
Wang, Frederick [8928-10] S3
Wang, Ge [8937-34] SPSun
Wang, George T. [8986-44] S8
Wang, Guiling [8964-1] S1
Wang, H. H. [8935-8] S2
Wang, Hanzheng [8974-32] SPTue, [8974-33] SPTue
Wang, Hao [8926-80] S16, [8934-78] S12
Wang, Hequn [8926-16] S4, [8926-8] S2
Wang, Hongcheng [8960-65] SPTue
Wang, Hsing-Wen [8948-88] SPSun
Wang, Hsin-Neng [8935-23] S5, [8957-5] S2
Wang, Hui [8926-58] SPSat, [8926-59] SPSat
Wang, Hui [8941-20] S5
Wang, Irene [8950-6] S2, [8978-9] S3
Wang, Jade P. [8971-36] S4, [8971-37] S4, [8971-38] S5, [8971-39] S5
Wang, Ji [8944-3] S1
Wang, Ji 8961 Program Committee, 8961 S13 Session Chair, [8961-23] S6
Wang, Jiandong [8935-31] S7
Wang, Jianru [8942-38] SPSun
Wang, Jianting [8936-22] S5, [8945-2] S1, [8948-88] SPSun
Wang, Jing [8926-97] S20, [8926-98] S20, [8938-33] S7
Wang, Jing [8928-64] S13, [8942-21] S5, [8944-9] S3
Wang, Jingyi [9001-1] S1
Wang, Jiong [8931-27] S5
Wang, Junjun [8986-73] S15
Wang, Kai [8988-3] S1, [8988-6] S1, [8991-34] S8
Wang, Kaiyang [8998-39] S9
Wang, Kenneth K. 8931 Program Committee, 8931 S6 Session Chair, [8931-24] S5
Wang, Kun [8937-35] SPSun
Wang, Kun [8943-182] SPMon, [8943-215] SPTues, [8943-88] S13
Wang, Li [9001-12] S3
Wang, Lidai [8943-121] SPSun, [8943-122] SPSun, [8943-168] SPMon, [8943-212] SPTues, [8943-36] S6, [8943-37] S6, [8943-42] S7, [8943-51] S8, [8943-52] S8, [8943-68] S10, [8943-91] S14
Wang, Lihong V. 8942 Program Committee, 8943 Conference Chair, 8943 S1 Session Chair, 8943 S2 Session Chair, 8943 SAwd Session Chair, [8943-102] S15, [8943-113] SPSun, [8943-114] SPSun, [8943-115] SPSun, [8943-121] SPSun, [8943-122] SPSun, [8943-132] SPSun, [8943-136] SPSun, [8943-141] SPSun, [8943-153] SPMon, [8943-157] SPMon, [8943-159] SPMon, [8943-163] S3, [8943-167] SPMon, [8943-168] SPMon, [8943-180] SPMon, [8943-187] SPMon, [8943-188] SPTues, [8943-191] SPTues, [8943-197] SPTues, [8943-205] SPTues, [8943-212] SPTues, [8943-215] SPTues, [8943-219] SPTues, [8943-224] SPTues, [8943-36] S6, [8943-37] S6, [8943-40] S6, [8943-41] S6, [8943-42] S7, [8943-45] S7, [8943-51] S8, [8943-52] S8, [8943-56] S9, [8943-64] S10, [8943-66] S10, [8943-68] S10, [8943-8] S2, [8943-86] S13, [8943-88] S13, [8943-91] S14, [8943-92] S14, [8943-94] S14, [8943-95] S14, [8950-39] SPSun
Wang, Like [8946-36] SPSun
Wang, Lin [8947-66] SPMon
Wang, Lin [8941-41] SPMon, [8947-67] SPMon
Wang, Lin [8984-55] SPWed
Wang, Ling [8938-47] SPSun
Wang, Mei [8951-41] SPMon
Wang, Meng C. [8948-22] S4
Wang, Michael R. 8991 Program Committee, 8991 S6 Session Chair, [8991-25] S6, [8993-46] S8
Wang, Min-Huan [8974-18] S5, [8993-87] S17, [9003-8] S2
Wang, Minjie [8945-8] S2
Wang, Ning [8985-2] S1
Wang, Pei [8997-15] S6
Wang, Ping [8948-34] S6
Wang, Po-Hsun [8943-39] S6
Wang, Pu [8943-63] S10, [8943-80] S12
Wang, Puqun [8980-39] S10
Wang, Q. [8959-40] S10
Wang, Qi [9003-5] S2
Wang, Qijie [8980-49] S12, 9002 S13 Session Chair, [9002-60] S14
Wang, Qing [9001-13] S3
Wang, Qiong-Hua 9005 Program Committee
Wang, Quan [8950-3] S1
Wang, Quanzeng [8936-2] S1
Wang, Ran [8959-16] S4
Wang, Rui [8984-2] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Wang, Rui [8942-29] S7
Wang, RuiKang K. 8934 Program Committee, 8934 S8 Session Chair, [8934-29] S5, [8934-50] S8, [8934-54] S8, [8936-35] S8, [8936-6] S2, 8942 Conference Chair, 8942 S1 Session Chair, 8942 S7 Session Chair, 8942 S9 Session Chair, [8942-19] S4, [8942-27] S7, [8942-31] S8, [8942-32] S8, [8942-33] S8, 8946 Program Committee, 8946 S3 Session Chair, [8946-25] S6, [8946-6] S2, 8953 Program Committee
 Wang, Rulin [8951-33] SPMon
 Wang, Ruliang [8949-43] S9
Wang, Shang [8930-3] S1, [8934-33] S5, [8942-10] S2, [8946-28] S6, [8946-7] S2, [8953-19] S4
 Wang, Shaohua [8943-217] SPTues
Wang, Sheng-Wen [9003-15] S3
Wang, Shing C. [8995-13] S4, [9001-19] S4
 Wang, Shuo [9006-24] S5, [9006-25] S5
 Wang, Shurui [8990-32] S6
 Wang, Sumei [8974-34] SPTue, [8974-38] SPTue, [8974-40] SPTue, [8974-42] SPTue, [8974-44] SPTue
 Wang, Sunlin [8974-11] S3
 Wang, Tiejun [8927-26] S6, [8934-84] S12, [8935-54] S11
Wang, Thomas D. 8927 Conference Chair, 8927 S2 Session Chair, [8927-15] S4, [8927-31] S1, [8927-31] S8
 Wang, Tianhe [8985-22] S5
Wang, Tianheng [8943-110] SPSun, [8943-5] S1
Wang, Tianshi [8934-7] S2
 Wang, Tianyi [8926-78] S16
 Wang, Ting [8934-121] SPMon
 Wang, Ting [9008-16] S8, [9010-7] S4
 Wang, Tongzhou [8949-43] S9
Wang, Wang Nang [8986-7] S2
 Wang, Wanjun 8976 Program Committee, 8977 Program Committee
 Wang, Wei [8987-44] S9
 Wang, Wei [8981-32] S8
 Wang, Wei [8940-11] S3
 Wang, Wei [8965-48] SPTue, [8988-53] SPWed
Wang, Wenbo [8926-19] S4
 Wang, Wentao [8955-10] S3
 Wang, Wubao 8940 S4 Session Chair
 Wang, Xi [8947-33] S1, [8947-33] S7, [8948-38] S7
 Wang, Xiangyu [8983-5] S1, [8991-29] S7
Wang, Xiaodong [9002-56] S13
 Wang, Xiaohong [8943-5] S1
 Wang, Xiaohui [8982-39] S8
 Wang, Xiaojun [9002-57] S13, [9002-61] S14
Wang, Xiaolong [8954-2] S1
 Wang, Xiaoman [8963-40] SPTue
 Wang, Xiao-Ping [8944-21] SPMon
 Wang, Xiaoyang [8964-1] S1
 Wang, Xin [8952-44] SPSun
 Wang, Xingbing [8962-22] SPTue
 Wang, Xingjun [8982-32] S7
Wang, Xueding [8926-117] S24, [8943-10] S2, [8943-108] S16, [8943-133] SPSun, [8943-217] SPTues, [8943-218] SPTues, [8943-38] S6, [8943-50] S8, [8943-59] S9
 Wang, Xunsi [8982-77] SPWed
 Wang, Y. Y. [8946-36] SPSun
 Wang, Yan [8927-41] S10, [8928-43] S8, [8928-46] S9, [8928-78] SPMon, [8934-43] S7, [8952-22] S6
Wang, Yan J. [8943-127] SPSun
 Wang, Yang [8951-4] S1
 Wang, Yaqi [9003-13] S3
 Wang, Yaru [8951-4] S1
 Wang, Ye [8998-22] S5, [8998-28] S6
 Wang, Yi [8966-2] S1
 Wang, Yi [8987-44] S9
 Wang, Yi [8934-121] SPMon
 Wang, Yifan [8950-27] S7
 Wang, Yonggang [8961-121] SPTue
 Wang, Yongrui [9002-22] S5
 Wang, Yongsheng [8984-2] S1
 Wang, Yu [8956-13] S3
 Wang, Yu [8943-41] S6
 Wang, Yuan [8967-6] S3, [8967-6] S5
 Wang, Yucui [8943-159] SPMon
 Wang, Yue [9002-10] S2
 Wang, Yue [8946-27] S6
 Wang, Yunji [8982-83] SPWed
 Wang, Yuxia [8926-33] SPSun
 Wang, Yves T. [8928-35] S7, [8928-38] S7, [8934-62] S9, [8934-77] S12, [8953-10] S3, [8953-7] S2, [8953-8] S2
 Wang, Zhao [8980-73] SPWed
 Wang, Zhao [8926-91] S18, [8934-62] S9
 Wang, Zheng [9006-31] S7
Wang, Zheng [8998-33] S7
 Wang, Zhi Ping [8944-21] SPMon
 Wang, Zhigang [8943-127] SPSun
 Wang, Zhiji [8965-36] S8
 Wang, Zhiping [8955-39] SPSun
 Wang, Zhonghai [8948-105] SPSun
 Wang, Zi [8948-29] S5, [8948-95] SPSun
 Wang, Zuo-Jia [8975-23] S4
 Wangpraseurt, Daniel [8941-43] SPMon
 Wangüemert-Pérez, Juan Gonzalo [8995-30] S8, [8995-38] S10
 Wani, Fumio [8962-4] S2
 Wanke, Michael C. 8985 Program Committee, 8985 S10 Session Chair, 8985 S9 Session Chair
 Warashina, Yoshihisa [8977-11] S3
 Ward, Arlen K. [8926-46] S10
 Ward, Benjamin G. [8961-65] S15
 Ward, Jonathan M. [8960-17] S4, [8960-67] SPTue
Wårdell, Karin [8935-3] S1, [8945-4] S1
 Warm, Stefan [9009-13] S6
 Warner, Jamie H. [8944-19] S4
 Warram, Jason M. [8926-128] S3
 Warren, Sean [8927-7] S2
Warren, Warren S. 8947 Program Committee, [8949-22] S5
 Warsen, Adelaide [8941-52] S10
 Wartak, Marek S. [8980-33] S8
 Warych, Edward T. [8938-4] S1
Washio, Kunihiko 8960 Conference CoChair, 8960 S14 Session Chair, 8963 Program Committee, 8963 S6 Session Chair, 8968 Conference CoChair, 8968 S2 Session Chair
 Wasiak, Michal [8966-16] S5
 Wassei, Jonathan [8974-50] S8
 Wassenaar, Jivan [8926-57] S11
 Watabe, Kenji [8935-52] S11
Watanabe, Akira 8968 Program Committee, [8968-26] S6
 Watanabe, Akiyoshi [9002-34] S8, [9002-54] S12
 Watanabe, Junpei [8975-4] S1
 Watanabe, Katsuyuki [9002-33] S8
Watanabe, Kentaroh [8981-23] S6
 Watanabe, Kohei [8931-15] S3, [8931-53] SPMon, [8931-54] SPMon, [8943-60] S9
 Watanabe, Michiko [8928-38] S7, [8934-77] S12, 8953 Program Committee, [8953-10] S3, [8953-7] S2
 Watanabe, Minoru [9004-19] SPWed
 Watanabe, Rira [8931-12] S3
 Watanabe, Shigeki [9008-13] S7
 Watanabe, Takayuki [8993-80] S16
Watanabe, Wataru 8972 Program Committee
 Watanabe, Youseu [8967-52] SPTue
 Watcharapong, Janta [8935-64] SPSun
 Watkins, Michael T. [8934-59] S9
 Watras, A. [8987-93] SPWed
 Watson, Gary W. [8935-32] S7
 Watson, Jennifer M. [8936-8] S2
 Watt, David W. [8962-13] S4
 Watts, Claire M. [8985-59] SPWed
 Watts, Michael 8989 Program Committee, [8991-28] S7
 Watts, Michael [8989-5] S2
 Watts, Mike P. C. 8974 Program Committee, [8981-53] SPWed
 Watts, Regan [8993-9] S1
 Wauro, Matthias [8993-31] S6
 Wawrzynczyk, Dominika [8983-20] S5
Wax, Adam [8942-34] S9, 8952 Conference Chair, 8952 S7 Session Chair, 8952 S8 Session Chair, [8952-28] S7, [8952-35] S9, [8952-36] S9, [8957-29] S6
Weatherbee, Andrew [8934-130] SPMon
 Weaver, Abigail [8976-15] S4
 Webb, Andrew S. [8982-15] S3, [9009-11] S6
 Webb, Benjamin [8959-45] S11
 Weber, Anke [8934-86] SPMon
 Weber, Constanze [9003-22] S5
 Weber, Jessie R. [8935-46] S10, [8938-5] S1
 Weber, Julius [8992-20] S4
 Weber, Karina [8957-10] S3
 Weber, Norbert [8994-56] S14
 Weber, Rudolf [8967-16] S13, [8967-16] S8, [8967-20] S9
 Webster, Mark [8990-37] S7
 Webster, Paul J. [8963-25] S6
 Weda, Jelmer J. A. [8934-44] S7
 Weeks, David E. [8962-6] S2
 Wegener, Konrad [8967-15] S12, [8967-15] S7, [8967-30] S11
 Wegener, Martin 8970 Conference Chair, 8970 S2 Session Chair, [8970-8] S2, [8974-26] S6, [8974-27] S7
 Wegscheider, Werner [8984-13] S3
Wei, Chen-Wei [8943-119] SPSun, [8943-156] SPMon, [8943-34] S5, [8943-75] S11
 Wei, Jinlong [8991-12] S3
 Wei, Kanxian [8961-101] SPTue, [8961-91] SPTue
Wei, Lu [8948-22] S4, [8948-76] SPSun
 Wei, Ming [8987-54] S10
 Wei, Mingyuan [8943-206] SPTues, [8943-46] S7, [8956-14] S3, [8956-21] S5
 Wei, Qing [8934-41] S7
 Wei, Qingshan [8954-10] S3
 Wei, Xunbin 8944 Program Committee, 8944 S3 Session Chair, [8944-25] SPMon, [8944-9] S3
 Wei, Yong [9002-16] S4
 Weichmann, Ulrich [8966-15] S5, [9001-14] S3
 Weiershausen, Werner 9007 S2 Session Chair, 9008 Conference Chair, 9008 S10 Session Chair, 9008 S2 Session Chair, 9009 S2 Session Chair, 9010 S2 Session Chair
 Weig, Thomas [8986-59] S11, [9002-15] S3, [9002-17] S4, [9002-19] S4
 Weigel, Thomas [8960-16] S4, [8999-49] S10
 Weightman, Peter [8941-65] SKey
Weigl, Bernhard H. 8976 Program Committee
 Weih, Robert [8993-44] S8, [9002-46] S11
 Weiland, Martin [8933-6] S2
 Weiler, Sascha [8972-25] S6
 Weimann, Claudius [8992-23] S5
 Weingarten, Kurt [8959-40] S10
 Weingarten, Michael S. [8935-56] S12
 Weinhold, Sebastian [8967-57] SPTue
Weinigel, Martin [8926-26] S6, [8948-3] SKey, [8948-43] S7, [8948-59] S10, [8948-61] S10
 Weinroth, Jacques [9006-16] S4
 Weirich, Johannes [8961-39] S9
Weisberg, Alanna L. [8934-100] SPMon
 Weisbuch, Claude [8986-69] S15, [9003-35] S12, [9003-35] S8
 Weismann, Constance [8953-11] S3
 Weiss, Heike [8930-1] S1
 Weiss, Jeffery [8953-9] S2
 Weiss, Nicolas [8934-56] S8, [8942-26] S7
 Weiss, Pierre [8941-36] S9
Weiss, Sharon M. 8933 Program Committee, [8933-12] S1, [8933-5] S2, 8954 Program Committee, [8990-48] S9
 Weiss, Shimon 8950 Program Committee
 Weitsman, Gregory E. [8949-12] S3
 Weitz, David A. [8955-70] S7
 Weitz, Martin [9000-9] S2
Weige, Weston A. [8936-8] S2
 Welker, Florian [8987-60] S12
 Welle, Cristin [8928-3] S1
 Wellenzohn, Markus [8933-4] S2, [8981-61] SPWed
 Weller, Horst 8955 Program Committee, [8955-67] SPSun
 Wells, Nathan P. [8981-43] S11
 Welp, Hubert [8952-34] S9
 Welsh, John P. 8928 Program Committee
 Welsh, Timothy [8934-16] S3
Wen, Fangfang [8993-82] S17
 Wen, Yu [8931-28] S5
 Wendel, Myriam [8972-40] S9
 Wendt, Joel R. [8989-20] S6, [8994-45] S11
 Weng, Binbin [8993-37] S7
 Weng, Chen-Ya [8980-72] SPWed
 Weng, Chun-Hung [8994-68] SPWed
 Weng, Seng [8947-33] S1, [8947-33] S7
 Weng, Wei-Sheng [8983-58] SPWed
 Weng, Xiaolong [8988-27] S6
Weng, Yi [9009-5] S4
 Wenger, Jerome [8950-12] S3
 Wenzel, Hans [8965-17] S4, [8965-8] S2, [9002-14] S3
 Werdich, Andreas A. [8953-8] S2
 Werkmeister, René M. [8934-27] S4
 Werman, Michael [9006-16] S4
 Werner, Christoph S. [8960-6] S2
 Werner, Douglas [8974-54] S9
 Werner, James H. [8947-56] S13, [8950-2] S1
Werner, John S. [8930-20] S5, [8930-30] S7
 Wernicke, Tim [8986-67] S14, [9003-25] S6, [9003-29] S6
 Wergulin, Sam [8954-23] S6
 Werquin, Volker [8963-20] S5
 Wessels, Peter [8961-116] SPTue
 Wessels, Victor [8967-30] S11
 West, Gavin N. [8966-30] S8
 West, Jennifer L. [8953-19] S4
 West, Kenneth W. [8997-27] S10
 West, Simeon [8938-2] S1, [8943-25] S4
 Westbrook, Christoph I. [8993-78] S16
 Westbrook, Paul S. [8938-15] S3, [8984-5] S1
 Westerman, Russell J. [8973-9] S3
 Westphalen, Thomas [8965-30] S7
 Weyer, Floriane [8938-49] SPSun
 Weyers, Markus [8986-67] S14, [9000-14] S3, [9003-25] S6, [9003-29] S6
 Whang, Jong-Woel Allen [8981-54] SPWed, [8981-55] SPWed
 Wharmby, Andrew W. [8941-8] S3
Whelan, William M. 8943 Program Committee, 8943 S9 Session Chair, [8943-181] SPMon
 White, Chris [8943-120] SPSun
 White, Ian H. 8991 Program Committee, [8991-12] S3
 White, Jeffrey O. [8961-1] S1, [8961-127] SPTue
 White, John G. [8949-44] S9
 White, Matthew [8975-15] S3
 White, Steve [8934-99] SPMon
 White, Susan M. [8982-28] S6
 White, Thomas P. [8981-19] S5
White, Timothy J. [9004-24] S3, [9004-4] S1
 Whitesides, George M. [8927-21] S5
 Whitney, Peter [8934-3] S1, [8977-2] S1, [8977-2] S8
 Wichmann, Matthias [8966-21] S6
 Wickham, Benjamin J. [8959-28] S7
Wicks, Geoffrey R. [8956-34] S9, [8956-35] S9, [8983-27] S7, [8983-29] S7
 Widmer, Johannes [8971-21] S4
 Wiebe, Edward [8943-189] SPTues
 Wiedenmann, Margit [8967-20] S9
 Wiedmann, Maximilian [8927-39] S10
Wiegraebe, Winfried [8950-5] S2
 Wijesma, Kort [8961-68] SPTue
 Wiesbauer, Moritz [8970-6] S2
 Wiese, Stefan [8990-37] S7
 Wieser, Wolfgang [8934-24] S4, [8934-7] S2
 Wiest, Florian [8982-74] SPWed
 Wigdor, Harvey A. 8929 Program Committee
 Wigle, Jeffrey C. [8932-12] S3
 Wijesundara, Kushal C. [8935-45] S9
 Wijewanasuriya, Priyalal S. 8993 Program Committee, [8993-52] S10
Wilcox, Christopher C. [8978-4] S1
 Wilcox, Keith G. [8966-25] S7
 Wilding, Greg [8926-140] S6

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Wildman, Ricky [8970-18] S5
Wilfert, Otakar [8941-12] S3
Wilhelm, Elisabeth [8976-12] S3, [8976-8] S2
Wilk, Leah S. [8930-33] S7
Wilkinson, James S. [8988-55] S10
Willadino, Lilia G. [8947-69] SPMon
Willander, Magnus 8987 Program Committee, 8987 S12 Session Chair, [8987-53] S11
Willenbrock, Saskia [8972-13] S3
Willenbrock, Saskia [8972-6] S2
Williams, Adrienne [8983-48] S11
Williams, Christopher 9005 Program Committee
Williams, Henry E. [8974-25] S6
Williams, Jarrod [8950-29] S7
Williams, Joshua D. [8955-52] S11
Williams, Justin [8928-91] S18
Williams, Kevin A. [8991-41] S10, [8991-41] S3
Williams, Logan [9006-19] S4, [9006-32] S7
Williams, Mathew D. [8999-25] S6, [8999-32] S7
Williams, Robert J. [8964-17] S4, [8997-35] S8
Willis, Matthew M. [8971-32] S5
Willmann, Juergen K. [8943-30] S5
Willner, Alan E. 8971 Program Committee, 8995 Program Committee, 8997 Program Committee, [8998-47] S11, [9007-23] S8, [9008-8] S6, [9008-8] S7
Willson, Richard C. [8933-19] S5
Wilm, Jakob [8979-22] S2, [8979-22] S8, [8979-3] S3
Wilmink, Gerald J. 8941 Conference Chair, 8941 Program Committee, 8941 S10 Session Chair, 8941 S11 Session Chair, 8941 S12 Session Chair, [8941-54] S11, [8941-61] S12, [8941-64] S10
Wilson, Brian C. [8928-15] S4, [8928-8] S3, [8928-9] S3, [8937-2] S1, [8943-203] SPTues, [8951-20] S5
Wilson, Carol J. [8934-107] SPMon, [8935-10] S3, [8942-9] S2
Wilson, Chris [8968-27] S6
Wilson, Christopher R. [8926-54] S11, [8926-56] S11
Wilson, Christy [8935-13] S4, [8957-29] S6
Wilson, David L. [8926-91] S18, [8926-96] S19
Wilson, Jesse W. [8949-22] S5
Wilson, Katherine E. [8943-30] S5
Wilson, Mark A. [8951-2] S1
Wilson, P. R. [8989-12] S5
Wilson, P. W. [8991-18] S5
Wilson, Robert H. [8927-16] S4, [8935-80] SPSun, [8936-17] S4
Wilson, Tom [8981-58] SPWed
Wilson, Tony 8949 Conference Chair, 8949 S6 Session Chair
Wilsterman, Eric [8927-52] S12, [8927-57] S13
Wilt, David M. 8981 Program Committee, 8981 S11 Session Chair, [8981-29] S7
Wilton, Sam [9001-13] S3
Winkler, Pascale [8950-11] S3
Winebrenner, Dale Paul [8941-52] S10
Wingad, Brett [8980-82] SPWed
Winhold, Heiko [8965-36] S8
Winkelmann, James A. [8927-12] S3
Winkler, Amy M. [8943-36] S6
Winkler, Katrin [8931-27] S5
Winn, Kevin [8966-33] SPTue
Winner, Julia [9002-35] S8
Winter, Jessica O. [8954-12] S3
Winters, Daniel [8992-13] S3
Winzer, Torben [8984-20] S5
Wion, Didier [8947-53] S12
Wippermann, Stefan [8981-13] S4
Wirth, Dennis J. [8928-6] S2, [8935-37] S8, [8940-8] S2
Wirth, Martin [8959-20] S5
Wirth, Ralph [9003-2] S1
Wirthmüller, Alexander [8993-68] S14
Wischke, Christian [8955-65] SPSun
Wise, Frank W. [8948-39] S7, [8948-9] S1
Wiseman, Paul W. 8948 Program Committee
Wisniewski, Natalie A. [8935-23] S5, [8958-10] S3
Wisniewski, Przemek [8986-25] S5
Wisniowiecki, Anna M. [8934-32] S5
Wissinger, John [8979-6] S5, [8991-26] S6
Witberg, Karen [8926-93] S19
Withers, Nathan J. [8955-18] S4
Withford, Michael 8968 Program Committee, 8968 S3 Session Chair, [8988-12] S3, [8997-35] S8
Wiłski, Mark F. [9002-55] S13
Witort, Ewa [8955-45] S10
Witt, Colleen [8956-24] S6
Witte, Reiner M. [8967-43] S15, [8967-43] S7
Witte, Ulrich [8959-53] S12, [8965-11] S3
Wittek, Michael 9005 Program Committee
Wittrock, Ulrich 8978 Program Committee
Wittwer, Valentin J. [8966-10] S3, [8966-22] S6, [8966-31] SPTue, [8966-5] S2, [8966-7] S2
Witzigmann, Bernd [8966-17] S5, 8980 Conference Chair, 8980 S10 Session Chair, [8980-27] S7, 8981 S10 Session Chair, [8986-61] S12, [8986-61] S8, [9001-14] S3
Wixforth, Achim [8984-9] S2
Wlodawski, Mitchell S. [8961-94] SPTue, [8990-5] S1
Wohlfeil, Benjamin [8988-19] S4
Wojciechowski, Artur [8969-25] SPTue
Wojcik, Aleksander K. [9002-22] S5
Wojtkowski, Maciej 8934 Program Committee, 8934 S3 Session Chair, [8934-66] S10, [8934-94] SPMon, [8934-95] SPMon, [8946-9] S3
Wojtowicz, Tomasz [8984-41] S11
Wolf, David E. [8926-17] S4, [8936-40] SPSun, [8951-19] S4
Wolf, Günther [8947-30] S6
Wolf, Jean-Pierre [8972-1] S1
Wolf, Martin [8972-25] S6
Wolf, Martin [8984-40] S11
Wolf, Philip [9001-10] S2, [9001-2] S1
Wolf, Sebastian [8981-9] S3
Wolfe, John C. [8928-83] S15
Wölfelschneider, Harald [8992-23] S5
Wolff, Svenja [9003-9] S2
Wollhofen, Richard [8970-6] S2
Wollweber, Merve [8945-10] S3
Wolstenholme, Adrian J. [8978-16] S5
Wolter, Klaus-Jürgen [8991-4] S1
Won, Kang-Hee [8977-20] S5
Won, Yong Hyub [8987-81] SPWed
Won, Yong-Yuk [9008-21] S9
Wong, Alexander [8930-5] S1, [8934-68] S10
Wong, Brian J. F. 8926 Conference Chair, 8926 S2 Session Chair, 8926 S3 Session Chair, 8926 S7 Session Chair, 8926 Track Chair, [8926-143] S7, [8926-145] S7, 8927 Track Chair, 8928 Track Chair, 8929 Track Chair, 8930 Track Chair, 8931 Track Chair, 8932 Track Chair, 8933 Track Chair, [8934-11] S2, [8934-96] SPMon
Wong, Chee Wei [8960-2] S1
Wong, Emily Y. [8934-29] S5, [8946-6] S2
Wong, Franklin [8987-23] S5
Wong, Kelvin K. [8947-33] S1, [8947-33] S7, [8948-38] S7
Wong, Kenneth K. Y. [8927-27] S7, [8947-49] S11, [8947-78] SPMon, [8948-25] S4, [9008-19] S9
Wong, Kevin Kevin [8934-93] SPMon
Wong, Melissa [8947-5] S1
Wong, Molly [8944-15] S4
Wong, Stephen T. C. [8947-33] S1, [8947-33] S7, [8948-38] S7
Wong, Terence T. W. [8947-49] S11, [8947-78] SPMon
Woo, Jae-Heun [8983-64] SPWed
Woo, Van H. [8932-1] S1
Wood, Christopher J. [8950-5] S2
Wood, Fiona M. [8934-45] S7
Wood, Viviane Tim [8932-25] S5
Woodard, Brian S. [8962-15] S4
Woods, Christopher W. 8935 Program Committee
Woods, Kevin [8927-2] S1
Woolley, Adam T. 8993 S14 Session Chair
Woolliams, Emma R. [8988-44] S10
Woolsey, Nicholas J. [8936-22] S5
Woolthuis, Rutger G. [8952-17] S5
Worchesky, Terrance [9002-58] S13
Wörl, Andreas [8993-31] S6
Worrall, Alex [8991-34] S8
Wortmann, Dirk [8967-30] S11
Wouters, Fred S. [8950-14] S4
Wouters, Michiel [8984-31] S9
Woycicki, Rafal [8941-50] S10
Wraychtrup, Jörg 8997 Program Committee, [8997-5] S3, [8997-5] S7
Wray, Parker [8989-23] S7, [8990-31] S6
Wright, Barbara M. [8961-71] SPTue
Wright, Donald [8982-75] SPWed
Wright, Graham [8950-52] S8
Wright, Jeremy B. [8986-44] S8
Wright, John [8935-26] S6
Wright, Karina T. [8947-54] S12
Wright, Logan G. [8963-25] S6
Wright, Malcolm W. [8971-10] S2, [8971-34] S5
Wu, An'an [9006-6] S1
Wu, Andy [8927-47] S11
Wu, Binlin [8926-63] S12
Wu, Bo [8981-35] S9
Wu, Chen [8934-89] SPMon, [8953-5] S1
Wu, Chen [8942-10] S2
Wu, Chengping [8969-6] S1
Wu, Chunbai [8928-12] S3
Wu, Chun-Hsien [8955-46] S10, [8956-15] S4
Wu, Di [8944-15] S4, [8944-16] S4
Wu, Di [8949-63] SPMon
Wu, Di [8949-64] SPMon
Wu, E. [8997-5] S3, [8997-5] S7
Wu, Frank F. [8959-69] SPTue, [8959-70] SPTue
Wu, Haueun [8947-50] S12
Wu, Hongbin [8974-34] SPTue, [8974-38] SPTue, [8974-40] SPTue, [8974-42] SPTue, [8974-44] SPTue
Wu, Hsueh-Yu [8950-41] SPSun, [8957-30] S7
Wu, Jackie [8948-20] S3
Wu, Jeong-Weon 8983 Program Committee, [8983-64] SPWed
Wu, Jheng-Syong [8949-58] SPMon
Wu, Jian [8935-27] S6
Wu, Jiang [9002-30] S7
Wu, Jianhong [8974-41] SPTue
Wu, Jing [8947-38] S9
Wu, Jingpeng [8928-54] S11
Wu, Jinhua [8991-37] S9
Wu, Joyce H. 8975 Program Committee, 8975 S1 Session Chair
Wu, Lehao [8934-76] S11, [8935-47] S10
Wu, Linhui [8952-44] SPSun
Wu, Lorinda [8996-39] SPWed
Wu, Mei X. [8944-3] S1
Wu, Miao [8955-30] S7
Wu, Min [8926-82] S17, [8943-79] S12
Wu, Ming C. Symposium Committee, [8977-14] S4, 8995 Program Committee, [8995-26] S7
Wu, Ming Hsien 9004 Program Committee, 9005 Conference Chair, 9005 S1 Session Chair, 9005 S3 Session Chair, 9005 S4 Session Chair
Wu, Peiheng [8985-31] S7
Wu, Pengfei [8989-16] S5
Wu, Ping [8937-35] SPSun
Wu, Qiang [8937-5] S1
Wu, Qianqian [8990-49] S9
Wu, Shang [8962-20] SPTue
Wu, Sheng 8993 Program Committee, 8993 S17 Session Chair, [8993-29] S5, [8993-69] S14
Wu, Shin-Tson 9004 Program Committee, [9005-15] S4, [9005-2] S1, [9005-7] S2
Wu, Shu-Hsien [8995-13] S4
Wu, Shulian [8926-33] SPSun
Wu, Tao [8927-19] S5, [8927-2] S1, [8927-29] S7, [8927-4] S1, [8927-5] S1
Wu, Tsung-Tsong [8994-15] S4
Wu, Tzeng-Tsong [8995-13] S4
Wu, Tzu-Yu [8927-9] S2
Wu, Wei [8995-34] S9, [9005-8] S2
Wu, Wei-Chen [8934-35] S6, [8952-38] S10
Wu, Weicheng [8928-4] S1, [8934-49] S8, [8952-37] S10
Wu, Wei-Wen [8948-71] SPSun
Wu, Xiangwei [8926-136] S5
Wu, Xiao-Rong [8981-54] SPWed
Wu, Xizeng [8944-15] S4
Wu, Xueyuan [8982-18] S4
Wu, Yuh-Renn [8981-59] SPWed, [8986-52] S10, [9003-12] S3
Wullinger, Ingo [8977-21] S5
Wünsche, Martin [8972-14] S4
Wüppen, Jochen [8959-17] S5
Würth, Christian [8955-20] S5
Wurzinger, Gerhild [8943-126] SPSun, [8943-220] SPTues
Wuu, Dong-Sing [8986-14] S3, [9003-24] S5, [9003-26] S6
Wyant, James C. SC212
Wynne, Karon E. [8943-179] SPMon
Wynne, Klaas 8984 Program Committee
Wyrowski, Frank [8972-47] S11, [8972-47] S6, [8977-33] SPTue, [8977-34] SPTue, [8999-20] S5
Wyszomolek, Mateusz [8961-87] SPTue
-
- X**
- Xereas, George [8973-23] SPTue, [8973-24] SPTue
Xi, Jiangtao [8975-10] S2, [8975-20] S4, [8980-73] SPWed
Xi, Jiefeng [8927-38] S10, [8934-18] S3, [8934-9] S2, [8948-17] S3
Xia, Andong 8950 Program Committee
Xia, Jinjun [8943-119] SPSun, [8943-156] SPMon, [8943-34] S5, [8943-75] S11
Xia, Jun [8943-141] SPSun, [8943-16] S3, [8943-219] SPTues, [8943-86] S13, [8943-88] S13, [8943-91] S14, [8943-94] S14
Xia, Kangwei [8997-5] S3, [8997-5] S7
Xia, Younan [8943-159] SPMon
Xiang, Liangzhong [8943-125] SPSun
Xiang, Lu Yun [8948-73] SPSun
Xiang, Peng [8948-93] SPSun, [8949-68] SPMon
Xiao, Chuan [8944-13] S3
Xiao, Deng [8994-75] SPWed
Xiao, Feng [8971-26] S4
Xiao, Hai [8950-35] SPSun, [8974-32] SPTue, [8974-33] SPTue
Xiao, Jianliang [8958-9] S2
Xiao, Jin-Long [8960-34] S9
Xiao, Lifu [8939-7] S2
Xiao, Lifu [8947-77] SPMon
Xiao, Peng [8934-36] S6, [8935-54] S11
Xiao, Shiyi [8995-36] S9
Xiao, Shu 8941 Program Committee
Xiao, Xiao [9009-1] S2
Xiao, Xue [9006-6] S1
Xiao, Yanhong 8998 Program Committee, [8998-24] S5
Xiao, Yun-Feng [8960-15] S4
Xiao, Zhisong [8998-14] S3, [8998-53] S12
Xie, Bin [8976-27] S6
Xie, Chuan [9001-12] S3
Xie, Feng [8993-70] S14
Xie, Hongen [9002-16] S4
Xie, Huikai [8934-92] SPMon
Xie, Jianliang [8988-27] S6
Xie, Jingya [8990-49] S9
Xie, Junqi [8982-61] SPWed
Xie, Mao Hai [8987-68] S1
Xie, Wenming [8943-123] SPSun, [8944-23] SPMon
Xie, Xiaoliang Sunney 8948 Program Committee, [8948-24] S4, [8948-30] S5, [8948-35] S6, [8948-39] S7
Xie, Yijing [8947-79] SPMon
Xie, Yizhu [8958-9] S2
Xie, Zhixing [8943-10] S2, [8943-133] SPSun, [8943-38] S6
Xin, Hao 8941 Program Committee
Xin, Jianguo [8948-38] S7
Xing, Da 8944 Program Committee

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Xing, HuiLi Grace [8986-66] S14
 Xing, Lei [8943-125] SPSun, [8956-2] S1
 Xing, Peng [8974-16] S4, [8980-31] S8
 Xing, Wenxin [8943-153] SPMon, [8943-219] SPTues, [8943-37] S6
 Xiong, Daxi [8949-42] S9
 Xiong, Hanqing [8928-60] S12
 Xiong, Li [8931-28] S5
Xiong, Qihua 9000 Program Committee, 9000 S2 Session Chair, [9000-10] S3, [9000-11] S3
 Xiong, Wei [8969-8] S2
 Xiong, Yihan [8965-29] S6
Xiong, Yule [8990-51] SPWed
 Xiu, Peng [8950-27] S7
 Xu, Anshi 8995 Program Committee, [8995-42] S10
 Xu, Bingwei [8948-87] SPSun
 Xu, Chris 8948 SPSun Session Chair, [8948-2] SKey, [8961-9] S3
 Xu, Daguang [8949-23] S5
 Xu, Dan-Xia 8989 Program Committee, 8990 Program Committee, [8990-32] S6, [8995-30] S8, [8995-38] S10
 Xu, Faming [8959-34] S8, [8959-39] S9
Xu, Guan [8926-117] S24, [8943-108] S16, [8943-218] SPTues, [8943-50] S8
Xu, Guangming [8983-62] SPWed, [8983-63] SPWed
 Xu, Guoyang [9001-13] S3
 Xu, Haitan [8995-25] S7
 Xu, Han [8937-22] S4, [8941-22] S6
 Xu, Hui [8965-6] S2
 Xu, Huiwen [8949-20] S4, [8986-44] S8
 Xu, Jian [8967-8] S10, [8967-8] S5, [8976-17] S4
Xu, Jing [8934-93] SPMon
Xu, Jingjiang [8948-25] S4
 Xu, Jingjun [8944-20] SPMon
 Xu, Junbin [8935-16] S4, [8935-18] S4
 Xu, Junqing [8937-13] S3
 Xu, Ke [9003-40] S10
Xu, Kexin [8939-37] SPSun, [8942-37] SPSun, [8942-7] SPSun, 8951 Program Committee
 Xu, Lei [8960-24] S5
 Xu, Lei [8965-6] S2
 Xu, Min [8937-14] S3
 Xu, Min [8926-63] S12, [8940-22] S5, [8949-33] S7
 Xu, Peipeng [8988-47] S10
Xu, Peipeng [8988-29] S7
Xu, Ronald X. [8935-16] S4, [8935-17] S4, [8935-18] S4, [8937-14] S3, [8937-19] S4, [8937-21] S4, [8937-5] S1, [8945-8] S2, [8951-22] S5, [8956-10] S2, [8956-18] S4, [8956-42] SPSun, [8976-27] S6
 Xu, Su [9005-15] S4, [9005-2] S1
 Xu, Tonghui [8928-61] S13, [8928-64] S13
 Xu, Weihe [8975-25] S2
Xu, Xianfan 8967 Conference Chair, 8967 S2 Session Chair, 8968 Program Committee, 8969 S4 Session Chair
Xu, Xiao [8943-113] SPSun, [8943-187] SPMon
 Xu, Xiaochuan [8990-16] S3, [8990-28] S5, [8990-31] S6
 Xu, Xiaojun [8961-124] SPTue
 Xu, Xiaoyun [8947-33] S1, [8947-33] S7, [8948-38] S7
 Xu, Xiaozhen [8964-15] S4
 Xu, Yan [8949-57] SPMon
Xu, Yaqiong [8969-16] S3, [8969-16] S5
Xu, Yi [8962-21] SPTue
 Xu, Yong 8994 Program Committee
 Xu, Yongyue [8962-22] SPTue
 Xu, Yuan [8942-36] S9
 Xu, Zhengbin [8926-39] S8
Xu, Zhizhan [8962-21] SPTue
 Xuan, Hongwen [8961-93] SPTue
 Xuan, Jason Rongwei [8926-55] S11
 Xue, Jianqing [8940-41] SPTue
 Xue, Weiqi [8996-7] S2
 Xue, Xiaojie [8982-63] SPWed, [8982-70] SPWed
 Xylas, Joanna [8947-45] S11, [8947-6] S1, [8948-11] S2

Y

Yablou, Andrew D. [8961-15] S4, SC974
 Yablou, Joshua [8998-12] S3, [8998-17] S4, [8998-22] S5, [8998-28] S6, [8998-55] S12
 Yablonovitch, Eli 8994 Program Committee
Yada, Shuhei [8972-54] SPTue
 Yadav, Amit [8986-79] SPWed
 Yadav, Amrita R. [8933-3] S1
 Yadav, Rajeev [8992-22] S5
 Yadav, Suchita [8964-68] SPTue
 Yagi, Ryohei [9004-21] SPWed
 Yagi, Shogo [8934-103] SPMon
 Yagi, Takeshi [8991-16] S4
 Yagi, Tetsuya [8965-1] S1
 Yahiatène, Idir [8950-50] SPSun, [8952-4] S1
 Yajima, Masahiro [8926-74] S15, [8941-31] S8
 Yakes, Michael K. [8981-2] S1, [8981-40] S11
Yakovlev, Vladislav V. [8939-8] S2, [8946-34] S7, [8948-42] S7
 Yakunin, Alexander N. [8982-69] SPWed
 Yalamanchili, Prasad [8965-6] S2
 Yam, Navy [8988-13] S3, [8988-28] S7
 Yamada, Hidenori [8961-8] S2
Yamada, Kenji [8935-52] S11, [8954-24] S6
 Yamada, Koji [9010-5] S3
 Yamada, Makoto [9009-21] S8
 Yamada, Tomonori [8963-35] S6, [8963-35] S9
 Yamada, Toru [8928-27] SPSat, [8928-28] SPSat
 Yamada, Toshiaki [8983-42] S10
 Yamada, Yasuhiro [8987-27] S6
 Yamagishi, Shogo [8934-103] SPMon
 Yamaguchi, Atsushi A. [8986-30] S6
 Yamaguchi, Joji [8988-15] S4
 Yamaguchi, Masanori [8986-76] SPWed
 Yamaguchi, Mitsushiro [8948-47] S8
 Yamaguchi, Ryo [8926-69] S14
 Yamaguchi, Takeshi [9006-47] SPWed
 Yamaguchi, Tokutarou [8957-34] S7
 Yamaguchi, Tomohiro [8986-13] S3, [9003-6] S2
 Yamakawa, Shiro 8971 Program Committee
 Yamaki, Etsuko [8928-23] S6
 Yamamoto, Fumihiko [9009-2] S3
 Yamamoto, Fumihiko [8994-65] SPWed
 Yamamoto, Hideki [8986-12] S3, 8987 S5 Session Chair, 8987 S6 Session Chair, [8987-22] S5
 Yamamoto, Hiroki [8983-17] S4
 Yamamoto, Johtarou [8947-39] S9
 Yamamoto, Jun [9004-31] SPWed
 Yamamoto, Jun [9004-2] S1
 Yamamoto, Kazuhiro [8935-2] S1, [8940-16] S4
Yamamoto, Kazuhiro [8983-46] S10
 Yamamoto, Kazuya [8929-7] S2, [8974-36] SPTue
 Yamamoto, Kenji [9006-33] S7
 Yamamoto, Kenji I. 8955 Conference Chair, 8955 S12 Session Chair
 Yamamoto, Kohei [8952-45] SPSun
 Yamamoto, Manabu [9006-48] SPWed, [9006-49] SPWed
 Yamamoto, Naokatsu [9002-4] S1
 Yamamoto, Shinichi [8971-28] S5
 Yamamoto, Taiji [8986-35] S7
 Yamamoto, Tsuyoshi [8988-15] S4
 Yamamoto, Yoshihisa [8993-7] S1
 Yaman, Fatih 9009 Program Committee
 Yamanaka, Junji [8964-47] SPTue
 Yamanaka, Kazuhiko [8986-54] S11
Yamanaka, Masahito [8948-64] S11, [8949-54] S11, [8950-41] SPSun, [8957-30] S7
 Yamanaka, Yuuji [8992-30] SPWed
 Yamane, Keisaku [8999-31] S7
 Yamano, Kouji [8996-9] S3
Yamaoka, Yoshihisa [8943-117] SPSun
 Yamasaki, Kota [8967-52] SPTue
 Yamashina, Yohzoh [8983-61] SPWed
 Yamashita, Daisuke [8987-35] S7
 Yamashita, Daisuke [8928-23] S6
 Yamashita, Hiroyuki [9010-12] S4, [9010-12] S5

Yamashita, Kouhei [9003-14] S3
 Yamashita, Suguru [8956-4] S1
 Yamashita, Tatsuya [8982-70] SPWed
 Yamashita, Tomoya [8974-36] SPTue
 Yamashita, Tsugito [8967-26] S11
 Yamashita, Yohei [8989-30] SPlen
 Yamashita, Yutaka [8928-23] S6, [8947-62] S14
 Yamauchi, Toyohiko [8931-38] S8, [8943-202] SPTues, [8947-62] S14
 Yamawaki, Hisashi [8964-12] S3
 Yamazaki, Hirohito [8954-6] S2
 Yampolsky, Steven [8948-33] S6
 Yan, Aimin [8944-15] S4
 Yan, Chunsheng [9003-63] SPWed
 Yan, Di [8951-28] S6
 Yan, Hui Juan [8991-37] S9
 Yan, Lesan [8927-25] S6
 Yan, Lianshan [9008-9] S7
Yan, Long [8948-104] SPSun
 Yan, Min [8960-19] S5
 Yan, Shaohui [8949-65] SPMon
 Yan, Weizhen [9008-3] S2
 Yan, Ying [8941-16] S4
 Yanagi, Hiroyuki [8986-64] S14
 Yanagihara, Ai [8996-9] S3
Yaney, Perry P. [8983-48] S11
Yang, Bona [9005-18] SPWed
 Yang, Bruce [8926-4] S1
 Yang, Celina [8955-14] S4
Yang, Changhui [8949-36] S8, [8978-19] S6
 Yang, Chenying [8927-15] S4, [8927-18] S4, [8936-27] S6, [8945-5] S1
 Yang, Chih-Chung [8934-38] S6, [8957-27] S6, 8986 Program Committee, [8986-36] S7, [8986-53] S10, [9003-23] S5, [9003-30] S7, [9003-34] S7
 Yang, Chuanghua [8975-19] S4
 Yang, Fei [8944-27] SPMon
 Yang, Fugang [8937-30] SPSun
 Yang, Guang-Zhong [8935-35] S8
 Yang, Hao [8931-11] S3
 Yang, He [8937-34] SPSun
 Yang, Hongjun [8994-8] S2
Yang, Ho-Soon [8992-14] S3
 Yang, Huan [8960-54] S14
 Yang, Huomu [8959-80] SPTue
 Yang, In-Sang [8987-95] S6
 Yang, Jinghui [8960-2] S1
 Yang, Jinping [8937-10] S2
 Yang, Joon-Mo [8943-68] S10
 Yang, Juhee [8959-48] S11
 Yang, Kuang-Yu [8995-36] S9
Yang, Lan 8960 Program Committee, 8960 S4 Session Chair, [8960-25] S6
 Yang, Lifeng [8926-113] S23, [8943-96] S14
 Yang, Lih-Mei [8959-4] S1, [8961-19] S5, [8972-16] S4
 Yang, Peidong [8996-38] S3
 Yang, Pingxiong [8938-21] S4
 Yang, Qi [9009-1] S2
 Yang, Qiang [8943-113] SPSun
 Yang, Qingbo [8950-35] SPSun
 Yang, Quankui K. [8993-57] S12
 Yang, Ren-jie [8939-37] SPSun
 Yang, Rui Q. 8993 Program Committee, 8993 S15 Session Chair, [8993-36] S7
 Yang, Ruigang [8979-4] S4
 Yang, Sean [8947-26] S5
 Yang, Se-Hoon [9007-22] S7
 Yang, Shang Hua [8985-2] S1
 Yang, Shuying [8944-20] SPMon
 Yang, Shuyu [8990-1] S1
 Yang, Stephanie [8955-38] S8
 Yang, Tao [8989-29] SPlen
 Yang, Tianxin 8985 Program Committee, 8985 S1 Session Chair, 8985 S2 Session Chair, [8985-22] S5
 Yang, Tiè [8976-21] S5
 Yang, Ting [8985-41] S9
 Yang, Tiyuan [8952-1] S1
 Yang, Tsung-Jui [8981-59] SPWed
 Yang, Tsung-Lin [8986-52] S10
 Yang, Tung-Ting [8981-57] SPWed
Yang, Victor X. D. 8926 Program Committee, 8927 Program Committee, 8928 Program Committee, [8935-60] S12, [8942-36] S9, 8946 Program Committee, 8946 S6 Session Chair, [8946-35] SPSun, [8952-19] S5, [8972-36] S8

Yang, Wei [9008-7] S6, [9008-7] S7
 Yang, Weijian [8977-14] S4, [8995-26] S7, [8995-35] S9, [8998-40] S9
 Yang, Weiquan [8981-45] S12
 Yang, Won-Bo [9003-56] SPWed
 Yang, Xiaojie [8935-49] S10
 Yang, Xiaoping S. [8964-39] S9
 Yang, Xiaoqi [8949-68] SPMon
 Yang, Xiaoquan [8942-22] S5
 Yang, Xiaoxia [8943-197] SPTues
 Yang, Xibin [8949-42] S9
 Yang, Xin [8935-31] S7, [8937-22] S4, [8956-5] S1
Yang, Xinmai [8943-170] SPMon
 Yang, Xu [8960-25] S6
 Yang, Yan Long [8949-63] SPMon, [8949-64] SPMon, [8949-65] SPMon
 Yang, Yang [8986-37] S7
 Yang, Yanrong [8939-37] SPSun
 Yang, Yi [8943-5] S1
 Yang, Ying 8942 Program Committee, [8942-11] S2
 Yang, Yong [8960-17] S4, [8960-67] SPTue
 Yang, Yongzhi Charley 8979 Program Committee
 Yang, Yue-De [8960-34] S9
 Yang, Yujing [8989-29] SPlen
 Yang, Zhi Yi [8961-1] S1, [8961-127] SPTue
 Yang, Zhili [8999-31] S7
 Yang, Zhiyong [8982-77] SPWed
 Yang, Zhongqing [8928-55] S11
 Yang, Zhongwei [8937-36] SPSun
 Yanik, Ahmet Ali [8990-25] S5
 Yankelevich, Diego R. [8926-85] S17, [8926-86] S17
 Yankov, Vladimir [8988-16] S4
 Yannas, Ioannis V. [8947-63] S14, [8956-19] S5
 Yano, Mitsuaki [8987-45] S9
 Yanson, Dan [8965-21] S5
 Yao, Baoli [8949-63] SPMon, [8949-64] SPMon, [8949-65] SPMon
 Yao, Chengbao [8998-7] S2
 Yao, Jianing [8934-127] SPMon
 Yao, Junjie [8943-191] SPTues
 Yao, Junjie [8943-115] SPSun, [8943-136] SPSun, [8943-168] SPMon, [8943-37] S6, [8943-51] S8, [8943-64] S10, [8943-66] S10, [8943-68] S10, [8943-91] S14, [8943-95] S10
 Yao, Kaiyuan [8988-47] S10
 Yao, Takafumi 8987 Program Committee, 8987 S9 Session Chair, [8987-18] S4
 Yao, Xianghan [8980-46] S12
Yao, Xincheng [8930-6] S1, [8950-34] SPSun
 Yao, Yu [8993-76] S16
 Yao, Yu-Feng [8986-36] S7
 Yao, Yuhuan [8995-34] S9, [9005-8] S2
Yao, Yuhong [8964-24] S6
 Yaqoob, Zahid [8943-202] SPTues, [8946-22] S5, [8949-28] S6, [8952-39] S10
 Yarborough, J. Michael [8966-33] SPTue
 Yarov, Amnon [8961-1] S1, [8961-127] SPTue
 Yaron, Lior [8998-31] S7
 Yaroslavsky, Anna N. [8926-40] S8, [8928-6] S2, [8935-37] S8, 8940 S5 Session Chair, [8940-1] S1, [8940-28] S6, [8940-8] S2, [8941-53] S11, 8942 Program Committee, 8942 S8 Session Chair
 Yaroslavsky, Ilya V. [8926-40] S8
 Yaseen, Mohammad A. [8928-4] S1
 Yaseen, Mohammad T. [8982-43] S8
 Yashin, V. E. [8959-48] S11
 Yashiro, Masayuki [8947-51] S12
 Yashkarova, Marziya G. [8956-12] S3
 Yashkov, Mikhail V. [8961-32] S8
Yasu, Takeshi [8948-81] S2
Yasuno, Yoshiaki [8930-31] S7, [8930-50] SPSun, [8930-7] S2, 8934 Program Committee, 8934 S4 Session Chair, [8934-109] SPMon, [8934-30] S5, [8934-60] S9
 Yasuo, Kenzo [8929-7] S2
Yasuoka, Fatima M. M. [8930-53] SPSun, [8936-39] SPSun

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Yasutomi, Keita [8947-39] S9
 Yau, Hairong [9001-1] S1
Yazdanfar, Siavash 8937 Program Committee, 8940 Program Committee, [8948-78] SPSun
 Ye, Changgeng [8961-103] SPTue, [8961-37] S9
 Ye, Chenran [8984-6] S2
 Ye, Hao [8993-36] S7
 Ye, Jia [9008-9] S7
 Ye, Jinzuo [8935-31] S7, [8935-66] SPSun, [8937-22] S4
 Ye, Jun [9000-14] S3
 Ye, Qing [8959-16] S4
 Ye, Tong [8949-63] SPMon, [8949-64] SPMon, [8949-65] SPMon
Ye, Winnie N. [8981-44] S12, [8990-51] SPWed
 Yeager, Douglas E. [8926-84] S17
 Yeh, Chenghung [8943-180] SPMon, [8943-212] SPTues
 Yeh, Chia-Hsien [8944-34] SPMon
 Yeh, Chun-Ming [8981-59] SPWed
 Yeh, Jack [8971-7] S1
 Yeh, Nien-Tze [8986-86] SPWed
 Yeh, Pochi 9005 Program Committee
 Yeh, Shu-ting [9003-12] S3
 Yeh, Tim H. C. [8950-2] S1, [8950-46] SPSun
 Yeheksely-Hayon, Daniella [8972-10] S3
 Yehia, Mohamed [8934-125] SPMon
 Yelbuz, Talat Mesud 8953 Program Committee
Yelin, Dvir [8927-22] S5, [8927-3] S1, 8972 S2 Session Chair, [8972-10] S3
 Yelin, Ronit 8927 S1 Session Chair
 Yelleswarapu, Chandra S. [8931-7] S2, [8947-3] S1, [8956-8] S2
 Yen, Chun-Wan [8983-38] S9
 Yendluri, Raghuvara B. [8955-27] S6
 Yeoh, George C. [8934-83] S12
 Yeoh, Khay Guan [8939-22] S4
 Yeom, Dong-II [8966-4] S2
 Yerolatsits, Stephanos [9009-20] S8
 Yew, Elijah Y. S. [8948-21] S3
 Yi, Cheng [8946-13] S4
 Yi, Dingrong [8949-67] SPMon
 Yi, Fei [8982-8] S2, [8993-85] S17
 Yi, Fei [8988-42] S9
 Yi, Guang yong [9008-22] S10
 Yi, Ji [8934-41] S7, [8952-13] S4, [8952-33] S9
Yi, Jonghoon [8959-68] SPTue
 Yi, Xi [8952-43] SPSun, [8952-44] SPSun
Yifat, Yuval [8994-42] S11
 Yih, T. C. 8973 Program Committee
Yildirim, Murat [8938-20] S4
 Yilmaz, Hasan [8999-38] S8
 Yilmaz, Huzeyfe [8960-25] S6
 Yin, Biwei [8952-40] S10
 Yin, Chuansheng [8937-21] S4
 Yin, Hong [8937-13] S3
 Yin, huabing [8946-21] S5
 Yin, L. J. [8980-15] S4
 Yin, Shuang [9007-2] S2
 Ying, Da [8969-16] S3, [8969-16] S5
 Ylinen, Sami [8990-14] S3, [8990-2] S1, [8990-22] S4, [8990-3] S1, [8990-4] S1
 Yoda, Kaoru [9005-14] S3
 Yoder, P. Douglas [9002-16] S4
 Yodh, Arjun G. 8937 Program Committee, [8942-17] S4
 Yokogawa, Toshiya [9003-42] S10
 Yokouchi, Noriyuki 9001 Program Committee
 Yokoyama, Eisuke [8987-72] SPWed
Yokoyama, Hiroshi 9004 Program Committee
 Yokoyama, Nobuyuki [8990-47] S9
Yokoyama, Shiyoshi 8983 Program Committee, [8983-46] S10
 Yonemaru, Yasuo [8950-41] SPSun, [8957-30] S7
 Yoneyama, Takuo [9006-35] S7, [9006-42] SPWed
 Yong, Saw Soon [8959-74] SPTue
 Yoo, Byung-Wook [8977-14] S4, [8995-26] S7
 Yoo, Hakdo [9003-39] S10
Yoo, Hongki 8926 S16 Session Chair, [8926-100] SPSun, [8926-99] SPSun, [8927-32] SPSun
 Yoo, Hyung Keun [8969-26] SPTue
 Yoo, Jinkyong [8984-29] S8
 Yoo, Kyung Ho [8986-75] SPWed
 Yoo, S. J. Ben [8988-48] S11, [8989-9] S4
 Yoo, Sang Jin [9008-22] S10
 Yoon, Changhyeong [8978-20] S6
 Yoon, David [8927-40] S10
 Yoon, Euijoon 8986 Conference CoChair, [9003-6] S2
 Yoon, Heesun [8977-9] S3
 Yoon, Jae Woong [8995-39] S10
 Yoon, Mina [8969-6] S1
 Yoon, Min-Seok [8982-54] SPWed
 Yoon, Soon Joon [8943-72] S11, [8943-76] S11, [8955-29] S7, [8955-47] S10
Yoon, Tae-Hoon 9004 Program Committee, 9004 S3 Session Chair, [9004-12] S4, [9004-18] SPWed, [9004-3] S1, 9005 Program Committee
 Yoon, Yeoreum [8935-54] S11
 Yoon, Young Kyung [8928-80] SPMon
Yoshida, Harumasa [8986-68] S14
 Yoshida, Hidetsugu [8959-27] S7
 Yoshida, Hiroyuki [9004-7] S2
 Yoshida, Hisashi [8986-51] S10
 Yoshida, Keiichiro [8928-22] S5
 Yoshida, Syuhei [9006-49] SPWed
 Yoshihara, Toshitada [8950-32] S8
 Yoshikawa, Akihiko [8986-45] S8
Yoshikawa, Hiroshi 9006 Program Committee, 9006 S4 Session Chair, [9006-47] SPWed
Yoshikawa, Kazushi [8929-7] S2
Yoshikawa, Kengo [9006-48] SPWed
 Yoshimoto, Kayo [8935-52] S11
 Yoshimoto, Kenji [8928-23] S6
 Yoshimoto, Naoto [9007-11] S5
Yoshimura, Elisabeth M. [8932-17] S4
 Yoshimura, Kazuki [9004-17] S4
Yoshimura, Tania M. [8932-18] S4
 Yoshino, Takashi [9003-14] S1
 You, Borwen [8985-20] S5, [8985-27] S6
 You, Jang-Woo [8977-9] S3
 You, Shanhong [9009-1] S2
You, Xin [8964-48] SPTue, [8964-60] SPTue, [9009-22] S8
 Young, Abram [8966-12] S4
Young, Amber L. [8989-20] S6
 Young, Henry D. [8983-48] S11
 Young, Hunter [8928-103] S8, [8928-104] S8
 Young, Joseph W. [8962-7] S2
 Young, Madison A. [8935-40] S8
 Young, Steven M. [8995-20] S5
Youngworth, Richard N. SC003
 Yousefi, Mirvais [8980-10] S3
 Yousefi, Siavash [8934-54] S8, [8942-19] S4, [8942-31] S8
 Yu, Aiping [8982-39] S8
 Yu, Anlan [8962-22] SPTue
 Yu, Anthony W. [8959-18] S5, [8959-19] S5, [8959-5] S2, [8988-8] S2
Yu, Byeong-Hun [9004-12] S4, [9004-18] SPWed
 Yu, Changqiu [8998-39] S9
 Yu, Chin-Ping [8985-20] S5
 Yu, Dao Yin [8934-121] SPMon
 Yu, Feng [8983-46] S10
 Yu, Hongyan [8990-50] SPWed
 Yu, HyeonSeung [8950-40] SPSun
 Yu, Ite A. [8998-61] S13
 Yu, Jae Su [8981-66] SPWed, [8986-85] SPWed, 8987 Program Committee, [8987-40] S8
 Yu, Jianhui [8992-9] S2
 Yu, Jianjun [9007-5] S4
 Yu, Jianjun 9008 Program Committee, 9008 S8 Session Chair, [9008-15] S8, [9009-18] S7
 Yu, Jingyi [8948-85] SPSun
Yu, Jiun-Yann [8948-15] S2, [8949-1] S1
Yu, Kyoungsik [8991-6] S2
 Yu, Li-Ping [8952-2] S1
Yu, Longhai [8989-11] S4
 Yu, Meng D. [8951-12] S3
 Yu, Nan 8960 S3 Session Chair, [8960-33] S9
 Yu, Nanfang [8993-76] S16, [8994-51] S13
Yu, Paul Kit-Lai [8991-21] S5
Yu, Peichen 8981 Program Committee, 8981 S12 Session Chair, [8981-3] S1, [8981-57] SPWed, [8983-57] SPWed, [8983-58] SPWed
 Yu, Qingfeng E. [8950-5] S2
 Yu, Shaohua [9009-1] S2
 Yu, Siyuan [8960-39] S10
 Yu, Wenlong [8993-83] S17
 Yu, Xia [8960-36] S9
 Yu, Xiaojun [8935-44] S9
 Yu, Xiaoming [8968-16] S4
 Yu, Yang [8959-74] SPTue
 Yu, Yanguang [8975-10] S2, [8975-20] S4, [8980-73] SPWed
 Yu, Yanlei 9004 Program Committee
 Yu, Yong [8948-22] S4
 Yu, Zhenhua [8961-121] SPTue
 Yu, Zhongyuan [8975-19] S4, [8980-57] S14
Yuan, Baohong [8943-206] SPTues, [8943-46] S7, [8956-14] S3, [8956-21] S5
 Yuan, Hsiangkuo [8935-13] S4, [8957-2] S1
 Yuan, Hushan [8931-14] S3
 Yuan, Jie [8943-218] SPTues
 Yuan, Lei [8950-35] SPSun, [8974-32] SPTue, [8974-33] SPTue, [8974-34] SPTue, [8974-38] SPTue, [8974-40] SPTue, [8974-42] SPTue, [8974-44] SPTue
 Yuan, Lijun [8990-50] SPWed
 Yuan, Ping [8998-26] S6
 Yuan, Ping [8998-7] S2
 Yuan, Shuai [8956-42] SPSun
 Yuan, Xiao [8962-20] SPTue
 Yuan, Xiaohui [8946-21] S5
 Yuan, Yanping [8974-34] SPTue, [8974-38] SPTue
Yuan, Zhen [8928-17] S5, [8937-12] S3, [8943-131] SPSun
 Yuan, Zijian [8993-37] S7
 Yüce, Emre [8998-41] S9
 Yucel, Meryem A. [8928-34] SPSat
 Yue, Gauan [8942-38] SPSun
 Yue, Shuhua [8939-16] S3, [8948-23] S4
 Yue, Ting [8935-17] S4, [8935-18] S4
Yuen, Clement [8955-42] S9, [8957-4] S1
 Yuen, Horace P. 8997 Program Committee
 Yukna, Raymond A. [8929-15] S4
 Yun, Jin [8941-16] S4
 Yun, Juhung [8954-19] S5, [8994-35] S9
 Yun, Seok Hyun Andy 8946 Program Committee, 8946 S5 Session Chair, [8946-11] S3, 8958 Conference Chair, [8958-11] S3, [8958-13] S3, [8958-19] S5
 Yun, Seokho [8974-54] S9, [8977-15] S4
 Yun, Young-Jun [8977-20] S5
 Yung, Rex [8927-38] S10
 Yurevich, Vladimir [8963-33] S8
 Yusoff, Mashitah M. [9005-20] S2
Yust, Brian G. [8956-24] S6, [8956-38] SPSun, [8956-7] S2
 Yuste, Rafael 8928 Program Committee, [8928-66] S14, [8928-81] S15
 Yuvaraj, A. R. [9005-20] S2
 Yuyama, Ken-ichi [8983-19] S5
 Yuzvinsky, Tomas [8988-40] S9
 Yvind, Kresten [8996-5] S1, [8996-7] S2, 9002 Program Committee, 9002 S8 Session Chair

Z

 Zabihiyan, Behrooz [8934-2] S1, [8943-142] SPSun
 Zablocki, Mathew J. [8983-45] S10
 Zacharovas, Stanislovas J. 9006 S2 Session Chair, [9006-4] S1
 Zachary, Christopher B. [8948-59] S10
 Zadok, Avinoam [8998-31] S7
 Zadoyan, Ruben [8948-36] S6
 Zaeh, Michael Friedrich [8963-28] S7
Zafar, Haroon [8926-101] SPSun, [8942-25] S7, [8943-2] S1
Zagaynova, Elena V. [8950-37] SPSun
Zagolla, Volker [8981-31] S8
 Zagonel, Luiz [8986-34] S7
 Zagorodnev, Vladimir Nikolaevich [8938-18] S4
 Zagoruiko, Yuri A. [8959-78] SPTue
 Zah, Chung-en [8993-70] S14
Zahedi, Atena [8928-95] S19
 Zahnert, Thomas [8926-120] S1
 Zahreddine, Ramzi N. [8949-46] S9
 Zair, Amelle [8961-108] SPTue, [8984-46] S12, [8984-49] S13
 Zajac, Marcin [8986-5] S1
 Zakel, Sabine [8987-88] SPWed
 Zakharkina, Olga L. [8948-8] S1
 Zakythinous, Panagiotis [9009-16] S7
 Zaldívar Huerta, Ignacio Enrique [8980-65] SPWed
 Zalesny, Robert [8969-24] SPTue
 Zalevsky, Zeev [8979-9] S6
 Zalkovskij, Maksim [8984-48] S13, [8989-28] S8, [8993-50] S9
 Zam, Azhar [8930-4] S1, [8934-34] S5, [8934-73] S11
Zamani Aghaie, Kiarash [8998-15] S3
Zamboni, Roberto 8983 Program Committee
 Zamboni-Rached, Michel [9006-20] S4
 Zambrano, Felipe [8934-32] S5
 Zamfirescu, Marian [8967-3] S1, [8967-3] S3
 Zamkotsian, Frédéric [8977-23] S5
 Zamora Gomez, Alethea V. [8933-6] S2
Zamora, Gilberto [8930-16] S4
 Zanaga, Jéssica Q. [8926-106] S21
 Zannata, Antonio R. [8970-12] S3
 Zancope, Bruna Raquel [8929-19] SPSun
 Zandi, Roya [8947-75] SPMon
 Zandi, Soodabeh [8926-8] S2
 Zandieh, Alireza [8985-26] S6
 Zângaro, Renato Amaro [8926-36] SPSun, [8935-77] SPSun
 Zangen, Avraham [8930-37] S8
 Zanin, Fátima Antonia Aparecida [8932-15] S3, [8932-16] S3, [8932-41] SPSun
 Zanon, Enrico [8986-59] S11, [9003-48] S11
 Zanon, Ivan [8955-68] SPSun
 Zanutta, Alessio [9006-8] S2
 Zaouter, Yoann [8961-20] S5, [8961-50] S12, [8961-51] S12, [8961-52] S12
 Zapien, Juan A. [8987-62] S12
 Zappa, Franco [8993-93] S18
 Zappe, Andrea [8997-5] S3, [8997-5] S7
Zappe, Hans Symposium Committee
 Zarnescu, Daniela C. [8948-68] S11, [8948-90] SPSun
Zarnescu, Livia [8953-14] S3
 Zarrabi, Nawid [8948-50] S8
 Zasadzinski, Joseph A. [8926-136] S5
 Zastra, Ulf [8972-14] S4
 Zatsarinny, Oleg [8962-12] S3
 Zaugg, Christian A. [8966-17] S5, [8966-22] S6, [8966-31] SPTue, [8966-5] S2, [8966-7] S2
Zavada, John M. 8982 Program Committee, 8993 Program Committee, 8993 S2 Session Chair
 Zavala, Laura [8965-6] S2
 Zaverton, Melissa A. [8974-11] S3
Zawadzki, Robert J. [8930-20] S5, [8930-30] S7, [8930-4] S1, [8930-40] S9, [8934-25] S4, [8934-73] S11
 Zayer, Igor [8971-33] S5
 Zdravkova, Liliana [8980-77] SPWed, [8982-39] S8
 Zebrowski, Thomas [8974-26] S6
 Zederbauer, Tobias [9002-23] S5, [9002-24] S6
Zediker, Mark S. [8961-12] S3, 8965 Conference Chair
 Zehetner, Johann [8968-24] S5, [8976-3] S1
 Zehnder, Sarah [8967-9] S10, [8967-9] S5, [8968-37] SPTue
 Zeidan, Adel [8927-22] S5
 Zeimer, Ute [9003-25] S6
 Zeitak, Reuven [8943-128] SPSun
 Zeitler, Axel [8985-50] S11
 Zeitlmaier, Martin [8996-4] S1
 Zeitner, Uwe D. [8974-15] S4, [8974-57] S9, [8995-3] S1
 Zeitouni, Natalie [8931-21] S4
 Zelgowski, Julien [8967-29] S11
 Zelmon, David E. [8964-40] S9

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Zeltzer, Gabi** [8988-64] SPWed
Zemánek, Pavel [8939-25] S5, [8947-58] S13, [8960-40] S10, [8999-3] S1, [8999-8] S2
Zemp, Roger J. [8943-13] S2, [8943-135] SPSun, [8943-175] SPMon, [8943-189] SPTues, [8943-35] S6, [8943-67] S10, [8943-74] S11, [8943-81] S12, [8943-82] S12, [8943-83] S12, [8943-93] S14
Zena, Antonio C. [8935-77] SPSun
Zendzian, Waldemar [8959-71] SPTue
Zeng, Gui Lin [8980-80] SPWed
Zeng, Hai Lu [8952-26] S7
Zeng, Haishan 8926 Conference Chair, 8926 S3 Session Chair, [8926-16] S4, [8926-19] S4, [8926-32] S7, [8926-8] S2, 8939 S5 Session Chair, [8939-3] S1, [8939-33] S6, [8948-103] SPSun
Zeng, Heping [8997-5] S3, [8997-5] S7
Zeng, Jianbo [8933-19] S5, [8951-13] S3
Zeng, Nan [8935-27] S6, [8952-46] SPSun, [8952-47] SPSun
Zeng, Shaogun 8928 Program Committee, 8928 S14 Session Chair, [8928-55] S11, [8928-56] S11, [8928-60] S12, [8928-68] S14, [8928-71] SPMon, [8928-73] SPMon, [8928-74] SPMon, [8949-18] S4, [8949-57] SPMon, 8951 Program Committee, [8951-30] SPMon
Zengel, Pamela [8926-137] S6
Zengin, Güllis [8957-26] S6
Zenner, Chris J. [9002-50] S12
Zentel, Rudolf [8983-23] S6
Zerda, T. W. [8950-51] SPSun
Zergioti, Ioanna [8967-28] S11, [8970-17] S12, [8970-17] S4
Zervas, Michalis N. [8960-21] S5, [8960-43] S11, 8961 Program Committee, [8988-65] SPWed
Zervos, Charalampos [8959-44] S10
Zervos, Nikos [9006-3] S1
Zetterlund, Erik [8992-26] S6
Zezell, Denise M. [8926-115] S24, [8929-4] S1
Zgarian, Roxana [8983-10] S3
Zgirian, Roxana [8983-49] S11
Zgonik, Marko [8964-53] SPTue, [8986-31] S6
Zhai, Ming [8965-48] SPTue
Zhan, Li [8998-30] S7
Zhan, Naiqian [8955-24] S5, [8955-67] SPSun
Zhan, Qiwen 8988 Program Committee
Zhang, Anqi [8934-9] S2
Zhang, Bo [8947-39] S9
Zhang, Can [8988-53] SPWed
Zhang, Cheng [8943-124] SPSun, [8943-38] S6, [8995-16] S4
Zhang, Chi [8947-38] S9, [8948-89] SPSun
Zhang, Chi [8943-205] SPTues, [8943-40] S6, [8943-8] S2
Zhang, Chi [9008-19] S9
Zhang, Chiyuan [9000-10] S3
Zhang, Chong [8989-3] S1
Zhang, Chunyuan [8940-11] S3
Zhang, Cunlin [8985-9] S2
Zhang, D. [8990-32] S6
Zhang, Danning [8988-5] S1
Zhang, Dao Hua [8995-11] S3
Zhang, Edward Z. [8943-11] S2, [8943-129] SPSun, [8943-140] SPSun, [8943-184] SPMon, [8943-225] SPTues, [8943-24] S4, [8943-61] S9, [8943-77] S12
Zhang, Ellen Z. [8926-89] S18, [8934-105] SPMon
Zhang, Fan [8986-20] S4, [8986-77] SPWed, [8986-81] SPWed, [8986-82] SPWed, [8986-83] SPWed, [9003-65] SPWed
Zhang, Fan [8987-92] SPWed
Zhang, Guo-yi [8980-66] S1, [9003-57] SPWed
Zhang, Haibin 8968 Program Committee
Zhang, Haixi [8957-17] S4
Zhang, Han [8950-21] S5
Zhang, Hao [8942-37] SPSun
Zhang, Hao [8998-14] S3
Zhang, Hao [9006-31] S7
Zhang, Hao F. [8934-116] SPMon, [8934-28] S4, [8934-41] S7, [8935-74] SPSun, [8943-116] SPSun, [8943-118] SPSun, [8943-130] SPSun, [8943-145] SPSun, [8943-151] SPMon, [8943-152] SPMon, [8943-97] S14
Zhang, Hong [8959-80] SPTue
Zhang, Hongbin [9008-14] S8
Zhang, Hongyan [8951-4] S1
Zhang, Huailiang [8974-31] SPTue, [8985-29] S7, [8988-57] SPWed
Zhang, James J. [8926-55] S11, [8926-59] SPSat
Zhang, Jessica [9007-8] S4
Zhang, Jun [9000-10] S3, [9000-11] S3
Zhang, Jun [8992-9] S2
Zhang, Jun [8926-125] S3, [8926-79] S16, [8934-11] S2, [8934-79] S12
Zhang, Junnan [8937-14] S3
Zhang, Juncqi [8949-43] S9
Zhang, Junwen [9008-15] S8, [9009-18] S7
Zhang, Kaihu [8974-34] SPTue, [8974-38] SPTue
Zhang, Kevin [8943-151] SPMon
Zhang, Lei [8982-58] SPWed
Zhang, Lei [8996-14] S4, [8996-16] S5, [8996-17] S5
Zhang, Lei [8928-40] S8
Zhang, Lewei [8935-19] S4
Zhang, Liang [8929-3] S1
Zhang, LiangLiang [8985-9] S2
Zhang, Limin [8937-36] SPSun, [8952-44] SPSun
Zhang, Lin [8940-30] S6, [8940-41] SPTue
Zhang, Lin [8938-47] SPSun
Zhang, Lin [8960-3] S1
Zhang, Lixin [8936-38] SPSun
Zhang, Nengyun [8933-23] S6
Zhang, Ning [8965-42] SPTue
Zhang, Pengfei [8930-4] S1
Zhang, Pengfei [8947-56] S13
Zhang, Pengfei [8934-117] SPMon, [8934-73] S11
Zhang, Qian [8956-5] S1
Zhang, Qian [8935-31] S7, [8941-22] S6
Zhang, Qiang [8965-29] S6
Zhang, Qiming [8993-95] SPWed
Zhang, Qiuxiang [8930-6] S1, [8950-34] SPSun
Zhang, Rong-Jun [8987-92] SPWed
Zhang, Rui [8988-21] S5
Zhang, Ruikang [8965-48] SPTue
Zhang, Ruiying [8943-197] SPTues, [8943-64] S10
Zhang, Sasa [8945-19] SPSun
Zhang, Shaofei [9003-5] S2
Zhang, Shengdong [8987-44] S9
Zhang, Shiguo [8965-37] S8, [8965-39] S8, [8965-46] S2
Zhang, Shiwu [8935-16] S4, [8935-17] S4, [8935-18] S4, [8937-14] S3, [8937-5] S1, [8951-22] S5
Zhang, Shuang [8935-66] SPSun
Zhang, Shuang [8937-22] S4
Zhang, Site [8972-47] S11, [8972-47] S6, [8977-33] SPTue, [8977-34] SPTue
Zhang, Song [8979-1] S3
Zhang, W. [8993-71] S14
Zhang, Wei [8927-35] S9, [8927-37] S9
Zhang, Wei [9000-14] S3
Zhang, Weizhi [9007-21] S7, [9010-9] S4
Zhang, Wen [8980-57] S14
Zhang, Xiang [8962-20] SPTue
Zhang, Xiang [8967-6] S3, [8967-6] S5
Zhang, Xi-Cheng SC547
Zhang, Xing D. [8987-44] S9
Zhang, Xingyu [8991-22] S5
Zhang, Xinliang [8985-41] S9
Zhang, Xinzheng [8944-20] SPMon
Zhang, Yang [8951-33] SPMon
Zhang, Yang [8928-64] S13, [8942-21] S5, [8942-22] S5
Zhang, Yi [8990-1] S1
Zhang, Yifei [8985-40] S8
Zhang, Ying [9002-60] S14
Zhang, Yong [8955-36] S8, [8997-4] S3, [8997-4] S7
Zhang, Yong-Gang [9002-49] S11
Zhang, Yong-Hang [8981-45] S12
Zhang, Yongzhe [8980-49] S12
Zhang, Yuchen [8985-22] S5
Zhang, Yundong [8998-26] S6, [8998-39] S9, [8998-43] S10, [8998-7] S2
Zhang, Zeng [8986-47] S9
Zhang, Zhaoying [8979-17] S7
Zhang, Zhaoxyu [8994-75] SPWed
Zhang, Zhen [8943-116] SPSun, [8943-118] SPSun, [8943-130] SPSun, [8943-145] SPSun, [8943-151] SPMon, [8943-152] SPMon
Zhang, Zhihao [8974-54] S9
Zhang, Zhihong 8944 S3 Session Chair, [8944-11] S3, [8944-26] SPMon, [8944-27] SPMon, [8944-28] SPMon, [8956-37] S9
Zhang, Zhiwu [8935-17] S4
Zhang, Zhonghan [9000-2] S1
Zhang, Zhongxing [8928-69] SPMon, [8928-70] SPMon
Zhang, Ziyang [8959-40] S10, [9002-3] S1
Zhang, Zongxin [8962-21] SPTue
Zhanserkenova, Orik [8939-1] S1
Zhao, Binghui [8980-48] S12
Zhao, Chao [8986-37] S7
Zhao, Dengke [8935-76] SPSun
Zhao, Deyin [8994-58] S14, [8994-8] S2
Zhao, Fusheng [8933-19] S5, [8951-13] S3
Zhao, Haitao [8959-42] S10, [8972-23] S6
Zhao, Haiyan 8968 Program Committee
Zhao, Hongping [9003-32] S7
Zhao, Hui [8983-62] SPWed
Zhao, Hui [8984-2] S1
Zhao, Huijuan [8936-38] SPSun, [8937-23] SPSun, [8937-36] SPSun, [8952-42] SPSun, [8952-43] SPSun, [8952-44] SPSun
Zhao, Jianhua [8926-19] S4, [8926-8] S2, [8939-33] S6
Zhao, Jianmin [8941-22] S6
Zhao, Jun [8993-25] S4
Zhao, Kai [8982-45] S9, [8988-68] S10, [8992-17] S4
Zhao, Lihua [8993-37] S7
Zhao, Lingling [8937-34] SPSun, [8937-37] SPSun
Zhao, Long [8998-53] S12
Zhao, Ming [8936-30] S7, [8948-68] S11, [8948-90] SPSun, [8950-21] S5, [8953-2] S1
Zhao, Mingtao [8934-46] S7
Zhao, Nannan [8987-44] S9
Zhao, Rongkuo [8994-37] S10
Zhao, Runchen [8980-37] S9
Zhao, Songrui [8986-41] S8, [8996-1] S1
Zhao, Tianzhuo [8941-16] S4
Zhao, Wangshi [8980-20] S5, [8980-37] S9, [8980-48] S12
Zhao, Wendy Xiaoxue [9007-23] S8
Zhao, Xinwei [8987-94] S11
Zhao, Yan [9006-31] S7
Zhao, Yan [8931-18] S4
Zhao, Yanzhu 8975 Program Committee
Zhao, Yiliang [8933-12] S1
Zhao, Youbo [8926-25] S6, [8934-65] S10, [8946-27] S6, [8948-96] SPSun
Zhao, Yu [9006-52] SPWed
Zhao, Yuan [8928-59] S12
Zhao, Yue [8928-26] S6, [8932-8] S1
Zhao, Yunsong [8965-14] S3
Zhao, Yuxing [8968-18] S4
Zhao, Zhengtuo [8958-8] S2, [8976-9] S2
Zhao, Zhen-Sheng [8947-76] SPMon, [8970-13] S3
Zhao, Zhigang [8961-93] SPTue
Zhao, Zhuang [8983-30] S7
Zharov, Vladimir P. 8942 Program Committee, 8943 Program Committee, 8943 S10 Session Chair, [8943-31] S5, 8944 Program Committee
Zhen, Zhen [8983-62] SPWed, [8983-63] SPWed
Zheng, Gang [8943-203] SPTues, [8943-71] S11, [8943-74] S11
Zheng, Guoan [8949-21] S4
Zheng, Jiajiu [8988-47] S10, [8989-11] S4
Zheng, Mei-Ling [8947-76] SPMon, [8970-13] S3
Zheng, Ting [8928-55] S11
Zheng, Wei [8939-22] S4, [8939-31] S6, [8948-29] S5, [8948-95] SPSun
Zheng, Wenli [8951-22] S5
Zheng, Wenxin [8963-19] S5
Zheng, Xiang [8931-13] S3, [8956-3] S1
Zheng, Xiaoxiao [8926-33] SPSun
Zheng, Yan [8965-24] S5
ZHENG, YONGCHAO [8947-74] SPMon, [8947-76] SPMon
Zheng, Yong-Ping [8946-36] SPSun
Zheng, Yuanjin [8943-146] SPSun, [8943-200] SPTues
Zheng, Yuanyi [8943-127] SPSun
Zherdeva, Victoria V. [8950-17] S4
Zherebtsov, Evgeny [8936-11] S3
Zhi, Jin-Fang [8947-76] SPMon
Zhigilei, Leonid V. [8969-6] S1
Zhong, Huiying [8977-34] SPTue
Zhong, Weijia [9003-62] SPWed, [9003-63] SPWed
Zhong, Xiwei [8942-38] SPSun
Zhou, Anhong [8939-7] S2, [8947-77] SPMon
Zhou, Chao [8934-15] S3, [8934-72] S11, [8934-75] S11, [8953-16] S4
Zhou, Chong X. [8960-54] S14
Zhou, Chuanle [9000-5] S2
Zhou, Delai [9001-13] S3
Zhou, Feifan [8944-17] S4, [8944-24] SPMon, [8944-29] SPMon, [8944-32] SPMon, [8944-33] SPMon
Zhou, Feifan [8944-18] S4
Zhou, Guangya 8977 Program Committee, 8977 S4 Session Chair, 8977 S6 Session Chair, [8977-17] S4, [8977-18] S4
Zhou, Hang [8928-56] S11
Zhou, Heng [8960-2] S1
Zhou, Jiangfeng 8985 Program Committee, 8985 S6 Session Chair, 8985 S7 Session Chair
Zhou, Jie [8988-5] S1
Zhou, Jiong [9005-4] S1
Zhou, Joe [9010-11] S4, [9010-11] S5
Zhou, Joe P. 8935 Program Committee, 8935 S2 Session Chair, 8935 S3 Session Chair, [8935-11] S3, [8949-2] S1
Zhou, Kejia J. [8959-40] S10, [9002-3] S1
Zhou, Keming [8928-84] S16
Zhou, Kenneth J. [8941-41] SPMon, [8947-66] SPMon, [8947-67] SPMon, [8984-55] SPWed
Zhou, Lei [8995-36] S9
Zhou, Leijie [8979-12] S6
Zhou, Li [9002-49] S1
Zhou, Lili [8944-27] SPMon
Zhou, Linjie [8990-49] S9
Zhou, Lixin [8940-11] S3, [8940-42] SPTue
Zhou, Min [8943-19] S3
Zhou, Minchuan [8998-17] S4, [8998-55] S12
Zhou, Mingzhou [8956-43] S4
Zhou, Qifa [8926-79] S16, [8926-83] S17, [8926-87] S17, [8934-31] S5, [8934-79] S12, 8943 Program Committee, 8943 S10 Session Chair, 8943 S6 Session Chair, [8943-122] SPSun, [8943-178] SPMon, [8943-212] SPTues, [8943-63] S10, [8946-26] S6
Zhou, Rongguo [8988-57] SPWed
Zhou, Rongguo [8985-29] S7
Zhou, Shou-huan [8959-80] SPTue
Zhou, Shuai [8975-19] S4
Zhou, Si [8987-17] S13
Zhou, Wei [8928-59] S12
Zhou, Weibin [8948-68] S11, [8948-90] SPSun, [8953-2] S1
Zhou, Weidong [8994-58] S14, [8994-8] S2, 8995 S5 Session Chair, [8995-15] S4, [8995-32] S8
Zhou, Weimin 8995 Conference Chair, [8995-8] S2, [8998-40] S9
Zhou, Wen-Yuan [8960-19] S5
Zhou, Xiang 9009 Program Committee
Zhou, Xiangyu [9003-36] S12, [9003-36] S8
Zhou, Xiaowei [8928-21] S5, [8928-24] S6
Zhou, Xing [8949-63] SPMon

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Zhou, Xing [8949-64] SPMon, [8949-65] SPMon
Zhou, Yan [8940-11] S3, [8940-42] SPTue
Zhou, Yang [8926-102] SPSun
Zhou, Yanyan [8960-36] S9
Zhou, Ying [8983-37] S9
Zhou, Yong [8943-115] SPSun, [8943-132] SPSun, [8943-191] SPTues, [8943-36] S6, [8943-40] S6, [8943-66] S10
Zhou, Yu [8965-42] SPTue
Zhou, Yunshen [8954-1] S1, [8969-8] S2
Zhou, Zhengwei [8934-92] SPMon
Zhou, Zhiping [8982-32] S7, 8990 Program Committee
Zhou, Zhongxing [8936-38] SPSun
Zhou, Zifan [8998-12] S3, [8998-22] S5, [8998-28] S6, [8998-55] S12
Zhou, Zili [8993-19] S3, [8993-20] S3
Zhu, Alexander Y. [8982-8] S2, [8988-42] S9, [8993-85] S17
Zhu, Banghe [8945-1] S1
Zhu, Caigang [8935-4] S1, [8935-63] SPSun, [8940-17] S4, [8940-3] S1
Zhu, Congyong [8986-83] SPWed
Zhu, Dan [8928-64] S13, 8942 Program Committee, [8942-21] S5, [8942-22] S5, [8942-38] SPSun, [8944-9] S3, [8951-33] SPMon
Zhu, Dongshan [8984-56] SPWed
Zhu, Hai [8988-42] S9, [8993-85] S17
Zhu, Hongliang [8988-53] SPWed
Zhu, Hui [8993-61] S12
Zhu, Jianfeng [8949-42] S9
Zhu, Jiangang [8960-25] S6
Zhu, Junjie [8954-20] S5
Zhu, Ke [8940-42] SPTue
Zhu, Li [8995-27] S7
Zhu, Liang [8933-14] S4, [8933-15] S4, [8990-26] S5, [8990-33] S6
Zhu, Liangchen [8987-6] S2
Zhu, Lili [8943-123] SPSun
Zhu, Lin [8965-14] S3, [8965-24] S5
Zhu, Liren [8943-122] SPSun
Zhu, Long Xiu [8991-37] S9
Zhu, Nan [8936-25] S6, [8936-26] S6
Zhu, Quing 8943 Program Committee, 8943 S13 Session Chair, [8943-110] SPSun, [8943-150] SPMon, [8943-5] S1
Zhu, Shan [8934-76] S11, [8935-47] S10
Zhu, Timothy C. [8926-135] S5, [8931-17] S4, [8931-20] S4, [8931-35] S7, [8931-42] SPMon, [8931-43] SPMon, [8931-47] SPMon, [8931-48] SPMon, [8931-9] S2
Zhu, Xinxin [8948-76] SPSun, [8956-16] S4
Zhu, Xinzong [8941-22] S6
Zhu, Yizheng [8949-49] S10
Zhu, Zhiting [8933-20] S6
Zhuang, Quincy [8950-46] SPSun
Zhukovsky, Sergei V. [8989-28] S8
Zia, Rashid 8994 Program Committee
Ziebell, Melissa [8990-36] S7
Ziefuß, Anna [8955-9] S2
Ziegler, David [8938-41] S8
Ziegler, Jed I. [8984-53] S14
Ziegler, Johann [8993-31] S6
Ziegler, Kyle [8973-3] S1
Zielinski, Rafał [8940-27] S5

Zielke, Andrzej [8932-3] S1
Zierbock, Sophie [8957-10] S3
Zilio, Sérgio Carlos [8964-46] SPTue, [8964-64] SPTue
Zilkie, Aaron J. [8990-18] S4, [9010-11] S4, [9010-11] S5
Zimányi, Gergely T. [8981-13] S4
Zimmer, Klaus-Peter [8967-9] S10, [8967-9] S5, [8968-37] SPTue
Zimmerley, Maxwell [8948-67] S11
Zimmerman, Brandon G. [8949-38] S8
Zimmerman, Joseph W. [8962-15] S4
Zimmermann, Bernhard 8948 Program Committee
Zimmermann, Christian [8993-44] S8
Zimmermann, Felix [8972-34] S8
Zimmermann, Hartmut [8938-14] S3
Zimmermann, Horst [8991-18] S5
Zimmermann, Lars [8988-19] S4, [8991-18] S5
Zimmermann, Markus [8967-25] S10
Zinchik, Alexander A. [8960-57] S15
Zink, Christof [8960-53] S14
Zink, Jeffrey I. 8957 Program Committee
Zinn, Kurt R. [8926-128] S3
Zinoviev, Oleg [8988-64] SPWed
Zint, Virginia [8935-38] S8
Ziolek, Carsten [8959-22] S6
Ziolkowski, Ewa [8963-27] S7
Zipfel, Warren R. 8948 Program Committee
Zito, Gianluigi [8960-42] S11



Call for Articles

SPIE Professional is accepting article proposals from members.

Future issues of the open-access magazine will cover career and industry topics as well as advances in optics, sustainable energy, high-power lasers, and more.

Do you know of a researcher, engineer, or entrepreneur who is making the world a better place?

Please submit your idea as a short outline or abstract to:

spieprofessional@spie.org

Ziyadi, Morteza [9007-23] S8
Zlobina, Ekaterina A. [8961-102] SPTue
Zogal, Karolina [9001-6] S2
Zolnai, Zsolt [8988-39] S8
Zolotovskiy, Igor O. [8941-39] SPMon, [8961-102] SPTue, [8980-59] SPWed
Zong, Jie [8961-68] SPTue, [9000-20] S5
Zorn, Martin [8965-28] S6
Zortman, William A. [8989-14] S5
Zotter, Stefan [8930-8] S2, [8930-9] S2, [8934-21] S4, [8934-58] S9, [8934-80] S12
Zou, Chang-Ling [8998-44] S10
Zou, Daniel [8965-6] S2
Zou, Jun [8943-102] S15, [8943-68] S10
Zou, Kuaisheng [8962-20] SPTue
Zou, Ling-Xiu [8960-34] S9
Zou, Xihua [9008-9] S7
Zou, Yi [8974-12] S4, [8988-5] S1, [8991-27] S6
Zou, Yi [8933-14] S4, [8989-23] S7, [8990-26] S5, [8990-31] S6, [8990-33] S6
Zou, Zhi [8990-49] S9
Zouaoui, Judy [8943-29] S5
Zoubi, Alaa [8928-37] S7, [8928-44] S9
Zoubir, Arnaud [8972-56] SPTue
Zrenner, Artur [8984-9] S2
Zribi, Olena [9005-9] S2
Zschiedrich, Lin [8980-7] S2, [8988-54] SPWed
Zubairy, M. Suhail 8997 Program Committee

Zuber, Agnieszka [8938-30] S6, [8957-24] S5
Zubia-Zaballa, Joseba [8983-16] S4
Zubkov, Leonid [8935-56] S12
Zucker, Erik P. 8965 Program Committee, 8965 S1 Session Chair, 8965 S2 Session Chair, [8965-6] S2
Zuffo, Marcelo Knorich [8979-16] S7
Zuhlke, Craig A. [8968-12] S3, [8968-27] S6
Zuitlin, Roey [8963-41] S4, [8963-41] S8
Zukauskas, Albertas [8970-9] S2, [8972-61] SPTue
Zulkafly, Nasir [8945-6] S2
Zulonas, Modestas [8986-79] SPWed
Zumer, Slobodan [9004-10] S3
Zunoubi, Mohammad R. [8961-95] SPTue
Zuo, Duluo [8962-22] SPTue
Zurauskas, Mantas [8934-20] S3
Zürch, Michael [8984-45] S12
Zuzak, Karel J. 8947 S8 Session Chair, 8979 Program Committee, 8979 S2 Session Chair, [8979-21] S2, [8979-21] S8
Zwiller, Valery [8997-33] SPWed
Zygadlo, Krystian [8982-9] S2
Zyss, Joseph [8955-11] S3, [8983-1] S1

Registration

Onsite Registration and Badge Pick-Up Hours
Moscone Convention Center, North Lobby

Saturday 1 February	7:00 am to 5:00 pm
Sunday 2 February	7:15 am to 5:00 pm
Monday 3 February	7:15 am to 5:00 pm
Tuesday 4 February	7:30 am to 5:00 pm
Wednesday 5 February	7:30 am to 5:00 pm
Thursday 6 February	7:30 am to 4:00 pm

Conference Registration

Includes admission to all conference sessions, plenaries, panels, poster sessions, admission to the both BiOS Expo and Photonics West Exhibition, Welcome Reception, technical and networking events, coffee breaks, and a choice of proceedings. Student pricing does not include proceedings.

Course and Workshop Registration

Courses and workshops are priced separately. Course-only registration includes your selected course(s), course notes, coffee breaks, and admittance to the exhibition. Course prices include applicable taxes. Onsite, please go to Course Materials Pickup after you pick up your badge. Multiple facilities may be used for courses; allow yourself enough time to register, pick up your materials and possibly walk to a nearby facility before your course begins.

Exhibition Registration

Exhibition-Only visitor registration is complimentary.

SPIE Member, SPIE Student Member, and Student Pricing

- SPIE Members receive conference and course registration discounts. Discounts are applied at the time of registration.
- SPIE Student Members receive a 50% discount on all courses.
- Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

Press Registration

For credentialed press and media representatives only. Please email contact information, title, and organization to media@spie.org.

SPIE Cashier

Registration Area
Open during registration hours
Registration Payments

If you are paying by cash or check as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the SPIE Cashier.

Receipts and Certificate of Attendance

Preregistered attendees who did not receive a receipt may obtain one at Badge Corrections and Receipts next to SPIE Cashier. Attendees who need a Certificate of Attendance may obtain those from the SPIE Cashier.

Badge Corrections

Badge corrections can be made at the Badge Corrections station. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

Refund Information

There is a US\$50 service charge for processing refunds. Requests for refunds must be received by 23 January 2014; all registration fees, will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions or Special Events purchased are not refundable.

U.S. Government Credit Cards

U.S. Government credit card users: have your purchasing officer contact the credit card company and get prior authorization before attempting to register. Advise your purchasing agent that SPIE is considered a 5968 company for authorization purposes.

Speaker Check-In and Preview Station

Esplanade

Saturday through Thursday 7:30 am to 5:00 pm

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to Speaker Check-In with their memory devices or laptops to confirm their presentation display settings.

Poster Sessions

To find out which poster session you are scheduled for, check the individual conference programs.

Poster Sessions in South Hall A (with BIOS Expo):

Saturday and Sunday 3:00 to 4:00 pm:
select BIOS conferences

Poster Sessions in Room 103 (Exhibit Level):

Sunday 5:30 to 7:30 pm:
select BIOS conferences

Monday 5:30 to 7:30 pm:
select BIOS conferences

Tuesday 6:00 to 8:00 pm:
all LASE and MOEMS-MEMS conferences
and select BIOS conferences

Wednesday 6:00 to 8:00 pm:
all OPTO conferences

Poster Setup Instructions

Setup hours vary

Saturday-Sunday BIOS Poster Sessions in South Hall A:

Set up your poster noon on Saturday, or 8:00 to 9:00 am on Sunday.

Sunday-Wednesday Evening Poster Sessions in Room 103:

Set up your poster from 10:00 am to 4:30 pm on the day of your assigned presentation.

Paper numbers will be placed on the poster boards in numerical order; please find your paper number and put up your poster in the designated space.

A poster author is required to stand by the poster during the scheduled poster session to answer questions from attendees.

Presenters who have not placed their poster(s) on their assigned board by 60 minutes prior to the session on the day of their presentation will be considered a “no show” and their manuscript will not be published.

Presenters must remove their posters immediately after the poster session. Any posters that are not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.

Coffee Breaks

Complimentary coffee will be served twice daily, at 10:00 am and 3:00 pm. Check individual conference listings for exact times and locations.

Saturday AM Esplanade Foyer
North Lower Lobby (Exhibition Level)

Saturday PM BIOS Expo (Exhibition Hall A)

Sunday AM & PM BIOS Expo (Exhibition Hall A)

Monday AM & PM Esplanade Foyer
North Lower Lobby (Exhibition Level)

Tuesday through Thursday Exhibition Halls A, B, C, D

Food & Refreshments for Purchase

Saturday through Thursday

A variety of food outlets will serve hot and cold snacks, espresso, beverages, hot entrees, deli sandwiches, salads, and pastries are available for purchase. Cash and credit cards accepted.

Food Outlets Open in the Exhibition Halls

Exhibition Hall A

Saturday Noon to 3:00 pm

Sunday 11:00 am to 3:00 pm

Exhibition Halls A, B, C, D

Tuesday through Thursday 10:00 am to 4:00 pm


Desserts

Saturday and Sunday BIOS Expo, Exhibition Hall A

Tuesday through Thursday Exhibition Halls A, B, C, D

Complimentary tickets for dessert snacks are included in course and conference attendee registration packets.

Car Rental

 Hertz Car Rental is the official car rental agency for this Symposium. To reserve a car, identify yourself as a Photonics West Conference attendee using the Hertz Meeting Code **CV# 029B0019**.

In the United States call **1-800-654-2240**

Parking During Photonics West

For parking information please check the SPIE website www.spie.org/x24985.xml

Internet Access

North Hall D Entrance (Exhibition Level)
Esplanade Lobby (Esplanade Level)

Complimentary wired internet access is available; attendees can hook up their laptops or use provided workstations.

Wireless

North Lower Lobby (Exhibition Level)
South Lobby

Complimentary wireless access is also available; instructions will be posted onsite.

Wireless internet sponsored by:

Lumen Dynamics Group Inc. and **OFS**

SPIE Conference App

iZone (North Lower Lobby)

Search and browse the program, special events, participants, exhibitors, courses, and more. Free Conference Apps also available for iPhone and Android smart phones.

SPIE Exhibitor Directory

iZone (North Lower Lobby)

Search exhibitors by name or booth numbers, browse products, and search technologies.

SPIE Bookstore

North Lower Lobby (Exhibition Level)

The SPIE Bookstore is your source for the latest SPIE Press Books, Proceedings, and Education and Professional Development materials. Become an SPIE Member, explore the Digital Library, take home a free SPIE poster, or buy a souvenir (tie, t-shirt, educational toys, and more).

SPIE Education Services

North Lobby

Browse course offerings and the other education services available: SPIE courses, videos, and CDs as well as customized in-company courses.

SPIE Press Room

Room 214 (Mezzanine Level)
Open during Registration hours

For Registered Press only. The Press Room provides meeting space, refreshments, access to exhibitor press releases, and Internet connections. Press are urged to register before the meeting by emailing name, contact information, and name of publication to media@spie.org. Pre-registration closes approximately 10 days before the start of the event.

SPIE Luggage and Coat Check

Saturday through Thursday
Room 102 (Exhibition Level)

Complimentary luggage, package, and coat storage are available. Please note posted hours; no late pickup available.

Business Center

Near Hall C on the Exhibition Level
Tuesday through Thursday

The Moscone Business Center provides full service business needs for your convenience. Their services include photocopying, faxing, computer workstations and printing services.

Restaurant and City Information

South Lobby

Monday through Wednesday 9:00 am to 5:00 pm

The San Francisco Travel Association will have Visitor's guides and maps available. Staff will be available during the posted hours to discuss city information including tips on local restaurants, the city's many attractions, sightseeing suggestions and transit information.

Child Care Services

- **ABC Bay Area Child Care Agency**, San Francisco, CA 94122, Phone: 415.309.5662
- **American Childcare Services**, 580 California Street, Suite 1600, San Francisco, CA 94104, Phone: 415.285.2300, americanchildcare.com

Urgent Message Line

An urgent message line is available during registration hours:
415.978.3700

Airline Check-In and Boarding Pass Kiosk

Room 102 (Exhibition Level)
Saturday through Thursday

Use this complimentary service to check in for your flight and print your boarding pass.

Lost and Found

Cashier – North Lobby

Found items will be kept at Cashier during the meeting and available only during registration hours. At the end of the meeting, all found items will be turned over to Moscone Security Control, 415.974.4021.

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

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SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, who in their sole opinion are not, or whose conduct is not, in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to any attendee, exhibitor, representative, or vendor who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

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SPIE is a professional, not-for-profit society committed to providing valuable conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members and meeting attendees. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violators will be asked to leave the event.

Identification

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued Photo ID at registration to collect registration materials.

Individuals are not allowed to pick up badges for attendees other than themselves. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

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By registering for this event, I grant full permission to SPIE to capture, store, use, and/or reproduce my image or likeness by any audio and/or visual recording technique (including electronic/digital photographs or videos), and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

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Payment Method

Registrants for paid elements of the event, who do not provide a method of payment, will not be able to complete their registration. Individuals with incomplete registrations will not be able to attend the conference until payment has been made. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also pay with Cash.

Authors/Coauthors

By submitting an abstract, you agree to the following conditions:

- An author or coauthor (including keynote, invited, and solicited speakers) will register at the author registration rate, attend the meeting, and make the presentation as scheduled.
- A full-length manuscript (6-page minimum) for any accepted oral or poster presentation will be submitted for publication in the SPIE Digital Library, printed conference Proceedings, and CD. (Some SPIE events have other requirements that the author is made aware of at the time of submission.)
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings and SPIE Digital Library (or via the requirements of that event).

Audio, Video, Digital Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use the materials presented in any meeting/course room, or in course notes on display without written permission. Consent forms for material presented in meeting rooms are available at Speaker Check-In. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media.

Exhibition Hall: For security and courtesy reasons, recordings of any kind are prohibited unless one has explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall.

Your registration signifies your agreement to be photographed or videotaped by SPIE in the course of normal business. Such photos and video may be used in SPIE marketing materials or other SPIE promotional items.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. Come to Speaker Check-In and test your laser pointer on our power meter. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Misuse of any laser pointer can lead to eye damage.

Access to Technical and Networking Events

Persons under the age of 18 including babies, carried or in strollers, and toddlers are not allowed in technical or networking events. Anyone 18 or older must register as an attendee. All technical and networking events require a valid conference badge for admission.

Underage Persons on Exhibition Floor Policy

For safety and insurance reasons:

- No persons under the age of 18 will be allowed in the exhibition area during move-in and move-out.
- Children 14 and older, accompanied by an adult, will be allowed in the exhibition area during open exhibition hours only
- All children younger than 14, including babies in strollers and toddlers, are not allowed in the exhibition area at any time.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

At SPIE events where wireless is included with your registration, SPIE provides wireless access for attendees during the conference and exhibition but cannot guarantee full coverage in all locations, all of the time. Please be respectful of your time and usage so that all attendees are able to access the internet.

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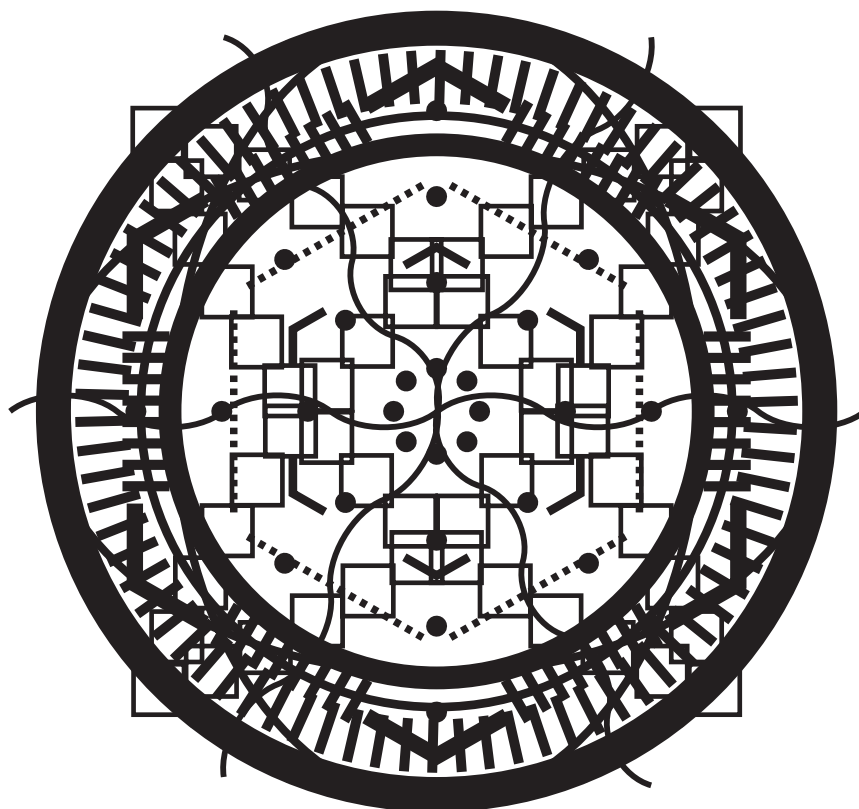
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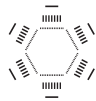
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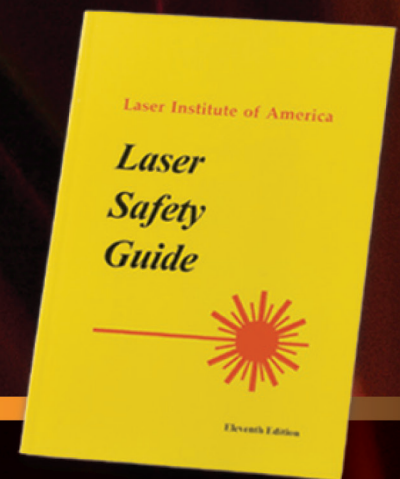
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