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**Thomas George
M. Saif Islam
Achyut Dutta**
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- 1 Mesodynamic Architectures I
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- 2 Mesodynamic Architectures II
Ryan P. Lu, Space and Naval Warfare Systems Command
(United States)
- 3 Novel Micro/Nano Approaches for Radiation Sensors and Materials
Joan A. Hoffmann, The Johns Hopkins University Applied Physics
Laboratory (United States)
- 4 Scanning Microscopies for Micro- and Nanotechnology Applications:
Joint Session with Conference 8378
Michael T. Postek, National Institute of Standards and Technology
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Thomas George, Zyomed Corporation (United States)
- 5 Micro- and Nanotechnology for Health Care
Noriko Satake, UC Davis Medical Center (United States)
Scott D. Collins, University of Maine (United States)
- 6 Beam Control Systems Using MEMS and Liquid Crystals
Christopher C. Wilcox, U.S. Naval Research Laboratory (United States)
- 7 Emerging Micro- and Nanotechnologies for Sensing in Challenging
Environments
Kyung-Ah Son, HRL Laboratory, LLC (United States)
- 8 Nanotechnologies for Energy Generation and Storage: Joint Session
with Conference 8377
Michael C. McAlpine, Princeton University (United States)
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- 9 Systems Engineering for Microsystems: From Research to Applications
Robert Osiander, The Johns Hopkins University Applied Physics
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- 10 Heterogeneous Integration of Multifunctional Materials, Devices, and Micro/Nanosystems
M. Saif Islam, University of California, Davis (United States)
- 11 MAST: Small-Scale Autonomous Platforms: Joint Session with Conference 8387
Christopher M. Kroninger, U.S. Army Research Laboratory (United States)
- 12 MAST: Sensors for Small-Scale Autonomous Platforms: Joint Session with Conference 8387
William D. Nothwang, U.S. Army Research Laboratory (United States)
- 13 Nanomaterials for Armor Applications
Morgana M. Trexler, The Johns Hopkins University Applied Physics Laboratory (United States)
- 14 New Boundaries and Frontiers for MEMS
Ernest J. Garcia, Sandia National Laboratories (United States)
Victor M. Castaño, Universidad Nacional Autónoma de México (Mexico)
- 15 Applications of Nanomaterials for Surface Enhanced RAMAN Spectroscopy (SERS)
Stergios J. Papadakis, The Johns Hopkins University Applied Physics Laboratory (United States)
- 16 Metamaterials, Graphene, Compound Semiconductors for THz Technology Applications
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- 17 Nanotechnology for Standoff Detection and Counterterrorism Operations I: Joint Session with Conference 8358
Michael K. Rafailov, The Reger Group (United States)
Thomas G. Thundat, University of Alberta (Canada)
- 18 Nanotechnology for Standoff Detection and Counterterrorism Operations II: Joint Session with Conference 8358
Michael K. Rafailov, The Reger Group (United States)
Thomas G. Thundat, University of Alberta (Canada)
Mogens H. Jakobsen, Technical University of Denmark (Denmark)

Introduction

The 2012 Micro- and Nanotechnology Sensors, Systems, and Applications IV conference continued its successful approach of showcasing a diverse range of MEMS and Nanotechnology topics that are testament to the practically limitless applications of these exciting technologies. We also continued to build on the synergies between our conference and other, equally diverse, sets of conferences by having joint sessions with the Scanning Microscopies (8378), Energy Harvesting and Storage (8377), Unmanned Systems Technology (8387) and the Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Sensing (8358) conferences. Exciting new sessions that were introduced in 2012 were on Mesodynamic Architectures (based on the program by the same name managed by Dr. Jeffrey Rogers, DARPA), Novel Micro/Nano Approaches for Radiation Sensors and Materials, Scanning Microscopies for Micro- and Nanotechnology Applications (Joint Session), Beam Control Systems Using MEMS and Liquid Crystals, Heterogeneous Integration of Multifunctional Materials, Devices, and Micro/Nanosystems, Nanomaterials for Armor Applications, New Boundaries and Frontiers for MEMS, and Applications of Nanomaterials for Surface Enhanced RAMAN Spectroscopy (SERS).

As in previous years, each session was designed to address three “cornerstones” namely, programmatic investments that set the overall context for the cutting-edge research and development being presented, and the challenges involved in transitioning these exciting concepts to applications in defense, homeland security and space. We were fortunate to showcase advanced micro and nanoscale research being conducted by the Air Force Office of Scientific Research, National Institutes of Health, Department of Energy, Office of Naval Research and the Naval Research Laboratory, Army Research Laboratory, NASA, and the Defense Advanced Research Projects Agency.

Thanks to our distinguished contributors, in this proceedings volume, you will find papers covering a breathtaking range of topics from Topological Insulators to lens-free holographic imaging of cells. This year we have continued an exploration of the sensors and sensor platforms required for ARL's Micro Autonomous Systems. The drive to miniaturization has brought about challenging SWaP (Size, Weight and Power) constraints, once the exclusive domain of NASA spacecraft, to these Micro Autonomous Systems platforms and to the sensors that could be integrated on these exciting new platforms.

Thomas George
M. Saif Islam
Achyut Dutta

