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:

Capstone Semester Update: The fall 2006 capstone semester is presently in the final stage. Thirteen students are presently on track to complete this semester’s work in early December 2006. The spring 2007 capstone will begin on January 16, 2007 with eighteen registered attendees. Registrations for the summer 2007 and fall 2007 capstone semesters are presently being accepted.

NCLT Webcast: Dr. Paul Hallacher will host a National Center for Learning & Teaching (NCLT) in Nanoscale Science & Engineering Web Seminar on February 9, 2007 from 1:30 to 2:30 PM EST. The title of the talk will be “The NSF Advanced Technological Education (ATE) Center for Nanofabrication Manufacturing Education”. More information on accessing this webcast will be forthcoming.

Hands-On Nanofabrication Workshop for Educators: Mark your calendars for the spring 2007 offering of this workshop. Registrations are now being accepted for the May 15-17, 2007, 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 Lisa Daub at 814-865-9635 (ldaub@engr.psu.edu) to register, or for further information. Workshop spaces fill up quickly, so please register as soon as possible.

Summer Nanotech Camps: The CNEU will again be hosting three-day Nanotechnology Introduction Camps during the summer of 2007. These Nanotechnology Introduction Camps, for students in 9th grade and above, are a great opportunity to learn about nanotechnology and nanofabrication. Careers are explored and educational pathways to nanofabrication careers are discussed. The agenda is designed to be interactive and fun, while still maintaining a high level of introductory level knowledge. For further information on Nanotech Camps and to make camp reservations, please contact Ms. Darlene Fink at 814-863-2955 or dfink@engr.psu.edu.

2007 NNIN REU Program: During the summer of 2007, the National Nanotechnology Infrastructure Network will host a Research Experience for Undergraduates Program (NNIN REU) from June through August at the nation wide university NNIN research facilities. Engineering and science students with broad interests across disciplines focusing on nanotechnology are eligible to apply if they are not graduating before the end of the program in August 2007. The application deadline for this program is February 19, 2007. For more detailed information about the REU program, eligibility requirements, and other important facts please see http://www.reu.nnin.org/nnin11_login.php

2007 NNIN RET Program: During the summer of 2007, the Penn State National Nanotechnology Infrastructure Network site in conjunction with the Penn State Science Education Department will again be offering teachers (in-service and pre-service) the opportunity to experience the excitement of nanotechnology research and to share this experience in their classrooms and with their peers. This program will also be offered to teachers (in-service and pre-service) by four other NNIN sites: Georgia Institute of Technology, Harvard University, Howard University, and the University of California Santa Barbara. Some of the objectives of this program are to assist a diverse group of science teachers in understanding and communicating the importance of using inquiry-based methods to solve problems by doing research in nanotechnology and to establish a long-term mentorship support group of teachers who will become advocates for nanotechnology education and careers. More information on program details and eligibility requirements will be available in the near future on the NNIN website www.nnin.org.

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.
CNEU Program Highlights for October-November 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.

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 of the Career Day attendees.

Teaching Clean Room Webcast: A webcast entitled "Design and Implementation of an Educational Laboratory for Nanofabrication Manufacturing Technology" was held on Friday November 10, 2006 to introduce the new educational cleanroom at the Penn State Center for Nanotechnology Education and Utilization to a national audience. The webcast included a video tour of CNEU's new Educational Laboratory, a presentation discussing facets of the design process (including laboratory layout, equipment purchase criteria, safety, support and maintenance) and concluded with a live question and answer session. The webcast was recorded and is available for viewing at http://www.cneu.psu.edu/labwebcast.htm.

International Congress of Nanotechnology 2006: Bob Ehrmann gave an invited presentation at the International Congress of Nanotechnology 2006 Annual Conference in San Francisco, California on October 31, 2006. The theme of the conference “Roadmap for the Next Frontier” and the presentation was given during the nanotech workforce training panel discussion section of the conference.

November 2006 - Hands-On Nanofabrication Workshop for Educators: The latest offering of this three-day workshop was held November 14-16, 2006 with thirty one educators in attendance. The participants learned 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 were 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. Nine of the workshop participants were non-Pennsylvanians (North Dakota, Minnesota, Colorado, Texas, and New York). The next workshop in this continuing series will be held May 15-17, 2007.

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: During the October and November period, the Center received 84 visitors representing 6 organizations. Offsite and remote access presentations impacted an additional 749 individuals highlighted by educational outreach to NMT Partner sites.

Educational Outreach Initiative Highlights: CNEU personnel (Amy Brunner, Bill Mahoney, and Bob Ehrmann) visited 20 NMT Partner sites, met with NMT Partner representatives, and held information forums to a collective audience of ~ 584 educators, administrators and potential capstone attendees, during the months of October and November 2006. The NMT Partner sites visited during this time period were Community College of Allegheny County, Buck County Community College, Butler County Community College, Delaware County Community College, Harrisburg Area Community College, Lehigh Carbon Community College, Luzerne County Community College, Montgomery County Community College, Northampton Community College, PA Highlands Community College, Reading Area Community College, Westmoreland County Community College, California University of PA, Clarion University, Indiana University of PA, Lock Haven University, Penn State Fayette, Penn State Hazleton, and Penn State Wilkes-Barre.

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

- Bob Ehrmann (814) 865-7558 rke2@psu.edu
- Lisa Daub (814) 865-9635 ldaub@engr.psu.edu