

NANO-RAMA

Through training and education, Penn State aims to steer nanotechnology research and development toward world change for the better

A CANCER PATIENT IS INJECTED WITH A MICROSCOPIC VEHICLE that safely delivers a potent drug directly to cancer cells. A football player pulls on his lucky pair of socks, unwashed for 10 straight games, yet surprisingly odor-free. A college student eats a week-old portion of leftover sushi and does not get sick.

All of these scenarios may soon become a reality as nanotechnology—basically, the science of building objects at the nanometer scale, or 100,000 times thinner than a human hair—becomes an increasingly popular field.

“Nanotechnology is expected to play a key role in the next industrial revolution,” said Dr. Stephen Fonash, director of the new Nanotechnology Applications and Career Knowledge (NACK) Center at Penn State.

NACK, funded in September 2008 with a grant from the National Science Foundation (NSF), supports the development of two-year nanotech degree programs across the country; offers professional development programs for secondary teachers to become nano-literate; and develops and delivers worker education programs.

In Pennsylvania, more than 500 students from partner community and technical colleges have completed nanotechnology programs at Penn State, and nearly all of them have found nanotechnology jobs in more than 90 firms, ranging from pharmaceutical to photovoltaics companies.

“Not only students but also industry personnel must have a better understanding of nanotechnology and its



The nanometer scale is 100,000 times thinner than a human hair.

far-reaching implications if they hope to take advantage of the competitive opportunities becoming available,” added Fonash.

To Market, To Market

It’s the ethical implications of nanotechnology that led Penn State faculty Drs. Richard Doyle (English), Mark Horn (engineering science and mechanics) and Richard Devon (engineering design) to develop and deliver an NSF-sponsored undergraduate course in which students explore how nanotechnology is researched, designed and commercialized. Students in the class work in teams and collaborate with nanotech researchers to create scenarios for design commercialization and social impact.

Although nanotechnology is radically transforming our lives in wonderful ways, some health and safety analysts worry about how nanoparticles will behave in our bodies and in the environment. “We need to think systemically about how these technologies will alter our lives,” said Doyle.

This fall, Doyle, Horn and Devon are hosting what they refer to as a “town hall on nano” with students who took the class last spring, plus interested researchers and members of the community, to discuss nano research and how it might affect people and the environment.

“It is important that not only students learn about these technologies, but also that researchers and policy-makers learn from the collective deliberations of students focusing their attention on this burgeoning field,” said Doyle. The students’ scenarios will be shared with researchers in ongoing Wikibooks on nanotechnology.

WHAT’S NEW ONLINE: MASTER OF PROFESSIONAL STUDIES IN INFORMATION SCIENCES

A NEW ONLINE MASTER’S DEGREE in information sciences aims to give professionals the skills to not only use the foundations of information sciences and technology, but also to apply them in a real-world context.

John Van Vactor, director of online education in the College of Information Sciences and Technology, gives as an example the challenges of protecting a computer system. “If a person shares a

computer system password, then that person has circumvented the technology side of information security. Once that information is shared, there isn’t anything that can be done from a technology standpoint to correct it,” he said. “This new program will help students ... deal with those information-centric challenges.”

Offered by the college through Penn State World Campus, a unit of Outreach, the program admitted its first students this fall.

Engineering: ONE GIRL AT A TIME

WHILE ATTENDING A CONFERENCE, David Meredith struck up a conversation with the woman sitting beside him and discovered that she was an engineer for a large cosmetics company. “How did you become interested in engineering?” he asked. “Well,” she said, “when I was in fifth grade, you came to my class to talk about engineering. Your message was inspiring, and it stuck with me.”

Meredith, associate professor of engineering at Penn State Fayette, The Eberly Campus, said that moments like this are what motivate him to continue science outreach to girls. Since 1995, he has conducted programs that introduce girls to engineering—a field historically low in numbers of women. In fact, for his efforts, he won the 2009 Introduce a Girl to Engineering Day Award (from the Women in Engineering ProActive Network), given to exemplary individuals who encourage young girls to pursue science, math and engineering.

“Girrl Power,” Meredith’s most successful outreach program for girls, is aimed at middle school students and is held each winter. The program focuses on topics such as how civil engineers use metal detectors to find underground pipes and how GPS systems are made. The program also includes visits by professional engineers. For example, one year the first female to climb poles for a telephone company talked to the girls about the challenges she faced in a male-dominated career.

“I hope to see as many females as males registering for my college-level thermodynamics class before I retire,” said Meredith.

Meredith’s other programs run the gamut from summer camps to professional development for teachers—all reflective of the University’s commitment to the Pennsylvania Science, Technology, Engineering and Mathematics (STEM) Initiative, one of six U.S. public-private partnerships aimed at increasing students in STEM careers and training the current workforce.



Efforts encourage girls to pursue a male-dominated career.

WEB 2.0 COURSE 101

JUST2IT!, a new online training program in Web 2.0 technologies for faculty and staff, takes its name from Nike’s popular “Just Do It!” slogan.

“Sometimes people hesitate to try new technologies until they’re encouraged to ‘just do it,’” said Lawrence Ragan, director of faculty development for Penn State Outreach’s Continuing and Distance Education. “Our course is presented as a low-stakes experience that enables faculty and staff to test the technology waters.”

Developed by a team from ITS Training Services, Continuing and Distance Education and the College of the Liberal Arts, the course delves into the technologies for Wikis, micro-blogging, video- and photo-sharing, and social networking, among others.

“As Web 2.0 technologies become more commonplace in our work and learning spaces, it is important that faculty and staff be exposed to these tools and consider how they might impact the teaching and learning at Penn State, as well as the work of staff,” said Ragan.

The course was piloted last spring and has been offered as an eight-week course this fall. For more information about Just2It! or to register for the course, contact Ragan at lcr1@psu.edu.