2014 MOEMS-MEMS
SPIE Photonics West Call for Papers
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Location
The Moscone Center
San Francisco, California, USA

Conferences and Courses
1–6 February 2014

Exhibition
BiOS Expo: 1–2 February
Photonics West: 4–6 February
www.spie.org/moemscall

Call for Papers
Submit your abstract by
22 July 2013
2014 MOEMS-MEMS
SPIE Photonics West

Advance your research by showcasing your results at MOEMS-MEMS

TECHNOLOGIES
- Micro/Nanofabrication
- Devices/Applications/Reliability
- Green Photonics

Call for Papers

Conferences and Courses: 1–6 February 2014
BiOS Expo: 1–2 February 2014
Photonics West Exhibition: 4–6 February 2014

The Moscone Center
San Francisco, California, USA
Plan to Participate

Share your research and development activities with colleagues, sponsors, customers, technologists, engineers, scientists, and clients in the growing industry of micro- and nanofabrication of MOEMS and MEMS. Micro- and nanofabricated electromechanical and optical components, created by batch processing, provide the missing links to the mass-produced miniaturized products and systems of the future—superior in cost, performance, and reliability. Now more than ever, these technologies help provide an engine for future economic growth. Be a part of this evolution by presenting at this international premier symposium event.

Moving toward this 19th annual symposium on MOEMS-MEMS, we have seen exceptional growth in the fields of micro- and nano-optics, especially through their merger with MEMS/BioMEMS and Microfluidics. We also enter the 12th year as a part of SPIE Photonics West; collocation with other Photonics West symposia on biomedical optics, laser applications, and integrated optoelectronics devices adds tremendous value to this symposium, making it an ideal forum for discussing emerging applications of micro- and nanotechnologies in these hot areas.

It is our goal to provide papers on new developments of MOEMS and MEMS technologies at both the basic research and commercialization stages. Microelectromechanical systems, or MEMS, refers to all aspects of the design, fabrication, operation, reliability, and testing of microdevices that have both electrical and mechanical elements. Micro-opto-electromechanical systems, or MOEMS, include optical, electrical and mechanical elements (that is, the merging of micro-optics and MEMS).

One of the unique features of this MOEMS-MEMS symposium is the strong presence of industrial and international participants. It offers multiple exciting conferences related to microfabrication processes, device and system reliability and packaging, testing, and characterization of MEMS and MOEMS. Other topics include MEMS adaptive optics, microfluidics, BioMEMS, RF MEMS, optical MEMS and medical microsystems, advanced micro- and nano-fabrication technologies for optics and photonics, MOEMS displays and imaging, and miniaturized microsystems and their applications. Awards for Best Papers will be presented within many of the conferences and for the symposium as a whole.

The 2014 symposium on MOEMS-MEMS will feature exciting joint sessions with other SPIE Photonics West symposia, facilitating interaction of a larger and diversified group of participants, and we will kick off with outstanding plenary speakers addressing cross-cutting and emerging technologies, while individual technical conferences offer more focused topics featuring excellent Keynote speakers, invited papers, and exciting panel discussions. Many courses will be available throughout the week of the symposium, while the Exhibition offers a chance to visit with representatives from more than 1300 companies. As a participant, you will have the opportunity to meet other innovative people, form new relationships, and invigorate your thinking. Please join us!

Symposium Chair

David L. Dickensheets
Montana State Univ. (USA)

Symposium Cochair

Holger Becker
microfluidic ChipShop GmbH (Germany)
Executive Organizing Committee

Holger Becker, microfluidic ChipShop GmbH (Germany)
Thomas G. Bifano, Boston Univ. (USA)
Michael R. Douglass, Texas Instruments Inc. (USA)
Sylvain Gigan, Institut Langevin (France)
Bonnie L. Gray, Simon Fraser Univ. (Canada)
Philip S. King, Texas Instruments Inc. (USA)
Joel Kubby, Univ. of California, Santa Cruz (USA)
Benjamin L. Lee, Texas Instruments Inc. (USA)
Mary Ann Maher, SoftMEMS (USA)
Yong-Hwa Park, Samsung Advanced Institute of Technology (Korea, Republic of)
Wibool Piayawanathanmetha, NECTEC (Thailand)
and Chulalongkorn Univ. (Thailand)
Rajeshuni Ramesham, Jet Propulsion Lab. (USA)
Paul J. Resnick, Sandia National Labs. (USA)
Raymond C. Rumpf, The Univ. of Texas at El Paso (USA)
Winston V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)
Herbert R. Shea, Ecole Polytechnique Fédérale de Lausanne (Switzerland)
Georg von Freymann, Technische Univ. Kaiserslautern (Germany)

MOEMS-MEMS Founding Chair
M. Edward Motamedi
Revoltech Microsystems (USA)

Steering Committee Chair
Rajeshuni Ramesham
Jet Propulsion Lab. (USA)

Steering Committee
Holger Becker, microfluidic ChipShop GmbH (Germany)
David L. Dickensheets, Montana State Univ. (USA)
Albert K. Henning, Aquarian Microsystems (USA)
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M. Edward Motamedi, Revoltech Microsystems (USA)
Patrick I. Oden, Texas Instruments Inc. (USA)
Ray Roop, Freescale Semiconductor, Inc. (USA)
Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany)
Thomas J. Suleski, The Univ. of North Carolina at Charlotte (USA)
Marilyn Gorsuch, SPIE (USA)

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.

The global community recognizes the need for sustainable and renewable energy sources, as well as the need to conserve resources and spur economic growth.

SPIE Green Photonics virtual symposium highlights the latest photonics and optoelectronic tools and materials that will reduce power consumption, enable cleaner manufacturing, and create new energy generation for a broad range of applications.

To be considered for inclusion in the SPIE Green Photonics virtual symposium, submit your abstract online, and enter “GREEN” when prompted if your research is on improvements in energy/sustainability/conservation. If your paper is accepted, SPIE will contact you to collect a 1-2 page summary explaining how your research is “green.” If your paper is selected by Green Photonics selection committee, your presentation will be cross-listed in the SPIE Green Photonics Virtual Program, and you will be eligible to win an SPIE Green Photonics Best Paper Award.

Papers are solicited on the following and related topics:

• Solid State Lighting and Displays
  Efficient new light sources will provide long-lived and economical illumination for human activities and information display.

• Laser-assisted Manufacturing and Micro/Nano Fabrication
  Optoelectronic sensors and concentrated optical energy sources will enable precision fabrication with low waste.

• Communications
  The next generation of optical networks will operate with increased bandwidth and reduced power consumption.

• Renewable Energy Generation: Fusion and Photovoltaics
  Small carbon footprint technologies will help meet the world’s increasing demand for energy in a sustainable manner.
General Information

Venue
The Moscone Center
747 Howard Street
San Francisco, CA 94103-3118 USA

San Francisco is often called “Everybody’s Favorite City,” a title earned by its scenic beauty, cultural attractions, diverse communities, and world-class cuisine. Visitors rate the atmosphere and ambience as their top reason for visiting San Francisco. Measuring 49 square miles, this walkable city is dotted with landmarks like the Golden Gate Bridge, cable cars, and Alcatraz.

Registration
SPIE Photonics West registration will be available October 2013

All participants, including invited speakers, contributed speakers, session chairs, co-chairs, and committee members, must pay a registration fee. Authors, coauthors, program committee members, and session chairs are accorded a reduced symposium registration fee.

Fee information for conferences, courses, a registration form, and technical and general information will be available on the SPIE website in October 2013.

Hotel Information
Opening of the hotel reservation process for SPIE Photonics West 2014 is scheduled for the beginning of June 2013. SPIE will arrange special discounted hotel rates for SPIE conference attendees. The website will be kept current with any updates.

Student Travel Grants
A limited number of SPIE student travel grants will be awarded based on need. Applications must be received no later than 25 November 2013. Eligible applicants must present an accepted paper at this meeting. Offer applies to undergraduate/graduate students who are enrolled full-time and have not yet received their PhD.

Clearance Information
If government and/or company clearance is required to present and publish your presentation, start the process now to ensure that you receive clearance if your paper is accepted.

Important News for All Visitors from Outside the United States
Find important requirements for visiting the United States on the SPIE Photonics West website. There are new steps that ALL visitors to the United States need to follow.

Online at: www.spie.org/visa
Micro/Nanofabrication

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VII (MF106)

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); Shanalya 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, Impatt Solutions (USA)

Conference Best Paper Award and
Best Student Paper Award Cosponsor:

Electron and Ion Beam Fabrication of Micro- and Nano-optics
- single and multilayer resists
- analog and multi-exposure methods
- unique patterning and beam controls
- three-dimensional structuring.

Ultrafast Laser Micromachining
- surface and bulk micromachining for micro- and nano-optics, fabrication of 2D and 3D waveguides, and the fabrication of novel optical elements.

Etching Technologies
- reactive ion etch (RIE) and chemically assisted etching of analog surfaces and high-aspect ratio structures
- focused ion beam and plasma jet etching
- processing of micro/nano optics and photonics in glass, silicon, and III-V and II-VI materials.

Deposition and Growth Technologies
- self-assembly and nucleation site control (2D and 3D)
- atomic-layer deposition
- lithographically defined selective growth
- pre-patterned and strain engineered templates.

Materials Issues and Technologies for Polymeric and Sol-Gel Micro- and Nano-optics
- LIGA, SLIGA, and related processes
- sol-gel processing methods for free-space and guided wave optics
- polymer replication
- novel photoresists.

Processing of Nanophotonic Devices
- holographic lithography and multi-beam exposure methods for photonic crystals
- patterning and etching of multilayer DBR structures
- porous silicon
- selective etching techniques for 2D and 3D photonic crystal fabrication
- fabrication of polarization optics
- nano-patterning for site selective growth
- texturing and patterning for enhanced light extraction
- fabrication of plasmonic devices
- quantum device fabrication for micro and nano-devices.

Technologies for fabrication of optics and photonics at the micro- and nano-scales continue to advance and diversify due to rising demands for miniaturization, cost reduction, functional integration, and increased performance in optical and photonic systems. Examples include diffractive optics, sub-wavelength optics, microrefractive optics, optical waveguides, photonic crystals, photonic metamaterials, plasmonic devices, and heterogeneously integrated micro- and nano-optical devices. These devices are playing increasing roles in a wide range of applications, including sensors, communications, imaging, biomedical, data storage, and other areas.

Both conventional and unconventional micro- and nano-fabrication techniques serve as fundamental enablers for wide ranges of passive and active optical components and devices. To this end, this conference provides a forum for exchange of viewpoints and reports on new techniques and advances in fabrication methods for optics and photonics at the micro- and nano-scales. Applications enabled through these novel fabrication processes are also appropriate.

Topics of interest include, but are not limited to:

Non-Conventional Lithography and Novel Approaches
- DNA based plasmonic self-assembly
- nano-imprint lithography
- plasmonic lithography
- dip-pen lithography
- two-photon processes for two-dimensional and three-dimensional micro- and nanostructures
- ink jet printing
- soft-lithography
- STED inspired lithography.

Lithographic Fabrication Approaches
- fabrication methodologies based on binary, grayscale, interferometric, and laser direct-write techniques
- additional techniques, such as additive lithography, and lift-off processes for sub-micron patterning.
Call for Papers

BEST PAPER AWARDS

We are pleased to announce that a cash prize, sponsored by Nanoscribe GmbH, will be awarded to the best paper and best student paper in this conference. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a cash prize.

To be eligible for the Best Paper Award, you must:
• be listed as an author on an accepted paper within MF106
• have conducted the majority of the work to be presented
• submit your manuscript online by 6 January
• present your paper as scheduled.

To be eligible for the Best Student Paper Award, you must:
• be a student without a doctoral degree (undergraduate, graduate, or PhD student)
• be listed as an author on an accepted paper within MF106
• have conducted the majority of the work to be presented
• submit your manuscript online by 6 January
• present your paper as scheduled.

Nominations
To be considered, send an email to Georg von Freymann [mailto:georg.freymann@physik.uni-kl.de] by 6 January 2014 (include the presenter’s name, email, paper title, and paper number, and indicate the award for which to be considered).

Micro- and Nano-optical Integration and Manufacturing
• passive and/or active integration
• quality and metrology issues
• volume fabrication techniques for micro- and nano-optics and photonics.

Mechanical Machining of Micro- and Nano-optics
• mechanical ruling and diamond turning
• microgrinding, flycutting, and multi-axis free-form micro-machining of micro- and nano-optics.

3D Printing
This session is addressed to recent progress in 3D printing on the micro- and nano-scale. 3D printing establishes itself as a powerful rapid-prototyping tool, relying on technologies as ink-jet printing, stereolithography, two-photon polymerization and others. Novel materials are developed providing, e.g., better functionality, conductivity or biocompatibility.

GREEN PHOTONICS
SPIE Photonics West

SPIE Green Photonics virtual symposium highlights the latest photonics and optoelectronic tools and materials that will reduce power consumption, enable cleaner manufacturing, and create new energy generation for a broad range of applications. See page 2 for information.

SPIE Digital Library

The paper you present will live far beyond the conference room
All proceedings from this event will be published in the SPIE Digital Library, promoting breakthrough results, ideas, and organizations to millions of key researchers from around the world.

Helping engineers and scientists stay current and competitive
— www.SPIEDigitalLibrary.org

MOEMS14 Insides#5.indd 5 5/1/13 5:47 PM
Successful MEMS and optical MEMS products depend on the development of novel and cost-effective manufacturing techniques and fabrication processes. This conference is intended to bring together process developers and integrators, device and system creators, and manufacturing engineers and researchers who are interested in the present and future state of MEMS/MOEMS process technologies. The topics covered in the conference will include novel fabrication, packaging and assembly techniques, process integration of MEMS/MOEMS and ICs, and manufacturing-driven process development. Special emphasis will be placed on the application of MEMS/MOEMS processes to new commercial products and issues such as manufacturability, yield management, reliability and process characterization associated with bringing these products to high-volume manufacturing. The topics for this conference include, but are not limited to:

**Microfabrication Techniques for MEMS and Optical MEMS**
- bulk and surface micromachining
- lift-off processes
- deposition techniques including ALD (atomic layer deposition)
- lamination and multi-layer deposition
- growth techniques
- texturing, patterning and etching techniques including wet etching
- use of lasers in MEMS/MOEMS manufacturing
- grinding, polishing and planarization techniques
- lithography including soft lithography, nano-imprinting, dip-pen, plasmonic and holographic
- mask making and grey scale masks
- e-beam and direct write patterning methods.

**High-Aspect Ratio Microfabrication Technologies**
- DRIE and deep-trench etching
- thick resist materials and processes
- conformal deposition and trench fill processes
- LIGA
- Electroplating.

**Fabrication Processes and Technologies**
- fabrication technologies for new categories of devices such as microphotonic, microfluidic and energy-scavenging devices
- nanotechnologies
- display and camera process technologies
- glass and plastic processes.
- silicon on insulator (SOI) processes
- photonic crystal fabrication
- high frequency device fabrication including plasmonics
- scaffolding and biomaterial deposition and growth
- quantum scale device fabrication
- novel photovoltaic and waveguide processing.

**Materials and Materials Characterization**
- thick polysilicon, porous silicon
- polymers and resins
- novel materials
- III-V and II-VI materials
- ceramics
- magnetic materials
- sol gels
- meta-materials
- anti-stiction and wear-resistant coatings
- nanomaterials
- materials compatibility
- material properties and their measurement
- test structures.

**Manufacturability Issues**
- processing effects on yield and reliability
- yield management and enhancement
- in-situ metrology
- design for manufacturability.

**MEMS and Electronics Co-manufacturing Processes**
- process integration between MEMS/MOEMS and IC processes
- silicon photonics processes
- MEMS and Integrated circuits
- photonic interconnects
- on-chip light generation.

**Packaging Technologies**
- wafer level capping
- TSV (through silicon vias)
- chip stacking
- packaging for multiple MEMS/MOEMS and electronics
- SiP (system in package)
- manufacturable packaging techniques
- wafer scale devices and packaging
- cleaning, dicing, bonding, and assembly methods.

**MEMS Foundries and Product Development**
- technology transfer
- rapid prototyping
- foundry processes
- multi-project wafer processes
- process issues for high volume manufacturing.

**Software for MEMS Design and Manufacturing**
- numerical analysis software for device, process and device simulation
- software for MEMS device design and analysis
- software for MEMS/MOEMS modeling, compact modeling, reduced order modeling
- modeling of micro-scale and nano-scale phenomena
- statistical analysis, yield analysis and optimization
- manufacturing costing tools and software.

**3D Printing**
This session is addressed to recent progress in 3D printing on the micro- and nano-scale. 3D printing establishes itself as a powerful rapid-prototyping tool, relying on technologies as ink-jet printing, stereolithography, two-photon polymerization and others. Novel materials are developed providing, e.g., better functionality, conductivity or biocompatibility.
Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XIX (LA110)

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 Raciuikaitis, 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 Sugioaka, RIKEN (Japan)

This conference of related interest is part of LASE 2014, co-located at Photonics West: www.spie.org/lasecall

The aim of this conference is to provide a forum for discussion of fundamentals, methods, and techniques in laser materials processing and their relation to the applications and manufacturing of micro- and nanoscale electronic, photonic, optical, mechanical, fluidic, energy, and hybrid devices. As in previous years, we expect to offer awards for the best student poster and student oral presentations. Papers are solicited on, but not limited to, the following topics within the broad area of microelectronics and optoelectronics manufacturing:

- fundamental aspects of laser-materials interaction
- laser modification of materials (annealing, doping, intermixing, photosensitivity)
- laser cleaning, texturing, bending, and repair
- laser microscale materials processing and manufacturing
- laser nanoscale materials processing and manufacturing, including near-field nano-optical lithography and materials processing
- pulsed-laser deposition, laser-assisted thin-film epitaxy, atomic-layer epitaxy, resonant infrared pulsed-laser deposition, thin film and wafer processing
- direct-write technologies
- laser additive manufacturing and rapid prototyping
- parallel laser manufacturing
- laser processing from cw to fs time scales
- laser processing across wavelength scales from VUV to IR
- laser manufacture of MEMS and microsystems, including microfluidic chips
- laser processing in microelectronic and optoelectronic manufacturing, including laser micro processing of electronic or optoelectronic material for advanced devices and integrated systems
- generation and dynamics of laser ablation plumes, including gas-dynamic effects, charge generation, and charge transfer
- modeling of laser-materials and laser-plume interactions for quantitative prediction of process parameters
- novel laser systems and optics for materials processing and device fabrication
- laser-induced modification of glasses or transparent materials for applications in optoelectronic and photonics.

Call for Papers

JOINT SESSION with LA110 and LA111—Photovoltaics, alternative energy sources, and advanced energy storage systems

This session is addressed to recent progresses in laser-assisted development and fabrication of advanced solar cell devices, energy sources, and advanced energy storage systems and materials. A broad range of advanced laser processes are of interest including materials research and applications such as hole drilling, groove formation, edge isolation, cutting, doping, soldering, and laser thin film ablation for silicon or organic solar cells, energy source, and advanced energy storage systems (e.g. lithium-ion batteries).

JOINT SESSION with LA110 and LA112—Laser Modification of Nanomaterials

The intent of this session is to present recent research in laser interactions with nanomaterials for the development of new laser-based processing techniques. This includes laser interactions with nanomaterials resulting in physical transformations such as melting, alloying, shaping, welding, sintering, and solidification, laser-induced chemical modifications to nanomaterials, mechanisms of laser-induced defect generation or healing, laser processing techniques to move, self-assemble, or separate nanomaterials, as well as laser-based processing techniques for producing plasmatic nanostructures.

JOINT SESSIONS with LA110 and LA113—Ultrafast Laser Micromachining

This session will address important emerging technologies at the picosecond, femtosecond and attosecond time scale, for a broad audience of researchers in the fields of ultra-fast lasers and laser processing, together with experts at the forefront of alternative micro- and nanofabrication technologies. The topics will cover, but will not be limited to, fundamentals of ultra-fast laser-matter interaction and novel machining techniques.

JOINT SESSION with LA110 and LA114—Additive Manufacturing and 3D Printing

The intent of this session is to present research in additive manufacturing and 3D printing. This includes laser-based digital fabrication techniques and processes, which offer the greatest versatility and range in terms of feature size (nano to macro), material type (from metals and ceramics to organics), phase (bulk to porous, homogenous to graded compositions), and processing options (from ablative to sintering and physical to chemical modification).
Micro/Nanofabrication

Laser-based Micro- and Nano-Processing VIII (LA111)

Conference Chairs: 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 Couvroux, 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. Politecnica 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)

This conference of related interest is part of LASE 2014, co-located at Photonics West: www.spie.org/lasecall

Cutting-edge technological visions and applications are increasingly based on micro- and nano-system technologies. The realization of such devices or functional prototypes is often a new challenge for patterning, structuring, and processing. Scientists and engineers are increasingly confronted with tasks that cannot be accomplished with conventional tools.

Demands in high-tech industries are growing for specialized prototype and high-throughput devices with micro- and nano-structured surfaces including fluidic, biologic, chemical, electronic, mechanical, or photonic features. Nano-materials and nano-structuring technology increasingly coexist with micro-materials and micro-structuring technologies leading to new applications and research fields but also to new challenges for appropriate assembly and processing technologies. Laser-assisted applications is emerging as an increasingly important technology which can be established in new technical approaches, in order to overcome apparent process limitations on nearly each material and for different length scaling. The aim of this conference is to bring together scientists and engineers working on laser-based processes on micro- and nanometer scale for advanced applications such as for photovoltaics, energy storage systems, photonic devices (OLED), MOEMS, MEMS, micro-fluidic devices, analytical systems (e.g. lab-on-chip), or bio-compatible devices. Papers are solicited on the following application-oriented topics and other packaging related issues:

- fundamental physical and chemical issues in laser-based micro- and nanofabrication, processing, and assembly
- laser material processing for metals, polymer, ceramics, semiconductor, or dissimilar materials
- laser ablation (cutting, scribing, dicing, drilling, cleaving)
- laser joining (welding, soldering, bonding, splicing, sealing)
- laser transformations and modification for integrated device functionalities (annealing, curing, alloying, doping, metallization, texturing, interference patterning, cleaning, polymerization, sintering, cladding, bending, forming change of chemical/physical properties, transferring)
- laser ablation and micro- and nano-machining relevant for device fabrication and processing (drilling, marking, engraving, milling, caving, texturing, trimming, deflashing, lithography)
- laser processes for alternative energy sources and advanced energy storage systems (e.g. lithium-ion batteries), power-electronics devices, high-brightness white LEDs, photovoltaics processing including contact formation, laser-assisted selective metallization, edge isolation, thin film processing, soldering, etc.
- laser processing and packaging of thin and flexible advanced electronic, optoelectronic, and photonic components including OLED
- structuring, packaging, and assembling of components in micro-reaction technology, micro-electronic and photonic devices, MOEMS, MEMS/bio-MEMS, MEMS, micro- and nano-fluidic devices and analytical systems (e.g. lab-on-chip)
- advanced adaptive optics and beam engineering methods for improving laser processes, yields, and throughput.
- innovative “green photonics” for micro- and nano-processing and assembly.

JOINT SESSION with LA110 and LA111

Photovoltaics, alternative energy sources, and advanced energy storage systems

This session is addressed to recent progresses in laser-assisted development and fabrication of advanced solar cell devices, energy sources, and advanced energy storage systems and materials. A broad range of advanced laser processes are of interest including materials research and applications such as hole drilling, groove formation, edge isolation, cutting, doping, soldering, and laser thin film ablation for silicon or organic solar cells, energy source, and advanced energy storage systems (e.g. lithium-ion batteries).
Microfluidics, BioMEMS, and Medical Microsystems XII (MF104)

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, Sandia National Labs., California (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, Harvard Univ. (USA); Albert van den Berg, Univ. Twente (Netherlands); Wanjun Wang, Louisiana State Univ. (USA); Bernhard H. Weigt, PATH (USA)

The purpose of this conference is to provide an international technical forum to showcase recent advances in microfluidics, BioMEMS, and medical Microsystems. Microfluidic devices and systems have created a tremendous interest in many application fields, including life sciences, point of care (POC) diagnostics, and environmental applications. They offer many advantages over the existing macroscale systems, including compact size, disposability, higher speed and parallelism of analyses, increased functionality and decreased sample/reagent volumes. In the life sciences, research efforts have focused on bio/chemical analyses, pharmaceutical high-throughput systems, and biomaterial surface modification. The interaction of microsystems with living cells or tissues opens a pathway to novel methods of medical diagnostics and therapeutics. Thus, the range of interests has expanded from the molecular scale over single cells to more complex biological systems, and finally, living organisms. Further, several conventional methods in medical engineering for diagnosis and therapy have also been shifting towards miniaturization and MEMS technologies, including minimally invasive surgery, in vivo and ex vivo monitoring, and smart implants. Last, but not least, environmental applications have focused on developing inexpensive sensors for in situ monitoring of contaminants in the environment for public safety or measuring a person’s exposure to environmental contamination.

For many of these applications, microfluidics and other MEMS technologies are essential, as they provide the functional basis of many research tools as well as commercial devices and applications. Thus, over the past several years, there has been a significant increase in the activities associated with understanding, development, and application of micromechanical and microfluidic devices and systems for BioMEMS and medical Microsystems.

Papers are solicited on the following major topics and other related subjects:

Micro/Nano Fluidic Components
- fluid delivery, transport, and control
- micro -valves, -pumps, -mixers, and -reactors
- nanofluidic devices and systems
- microdroplet generation and manipulations
- micro-HEATING/cooling devices
- emerging microfluidic approaches (inertial microfluidics, electrofluidics, optofluidics)
- CAD, modeling, and analysis.

Microfabrication Technologies for Microfluidics and BioMEMS
- polymer microfabrication methods
- emerging fabrication technologies (e.g., paper microfluidics)
- fluidic modules and interconnects
- fluidic packaging and assembly
- microstructuring of organic materials
- functional materials for microfluidics and BioMEMS
- surface texturing and modification.

Applications of Microfluidics, BioMEMS, and Medical Microsystems
- point-of-care (POC) medical monitoring and diagnostics
- nano bio/medical sensors
- optofluidics, on-chip waveguides and optical detection
- cell-based sensing devices and systems, flow cytometry
- implantable medical Microsystems
- sensors and systems for environmental monitoring
- sensors and systems for in vitro/in vivo monitoring and diagnosis
- microfluidic-based drug development and analysis.

Microfluidics plays an important role in the realization of devices and systems for pathogen detection in applications such as food safety or bioterror threat detection. Miniaturization and functional integration can lead to portable instruments which can be field-deployed or applied in-line in production monitoring. The recent advances in this field and its growing importance will be recognized in a joint sessions between the two conferences “Frontiers in Biological Detection” (BO114) and “Microfluidics, BioMEMS and Medical Microsystems” (MF104).

BEST STUDENT PAPER AWARD

A $500 cash prize sponsored by microfluidic ChipShop GmbH and the Ohio Center for Microfluidic Innovation will be awarded to the best student paper.

Judging and Requirements

Presentations and manuscripts will be judged based on scientific merit, impact, and clarity. Candidates for the award need to be the presenting author, a full-time student, must have conducted the majority of the research presented in the paper, and must submit their manuscript by the deadline (6 January 2014).

Nominations

To be considered, submit your abstract online, select “Yes” when asked if you are a full-time student, and select yourself as the speaker.
The purpose of this conference is to provide a technical stage to present and publish recent advances in the reliability, packaging, testing, and characterization of micro-optoelectromechanical systems (MOEMS), microelectromechanical systems (MEMS), optical MEMS, nanodevices, and miniaturized systems for various applications. We are soliciting high-quality papers on the following topics:

- **Packaging process reliability**, including packaging materials, assembly processes, bonding materials, wafer-level packaging, high-vacuum packaging, hermeticity, leak testing, new testing tools to monitor hermeticity, thin-film getters and activation techniques, packaging without hermeticity, MEMS assembly cleanroom science, issues in integration of MEMS/MOEMS and ICs/ASICs/FPGAs/PCIs, nondestructive evaluation of packaged systems (x-ray, acoustic microscopy, IR), effects of extreme and harsh environments (low and high temperature, radiation, shock, vibration), commercial-off-the-shelf (COTS) solutions, simulations/models, lead-free solder, and predictions of lifetime of packaged MEMS systems.

- **BEOL process reliability issues**, including production and yield improvement, yield improvement by reducing stiction, parametric test methods and/or test structures used to assure fabrication processes, release methods and techniques, yield modeling, and process control methodologies.

- **Reliability methodology**, including aging, dormancy, early life failures, accelerated life testing, predictive models, acceleration factors, design of experiments, physics of failure, reliability in design, measurement techniques and properties, data reduction and visualization, scaling issues, reliability tool development, automation, and device/system reliability.

- **Reliability of surfaces**, including stiction, adhesion, lubrication, critical point drying methods, self-assembled monolayers (SAMs) or other coating materials, tribology, surface molecular contamination, particulate contamination, and contact resistance.

- **Reliability of materials**, including fracture, static and cyclic fatigue, wear, and life-cycle predictability.

- **Testing methods**, including qualification of devices or systems, environmental testing (shock, vibration, temperature extremes, humidity, power cycling, contact cycling), highly accelerated lifetime testing (HALT), verification, and automation.

- **Standards development**, including testing and measurement standards of devices or MOEMS/MEMS materials properties.

- **Characterization methods**, including metrology tool development, laser Doppler vibrometry, interferometric methods, confocal microscopy, automation, calibration, and comparison to models.

- **Failure Mode Effect Analysis (FMEA)**, including identification of failure modes and mechanisms, novel analysis techniques, novel tools, and case histories.

- **Reliability of MOEMS/MEMS devices/systems for space applications**.

- **Reliability of MOEMS/MEMS devices and miniaturized systems for oil and gas applications**. In particular sensors for harsh environments in applications such as downwell fuel analysis (DFA).

- **Reliability of MOEMS/MEMS, devices and miniaturized systems for medical applications**. In particular sensors for applications such as intravascular ultrasound (IVUS).

- **Reliability and miniaturization aspects of MEMS/MOEMS for automotive applications** (potential joint session, depending on contributions from other conferences).

### SPECIAL SESSIONS

- **Hot Commercial MEMS/MOEMS Products**

MOEMS/MEMS devices, optical MEMS are not a mere research topic but are found widespread in a large number of commercial products, as a result of many years of research and development in MEMS fabrication and reliability. In this session, leading worldwide experts/vendors/developers from the MOEMS/MEMS industry are invited to submit 10-min presentations showing the state-of-the-art in commercial MOEMS/MEMS devices, their reliability and packaging. No full paper submission is required, just the 10-min presentation slides that will be made available to the registered participants.
Call for Papers

JOINT SESSION with MF102, MF105, and MF107

MEMS/MOEMS, Nanodevices, and Miniaturized Systems for Space Exploration

MOEMS/MEMS and nanotechnology are key in the miniaturization of systems for Space instrumentation. The utilization of MOEMS/MEMS and nanotechnology in Nano- and Pico-Sat missions allows not only a cost and size reduction but also an acceleration of the instrument development cycle, therefore increasing the number of science experiments that can be carried out in Space. Furthermore, miniaturized systems are of utmost importance in Space Exploration Missions, where such devices can be integrated in different Rovers to perform a great variety of analyses. A great deal of work is still needed, though, to ensure that the MEMS/MOEMS based microdevices present the required reliability to be included in Space Missions and to develop standards and MOEMS Space Qualification plans.

In this Special Focused Session, papers are solicited in the following topics:

- Miniaturized systems based on the use of MEMS/MOEMS; micro-assembly and nanotechnologies for use in Space. Particular areas of interest include: photonic devices, microbolometers, microfluidic devices and lab-on-a-chip for use in Space applications and Space Exploration, DMD, adaptive optics, microenergetics, micro-propulsion devices, RF MEMS, etc.
- Miniaturized instrumentation for use in Space Exploration, such as the Mars Rover.
- MEMS applications in Astronomy and Earth Observation.
- Packaging of MEMS/MOEMS and nanodevices and packaging reliability issues.

MOEMS/MEMS, Optical MEMS Design for Test, Characterization, and Reliability

MOEMS, MEMS, Optical MEMS are complex systems that are difficult to accurately test and characterize. Testing is further complicated by needs of packaging MEMS. MOEMS/MEMS design-for-test can greatly increase learning and development cycles by enabling measurements of key metrics related to process tolerances, material parameters, performance, and reliability.

In this Special Session, papers are solicited in the following topics:

- Test structures for MOEMS, MEMS, optical MEMS, optical performance, material properties, and degradation
- Determining process tolerances with the structures
- Simplified models for characterizing MEMS validated with FEA modeling and/or experiment
- Packaging innovations for MEMS test, characterization, and reliability
- Design-for-test of MOEMS, MEMS, NEMS, microfluidics, RF MEMS, optical MEMS.

Critical Dates

Abstract Due Date: 22 July 2013

Post-Meeting Manuscript Due Date: 6 January 2014

Please Note: Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.
Micro and nano-technology based optical components and sub-systems are enabling the creation of highly functional systems with diverse applications including optical switches and spectrum analyzers, human interface components, imaging instruments, direct-write lithography tools and all-optical signal processing modules. MOEMS (for Micro-Opto-Electro-Mechanical-Systems) are MEMS devices or systems that sense or manipulate light. They exploit refraction, reflection or diffraction principles to control light intensity, polarization or phase. Prominent applications include spatial light modulators and devices for beam steering and beam shaping. The SPIE conference on MOEMS and Miniaturized Systems will address various aspects relating to technology development, systems integration, and new applications related to the following topics are solicited: MOEMS Devices

• design and simulation of MOEMS devices
• MOEMS for beam shaping, aberration correction, focus control devices, enhanced imaging, and visual aids
• micro optical 1D, 2D, and 3D beam steering components
• micromirror arrays and spatial light modulators
• micromachined diffraction grating, interferometric display and imaging devices
• micromachined microbolometer, pyroelectric, and other IR and thermal imaging sensors
• micromachined ultrasonic transducer arrays
• spectroscopic imaging devices
• tunable devices, tunable filters, lasers, lenses, microlens arrays, and DOE
• photonic crystals, waveguides and filters
• optical shutters and optical switching devices.

Systems, Subsystems, and Applications

• novel miniaturized optical subsystems, systems and instrumentation
• MOEMS for telecommunication, computer, automotive, and military applications
• MOEMS display systems (2D, 3D, holographic) and imaging systems
• MOEMS for biomedical/biological imaging systems (confocal, two-photon, SHG, fluorescence, Raman, multimodality imaging) including endoscopic imaging systems and ultrasonic imaging

Digital Micromirror Device (DMD) applications
• MOEMS instruments for space exploration
• MOEMS for medical diagnostics and health monitoring (Bio-MOEMS) and bench-on-a-chip
• MOEMS for sensing systems
• photonic crystal based subsystems and applications
• MOEMS for nanotechnology
• design and simulation of MOEMS based subsystems and systems
• control schemes and circuits for MOEMS
• MEMS based laser beam optical trapping.

Technology Development

• fabrication techniques for MOEMS
• integration of CMOS and MEMS for optical applications
• integration of photonics and MEMS (fabrication and functionality)
• integration of waveguides, integrated optics or photonic crystals with MEMS
• MOEMS-based III-V and II-VI compound semiconductors
• new approaches for MOEMS fabrication technologies (e.g. nanoimprinting)
• enhanced capabilities through novel materials including silicon, silica, non-silicon materials and polymers
• packaging, testing, and characterization schemes for MOEMS
• MOEMS technology transfer to manufacturing
• interfacing techniques for MOEMS.

SPECIAL SESSION

MEMS and MOEMS for Robotics or MicroRobotics

• design methodologies, physical investigations and manufacturing techniques involving various microsensors, microactuators and other Microsystems
• inertial sensor suites for control and guidance
• miniature wall-climbing robots using micro/ nano-fiber adhesives
• arrayed MEMS probe manipulators for tip-based nanomanufacturing
• gas and oil chemical sensor arrays for early warning systems
• ultra-compliant neural probes for brain-computer interfaces.
Call for Papers

JOINT SESSION with MF102, MF105, and MF107
MEMS/MOEMS, Nanodevices, and Miniaturized Systems for Space Exploration

MOEMS/MEMS and nanotechnology are key in the miniaturization of systems for Space instrumentation. The utilization of MOEMS/MEMS and nanotechnology in Nano- and Pico-Sat missions allows not only a cost and size reduction but also an acceleration of the instrument development cycle, therefore increasing the number of science experiments that can be carried out in Space. Furthermore, miniaturized systems are of utmost importance in Space Exploration Missions, where such devices can be integrated in different Rovers to perform a great variety of analyses. A great deal of work is still needed, though, to ensure that the MEMS/MOEMS based microdevices present the required reliability to be included in Space Missions and to develop standards and MOEMS Space Qualification plans.

In this Special Focused Session, papers are solicited in the following topics:

- Miniaturized systems based on the use of MEMS/MOEMS; micro-assembly and nanotechnologies for use in Space. Particular areas of interest include: photonic devices, microbolometers, microfluidic devices and lab-on-a-chip for use in Space applications and Space Exploration, DMD, adaptive optics, micro-energetics, micro-propulsion devices, RF MEMS, etc.
- Miniaturized instrumentation for use in Space Exploration, such as the Mars Rover.
- MEMS applications in Astronomy and Earth Observation.
- Packaging of MEMS/MOEMS and nanodevices and packaging reliability issues.

JOINT SESSION with MF105 and MF109
Spatial Light Modulator

Various technologies including MEMS, LCD, lasers, LED, and OLED are under development to build high-performance projection and flat panel display systems. They are needed to provide large display sizes or highlight efficiency in comparison to integrated displays for mobile phones, digital cameras, biomedical instruments, and personal digital assistants with ever decreasing size. This special session will give a comprehensive overview about recent development activities and results of the various light modulating technologies from modulating devices to module/system integration for novel applications.

JOINT SESSION with MF105 and BiOS BO104
Microscopy

This special joint session is in conjunction with BiOS conference BO104: Endoscopic Microscopy. Papers are solicited that address the unique challenges to deliver high-fidelity microscopic imaging of tissue with a miniaturized instrument platform. Example topics include mechanisms for distal beam scanning, focus control and aberration correction using MOEMS devices, MEMS actuators or electrowetting optics; proximal scanning based on DMD or other SLM technologies; novel optical assembly and alignment techniques; highly corrected miniature optical systems.

BEST PAPER AWARDS

We are pleased to announce that a cash prize, sponsored by Samsung Advanced Institute of Technology, will be awarded to the best paper and best student paper in MOEMS and Miniaturized Systems. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a cash prize.

To be eligible for the Best Paper Award, you must:

- be listed as an author on an accepted paper within MF105
- have conducted the majority of the work to be presented
- submit your manuscript online by 6 January
- present your paper as scheduled.

To be eligible for the Best Student Paper Award, you must:

- be a student without a doctoral degree (undergraduate, graduate, or PhD student)
- be listed as an author on an accepted paper within MF105
- have conducted the majority of the work to be presented
- submit your manuscript online by 6 January
- present your paper as scheduled.

Nominations

To be considered, select either ‘Consider for Best Paper’ or ‘Consider for Best Student Paper’ as your First Choice under ‘Topics’ during the online submission of your abstract.

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MEMS Adaptive Optics VIII (MF107)

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)

Adaptive optics (AO) are routinely used in astronomy, microscopy, medicine, communications and remote sensing. Many applications of adaptive optics could benefit from compact, robust, high-performance, inexpensive wave front correction devices. Devices using optical MEMS (or MOEMS) technology have the potential to achieve some or all of these characteristics. Optical MEMS adaptive optics devices have made considerable recent technical progress and are now in use in many application areas. This conference will cover all aspects of the development and use of optical MEMS technology for adaptive optics.

Technical papers concerning the following aspects of adaptive optics are appropriate for submission and consideration:

- AO scientific applications such as:
  - astronomy, microscopy, vision science, scientific laser systems
- AO commercial applications such as:
  - consumer imaging, bio-photonics, industrial inspection, lithography, industrial and medical lasers, optical communications, vision care and ophthalmology
- AO security applications such as:
  - surveillance, communications, targeting and tracking, laser systems, vibrometry, hyperspectral imaging
- theory, modeling, and simulation of AO devices and systems
- devices and fabrication approaches to achieve AO goals
- electronics and control methods for AO devices and systems
- measurement and characterization of AO devices
- reliability of AO devices and systems
- performance assessment of MEMS-based AO systems.

Critical Dates

Abstract Due Date: 22 July 2013

Post-Meeting Manuscript Due Date: 6 January 2014

Please Note: Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.

Adaptiv e  opt ics  are  rout in  e ly  u se d  in  as- tronomy, microscopy, medicine, communications and remote sensing. Many applications of adaptive optics could benefit from compact, robust, high-performance, inexpensive wave front correction devices. Devices using optical MEMS (or MOEMS) technology have the potential to achieve some or all of these characteristics. Optical MEMS adaptive optics devices have made considerable recent technical progress and are now in use in many application areas. This conference will cover all aspects of the development and use of optical MEMS technology for adaptive optics.

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MOEMS/MEMS and nanotechnology are key in the miniaturization of systems for Space instrumentation. The utilization of MOEMS/MEMS and nanotechnology in Nano- and Pico-Sat missions allows not only a cost and size reduction but also an acceleration of the instrument development cycle, therefore increasing the number of science experiments that can be carried out in Space. Furthermore, miniaturized systems are of utmost importance in Space Exploration Missions, where such devices can be integrated in different Rovers to perform a great variety of analyses. A great deal of work is still needed, though, to ensure that the MEMS/MOEMS based microdevices present the required reliability to be included in Space Missions and to develop standards and MOEMS Space Qualification plans.

In this Special Focused Session, papers are solicited in the following topics:

- Miniaturized systems based on the use of MEMS/MOEMS; micro-assembly and nanotechnologies for use in Space. Particular areas of interest include: photonic devices, microbolometers, microfluidic devices and lab-on-a-chip for use in Space applications and Space Exploration, DMD, adaptive optics, microenergetics, micro-propulsion devices, RF MEMS, etc.
- Miniaturized instrumentation for use in Space Exploration, such as the Mars Rover.
- MEMS applications in Astronomy and Earth Observation.
- Packaging of MEMS/MOEMS and nanodevices and packaging reliability issues.

Critical Dates

Abstract Due Date: 22 July 2013

Post-Meeting Manuscript Due Date: 6 January 2014

Please Note: Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.
Call for Papers

Emerging Digital Micromirror Device Based Systems and Applications VI (MF109)

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); Zheng 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)

Conference Cosponsor:

The Digital Micromirror Device (DMD) was conceived at Texas Instruments in 1987, following a decade of work on analog deformable-mirror and cantilever-mirror devices. This particular optical MEMS or MOEMS device has been applied most famously to conference room and portable projectors, large-screen high-definition televisions, and digital cinema projection systems, all of which were enabled by DLP® technology.

As evidenced in this well-attended conference at Photonics West 2013, the DMD and associated development platforms are enabling many exciting new systems and applications beyond traditional display technologies. By bringing together scientists, technologists, and developers, the goal of this conference is to highlight new and interesting means of applying DMD technology to end applications within these emerging markets.

Technical areas of particular interest include, but are not limited to:

• 3D displays (volumetric, light-field, multiviews, and holographic)
• additive manufacturing (rapid prototyping, 3D printing)
• augmented reality
• automotive applications
• beam/wave-front shaping
• biochemical visualization
• compressive sensing
• embedded and portable systems
• holography
• hyperspectral imaging
• intelligent lighting
• IR applications
• lithography
• medical devices
• metrology and machine vision, including 3D microscopy
• optical micromanipulation
• optical telecommunications
• security and surveillance
• spectrally tunable light sources
• spectroscopy
• structured light
• UV applications.

JOINT SESSION with BiOS B0400 and MF109

Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device or MEMS Array

This special joint session is in conjunction with BiOS conference B0400: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XII. The utilization of the DMD and other Optical MEMS arrays to manipulate light has numerous medical applications ranging from cancer detection to operating room aids to the manipulation of individual cells. Papers are solicited that address the uses of a DMD and other Optical MEMS arrays with:

• 3D medical visualization
• confocal microscopes
• hyperspectral imaging
• image-guided intervention
• optoelectronic tweezers
• organs on a chip
• oxygenation measurements
• phototherapy
• selectable wavelength light sources
• structured light
• tissue illumination.

JOINT SESSION with MF105 and MF109

Spatial Light Modulator

Various technologies including MEMS, LCD, lasers, LED, and OLED are under development to build high-performance projection and flat panel display systems. They are needed to provide large display sizes or high light efficiency in comparison to integrated displays for mobile phones, digital cameras, biomedical instruments, and personal digital assistants with ever decreasing size. This special session will give a comprehensive overview about recent development activities and results of the various light modulating technologies from modulating devices to module/system integration for novel applications.
Submission of Abstracts

By submitting an abstract, I agree to the following conditions:

An author or coauthor (including keynote, invited, oral, and poster presenters) will:

- Register at the reduced author registration rate (current SPIE Members receive an additional discount on the registration fee).
- Attend the meeting.
- Make the presentation as scheduled in the program.
- Submit a full-length manuscript (6 pages minimum) for publication in the SPIE Digital Library, Proceedings of SPIE, and CD-ROM compilations.
- Obtain funding for registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations.
- Ensure that all clearances, including government and company clearance, have been obtained to present and publish. If you are a DoD contractor in the USA, allow at least 60 days for clearance.

Submit an abstract and summary online at: www.spie.org/moemscall

- Abstracts should contain enough detail to clearly convey the approach and the results of the research. Accepted abstracts will be published and made available at the meeting. Please submit a 250-word abstract for review.
- Please also submit a 100-word text summary suitable for early release. If accepted, this summary text will be published prior to the meeting in the online or printed programs promoting the conference.
- Only original material should be submitted.
- Abstracts should contain enough detail to clearly convey the approach and the results of the research.
- Commercial papers, papers with no new research/development content, and papers where supporting data or a technical description cannot be given for proprietary reasons will not be accepted for presentation in this conference.
- Please do not submit the same, or similar, abstracts to multiple conferences.

**GREEN PHOTONICS**: If your research is working toward improvements in energy, sustainability, and conservation, identify your paper as “GREEN” when prompted during the abstract submission wizard. If your paper is accepted, SPIE will contact you to collect a 1-2 page summary explaining how your research is “green.” If your paper is selected by Green Photonics selection committee, your presentation will be cross-listed in the SPIE Green Photonics Virtual Program, and you will be eligible to win an SPIE Green Photonics Best Paper Award.

Critical Dates

**Abstract Due Date:**
22 July 2013

**Post-Meeting Manuscript Due Date:**
6 January 2014

**Please Note:** Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.

Review, Notification, and Program

**Placement Information**

- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
- Conference Chair/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- The contact author will receive notification of acceptance and presentation details by e-mail no later than 30 September 2013.
- Final placement in an oral or poster session is subject to the Chairs’ discretion.

Proceedings of SPIE and SPIE Digital Library Information

- Manuscript instructions are available from the “For Authors/Presenters” link on the conference website.
- Conference Chair/Editors may require manuscript revision before approving publication and reserve the right to reject for publication any paper that does not meet acceptable standards for a scientific publication. Conference Chair/Editors’ decisions on whether to allow publication of a manuscript is final.
- Authors must be authorized to transfer copyright of the manuscript to SPIE, or provide a suitable publication license.
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings of SPIE and SPIE Digital Library.
- Published papers are indexed in leading scientific databases including Astrophysical Data System (ADS), Chemical Abstracts (relevant content), Compendex, CrossRef, Current Contents, DeepDye, Google Scholar, Inspect, Portico, Scopus, SPIN, and Web of Science Conference Proceedings Citation Index, and are searchable in the SPIE Digital Library. Full manuscripts are available to SPIE Digital Library subscribers worldwide.

When submitting your manuscript to the proceedings, we encourage you to consider also submitting it to SPIE’s peer-reviewed Journal of Micro/Nanolithography, MEMS, and MOEMS (JM3). Manuscripts submitted to the journal will go through the normal JM3 peer-review process. No reformatting is necessary for initial submission to the journal, but manuscripts intended to be reviewed by JM3 must adhere to the generally higher standards of content required of a refereed journal. For more information, please visit the JM3 Author Information at www.spie.org/x85041.xml or contact jm3@spie.org.
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Two world-class exhibitions
- 1,300-Company Photonics West Exhibition
- 235-Company BIOS Expo

Industry and research insights
- More than 65 professional courses
- Roundtables and poster sessions
- Industry perspectives and plenary sessions
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