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Introduction

The Micro- and Nanotechnology Sensors, Systems, and Applications conference started in 2009 as a combination of the previous Micro (MEMS) and Nanotechnologies for Defense and Security, and the Nanosensing: Materials, Devices, and Systems conference from SPIE's Optics East symposium. The focus for this conference continues to be to not only highlight cutting-edge developments in Micro and Nanotechnologies (MNT), but also to address key issues involved in transitioning these developments to system-level applications in defense, homeland security, and space. We were particularly proud to host a new thematic session devoted entirely to the Army Research Laboratory's exciting Micro-Autonomous Systems and Technology (MAST) program. MAST provided an excellent example of an advanced R&D program aimed at bringing together all of the critical elements required for ultimately fielding MNT-based systems, including the systems engineering to layout the overall architecture as well as the various component developments in mechanics, electronics, power management, sensors, algorithms, and simulations.

The inter-disciplinary aspects of MNT and its wide range of applications were highlighted through the various sessions on Micro-Nanophotonics, Nanofabrication Techniques, BioMEMS and Microfluidics, Complex MEMS and Nanosystems, Nanoelectronics, Nanotechnology for Space Applications, and our newest theme, introduced this year, of Diamond MEMS/NEMS. We were very fortunate to have the leading experts from all of the above areas presenting invited talks to educate and guide the attendees on the critical challenges being faced in each of these topical areas, along with the attendant novel solutions that have been developed thus far to overcome several of these challenges. These talks spanned the gamut of new research results being obtained in academic institutions to complex new products being sold or under development at Hewlett Packard and Motorola. New for this year was a talk describing the work done on developing cheap disposable technologies for point-of-care diagnostics for the resource-poor environments of third-world, or developing countries for the early detection and monitoring of deadly diseases.

Research priorities from a funding perspective for DARPA and AFOSR were presented via keynote talks by program managers (PMs) from these agencies. The PMs presented results from past funded programs as well as roadmaps for the way forward in their respective areas of responsibility. This proceedings volume also includes papers presented at the poster session, describing new results in the modeling, fabrication, and testing of Micro and Nano devices.

There have been many people who have combined their efforts in reaching out and soliciting contributions from the scientific community to make this conference a success. We would like to thank the technical program committee

and the session organizers for their time and effort. They have been instrumental in bringing this conference to fruition by providing us with their advice and support, as well as contributing to the conference with their own excellent research. Finally, we would like to express our sincerest thanks to SPIE staff for their extraordinary coordination and exemplary hard work in publishing this volume of SPIE proceedings and their flawless effort over the last year in the overall organization of this conference.

We hope that you will enjoy these proceedings, that you feel encouraged to consider this conference as essential to participate, and that we will have the great pleasure of attending your future presentations on your contribution to this revolutionary field of nanosensing.

Thomas George
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