
The Penn State Center for Nanotechnology Education and Utilization (CNEU) is the home of the Pennsylvania Nanofabrication Manufacturing Technology (NMT) Partnership, and the National Science Foundation’s (NSF) National Center for Nanotechnology Applications and Career Knowledge (NACK).

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 and on developing a micro-and nano-technology workforce for PA and the nation.

CNEU – Highlights of Upcoming Activities:

Capstone Semester Update: The fall 2008 capstone semester is now complete. Congratulations to the students from all across Pennsylvania students who successfully completed the rigorous semester and are now on to the next step in their educational journey or have graduated their degree programs and are entering the working world to contribute to our economy. The spring 2009 capstone semester will begin on January 12, 2009 with eighteen students scheduled to attend. Registrations are now being accepted for the summer 2009 capstone which will begin on May 18, 2009. Registration for the fall 2009, and spring 2010 capstone semesters are also being accepted. Please contact Lisa Daub at 814-865-9635 (ldaub@engr.psu.edu) to register, or for further information.

Hands-On Nanofabrication Workshop for Educators: The 2009 dates for the next Hands-on Nanotechnology Workshop for Educators are not yet set. We are again trying to arrange at least two three day workshops in 2009, most likely in early May and in November. This three-day workshop utilizes the facilities at Penn State to teach nanotechnology at an introductory level and also enables the participant to understand how nanotechnology is and will continue to be integral to STEM curriculum and careers. 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, utilizing the Penn State NNN Nanofabrication Facility along with the CNEU educational cleanroom. Please contact Lisa Daub at 814-865-9635 (ldaub@engr.psu.edu) for further information.

Training-the-Trainers Workshop for Educators: As part of our NSF National NACK Center activities, we will be having several workshops in 2009 for faculty from institutions from across the US which are in the process of setting-up nanotechnology courses, minors, or degree programs. Each of these workshops will focus on one of the following topics: (1) Overview of Nanotechnology, (2) Equipment Set Options and Hands-on Experiences for Teaching Nanotechnology, (3) Combining Web Access and On-campus Teaching, and (4) A Set of Courses for Teaching Nanotechnology. Please contact Bob Ehrmann at 814-865-7558 (rehrmann@engr.psu.edu) or Lisa Daub at 814-865-9635 (lisa@psu.edu) for further information.

NMT Partnership Industry Outreach Initiative: In collaboration with area NMT Partners, a series of Industry Outreach Workshops entitled “Competing in the 21st Century: The Nanotechnology Edge” 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 what nanotechnology is and the immense opportunities that nanotechnology offers, 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. For information on our upcoming schedule for these events, please see www.cneu.psu.edu. Please contact Bob Ehrmann at 814-865-7558 (rehrmann@engr.psu.edu) or Darlene Fink at 814-863-2955 (dfink@engr.psu.edu) for any additional information.

NMT Partnership Educational Outreach Initiative: The fall 2008 recruitment season is now complete, but spring recruitment season is just around the corner. Center Engineer Jamie Houseknecht will be scheduling a series of Educational Outreach events at NMT Partner facilities across the Commonwealth of Pennsylvania. The objective of this initiative is to introduce nanotechnology and the nanotechnology education program available through PA NMT Partnership to as many students, administrators, and faculty as possible at NMT Partner institutions. This program along with the always welcome visits and tours to University Park are great opportunities to spread the word about the incredible academic opportunity available to Pennsylvania students. Please contact Jamie Houseknecht at 814-865-5285 (juh147@psu.edu) or Darlene Fink at 814-863-2955 (dfink@engr.psu.edu) for additional information. To schedule a facility tours on line please see http://www.cneu.psu.edu/edOutreachSecEdTour.html.

Website Upgrade: The CNEU website is being up-graded. Please check it out and give us your opinion.
CNEU Program Highlights for November-December 2008

PSU-CNEU Awarded NSF ATE National Center: The Penn State Center for Nanotechnology Education and Utilization (CNEU) is to receive $5 million over four years from the National Science Foundation for establishing and running a National Center for Nanotechnology Applications and Career Knowledge (NACK). Penn State has been a national leader in nanotechnology education and workforce development since 1998. From 2001 to 2008, Penn State was home to the NSF Regional Center for Nanofabrication Manufacturing Education. The new NSF grant establishes the National Center for Nanotechnology Applications and Career Knowledge (NACK) as successor to the Regional Center. According to Stephen Fonash, the Kunkle Chair Professor of Engineering Science, who will direct the new NACK Center, the Pennsylvania Department of Community and Economic Development was extremely farsighted when it created the Nanofabrication Manufacturing Technology (NMT) Partnership in 1998 to meet Pennsylvania industry needs for skilled micro- and nanofabrication workers. "The NMT Partnership prepares students to work in any industry using micro- and nanotechnology," said Fonash. "In addition to Penn State, the NMT Partnership includes the Pennsylvania Commission for Community Colleges, the Pennsylvania State System of Higher Education, the Pennsylvania College of Technology, other post-secondary and secondary schools, private industry and others." The nation's first associate degrees in nanofabrication were awarded in Pennsylvania through this partnership. The NMT Partnership also offers enormously popular summer Nanotech Academies for high school students, as well as professional development workshops for educators and industry personnel. The goal of the NACK Center is to provide national coordination of micro- and nanofabrication workforce development programs and activities on behalf of NSF. The center will assist educational institutions and industry across the nation to work together to develop and deliver micro- and nanotechnology education programs, including incumbent worker training programs. The center will also help to develop national education program accreditation and worker skill standards in micro-and nanotechnology. "There is tremendous interest within industry and educational institutions in finding ways to meet the growing need for workers with micro- and nanotechnology skills," says Fonash. "The NACK Center is already working with several hundred community colleges and other educational institutions in more than 20 states and Puerto Rico to help develop programs to meet this need." In addition to Penn State, other key partners in the NACK Center are the Dakota County Technical College/The University of Minnesota, the Maricopa Community Colleges in Arizona, Northwestern University, and the University of Puerto Rico/Humacao. For further information about NACK programs and activities please contact Mr. Robert Ehrmann by telephone at 814-865-7558 or e-mail at rke2@psu.edu or visit www.nano4me.org.

NACK Center Organizational Meeting: - The initial organizational meeting for the National Center for Nanotechnology Applications and Career Knowledge (NACK) was held on November 18-19, 2008 at Penn State. The meeting was well attended by National Center Partners representatives, representatives from Penn State, the National Science Foundation (NSF), the Pennsylvania Department of Community and Economic Development (DCED), National NACK Partners, and the PSU CNEU. The collective assets of the new Center were reviewed, the goals of the new Center were discussed, and next step action plans were developed at this meeting.

Hands-On Nanofabrication Workshop for Educators: The latest offering of this three-day workshop was held December 2-4, 2008 with 26 participants in attendance. This teacher workshop featured lectures on the fundamentals of nanotechnology, nanofabrication, and nano-characterization combined with laboratory experiments in the teaching clean room in which these fundamentals are practiced. Examples of lab demonstrations include material modification on the nanoscale, characterization methods, and new products enabled by nano-manufacturing methods. Hands on activities in the CNEU Teaching Cleanroom and the PSU NSF NNIN Cleanroom utilize techniques such as self-assembly, plasma based processing equipment, a range of current patterning equipment, and characterization equipment including the SEM, AFM and other methods. In addition, workshop participants learned about the role of nanotechnology in the modern workforce and the growing applications of nanotechnology in many areas including the biotechnology, medicine, sensors and detection, optoelectronics, clean energy, electronics, and water treatment. Seven of the workshop participants were non-Pennsylvanians (Arizona, California, Illinois, New York, and Virginia) representing secondary and post-secondary institutions in those states. The workshop was well received by the participants in attendance. Workshops are presently in the planning stages for May and November of 2009.
PA NMT Partnership Career Day: An NMT Partnership Career Day was held on November 10, 2008 at the Penn Stater Conference Center in University Park, PA. The event brought together Pennsylvania employers, students enrolled in the capstone semester, and alumni of the NMT capstone semester. Representatives from Silberline Manufacturing, Veeco, Cyoptics, Fairchild, Cyoptics, Plextronics, Lehighton Electronics, Kurt J. Lesker, Lockheed Martin, and Strategic Polymer Sciences were featured. Each company presented an overview of their organization, its’ mission, and how it is tied to nanotechnology to an audience of fifty prospective, current, and former NMT students. The annual NMT Career Day is a great way for students to refresh knowledge, update their skills, get in touch with former classmates, and network with Pennsylvania nanotechnology companies. 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. CNEU personnel also held cleanroom tours and training sessions on new AFM techniques and our latest piece of equipment the Veeco Innova SPM.

CNEU Outreach: During the months of November and December 2008 Center received 178 visitors representing 14 organizations. Offsite and remote access presentations impacted an additional 736 individuals at 19 sites.

PA NMT Educational Outreach Initiative Highlights: Included in the above outreach numbers are educational outreach at NMT Partner institutions across Pennsylvania. Collectively, Jamie Houseknecht (who led this effort) with assistance from other CNEU personnel met with NMT Partner representatives, and held information forums to a collective audience of 724 educators, administrators and potential capstone attendees, during the months of November and December. The PA NMT Partner sites visited during this time period were Montgomery County Community College, Bucks County Community College, Lock Haven University, Penn State- Greater Allegheny, Community College of Allegheny County, Luzerne County Community College, Community College of Philadelphia, Penn State Berks, Allegany College of Maryland, Reading Area Community College, Penn State Wilkes Barre, and Penn State York.

Center Asset Reminders:

Student Recruitment Brochure and Recruitment Video are Available: The Center published a new recruitment brochure and produced a new 9 minute recruitment video to inform students about the nanotechnology degree programs at Pennsylvania Partner schools in the summer of 2008. The new tag line developed during this process is “Take Matter Into Your Own Hands: The Capstone Semester: Your Pathways to a Career in Nanotechnology”. The video can be viewed on the Center website at http://www.cneu.psu.edu/nePublications.html#capstoneVideo. The brochures and DVD copies of the video can be attained by contacting Darlene Fink at 814-863-2955 dfink@engr.psu.edu.

Penn College Nanotechnology Video Available on CNEU Website: In mid November 2007, the Pennsylvania College of Technology and WVIA public television released a broadcast production entitled “Degrees that Work - Nanotechnology”. The video introduces 21st century career and education opportunities to viewers. This 30-minute presentation explores nanotechnology and the related career opportunities with experts in the field. The production follows a former Penn College student, Mark A. Atwater, as he completes the capstone semester at The Pennsylvania State University’s Center for Nanotechnology Education and Utilization. The video can be accessed at http://www.cneu.psu.edu/edCapstoneVideo.html.

CNEU Website: The CNEU website (www.cneu.psu.edu) and for now (www.nano4me.org) 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, overviews of the NMT Partnership Capstone Semester as well as other CNEU programs and offerings. Recent additions to the website include the 30 minute video entitled “Degrees that Work – Nanotechnology” which was produced by the Penn College of Technology, and the new 9 minute student recruitment video.

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

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