Microsystems Monthly

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Issue 11

Mid-Atlantic MEMS Alliance Mission Statement: To network expertise, capabilities, and research to facilitate the development of new applications and commercialization of miniaturization technologies.

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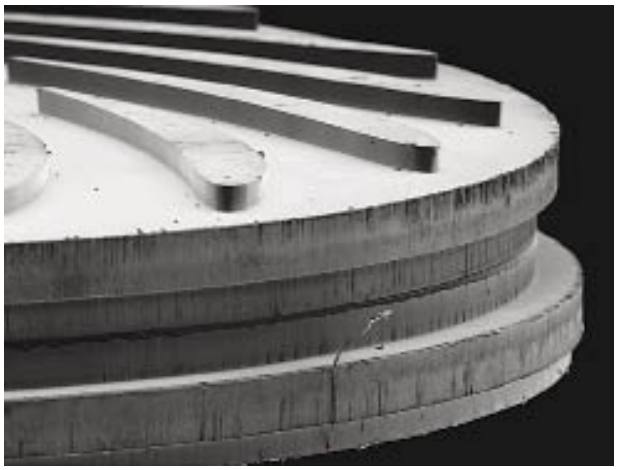
Microturbines headed back to the future

Adapted from Micr Manufacturing (see details below)

Nobody's talking about generating 1.21 gigawatts of power as was required in the "Back to the Future" movie, but microturbine research is headed back to where it was in early 2007. Dr. Alan Epstein, one of the prime movers behind the micro-engine project at the Massachusetts Institute of Technology, expected to have a micro-engine producing power by the late spring of that year, and a fully integrated device ready for commercialization within 5 years.

In the interim, however, the research hit a wall at MIT and has moved to the University of Maryland in College Park, Md. Dr. Reza Ghodssi, a member of the MIT team from 1997 to 2000 and now the Herbert Rabin Distinguished Professor and Director of the Institute for Systems Research with the A. James Clark School of Engineering at the University of Maryland, continued to work on such a device—though with one major difference: Ghodssi is using stainless steel ball bearings to support the rotor as opposed to air bearings.



A cross section of the microturbine (left created at the University of Maryland reveals the location of the micro ball bearings, which are contained in a notch in the edge of the turbine below the rotors (right). photos courtesy Ghodssi, McCarthy, Waits, Beyaz, Hanrahan, University of Maryland.

http://www.micromanufacturing.com/showthread.php?t=749

Get the complete article from Micro Manufacturing at the link above for more detail (contributed by R. Ghodssi)

What's in a Name?

I've spent some time over the past ten months speaking with people about what the MEMS Alliance has to offer and why they should consider joining us. We have enjoyed a lot of new participants this year and added several new Steering Committee members, yet I've noticed that the first thing out of people's mouths has been remarkably consistent- "I don't really *do* MEMS." The same response comes from academics, industrial practitioners, and Government Lab researchers. This is usually followed by an interesting description of what they *do* work on, which is: micro-fluidics, integrated photonics, or biosensors; advanced packaging concepts, ASIC design, or wireless sensor development; nanotechnology, embedded systems, or laser machining; micro-scale traditional machining, systems-on-a-chip, or sensor systems; environmental sensing, compact avionics, and much more. Oddly, if one reads our mission statement (which speaks about the development and commercialization of miniaturization technologies), all of these subjects are exactly what we're supposed to be about.

So, this begs the question of what, exactly, MEMS means, and what picture the term conjures that leaves so many of us thinking that we're on the outside. Of course the "electro-mechanical" part of the acronym should give us a clue, and indeed I have found that MEMS to most folks means micro-fabricated silicon with moving parts. The most classic and prolific example is inertial sensors (e.g. accelerometers and gyros). And certainly this area has been a great success story, emerging from the high value-added automotive market and in recent years conquering as well the consumer electronics area (think Wii, i-pod, cell phones, etc.) Yet, this is a developed technology, a multi-billion dollar per year market that has largely been commoditized. Typical inertial sensor runs are carried out by a few large players in massive foundry runs (usually combined MEMS and CMOS) with incremental R&D being carried out to usher in improvements in succeeding generations of device. Certainly, interesting research continues on inertial sensors, notably on the development of navigational-grade inertial measurement units (IMU's) which would open up new military and aviation markets. And while this is important and interesting work, it certainly does not capture the entire scope of our membership or where we hope to head in the future.

So, are we as an organization mis-named? I think so, and I don't think that it's just a matter of semantics. I think that the term "MEMS" no longer captures the essence of our group, and in fact hurts us as we strive to continue to grow, to connect people, and to become more dynamic and relevant. And, it turns out that there is a term in common use that seems to better capture what we do: "Microsystems Technology" or MST, seems to me to encompass all of the areas described in the first paragraph. I'd like to propose that we rename ourselves the "Mid-Atlantic Microsystems Alliance", however I'm interested to hear what all of you think.

Is it a stupid idea? Is there a better name out there that captures what we do? Drop us a line and let us know! http://www.mems-alliance.org/contact/members.htm

Best regards,

Brian Jamieson

POSITION OPENINGS IN THE AREA

Microfabrication Engineers and Technicians (truncated version...please go to web site for more details)

MEMS Exchange (Reston, VA)

Requirements

Looking for engineers at the BS,MS, and PhD levels with at least 5 years of experience in a wide diversity of microfabrication projects. Successful candidates will have ample relevant experience in performing photolithography, wet and dry etching, DRIE, wafer bonding, thin-film deposition, thermal processes, metrology, etc. It would also be helpful if the candidate has experience in using MEMS design tools such as Cadence, Matlab, L-Edit, AutoCAD, Coventor, etc. . U.S. citizenship is required and the candidate must be able to gain a DoD security clearance. Excellent written & oral communications skills required.

Responsibilities

MEMS Exchange engineers and technicians are responsible to perform processing work on MEMS development projects for our customers. These projects range from basic research to full-blown product development programs. The engineers and technicians are required to perform process development work, including debugging processes and process sequences, in order to implement working devices for our customers. Persons must have the ability to handle multiple projects simultaneously and on very tight time schedules.

Application

Interested candidates should forward their resumes to Christy Short at jobs@mems-exchange.org. The MEMS Exchange at CNRI is located in the suburban Washington, DC high tech corridor of Reston, VA, and housed in new facilities which include a class 10 clean room. CNRI is an equal opportunity employer, has great benefits and pays at industry competitive rates.

DRS Company DRS TechnicalServices, Inc. Senior Engineer……The Senior Engineer shall be responsible for efforts dealing with manufacturing, corrosion and environmental issues related to information technology systems, equipment and components. The Senior Engineer shall be an expert in Micro-Electro-Mechanical System (MEMS) technology, develop Joint Test Protocols, and develop processes for flexible manufacturing. The Senior Engineer shall have experience working directly with Nano-Technology and process modeling. Masters degree in engineering, mathematics, physics or computer science from an accredited college or university and U.S. citizenship. Fifteen years or more experience in manufacturing, corrosion, environmental or information technologies including Micro-Electro-Mechanical Systems (MEMS), development of Joint Test Protocols, flexible manufacturing, Nanotechnology and process modeling.

Additional Desirable Skills and Knowledge

The Senior Engineer shall have substantial experience and involvement with at least 5 of the 7 following areas:

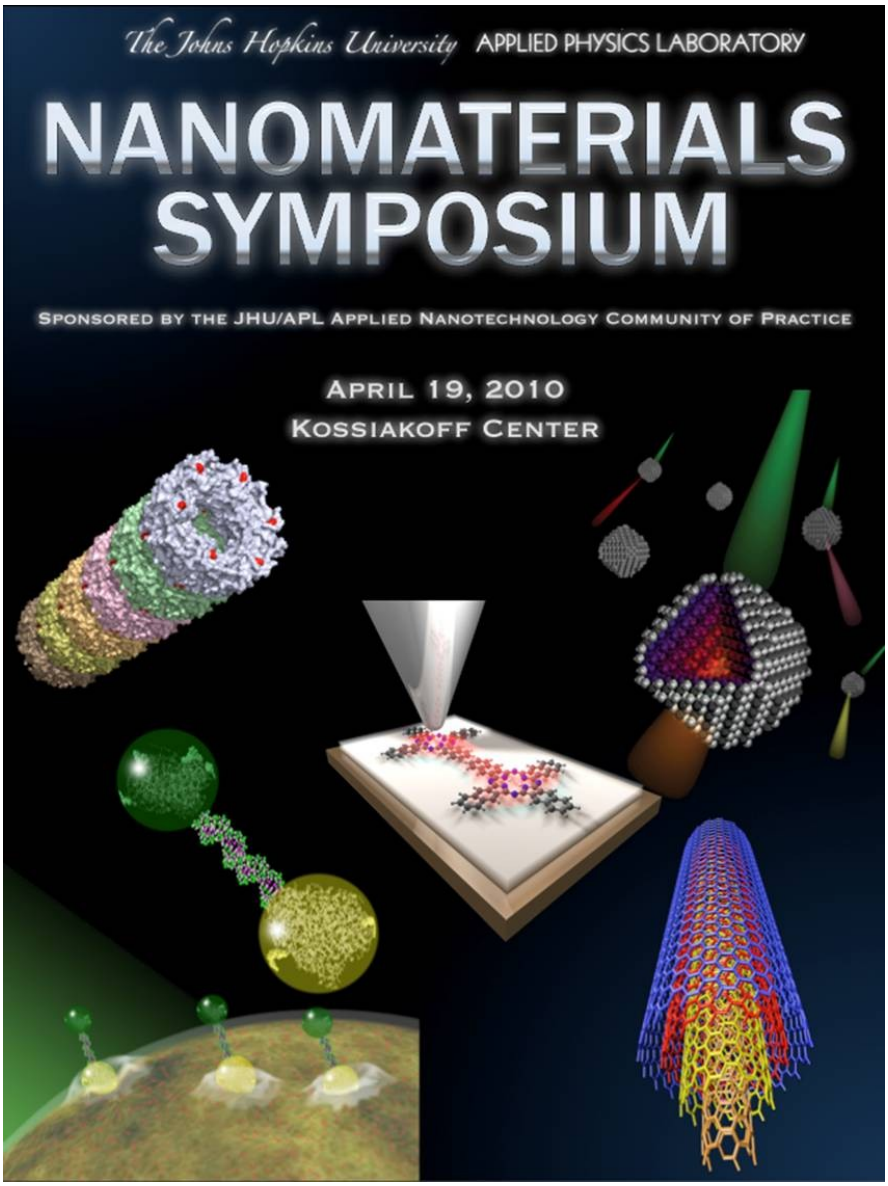
* Corrosion
* Surface Science
* Circuit Design
* Analytical techniques for material investigation
* Applications engineering
* Manufacturing management
* Naval Command, Control, Communications, Computers and Intelligence (C4I)

DRS Defense Solutions, LLC is an equal opportunity/affirmative action employer. We consider applicants without regard to race, color, religion, creed, gender, national origin, age, disability, genetic information, marital or veteran status, or any other category protected by federal, state or local law.

Upcoming Events

Hilton Head Workshop 2010 2010-06-06 - 2010-06-10 Hilton Head Island, South Carolina
The thirteenth in the series of Hilton Head Workshops on the science and technology of solid-state sensors, actuators, and microsystems will be held on June 6-10, 2010. Previous Workshops have provided a highly interactive forum for researchers to present and discuss recent advances in microfabrication technologies for sensing and actuation devices and microsystems for physical, chemical, and biological applications.
Attendance will be limited to 450 participants, with preference given to authors. As with previous Hilton Head Workshops, all prospective participants - accepted presenting authors, all previous attendees of any Hilton Head Workshop, and New Potential Applicants should complete an application on this website. For more information: http://www.hh2010.org/

Save the Date



PROCUREMENT/PROPOSAL OPPORTUNITIES

Feb 1, 2010

Solicitation Number: DARPA-BAA-10-12 **Notice Type:** Presolicitation

Synopsis:

DARPA is soliciting innovative research proposals in the area of grating-based integrated circuit layout design and patterning. The goal of the Gratings of Regular Arrays and Trim Exposures (GRATE) program is to develop revolutionary new circuit design methodologies combined with grating-based lithography tools to enable cost effective low volume nanofabrication for Department of Defense (DoD) applications. The novel circuit design methodologies will enable simplified physical layout implementation of circuits by leveraging extremely regular geometries. Overall circuit densities and performance will not be sacrificed when utilizing these new design approaches. These simplified circuit design geometries will be implemented using ultra-high-resolution grating patterns which can be fabricated at high throughput using either mask-based or maskless (interference) lithography. Cost effective low volume microfabrication will be achieved by lowering the design and fabrication costs of custom application-specific integrated circuits (ASICs), enabling maskless interference-based patterning with practical throughputs, and improving fabrication yield resulting from regular circuit patterns. See the full DARPA-BAA-10-12 document attached.

https://www.fbo.gov/?s=opportunity&mode=form&id=9d4f67fa73e424bd7dc1ac9eabdafc28&tab=core&_cview=1

IEEE Government Fellowships

2011 IEEE-USA Government Fellowships- Each year, IEEE-USA sponsors three government fellowships for qualified IEEE members. The fellows spend a year in Washington serving as advisers to the U.S. Congress and to key U.S. Department of State decision-makers. Known as either a Congressional Fellowship or an Engineering & Diplomacy Fellowship, this program links engineers with government, providing a mechanism for IEEE's U.S. members to learn firsthand about the public policy process. Application materials now available. Deadline: 15 March 2010

University of Maryland College Park, MD USA Position Type: Post Doc Small Energy Storage

UMD seeks two motivated, independent post-doctoral fellows to work on multifunctional nanostructures for next-generation small scale energy storage applications starting in early 2010. The activities will be focused on the following research areas:

Development of microsystems with integrated optical and mechanical components for the fundamental study of nanostructure synthesis, properties and electrochemical behavior. Implementation of microfabricated power sources such as batteries and fuel cells utilizing existing bio/nano templating methodologies.
The two research associates will become integral parts of interdisciplinary teams between multiple faculty at the University of Maryland as well as other academic institutions and National Labs. They will have the opportunity to work at the University of Maryland Nanocenter class 1,000 clean-room and nano-scale characterization facilities as well as various collaborating laboratories on campus.

The successful candidates will hold a Ph.D. in Engineering (EE, ME, MSE, ChE), Physics, Chemistry or other related discipline with hands-on expertise in micro/nanofabrication and high resolution microscopy techniques. A background in optics, mechanics, electrochemistry and nanomaterial processes and properties will be considered a plus.

All interested candidates should submit a C.V. with a list of references to: Professor Reza Ghodssi (see contact information below) and copy Mr. Konstantinos Gerasopoulos in their e-mail (geras@umd.edu). For more information about our research group please visit www.ece.umd.edu/MEMS. Professor Reza Ghodssi 2236 Kim Engineering Building University of Maryland College Park, MD, 20742 Phone: 301-405-8158Fax: 301-314-9281 ghodssi@umd.edu URL: www.ece.umd.edu/~ghodssi