Center for Nanotechnology Education and Utilization Bulletin – August - September, 2006

The Penn State Center for Nanotechnology Education and Utilization (CNEU) is the home of the Pennsylvania Nanofabrication Manufacturing Technology (NMT) Partnership, and the NSF Advanced Technology Education (ATE) Center for Nanofabrication Manufacturing Education. It is also the Penn State home of the NSF National Nanotechnology Infrastructure Network (NNIN), the national NSF nanotechnology resource for enabling academic and industry R&D.

The CNEU Mission:
The CNEU is dedicated to research, development, and education across all aspects of micro- and nanotechnology. The Center resources are focused on addressing the incorporation of nanotechnology into secondary education, into post-secondary education, and into industry applications.

CNEU – Highlights of Upcoming Activities:

NMT Partnership Industry Outreach Initiative: In collaboration with area NMT Partners, a series of Industry Outreach Meetings entitled “Competitive Modern Manufacturing through Nanotechnology” are presently scheduled or are in the planning stages at various locations across the Commonwealth in the upcoming months. The desired outcome for this initiative is to reach as many companies as possible to share: a beginning understanding of nanotechnology, the current and forecasted impact of nanotechnology upon the marketplace, and to make them aware of the nanotechnologist worker pool available to them through the NMT Partnership. Please contact Bob Ehrmann at 814-865-7558 (rehrmann@engr.psu.edu) or Darlene Fink at 814-863-2955 (dfink@engr.psu.edu) for additional information.

NMT Partnership Educational Outreach Initiative: Again, in collaboration with area NMT Partners, a series of Educational Outreach Meetings are being scheduled at NMT Partner facilities across the commonwealth of Pennsylvania. The objective of this initiative is to introduce the nanotechnology and the nanotechnology education program available through NMT Partnership to as many students as possible at NMT Partner institutions. Please contact Bob Ehrmann at 814-865-7558 (rehrmann@engr.psu.edu) or Darlene Fink at 814-863-2955 (dfink@engr.psu.edu) for additional information.

Teaching Clean Room Webcast: The CNEU Teaching Cleanroom is now up and running. A webcast entitled "Design and Implementation of an Educational Laboratory for Nanofabrication Manufacturing Technology" will be held on Friday November 10 at 1 PM to introduce this new teaching cleanroom at the Penn State Center for Nanotechnology Education and Utilization to a national audience. For more information on how to access this webcast, please contact Bill Mahoney at bmahoney@engr.psu.edu ...

Hands-On Nanofabrication Workshop for Educators: Mark your calendars for the next offering of this workshop. Registration continues for the November 14-16, 2006, three-day Hands-On Nanofabrication Workshop for Educators. Participants will learn about the growing applications of nanotechnology in many industries including the biotechnology, MEMs, optoelectronics, chemical and electronics industries. The basics of nanofabrication processes and tools will be covered and practiced through a combination of classroom lectures and hands-on processing labs in the class 10 clean rooms of the Penn State Nanofabrication Facility. Please contact Darlene Fink at 814-863-2955 (dfink@engr.psu.edu) to register, or for further information. Workshop spaces fill up quickly, so please register as soon as possible.

CNEU Program Highlights for August-September 2006

CNEU Educational Cleanroom Opens for Business: The CNEU Educational Cleanroom was officially opened for business on September 28, 2006. This 1000 square foot cleanroom has been populated with education size nanofabrication and nanocharacterization tools, and is being utilized for the capstone student laboratories, workshops, outreach opportunities, and remote tool access. As mentioned in the upcoming events section, a webcast with further details about the cleanroom will be held on Friday November 10, 2006.

NMT Partnership Career Day: An NMT Partnership Career Fair was held on September 28, 2006. Representatives from Cleanroom Filters, Cyoptics, Fairchild, Kurt Lesker, Plextronics, RJ Lee Group, Seagate, and Veeco were featured at this fair. Each company presented an overview of their organization, its’ mission, and how it is tied to nanotechnology to an audience of 66 prospective, current, and former NMT students. A large number of resumes were submitted to the represented companies for employment consideration and substantial time was allotted for student and company representative networking / interviewing. The company presentations were videotaped and are now available for those interested in learning more about these organizations and the opportunities that they offer. Contact Bill Mahoney bmahoney@engr.psu.edu if you are interested in viewing these presentations. Concurrent to the company presentation, CNEU personnel held AFM and SEM familiarization training sessions in the newly opened CNEU Teaching Cleanroom for 40 interested Career Day attendees.

Frost Museum Interactive Display: On Saturday September 23, 2006, Amy Brunner set up an interactive display entitled “Amazing Creatures with Nanoscale Features” at the Frost Entomological Museum as part of the Penn State Great Insect Fair. Approximately 80 visitors toured the exhibit throughout the day and were a part of this unique state of the art experience. Visitors to the exhibit were able to remotely operate the RJ Lee Scanning Electron Microscope located in the CNEU teaching cleanroom and see live magnified images of the some of the specimens that surround them in the museum. Visitors learn about the unique nanoscale features of these specimens (creatures) and how scientists and engineers are learning more about them through careful study and utilizing this knowledge to mimic their unique features and capabilities.
Workshop at the Commercialization of NanoMaterials 2006 Conference: Bill Mahoney and Bob Ehrmann held an invited pre-conference workshop to 70 attendees at the Commercialization of NanoMaterials Conference September 18, 2006 at the Hilton Hotel, in Pittsburgh Pennsylvania. The presentation entitled “Competitive Modern Manufacturing through Nanotechnology” focused on the role that nanotechnology is having in today’s society, the anticipated role it will have in the future, and reviewed some potential ways that companies may be able to utilize this anticipated technology revolution in order to give them a competitive edge. The conference provided a unique opportunity for dialogue among industry, small business, academia and government to understand each others’ needs and the opportunities for nanomaterials solutions.

NABIS Conference: Bob Ehrmann gave an invited presentation at the Nanotechnology and Business in Society (NABIS) in Chicago, Illinois on August 9, 2006. The presentation was part of the education and workforce issues breakout session of this conference and was entitled “Nanotechnology Education: The Pennsylvania Approach”.

National Nanotechnology Infrastructure Network (NNIN) Research Experience for Teachers (RET): The CNEU and Penn State Science Education Department hosted 2 in-service and 2 pre-service secondary teachers from Pennsylvania for a six week research experience beginning June 26, 2006 though August 4, 2006. The teachers experienced research first hand, collaborated with PSU research faculty, and helped to develop lesson plans and activities to be utilized back in their home classroom to assist in the teaching of science utilizing nanotechnology. Follow-up with these teachers will occur during the upcoming school year, where these teachers will continue to collaborate with CNEU and Science Education personnel on nanotechnology in-classroom activity development. This experience will culminate by participation at the National Science Teacher’s Association National Conference in the spring of 2007.

National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates (REU) Program Convocation: The NNIN REU Convocation was held August 9-12 at Cornell University. The REU program brought together select undergraduate students from colleges and universities from across the nation who each performed a ten week summer research experience at one of the thirteen NNIN partner institutions. Penn State University hosted five of these students: Sonia Cortes-Jimenez (University of Puerto Rico, Mayaguez), Esha Mathew (Cornell University), John Kroger (Georgia Institute of Technology), Myranda Martin (Lock Haven University), and Robert Patrick Martin (Erskine College). Congratulations to these students and all of the NNIN REU participants on a job well done.

Nanotechnology in the Secondary Classroom Workshop: The CNEU hosted a third secondary educator's workshop on July 31st to August 2nd 2006. During the workshop staff members facilitated high school teachers as they created and tested nanotechnology laboratory experiences and activities to utilize back in their home classrooms during the upcoming academic year. The feedback from the attendees is positive and suggests that several of these activities will be integrated into the multiple scientific disciplines represented at the workshop. The intent of this activity is to increase student awareness and interest in science and technology in general and nanotechnology in particular.

Summer Nanotech Camps: Twelve three-day Nanotechnology Introduction Camps were completed in June and July. The total attendance this year was 206 students and 50 chaperones. These Nanotech Introduction Camps, for students in 9th grade and above, serve as an acknowledged, excellent opportunity to learn about nanotechnology and nanofabrication. Again this year, processing, characterization, and applications of nanotechnology were covered and, careers were explored and educational pathways to nanofabrication careers were discussed. The agenda for this year was again improved to be even more interactive and fun, while still maintaining a high level of introductory level knowledge. Please keep these camps in mind for next summer. They fill up fast. Please remember that 1 day camp experiences are available throughout the year. Please contact Ms. Darlene Fink at dfink@engr.psu.edu for further information on available camp experiences.

Capstone Semester Update: The summer 2006 Capstone Semester was recently completed in August 2006 by 25 students representing partner institutions from across the Commonwealth. The fall 2006 Capstone Semester began on September 5, 2006 and is presently in full swing.

CNEU Website: The CNEU website (www.cneu.psu.edu) continues to be available as an aide to prospective students, parents, educators, counselors, and industry personnel. Highlighted website features include Nanotechnology Education Modules, Student and Industry Video testimonials, NMT Associate to Baccalaureate Pathways, and information, overviews of the NMT Partnership Capstone Semester as well as other CNEU programs and offerings.

CNEU Outreach: Outreach activities above during the August-September period, the Center received 153 visitors representing 6 organizations. Offsite and remote access presentations impacted an additional 40 individuals via remote access and an August visit to Luzerne County Community College

Industry Outreach Initiative Highlights: Bill Mahoney visited Willamaport, Pa on August 15, 2006 to man a tabletop display at the Williamsport Technology Futures Conference which featured information on PA NMT Partnership. The display was visited by ~100 visitors. On September 26, 2006, Bill Mahoney and Bob Ehrmann traveled to Bethlehem, PA (Northampton CC) to present to a group of 60 Lehigh Valley industrial representatives and educators from the region at the Lehigh Nanotech Network meeting. The presentation was entitled “Competitive Modern Manufacturing through Nanotechnology” and focused on an introduction to nanotechnology and the resources available through the CNEU for workforce education and training.

For Further Information on these Highlights or on the NMT Partnership in general, please contact:

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