

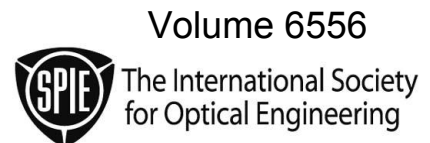
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***Micro (MEMS) and
Nanotechnologies for
Defense and Security***

**Thomas George
Zhongyang Cheng**
Editors

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Contents

ix	<i>Conference Committee</i>
xi	<i>Introduction</i>

SESSION 1 **COMPLEX MEMS AND NANODEVICES**

- 655602 **Complex MEMS device: microshutter array system for space applications (Invited Paper)** [6556-01]
M. J. Li, T. Adachi, C. Allen, S. Babu, S. Bajikar, M. Beamesderfer, R. Bradley, K. Denis, N. Costen, A. Ewin, D. Franz, L. Hess, R. Hu, K. Jackson, M. Jhabvala, D. Kelly, T. King, G. Kletetschka, A. Kuttyrev, B. Lynch, T. Miller, H. Moseley, V. Mikula, B. Mott, L. Oh, J. Pontius, D. Rapchun, C. Ray, K. Ray, E. Schulte, S. Schwinger, P. Shu, R. Silverberg, W. Smith, S. Snodgrass, D. Sohl, L. Sparr, R. Steptoe-Jackson, V. Valeriano, L. Wang, Y. Zheng, C. Zincke, NASA Goddard Space Flight Ctr. (USA)
- 655604 **Micropolarizer arrays in the MWIR for snapshot polarimetric imaging** [6556-03]
S. A. Kemme, A. A. Cruz-Cabrera, P. Nandy, R. R. Boye, J. R. Wendt, Sandia National Labs. (USA); T. R. Carter, S. Samora, L&M Technologies, Inc. (USA)
- 655608 **Deflection of silicon dioxide microbridge under distributed load** [6556-57]
H. Li, A. Chakraborty, X. Liu, H. Wang, C. Luo, Louisiana Tech Univ. (USA)

SESSION 2 **MEMS ADAPTIVE OPTICS**

- 65560A **Piezoelectric microactuator technologies for wavefront correction in space (Invited Paper)** [6556-07]
E.-H. Yang, Stevens Institute of Technology (USA); Y. Hishinuma, Fuji Film Corp. (Japan); R. Toda, K. Shcheglov, Jet Propulsion Lab. (USA)

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The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

- 65560B **MEMS deformable mirror optical limiter for dynamic range compression deconvolution** [6556-08]
J. Khoury, C. L. Woods, Air Force Research Lab. (USA); B. Haji-saeed, Univ. of Massachusetts, Lowell (USA) and Solid State Scientific Corp. (USA); S. K. Sengupta, W. D. Goodhue, Univ. of Massachusetts, Lowell (USA); J. Kierstead, Solid State Scientific Corp. (USA)
- 65560C **Optically addressed spring-patterned membrane mirror MEMS with megahertz response** [6556-09]
B. Haji-saeed, Univ. of Massachusetts, Lowell (USA) and Solid State Scientific Corp. (USA); G. Griffith, S. K. Sengupta, W. D. Goodhue, Univ. of Massachusetts, Lowell (USA); J. Khoury, C. L. Woods, Air Force Research Lab. (USA); J. Kierstead, Solid State Scientific Corp. (USA)

SESSION 3 PHOTONIC SENSORS I

- 65560E **Lab-on-a-chip bio/chemical sensing system based on the liquid core optical ring resonator (Invited Paper)** [6556-11]
I. M. White, J. D. Suter, H. Zhu, H. Oveys, L. Brewington, J. Gohring, X. Fan, Univ. of Missouri, Columbia (USA)
- 65560F **Novel chemical and biological fiber optic sensor** [6556-12]
B. Scott, C. Ma, G. Pickrell, K. Cooper, A. Wang, T. Ooi, Virginia Tech (USA)
- 65560G **Evanescence optical fluorescence excitation: the role of photonic mode density** [6556-13]
B. Menges, Max-Planck-Institute for Polymer Research (Germany); A. Sato, Max-Planck-Institute for Polymer Research (Germany) and Tokyo Institute of Technology (Japan); W. Knoll, Max-Planck-Institute for Polymer Research (Germany)
- 65560H **High-speed nano-optical photodetector for free space communication** [6556-14]
R. M. Kurtz, K. A. Alim, R. D. Pradhan, V. Esterkin, G. D. Savant, Physical Optics Corp. (USA); R. Venkatasubramanian, M. L. Lee, RTI International (USA); S. Ghosh, I. Calizo, A. A. Balandin, Univ. of California, Riverside (USA)
- 65560I **Integrated optical microring for high-resolution refractive index and pressure sensing applications** [6556-15]
S. Ja, ICx Nomadics (USA)
- 65560J **Optical micro- and nanofibers for sensing applications** [6556-16]
M. Sumetsky, OFS Labs. (USA)

SESSION 4 PHOTONIC SENSORS II

- 65560M **Microfluidic device detection of waterborne pathogens through static light scattering of latex immunoagglutination using proximity optical fibers** [6556-19]
J.-Y. Yoon, J.-H. Han, B. Heinze, L. J. Lucas, The Univ. of Arizona (USA)
- 65560N **Small form factor microsensor system using optical MEMS for passive optical digital communication (PODC)** [6556-20]
W. Wang, S. Samson, R. Agarwal, J. Bumgarner, R. Hazen, S. Kedia, G. Gonzalez, L. Langebrake, C. Munoz, E. Kaltenbacher, Univ. of South Florida (USA)

- 65560Q **Tunable ferroelectric photonic crystals based on Ba_{0.7}Sr_{0.3}TiO₃/MgO multilayer thin films** [6556-54]
D. Y. Wang, K. L. Jim, C. W. Leung, H. L. W. Chan, C. L. Choy, The Hong Kong Polytechnic Univ. (Hong Kong China)
- 65560R **Theoretical study of ferroelectric barium-strontium-titanate-based one-dimensional tunable photonic crystals** [6556-55]
K. L. Jim, D. Y. Wang, C. W. Leung, C. L. Choy, H. L. W. Chan, The Hong Kong Polytechnic Univ. (Hong Kong China)

SESSION 5 DIP PEN/NANOLITHOGRAPHY I

- 65560S **Nanolithography of metal catalysts by Dip Pen Nanolithography (DPN) (Invited Paper)** [6556-22]
D. Huitink, D. Banerjee, Texas A&M Univ. (USA); S. K. Sinha, Univ. of New Haven (USA)
- 65560T **Dip Pen Nanolithography: a maturing technology for high-throughput flexible nanopatterning** [6556-23]
J. R. Haaheim, E. R. Tevaarwerk, J. Fragala, R. Shile, NanoInk, Inc. (USA)
- 65560V **Method of matrix alignment for nanostructure lithography** [6556-25]
A. Sokolnikov, Visual Solutions and Applications (USA)

SESSION 6 DIP PEN/NANOLITHOGRAPHY II

- 65560Y **Investigation of the conducting polymer microsensors generated using an intermediate-layer lithography method** [6556-28]
A. Chakraborty, G. Parthasarathi, C. Luo, Louisiana Tech Univ. (USA)
- 65560Z **Generation of conducting polymer-based heterojunctions, diodes, and capacitors using an intermediate-layer lithography method** [6556-29]
X. Liu, A. Chakraborty, G. Parthasarathi, C. Luo, Louisiana Tech Univ. (USA)

SESSION 7 MEMS/NANOSYSTEMS/ALGORITHMS

- 655611 **Tier-scalable reconnaissance: the challenge of sensor optimization, sensor deployment, sensor fusion, and sensor interoperability (Invited Paper)** [6556-31]
W. Fink, California Institute of Technology (USA); T. George, ViaLog LLC (USA); M. A. Tarbell, California Institute of Technology (USA)
- 655613 **Miniaturized self-adaptive tuning of MEMS gyroscope for space** [6556-33]
D. Keymeulen, M. I. Ferguson, L. Breuer, C. Peay, B. Oks, Jet Propulsion Lab. (USA);
Y. Cheng, D. Kim, Univ of California, Los Angeles (USA); E. MacDonald, D. Foor, R. Terrile,
N. Arenki, K. Yee, Univ. of Texas at El Paso (USA)
- 655614 **Advanced signal processing for enabling next generation MEMS/NEMS sensors** [6556-34]
T. George, S. Ben-Menahem, S. Gulati, E. Wang, J. K. Breaux, B. Bromley, ViaLog LLC (USA)
- 655615 **Reliability shortcomings for micronanotechnology-based systems (Invited Paper)** [6556-35]
E. J. Garcia, M. A. Polosky, Sandia National Labs. (USA)

SESSION 8 ADVANCED MEMS DEVICES I

- 655616 **GaN-based microchemical sensor nodes for early warning of chemical agents (Invited Paper)** [6556-36]
K.-A. Son, B. Yang, Jet Propulsion Lab. (USA); N. Prokopuk, Naval Air Warfare Ctr. (USA); J. S. Moon, HRL Labs., LLC (USA); A. Liao, M. Gallegos, Jet Propulsion Lab. (USA); J. Yang, M. A. Khan, Univ. of South Carolina (USA)
- 655617 **Highly sensitive chemical sensors by functional integration of nanoporous zeolites with photonic devices** [6556-37]
T. Wei, J. Montoya, H. Xiao, Univ. of Missouri, Rolla (USA); J. Zhang, H. Dong, Univ. of Cincinnati (USA)
- 655618 **Performance of a carbon nanotube field emission electron gun** [6556-38]
S. A. Getty, T. T. King, R. A. Bis, H. H. Jones, F. Herrero, B. A. Lynch, P. Roman, P. Mahaffy, NASA Goddard Space Flight Ctr. (USA)
- 655619 **Detection of *Bacillus anthracis* spores in water using biosensors based on magnetostrictive microcantilever coated with phage** [6556-39]
L. Fu, S. Li, K. Zhang, Z.-Y. Cheng, J.M. Barbaree, Auburn Univ. (USA)
- 65561A **Micro-initiators as the fundamental building blocks of micro-energetic systems (Invited Paper)** [6556-40]
A. Desai, Tanner Research, Inc. (USA); B. Fuchs, U.S. Army Armament Research, Development and Engineering Ctr. (USA)
- 65561B **Computational survey of representative energetic materials as propellants for microthruster applications** [6556-41]
B. Fuchs, U.S. Army Armament Research, Development and Engineering Ctr. (USA); D. Stec III, SAIC (USA)

SESSION 9 ADVANCED MEMS DEVICES II

- 65561D **Optical micro-resonator chemical sensor** [6556-43]
A. Pyayt, X. Zhang, J. Luo, A. Jen, L. Dalton, A. Chen, Univ. of Washington (USA)
- 65561I **Flexural plate wave devices for biosensor platform** [6556-59]
S. H. Yoon, J.-H. Park, D. Shen, D.-J. Kim, Auburn Univ. (USA)
- 65561J **Piezoelectric micromachined ultrasonic transducers with rectangular diaphragms for binary frequency applications** [6556-60]
C. Chao, T.-Y. Lam, K.-W. Kwok, H. L. Chan, Hong Kong Polytechnic Univ. (Hong Kong China)

SESSION 10 NANOWIRE DEVICES

- 65561L **Growth and characterization of ZnO nanowires for various sensor applications** [6556-48]
A. K. Sood, Magnolia Optical Technologies, Inc. (USA); Y. R. Puri, Magnolia Optical Technologies, Inc. (USA) and Univ. of Massachusetts, Lowell (USA); P. Gao, W. Mai, C. Lao, Z. L. Wang, Georgia Institute of Technology (USA); D. L. Polla, DARPA/MTO (USA); M. B. Soprano, DARPA, U.S. Army, AMSRD (USA)

65561N **Review of an intermediate-layer lithography approach (Invited Paper)** [6556-50]
C. Luo, Louisiana Tech Univ. (USA)

65561P **Generation of silicon nanowires using a new thinning and trimming method** [6556-56]
H. Wang, A. Chakraborty, X. Liu, H. Li, C. Luo, Louisiana Tech Univ. (USA)

Author Index

Conference Committee

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Qifa Zhou, University of Southern California (USA)

Session Chairs

- 1 Complex MEMS and Nanodevices
Mary J. Li, NASA Goddard Space Flight Center (USA)
Reza Ghodssi, University of Maryland, College Park (USA)
- 2 MEMS Adaptive Optics
Eui-Hyeok Yang, Stevens Institute of Technology (USA)
David V. Wick, Sandia National Laboratories (USA)

- 3 Photonic Sensors I
Xudong Fan, University of Missouri, Columbia (USA)
Zhongyang Cheng, Auburn University (USA)
- 4 Photonic Sensors II
J. Todd Hastings, University of Kentucky (USA)
Gregory P. Nordin, Brigham Young University (USA)
- 5 Dip Pen/Nanolithography I
Debjyoti Banerjee, Texas A&M University (USA)
James J. De Yoreo, Lawrence Livermore National Laboratory (USA)
- 6 Dip Pen/Nanolithography II
Paul E. Sheehan, Naval Research Laboratory (USA)
James D. Batteas, Texas A&M University (USA)
- 7 MEMS/Nanosystems/Algorithms
Wolfgang Fink, California Institute of Technology (USA)
Dong-Joo Kim, Auburn University (USA)
- 8 Advanced MEMS Devices I
Amish Desai, Tanner Research, Inc. (USA)
C. Peter Cho, Naval Sea Systems Command (USA)
- 9 Advanced MEMS Devices II
Thomas G. Thundat, Oak Ridge National Laboratory (USA)
Kyung-ah Son, Jet Propulsion Laboratory (USA)
- 10 Nanowire Devices
Nosang V. Myung, University of California, Riverside (USA)
Cheng Luo, Louisiana Tech University (USA)

Introduction

This conference intends to bring together scientists and engineers involved in advancing micro (MEMS) and nanotechnologies, with the focus on applications in space, defense, and homeland security. Given the enormous diversity of MEMS and nanotechnologies, we have selected several cutting-edge topics in fabrication techniques, as well as novel devices and systems, advanced algorithms, and sensor networks. The sessions are organized to facilitate the exchange of ideas and promote the discussion of recent progress in MEMS/nanotechnology research and trends toward system-level development. It is anticipated that this conference will foster cross-fertilization across many disciplines with participants being exposed to the entire range of scientific and engineering problems associated with the concepts-to-systems technology development pipeline.

MEMS and nanotechnologies are disruptive by nature, and address universal requirements for high-capability systems with small mass and size and low power consumption. Among the many issues faced by technologies making the transition from laboratory to commercial production are the demonstration of economical manufacturability and reliability during operation in the application environments. Other system-level considerations include the development of 'smart algorithms' that are required in order to realize the full potential of MEMS and nanosystems. A particular area of interest is the detection of weak signals within noisy backgrounds, arising from the fact that miniaturization, in general, degrades the sensitivity of sensors.

The ultimate benefit of MEMS and nanotechnologies lies in the creation of networks of small mass and low power sensors and actuators for numerous networked applications such as distributed sensing, aircraft/spacecraft health monitoring, biological and chemical monitoring of the environment, and for defense and security applications. Once again, in addition to developing the MEMS and nanotechnology sensing/actuation hardware for each node of the network, advanced algorithms for sensor fusion and sensor interoperability need to be developed in parallel.

The scope of the conference ranges from topics in basic research in MEMS and nanotechnology, to component and subsystem level development for space, defense, and security applications.

Papers are solicited on the following and related topics:

- innovative micro- and nanofabrication, assembly, and manufacturing technologies
- novel micro- and nanotechnology-based physical, chemical, and biological sensor devices and systems

- micro- and nanophotonics
- micro- and nano-actuators
- systems based on micro- and nanotechnologies
- reliability considerations for micro- and nanotechnologies
- advanced algorithms for improving the performance of systems and networks based on micro- and nanotechnologies
- energy storage and generation for micro- and nanodevices and systems
- micro- and nanosensor and actuator networks.

**Thomas George
Zhongyang Cheng**