

# Microsystems Monthly

March 1, 2010

## Mid-Atlantic MEMS Alliance Mission Statement:

To network expertise, capabilities, and research to facilitate the development of new applications and commercialization of miniaturization technologies.

Special points of interest:

Upcoming Events p 3

Jobs, Post Doc and Internships p 4-7



**NANOMATERIALS SYMPOSIUM**  
SPONSORED BY THE JHU/APL APPLIED NANOTECHNOLOGY COMMUNITY OF PRACTICE

April 19, 2010

JHU/ APL Kossiakoff Center

8:30 am – 5:00 pm

## Agenda

8:30-9:00	Registration & Poster Set-up	
9:00-9:20	Opening Remarks	
9:20-10:00	<b>Applications of Nanocrystalline Diamond Films</b>	<b>Dr. James Butler, NRL</b>
10:00 -10:40	<b>Bismuth Nanowires</b>	<b>Dr. Tito Huber, Howard University</b>
10:40-11:10	Break	
11:10-11:50	<b>Measuring Carbon Nanotubes</b>	<b>Dr. Jeffrey Fagan, NIST</b>
11:50-12:30	<b>Nanomaterials</b>	<b>Dr. Viktoria Greanya, DARPA</b>
12:30-1:30	Lunch & Poster Session	
1:30-2:10	<b>Fluorescence Enhancement by Surface Plasmon Polaritons</b>	<b>Dr. Christopher Davis, UMCP</b>
2:10-2:50	<b>Colloidal Assembly on Energy Landscapes</b>	<b>Dr. Michael Bevan, JHU</b>
2:50-3:20	Break	
3:20-4:00	<b>Building Tissues from the Nanoscale and Beyond</b>	<b>Dr. Jennifer Elisseeff, JHU</b>
4:00-4:40	<b>Cancer Nanotechnology: Lessons Learned from Preclinical Translational Research</b>	<b>Dr. Anil Patri, NCL</b>
4:40-5:00	Door Prizes & Poster Awards	

Registration is free and includes lunch if you register by April 1<sup>st</sup>  
Register now at <http://www.jhuapl.edu/APLNano/>

With apologies to JFK, this is the question that I encourage the members of The Mid-Atlantic Microsystems Alliance (MAMA) to ask themselves over the next few weeks. We've come a long way in the twelve months since we kicked off a restructured and revitalized organization, adding several enthusiastic new members to our Steering Committee, co-hosting a Symposium for the first time with Georgetown Physics, and actively recruiting more industry participation in the organization. Thanks to the energy of Editor Ann Darrin, we continue to see the distribution of this newsletter grow rapidly. We have also seen tremendous growth in the level of interest in internship recruitment and applications, and have seen some collaborations within the group launched.

Still, we have a long way to go. The point of an organization such as ours is to serve its membership in specific and measurable ways. I tend to be a fairly concrete and practical thinker, and as a result, words from our mission statement like "network expertise" and "facilitate development" (while perfectly appropriate for a mission statement) are a little hard to appreciate. Over the six years of my involvement with MAMA, I can point to some very specific ways in which I have been served by the organization. I have hired people for both permanent positions and internships based on our job network. I have gotten numerous leads on projects and areas for collaboration, one of which turned into a very fruitful and long-term business relationship. I have had a chance to present "late-breaking" preliminary results and have had the benefit of early peer review to strengthen such efforts. I have been given opportunities to lecture and otherwise participate in academia, and I have had the benefit of "inside" exposure to projects and areas of research that I otherwise wouldn't have had.

This month, the Steering Committee is holding its annual strategy meeting to define its goals and agenda for the coming year. We are extremely interested in hearing from you, our membership, about the ways in which we could do a better job of serving you. Is there a new event that would be helpful to you in your professional life? A particular seminar or educational event or training forum? An area of Microsystems Technology that would make a good subject for a Workshop or Symposium? What about a career fair focused on Microsystems jobs in the region? Should we expand on the Panel or "Stone Soup" concept for bringing together technology "providers" with technology "users"? Absolutely no idea is off limits, and we encourage you to think broadly and ambitiously about "What's in it for me?" Please email your ideas directly to me at [brianj@sbmicrosystems.us](mailto:brianj@sbmicrosystems.us) and I will make sure that they are heard and discussed by the Steering Committee.

Then, on April 19th, MAMA will be holding its annual membership meeting. This is a chance for all of you, the membership, to meet the Steering Committee and each other, to make your voices heard, and to share some refreshments and camaraderie. The Johns Hopkins Applied Physics Laboratory will be holding a Nanomaterials Symposium on that day, which should be of great interest to our membership (see the announcement and registration information in this issue- it's free if you register before April 1.) We will be holding our annual meeting on-site at the Kossiakoff Center immediately following the Nanomaterials meeting (at 5:15) and look forward to your attendance. Please see the Nanomaterials Symposium announcement in this issue for directions and details on parking.

Best regards,



Conf. on Lasers & Electro-Optics (CLEO), San Jose, CA, May 16-21, 2010 (<http://www.cleoconference.org/>)

**Special Symposium: “Optomechanics for Physical and Biological Sciences”**

“The use of radiation pressure to probe and manipulate micromechanical systems has proven useful in diverse fields of science and engineering ranging from quantum dynamics to bioengineering. This symposium discusses the fundamentals, technology, and applications of optomechanics in topics including cavity optomechanics, micro- and nano-optomechanical devices, optical tweezers, and optical probing of cell and tissue biomechanics.”

**Topic/Category: “Biophotonics and Optofluidics”**

Topics include but are not limited to biomedical optics, laser medical diagnostics and therapeutics, optofluidics for bioanalytics and other photonic applications, biosensing and other related applications, including spectroscopic optical diagnostics; diffuse optical imaging, steady-state, time-resolved and photon-density-wave techniques; optical coherence tomography; advanced biological microscopy; photochemistry and photobiology; laser tissue interactions; laser surgery; photodynamic therapy; minimally invasive optical diagnostics; photoacoustic techniques; optics in biotechnology; optical-system engineering for medicine; optical and photonic biosensors; optical tweezing and manipulation; lab-on-chip devices; on-chip imaging techniques; single molecule spectroscopy; microfluidically tunable or reconfigurable optical and photonic systems; photonic crystals; optofluidic assembly and lithographic techniques; on-chip light and laser sources.”

Hilton Head 2010, June 6-10, 2010 (<http://hh2010.org/>)

The 9th Annual IEEE Conference on Sensors **IEEE Sensors 2010 Conference**

November 1-4, 2010

**Conference Chair:** Professor Gary Fedder, Carnegie Mellon University, Pittsburgh, PA, USA

**Technical Program Chair:** Professor Tom Kenny, Stanford University, Stanford, California USA

**Conference Location:** Hilton Waikoloa Village 69-425 Waikoloa Beach Drive  
Waikoloa, HI USA 96738-5710 <http://www.ieee-sensors2010.org/>

## Field Service Engineer

Raith is a world leader in nanofabrication and semiconductor navigation systems. Raith systems are installed all around the world at universities, government laboratories, and private industries. Founded in 1986, Raith USA, Inc. is a company of scientists, engineers and professionals committed to delivering and supporting these complex nanotechnology systems for the North American and Brazilian communities of researchers and engineers. Visit us online at [www.raith.com](http://www.raith.com).

Job Description Raith USA, Inc. has an immediate opening for a field service engineer (FSE) with a solid background in engineering, electronics, and/or physics, and extensive hands-on experience with instrumentation. Position requires travel to universities, government labs and private industries across North America, as well as occasional travel to South America and Europe. Advanced troubleshooting, independent decision-making, and professional customer support are essential skills. Job requirements will include installation, qualification, maintenance and repair of state-of-the-art e-beam and ion beam lithography systems following established procedures and policies. Up to 75% travel is required.

### Requirements:

Applicants must have a minimum of an AS degree with 5 years of relevant experience, or a BA/BS or MS degree with 2 years of relevant experience. US Citizenship is REQUIRED.

Raith will provide extensive in-house and on-site training on our systems at Raith USA headquarters in New York, customer locations in North America, and at the Raith GmbH headquarters in Germany.

Hands-on experience with the following is desired:

- High-vacuum systems,
- Electronic measurement / testing / repair,
- Charged particle optics,
- Electron beam lithography,
- Scanning Electron Microscopes, Focused Ion Beams,
- Laser interferometry,
- Software and PC hardware troubleshooting,

Cleanroom environments.

### Application Info:

Salary is competitive and commensurate with education and experience. Raith offers Health Benefits, a 401(k), and a Profit Sharing Plan. All qualified candidates are encouraged to apply.

Job Location Baltimore, MD / Washington, DC area.



## DEPARTMENT OF COMMERCE

### Internship Program for Postsecondary Students

#### ANNOUNCES

The Department of Commerce (DOC) has announced the availability of internships during Summer 2010 Session in its Internship Program for Postsecondary Students\*. These internships offer opportunities to participants for hands-on education and training related to their fields of interest and those of the DOC. Selected applicants will intern for 10 weeks beginning as early as 31 May 2010 or as late as 21 June 2010. Internships require either part time (20 hours per week) or full time (40 hours per week).

Internships will be available in the Washington, D.C metro area; however, some internships might be available at DOC Offices and Bureaus in other locations. ORISE will accept applications for Summer 2010 through March 2010.

#### **Disciplines of Interest**

Examples include the following: business; life, health, and medical sciences; communications and graphic design; computer science; physical sciences; communications and graphic design; mathematics; and international relations.

#### **Benefits:**

Undergraduate interns receive a weekly stipend of \$500; graduate interns receive \$600. In addition, both undergraduate and graduate interns receive a \$150 weekly housing allowance, plus limited travel reimbursement and accidental medical expense coverage.

#### **Eligibility Requirements:**

**US Citizens**

**Enrolled Undergraduates or Graduates**

**Submit a complete application\*\*by no later than 30 April 2010**

**Interested in and available for a ten-week Internship during Summer 2010**

Application form and more information can be found on this web site: <http://see.orau.org/ProgramDescription.aspx?Program=10038>

**Postdoctoral Research Opportunity:  
Optical MEMS & Nanophotonics  
Naval Research Laboratory, Optical Sciences Division**

**Overview:** We are seeking a motivated postdoctoral research associate with microfabrication experience in the field of microphotonics and/or MEMS/NEMS. Experience with photolithography and/or e-beam lithography as well as wet and dry-etch processing is desired. Experience with testing of integrated waveguide devices is a plus.

**Research Description:** We are investigating the optical properties of micromachined and nanomachined semiconductors for the development of novel photonics technologies. The high-index contrast and small feature sizes afforded by new precision patterning and etching technologies in semiconductors enables the creation of nanomechanical optical devices, highly nonlinear semiconductor waveguides, and unique electro-optic materials. Previous work has focused on lateral bandgap engineering using strain relaxation, micromechanical quantum well modulators, and high-Q-Fabry-Perot air-gap Bragg mirrors in waveguides.

Materials of interest include compound semiconductor heterostructures grown on InP and GaAs, as well as SOI. Research areas include dry etching and selective wet etching; strain relaxation and band structure deformation; electro-refraction and nonlinear optics in air-clad waveguides; high-Q microcavities and filters; novel coupled and asymmetric quantum well designs; photothermal, piezoelectric, and electrostatic actuation; noise and dissipation in MEMS and NEMS; and fabrication of micromechanical chemical sensors. Research is conducted in collaboration with the Electronics Science and Technology Division. Growth and fabrication capabilities include molecular beam epitaxy, inductively-coupled plasma etching, and electron-beam lithography. Measurement and characterization equipment includes a white-light profilometer, a Fourier-transform infrared spectrometer, all-band tunable diode lasers, optical spectrum analyzers, nanopositioning equipment, and a high numerical aperture cryostat.

**Keywords:** GaAs; InP; MEMS; Micromachining; NEMS; Photonics; Quantum wells; SOI; Waveguide;

**Eligibility:** U.S. citizenship required

**Contact:** Todd Stievater  
Email: [opticalmems@nrl.navy.mil](mailto:opticalmems@nrl.navy.mil)

**More Information:**

Group Website: <http://www.nrl.navy.mil/photonics/5654/opticalMEMS.php>  
Announcement at NRC Research Associateship Programs: <http://nrc58.nas.edu/RAPLab10/Opportunity/Opportunity.aspx?>

## Internship in bioMEMS and Microsystems:



We are seeking Electrical, Mechanical and Biomedical Engineers or other scientists with relevant experience for full time summer and year-long internships. We are a small (six person) engineering consultancy looking to grow and seeking motivated and adaptable engineers to support MEMS, micro-fluidics, and other Biomedical projects. Our permanent staff is composed of several individuals who started out as interns. Our team is close-knit and friendly, and the work is hands-on and fast paced. We are based in Columbia, MD and participate in all phases of project lifecycle for our clients: design and modeling, clean-room fabrication, and laboratory testing.

### Skill Set:

Candidates with a B.S., M.S. or Ph.D. are all encouraged to apply. Significant emphasis will be placed on your laboratory and design experience outside of the classroom, regardless of whether it was in an academic or an industrial setting. No one person is expected to possess all of the following skills, however a realistic candidate should have substantial experience in at least one area:

- finite element modeling of MEMS and Microsystems (Comsol preferred)
- clean room processing- lithography, etching, metal deposition and other relevant experience for small-scale MEMS fabrication and process development
- mechanical engineering: finite element modeling, CAD design w/ Solidworks, good general assembly and mechanical skills
- non-silicon micro-fluidic fabrication (i.e. soft lithography, PDMS, hot embossing, etc.)
- piezoelectric acoustic transducer design and/or fabrication

development, assembly, characterization and use of novel laboratory experimental set-ups

If you believe that you possess demonstrable competence and experience in one or more of these areas, please forward a resume and cover letter to [internship@sbmicrosystems.us](mailto:internship@sbmicrosystems.us).

To subscribe email: [memsalliancemidatlantic@jhuapl.edu](mailto:memsalliancemidatlantic@jhuapl.edu)

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If you need to speak to a live person try emailing [ann.darrin@jhuapl.edu](mailto:ann.darrin@jhuapl.edu).