National Nanotechnology Infrastructure Network Vol.4 # 3

A Periodic Newsletter of NNIN News and Announcements

Aug 2008

NNIN

The **National Nanotechnology Infrastructure Network** consists of 12 nanotechnology user facilities at 12 major academic institutions. Funded by the National Science Foundation, our facilities are available to the national user community on an open basis. We provide accessible resources across the entire breadth of nanotechnology. To this end, each site has specialized areas of expertise within the network, ranging from biology and chemistry to materials characterization and traditional microfabrication. Complete information on NNIN sites, resources and access is available via the web site at nnin.org

(note to recipients: All links clicked in this newsletter are redirected through a proxy server and are thus tracked. You may access the links directly without tracking by opening them manually in your browser)

Program Highlights

NNIN International Winter School for Graduate Students

NNIN announces and solicits applications for its first International Winter School for Graduate Students. This two week program in India offers an intense graduate level course in Organic Optoelectronics and Electronics, coupled with a rural technology implementation experience. The course will take place at IIT Kanpur, Dec. 8-19, 2008. The program is open to graduate students (U.S.Citizens or Permanent Residents) of the highest quality from across the United States with an application deadline of Sept. 10, 2008. Participants need not be NNIN Users. All living and transportation expenses will be covered. For further information, visit http://www.nnin.org/nnin_iwsg.html.

New Equipment Highlights

Ion Implanation at Cornell NanoScale Facility

CNF at Cornell has installed a Nova ion implanter and is now offering ion implantation services to its users. The Eaton NV-6200AV is a medium current Ion Implanter capable of implanting dopants at beam energies from 10 to 190 KEV. Currently Arsine, Phosphine, Boron Trifluoride, Carbon Dioxide, Argon and Helium are available for implant. The implanter is configured for 6" wafers but carrier wafers are available for implanting 4" wafers or pieces.
http://www.cnfusers.cornell.edu/cnf5_tool.taf?_function=detail&eq_id=153
In addition, CNF has installed an AG 8108 Rapid Thermal Processor that can be used for implant anneals as well as rapid thermal oxidation
http://www.cnfusers.cornell.edu/cnf5_tool.taf?_function=detail&eq_id=152.

Oxford FlexAL ALD at Cornell NanoScale Facility

The Cornell NanoScale Science and Technology facility has installed an Oxford FlexAl Atomic

Layer Deposition tool. This instrument can do both regular ALD as well as plasma activated ALD. CNF has entered into a joint development agreement with Oxford Instruments to develop new ALD processes of interest to CNF Users and Oxford customers on this tool. Currently available characterized processes include HfO2, Al2O3, and AlN.

Spin/Spray Processor for Germanium Surface Preparation at Stanford

The Stanford Nanofabrication Facility has installed a Laurell self contained automated acid spray clean system to properly support germanium surface preparation. After the sub-oxide removal, a key component of Ge surface preparation is the retention of the chemically induced surface passivation. The single wafer chemical processor contains the acid within the dispense module and all waste products go down the acid drain. Wafers are cleaned and passivated automatically and removed from the system dry.

Ontrak post-CMP Brush Cleaner at Stanford

The Stanford Nanofabrication Facility has installed an Ontrak DSS 200 post-CMP brush cleaner. This system supports dual sided scrub of 4 and 6 wafers after chemical mechanical processing. CMP can be a dirty process due to the particulates in the slurries used for the wafer polishing. Before installation of this system, SNF could only provide a spray rinse followed by a spin rinse dryer step to clean post-CMP wafers. The CMP system and this scrubber support a wide range of users at SNF including CMOS, MEMS, biological, GaAs-on-silicon and nanowire projects. Wafers leaving the cleaner will typically have fewer particles than those entering the CMP process.

The Ontrak system was purchased with funds from an Intel Higher Education Semiconductor Program grant.

New Multi-Target RF/DC AJA Sputtering System at UCSB

The UCSB Nanofabrication Facility has recently acquired and installed a 6-target RF/DC sputtering system from AJA international. This system is nominally configured with SiO2, SiN, ITO (reactive RF deposition,) Al (metallic and reactive oxide and nitride deposition), Fe, Ni, and Co. Magnetic materials can be co-deposited. Substrate heating up to 800C in oxygen and RF substrate biasing are also incorporated into the tool. The system can handle up to 100mm diameter wafers with better than 2% uniformity. Other materials can be installed into the system upon request and approval.

Dage XD-7600-NT at Georgia Tech

The MiRC has just installed Dage XD7600NT in the Pettit Microelectronics Research Center. The Dage XD7600NT provides high resolution and large X-ray images for failure analysis with oblique angle views up to 70 degrees, displayed at full 2 Mpixel resolution on screen.

The XD7600NT features:

- 250nm feature recognition
- Up to 70 degree oblique angle views over the entire inspection area
- Enhanced automated inspection routines

- Automatic BGA and die-void measurements
- Uninterrupted rotating live oblique views 360 degrees around any point
- in the sample

For more information on this tool or to gain access please contact Dr. Greg Book (greg.book@gatech.edu) or Rebhadevi Jeevagan (rebhadevi@gmail.com), or visit grover.mirc.gatech.edu.

Technical Conferences, Courses and Events

Innovations in Nanotechology for Cancer Research Symposium at Cornell

On Friday September 26th the Cornell NanoScale Facility will host a one day symposium on "Innovations in Nanotechnology for Cancer Research". The symposium, which is co-organized by the National Cancer Institute, will bring together experts in cancer biology and nanotechnology to discuss problems in the clinical and basic science of cancer which nano- and micro-fabrication may be uniquely suited to address. The day will showcase advances in nanotechnologies that have enabled forward strides in cancer research and treatment, and highlight the current challenges in cancer research that nanotechnology can begin to address.

The program includes keynote lectures by:

Tejal Desai, PhD
Professor, Dept. of Physiology and Div. of Bioengineering
University of California, San Francisco

Jianyu Rao, MD
Associate Professor, Dept. of Pathology and Epidemiology
University of California, Los Angeles

as well as presentations by:

- **Lajos Balogh, Ph.D.**, Roswell Park Cancer Inst.
- **Carl Batt, Ph.D.**, Cornell University
- **Michael King, Ph.D.**, Cornell University
- **Manfred Lindau, Ph.D.**, Cornell University
- **Michael McDevitt, Ph.D.**, Sloan-Kettering Inst.
- **Larry Nagahara, Ph.D.**, National Cancer Inst.
- **Rodney Page, D.V.M.**, Cornell University
- **Cynthia Reinhart-King, Ph.D.**, Cornell University
- **Michael Shuler, Ph.D.**, Cornell University
- **Abraham Stroock, Ph.D.**, Cornell University

Registration and poster submission will open soon at
http://www.cnf.cornell.edu/cnf_ncrsymposium.html

Metrology Technology and Techniques Workshop at Harvard University

The Center for Nanoscale Systems at Harvard University and Veeco will be jointly hosting a Metrology Technology and Techniques Workshop to be held at Harvard University on August 27-28th, 2008. The workshop will cover applications, techniques, tips, and new technology for AFM and other metrology instruments, including the NanoMan-AFM, the optical profiler, and stylus profiler available in the CNS facilities. Talks will be given by both industry and research scientists. The participants will have the opportunity for hands-on training and operation of these instruments.
For more information: contact Dean Schmidt dschmidt@veeco.com.

BioMEMS & Microfluidics for the Life Sciences: August 28 29, 2008

The University of Minnesota s Nanofabrication Center will present **BioMEMS and Microfluidics for the Life Sciences: A Hands-On Two-Day Introduction to the Field**. This short course is designed to provide an understandable overview of microfluidics for biomedical applications. It is intended for those who might be interested in becoming involved in the microfluidics field, but need a basic outline of what is possible and how the devices are designed and built. For complete details, visit: http://www.nano.umn.edu/biomems08/

Education and Outreach News and Events

Nanooze

Nanooze is the NNIN s science news magazine/web site for children. It presents nanotechnology and related science concepts in a light, colorful format, primarily for middle school students. Previously available only on the web (www.nanooze.org), Nanooze is now also as a colorful 8 page printed magazine. Due to mailing expense, individual copies are not distributed; Classroom packs are distributed to teachers at major conferences and NNIN events, or by mail by direct request. Teachers can request packages for classroom use (multiples of 30) for current or future issues directly from NNIN (rathbun@cnf.cornell.edu).

Nanooze is a project of NNIN, the Cornell Nanoscale Facility, and Prof. Carl Batt of Cornell.

NanoScience Workshop for Teachers and Educators

The Lurie Nanofabrication Facility at the University of Michigan is organizing a free one-day workshop on microtechnology and nanoscience targeted towards middle and high school teachers who would like a better understanding of micro/nanotechnology and how to use it in the classroom. The workshop will include some lecture material, but will focus on hands-on classroom and laboratory activities that can be used to introduce students to nanotechnology. The tentative date for this workshiop is November 7th 2008. More information is available at http://www.mnf.umich.edu/Events.aspx?id=99

UNM s Three-Week Summer Nanocamp and Teacher Workshop

Nanoscience@UNM conducted a middle school camp/teacher workshop June 22-July 11. Each morning teachers listened to nanoscience researchers and a nano-science fiction author. Guided by a Master Teacher, participants tried out inquiry-based, hands-on nano activities that they then presented to 27 middle school students every afternoon. Activities included Rube Goldberg contraptions activated by nitinol wire and nanoparticle stained glass. The camp visited the UNM ARTS Lab to learn about innovative ways of representing data and Sandia National Laboratory (SNL) where campers made sol-gels and nanogold and measured hydrophobic contact angles.

Teachers received a stipend, professional credit, ferrofluid, magic sand, lesson plans, materials and DVD presentations, and a fuel cell car kit (from SNL). Campers answered pre and post surveys. Teachers kept detailed journals on how to integrate nano activities into their curricula.

Job Openings

Technical Staff at Harvard

Center for Nanoscale Systems at Harvard University is seeking talented, enthusiastic individuals to fill two open technical staff positions within the Center.

- Requisition 33909 Biological/Advance Imaging Scientist
- Requisition 34264 Principal FIB Engineer

To learn more about these positions or to apply, please go to the CNS web site, http://www.cns.fas.harvard.edu. Harvard University is an Affirmative Action/Equal Opportunity Employer. Harvard requires pre-employment reference and background screening for these positions. Candidates must be authorized to work in the United States.

Director of Operations - Penn State Nanofabrication Laboratory

Penn State s Nanofabrication Laboratory is seeking a highly-qualified Operations Director to provide onsite management and to interface with external and internal users of the laboratory....

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NNIN is a network of open user facilities. All resources at member facilities are available equally to users from Academia, industry, and government. Contact information and facility details are available via the NNIN web site at http://www.nnin.org.