

Dear Members of the Mid Atlantic Micro Nano Alliance

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Mid Atlantic Micro-Nano Alliance Newsletter – May 2011 Edition

Help Wanted - GU

Cleanroom Technician Wanted contact: M. Paranjape, Ph.D, Associate Professor
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ABSTRACTS CALL – from T. Kenny / M. Schmidt

Dear Colleagues,
We would like to invite you to submit a paper to the upcoming Workshop on "Technologies for Micro/Nano Manufacturing" to be held at the Silverado Country Club in Napa, CA on August 8-10, 2011. The deadline for submitting abstracts is approaching rapidly (May 17th, 2011). Information on the meeting can be found at www.mfg2011.org <<http://www.mfg2011.org>> .

The goal of this meeting is to create a Hilton Head Workshop/Gordon Conference like environment to discuss the future of Micro/Nano manufacturing. We are particularly interested in using this as a forum to bring together industry/academia/government, but also experts in technology and policy. This will be a regional meeting, in the style of the Hilton Head

Workshop. A key goal will be to identify opportunities and strategies for restoring and initiating a strong base for next-generation manufacturing at the micro and nano scale in the United States.

Thus far, we have preliminarily secured some exciting plenary speakers;

Dr. Ken Gabriel, Deputy Director, DARPA
Dr. Greg Tasse, Senior Economist, NIST
Dr. Chad Mirkin, Northwestern University and Member, President Obama's Council of Advisors for Science and Technology (PCAST)

In addition, we have invited a number of very interesting speakers from government, industry, the finance community, and academia. Please visit the web site, which will be continuously updated with program notes and the latest information.

The meeting is shaping up to be a very interesting and timely event for those with interests in the future of manufacturing at the micro and nano scale. In order to maintain a highly interactive format, we anticipate the need to limit attendance, and therefore would like to encourage you to submit work to the meeting to ensure your participation!

Technologies for Micro/Nano Manufacturing Workshop August 8-10, 2011 Napa, California USA info@mfg2011.org <http://www.mfg2011.org>

Abstract Submission Deadline: May 17, 2011

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SENSORS 2011 -Limerick IR

IEEE Sensors announced they are extending the deadline for the abstract submission to IEEE Sensors 2011 until Thursday, May 19. (<http://ieee-sensors2011.org/>)

“**IEEE SENSORS 2011** is intended to provide a common forum for research scientists, engineers and practitioners throughout the world to present their latest research findings ideas, developments and applications in the area of sensors and sensing technology. IEEE SENSORS 2011 Conference will include keynote addresses by eminent scientists as well as Invited Speakers for the Topical Special sessions. The Conference solicits original and state-of-the-art contributions for both podium and regular poster sessions.

Topics of interest include: ” **Phenomena, Modeling, and Evaluation; Chemical and Gas Sensors; Optical Sensors; Mechanical and Physical Sensors; Sensor/Actuator Systems; Sensor Networks; Applications**”

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SUMMER INTERNSHIPS

Electrical and Electronics Engineering students: OPPORTUNITY FOR SUMMER INTERNSHIP STILL AVAILABLE!

The U.S. DEPARTMENT OF COMMERCE INTERNSHIP PROGRAM FOR POSTSECONDARY STUDENTS has an internship position available for Summer 2011. It's not too late to apply, but you must hurry! **Deadline: May 27, 2011.**

Contact: Alicia Wells

E-mail: DOCProgram@orau.org

Fax: [865-521-4220](tel:865-521-4220),

Phone: [865-576-3409](tel:865-576-3409)

Program Requirements: Currently enrolled students, U.S. Citizenship, DC Metro area.

Location: Washington, D.C.

Benefits: Opportunities to participate in hands-on education and training related to the Department of Commerce, weekly stipend and housing allowance, accidental medical expense coverage provided.

Desired Candidates will be Graduate or Junior/Senior level students in the fields of BSEE, chemical, mechanical or robotic engineering disciplines. Desired skills include wireless telecommunications and/or radio communications. Students in chemical, mechanical, or robotic engineering disciplines will be considered if working on research projects that involve wireless technology or dealing with the RF environment.

For more information, please contact Alicia Wells at [865-576-3409](tel:865-576-3409). You may also visit the following web site for general internship

information: <http://see.orau.org/ProgramDescription.aspx?Program=10038>

Applications are available for download at the web site listed above. Please send application materials to Attn: Alicia Wells. Fax: [865-521-4220](tel:865-521-4220), Phone: [865-576-3409](tel:865-576-3409), E-mail: DOCProgram@orau.org

DARPA Opportunities- Of Interest

Silicon Based Phased Array Tiles for Multifunction RF Sensors

Solicitation Number: BAA-11-50

Agency: Other Defense Agencies

Office: Defense Advanced Research Projects Agency

Location: Contracts Management Office Recent advances in SiGe/BiCMOS integrated circuit technology have shown promise for executing limited phased array capabilities at frequencies up to 94 GHz. Noise Figures (NF) and Power Amplifier (PA) efficiencies have been demonstrated that are suitable for low power applications when antenna gains are low. Numerous military sensor concepts require high antenna gain but only moderate radiated power in addition to an ability to rapidly scan in two dimensions. This requirement results in a need for circuits which have significant control capability per channel, yet small radiated power per element. The goal of

this effort would be the demonstration of a silicon-based tile array that would form a building block for Extremely High Frequency (EHF) electronically scanned arrays with large numbers of elements. A particular challenge may be executing the phased array RF control functions while maintaining acceptable tile level power added efficiency for low transmitter powers. Released April 22,2011

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Mid Atlantic Micro Nano Alliance member edits new MEMS Processing Reference

Ghodssi Co-Edits Comprehensive MEMS Handbook



Academic and industrial research scientists and engineers, as well as students working in micro-electromechanical systems (MEMS) commonly encounter an unnecessarily steep learning curve for the development of common MEMS fabrication processes. A fundamental, comprehensive MEMS-focused reference book just published by Springer promises to be an important game-changing asset for the field. The new *MEMS Materials and Processes Handbook* <<http://www.springer.com/978-0-387-47316-1>> (ISBN 978-0-387-47316-1) is an exhaustive design reference for researchers searching for new materials, properties of known materials, or specific processes available for MEMS fabrication. It will be valuable for seasoned researchers and engineers as well as students and other newcomers working in MEMS and materials processing. The handbook is co-edited by Reza Ghodssi <<http://www.isr.umd.edu/faculty/gateways/ghodssi.htm>> , director of the Institute for Systems Research and Herbert Rabin Distinguished Professor in the Department of Electrical and Computer Engineering at the University of Maryland, College Park, Md.; and **Pinyen Lin**, chief technologist and VP of business development at Touch Micro-System Technology Corp. in Taoyuan, Taiwan. The book features 35 international contributing authors who are MEMS leaders in academic, industrial and government laboratory settings.

The handbook's content is separated into distinct sections covering materials and processes (fabrication techniques). In the materials section, the extensive "Material Selection Guide" and a "Material Database" takes the reader through the selection of appropriate materials for the required task at hand. The processes section of the book is organized as a catalog of various microfabrication processes, each with a brief introduction to the technology, as well as examples of common uses in MEMS. The effects of processing conditions on material properties are covered where applicable, illustrating the interdependence and

multidisciplinary nature of MEMS fabrication. There are also chapters on general MEMS design and MEMS process integration.

Unique feature: step-by-step fabrication recipes, tricks, arts and secret

Not only does the book provide the reader with a broad understanding of the basics of materials and processes, it also gives practical insight into the workings and standard procedures carried out in research labs and production facilities on a daily basis.

As a particularly diverse and multidisciplinary field of research, MEMS presents a vast set of challenges relative to typical integrated circuit fabrication and design. While a wealth of knowledge exists in the MEMS community, much of it is most readily accessed by informal, non-methodological means such as discussions with colleagues at conferences. Much effort is focused on characterization runs and developing in-house recipes and specific processes to develop and manufacture MEMS structures, each time at the risk of wasting research efforts and “reinventing the wheel.”

The book addresses this by including case studies at the end of each chapter that give step-by-step examples and recipes prepared by seasoned MEMS experts. Readers will benefit from the identification and explanation of MEMS fabrication tricks, arts and secrets. This unique concept will be helpful for both academics and industrial researchers.

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Recent PhD Recipient Looking for Research Scientist Position

MAKI NISHIDA, a recent Ph.D. recipient, is seeking a position in industry or a national laboratory. She received her degree in Physics from Georgetown University, where her research was in optics and nanoparticle development. She has technical skills in numerous optical characterization techniques, such as dynamic light scattering and various spectroscopy techniques and also have clean room experience working on MEMS research. [\(202\) 302-1418](tel:2023021418) mn74@georgetown.edu

SB Microsystems Becomes COMSOL Certified Consultant

Consultancy, specializing in the design, simulation, prototyping, and testing of micro-fluidic devices and micro electro-mechanical system fabrication, certified as COMSOL Multiphysics experts.

BURLINGTON, MA (May 2, 2011) – COMSOL, Inc., developer of the industry-leading COMSOL Multiphysics modeling and simulation environment for scientists and engineers, announces that SB Microsystems has achieved COMSOL Certified Consultant status. SB Microsystems provides its clients engineering expertise in MEMS (micro electro-mechanical systems) and micro-fluidic device design, simulation, prototyping, testing, and fabrication. It offers particular expertise in medical and scientific sensors and instrumentation in which micro-scale miniaturization and low power consumption are critical criteria for its clients' success.

“We’re delighted to announce the certification of SB Microsystems as a COMSOL Consultant,” says Bernt Nilsson, Senior VP of Marketing, COMSOL, Inc. “SB Microsystems enables us to better serve our users developing micro-fluidic devices as well as those researching and developing new products leveraging MEMS-based technologies in such emerging fields as implantable biological sensors, miniature analytical instruments, and sensors for point-of-care medical testing.”

Headquartered in Columbia, MD, SB Microsystems provides research, development, and consulting services for clients both public and private worldwide. The company works with clients at any step within the MEMS and micro-fluidic device development and fabrication lifecycle. Additional services rendered include process design as well as detailed design ranging from final mask-level layout, circuit design, and CAD drawings of traditionally machined parts. SB Microsystems also maintains in-house testing facilities that can meet requirements ranging from simple acceptance testing through to complete bench-top and environmental characterization.

"Many of our projects begin with theoretical proof-of-concept and continue right on through the formalization of agreements with semiconductor foundries and vendors," says Brian Jamieson, President of SB Microsystems.

A key to SB Microsystems' attention to good engineering design is its extensive, hands-on experience with such state-of-the-art techniques and tools as the COMSOL MEMS Module, according to Jamieson. The module, which solves problems that couple structural mechanics, microfluidics, and electromagnetics, extends the core capabilities of the COMSOL Multiphysics modeling and simulation environment for the unique engineering problems encountered in the design and modeling of microscale electro-mechanical systems.

Its use of the COMSOL MEMS Module enables SB Microsystems to address almost all simulations in the microscale domain. "As a COMSOL Certified Consultant," says

Jamieson, "we are able to offer manufacturers and developers of highly miniaturized sensors and instruments unparalleled, certified expertise in the modeling and simulation of the coupled mechanical, thermal, and electrical phenomena inherent in MEMS and micro-fluidic devices."

The worldwide group of experts that are COMSOL Certified Consultants are innovative problem solvers who use their extensive experience with COMSOL Multiphysics and its discipline-specific products to deliver turnkey solutions for a wide range of modeling projects. COMSOL Certified Consultants produce ready-to-run models and reports as well as in-depth analyses of simulation results. The collective expertise of the COMSOL Certified Consultant group covers a breadth of applications and has resulted in the commercialization of many patented products. For further information about COMSOL Certified Consultants, visit www.comsol.com/company/consultants.

About COMSOL

COMSOL was founded in 1986. The company's flagship product is COMSOL Multiphysics, a software environment for the modeling and simulation of any physics-based system. A particular strength of COMSOL Multiphysics is its ability to account for multiple physics phenomena simultaneously. Optional modules add discipline-specific tools for acoustics, batteries and fuel cells, chemical engineering, electrodeposition, electromagnetics, fluid dynamics, geomechanics, heat transfer, MEMS, plasma, structural analysis, and subsurface flow. The company's U.S. offices are located in Burlington, MA, Los Angeles, CA, and Palo Alto, CA. International operations have grown to include offices in the BeNeLux countries, Denmark, Finland, France, Germany, India, Italy, Norway, Sweden, Switzerland, and the United Kingdom. Additional information about the company is available at www.comsol.com.

About SB Microsystems

SB Microsystems is located in Columbia, Maryland. SB Microsystems helps its clients develop highly miniaturized medical and scientific sensors and systems using modern micro-fabrication technologies such as MEMS (micro electro-mechanical systems). Problem solvers dedicated to the basic principles of good engineering design, SB Microsystems' expertise lies in the extensive hands-on experience with current state-of-the-art techniques and tools for the design, fabrication, and test lifecycle of miniaturized device development. To contact SB Microsystems for further information, visit the company on the web at www.sbmicrosystems.us.

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