

EngineeringNews



DEAN'S MESSAGE

We know that the engineers of tomorrow must be flexible and entrepreneurial, key factors we emphasize at Rowan.

A recent report by the National Academies, "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future," emphasizes these points, concluding that the health, security and prosperity of our nation depend on our ability to be creative and innovative. A key factor in ensuring that creativity and innovation is in educating the next generation of engineers and scientists.

First we need to attract that next generation. By any statistics, not enough students — especially not enough women and minorities — are graduating from high school with the preparation and enthusiasm needed to succeed in engineering and science. As you will read in this issue, Rowan is moving to change that in a number of ways. Although the challenges are very real, we firmly believe that the future is full of promise.

As a College, we continue to take a leadership role in engineering education. However, we cannot succeed without the help of our alumni and friends. For your loyalty and support, thank you.

Regards,

Dianne Dorland

Dianne Dorland
Dean of Engineering

Work Offers Hope for Early Alzheimer's Diagnosis

A Rowan College of Engineering team may have a hand in making early diagnosis — and therefore earlier treatment — of Alzheimer's disease possible.

Dr. Robi Polikar, associate professor of electrical and computer engineering, Rowan students and colleagues from the University of Pennsylvania School of Medicine and Drexel University are completing a four-year \$1.1-million study funded by the National Institute on Aging of the National Institutes of Health. The study demonstrated that Alzheimer's can be diagnosed with a high rate of accuracy by monitoring how a patient's brain reacts to a series of auditory stimuli as shown in electroencephalograms (EEGs).

Polikar and his students analyzed EEG data using sophisticated signal processing, pattern recognition and artificial intelligence techniques to study cerebral markers previously not associated with Alzheimer's.

Though Alzheimer's disease cannot be confirmed until a patient has died and the brain has been examined, the Rowan/Penn/Drexel work looking at the EEGs of 71 patients provided results 82 percent of the time or more that matched more complex, long-term procedures used at world-class teaching hospitals.

That is good news for people who are evaluated at community hospitals and clinics, where the diagnostic accuracy is estimated to

be around 75 percent. The results are all the more significant considering the EEG-based diagnosis results from a single evaluation at a specific time, as opposed to year-long monitoring that is typically required in neuropsychological testing at major facilities.

"Currently, the state-of-the-art evaluation for Alzheimer's disease is only available to those who have geographic proximity and/or financial ability to access research hospitals, where expert neuropsychologists continuously interview patients and caregivers over six to 12 months to make a diagnosis," Polikar said. "But most people don't have access to such facilities and instead go to community clinics and hospitals. Our methodology involves just one 'snapshot' that in itself is highly accurate and will be especially beneficial in these locations."

The team members hope that eventually a hand-held device will be developed that can be used to conduct evaluations similar to those done by the Rowan/Penn/Drexel group.

The team's work was most recently presented in New York City at the Annual International Conference of Engineering in Medicine and Biology Society of the Institute of Electrical and Electronics Engineers, Inc., and also was presented at several previous engineering and medical conferences. Different aspects of this work are slated for publication in *Computers in Biology and Medicine* and in *Information Fusion*.



Dr. Robi Polikar and his students have been working on the early diagnosis of Alzheimer's.

Engineers Offer Diverse Skills

When Pamela Daum, a senior engineer at Lockheed Martin in Moorestown, recently addressed the College of Engineering as part of Engineers' Week activities, she called for students to take charge of their college years in preparation for work after graduation.

Career growth and management are the individual's responsibility, Daum later summarized, and to ensure a positive college-to-career transition, students can seek internships, assist with research and gather mentors while still in school.

The College encourages participation in internships and research, and it also emphasizes communication skills. "Both public speaking and writing are an integral part of the engineering clinic experience," said Dr. Dianne Dorland, dean of the College.

In addition, Rowan's engineering clinic approach incorporates project management, professionalism, ethics and teamwork in a multidisciplinary framework, according to Dr. Steven Chin, associate dean of the College. Students further hone their abilities through this approach and apply them in internships before graduation.

All these skills are important to career success, according to Dick Dempster, a staffing manager at Campbell Soup Co. in Camden. "We are hiring people who have the predisposition to succeed in a culture where these skills — articulate, enthusiastic, good at time and project management — are essential," he said. "These skills are held by Rowan engineers."



Lockheed Martin scholarship winners **Colleen McGinness**, a junior chemical engineering major (left), and **Jami Saffioti**, a senior mechanical engineering major (right), met **Pamela Daum**, a senior engineer at Lockheed Martin, the day she spoke in Rowan Hall.

Many Indicators Point to College's Success

Rowan Engineering provides an excellent education, and various indicators point to its success.

The College wins accolades for its program, the demand exceeds the number of available seats in the freshman class, and regional and national companies actively recruit interns and graduates.

Recent honors for the College include national "Best Colleges" listings by *U.S. News & World Report* and recognition by the New Jersey Technology Council, which awarded Rowan the 2006 Excellence in Technology Education Award.

The backbone of the award-winning program is the engineering clinics, according to Carolyn Braun, a senior mechanical engineering student from Telford, Pa. "The clinics give the student a chance to apply his or her engineering skills to a real-life problem and figure out how to solve a problem where the answer is not in the back of a book," she said.



Seniors **Peter Renner** and **Carolyn Braun** check out the student-built *Integrated Awareness Computing Cluster*, which ties into Rowan Engineering's virtual reality equipment.

Peter Renner, a senior electrical and computer engineering major from Columbia, Md., agrees. "The clinics are good at giving you experience with real, open-ended problems, which is what engineering is all about. Communication skills are also an important aspect of being an engineer and are very strongly regarded by Rowan."

The College focuses on offering experiential learning with dedicated faculty members, according to Dr. Dianne Dorland, dean of the College of Engineering, and it targets growth while maintaining the high quality of its education.

This fall, a freshman class of 120 students from a pool of more than 600 applicants will begin their education in the College. The increase in applications continues a trend since the first freshman class of 1996, according to Dr. Steven Chin, associate dean of engineering.

A key indicator of the program's success is student retention rate, which is 20 percent higher than the national average of 60 percent reported by the American Society for Engineering Education. "In 2006, the Rowan engineering student retention rate, defined by the number of freshmen students who returned for their sophomore year, was 80 percent," Chin said.

Industrial Partners Make the Difference in Engineering Education

Whether assessing water quality, investigating alternative energy sources or developing green pharmaceutical processes, the College of Engineering's signature clinic sequence provides real-world project experiences for its students.

Area companies and organizations such as Lockheed Martin, Johnson Matthey and the N.J. Department of Transportation, among others, are essential partners with the College for these clinics.

Dr. Dianne Dorland, dean of the College of Engineering, said, "To truly expose our students to the breadth and complexity of problems in today's world, to teach them the skills to solve problems that do not yet exist and to use technology not yet developed, Rowan Engineering needs industry partners that can provide real experiences for our students."

According to Catherine (Jeffries) Ni (ME '00), a manager in Lockheed's Business

Development Leadership Development Program, Bethesda, Md., such partnerships also are valuable to the sponsors. "Through the clinic projects that we have sponsored, we have gained the insight and innovation of the graduates coming through Rowan," she said.

Partnerships often extend beyond clinics. Lockheed, for example, participates in events held by campus chapters of professional societies such as the American Society of Mechanical Engineers and the Society of Women Engineers. "That involvement has allowed for valuable mentoring relationships that both assist the Rowan student and enrich the Lockheed Martin employee," Ni said.

Melanie Basantis, director of outreach, said that the College's more than 260 industrial affiliates and partners support clinic projects, fund scholarships, serve on the Dean's Advisory Council and hire Rowan engineers for internships and permanent jobs.



The College of Engineering partners with various organizations for hands-on clinic projects. Here, students test bus emissions.

Noted Dorland, "Industrial partners are critical to a good engineering education. The best engineering education is experiential, hands-on. Our partners help that happen."

College of Engineering Engages Area Youth and Teachers

Girls launch rockets, middle school teachers build Jenga block towers and high school students investigate the properties of Kevlar®.

These hands-on activities exemplify Rowan Engineering's outreach to area students and teachers. Through programs designed to foster engineering education and build the technical workforce, the College introduces students to engineering concepts and careers and assists teachers with incorporating engineering in their curricula.

One initiative is Attracting Women to Engineering (AWE), a hands-on summer program for teenage girls heading into its ninth year. "We believe we're having a significant impact on making young girls aware of the opportunities that engineering holds for them through AWE," said Dr. Dianne Dorland, dean of the College of Engineering.

The College also involves teachers through the Engineering Clinics for Teachers (ECT), an initiative supported by a three-year, \$326,000 grant from

the Edison Venture Fund. ECT features workshops for middle school teachers that help them integrate engineering content into their curricula.

In addition, through serving as the New Jersey affiliate for Project Lead the Way (PLTW), a national program that promotes engineering opportunities, Rowan Engineering reaches out throughout the state. "Rowan will be leading the way by offering summer training institutes to teach middle school and high school teachers about the PLTW curriculum," Dorland said. "By introducing engineering curricula, schools address the state's goal of increasing the population ready for high-tech positions."



Attracting Women to Engineering involves girls in hands-on engineering activities.

Through these and other endeavors, the College raises awareness of engineering. "We are making sure we have a diverse number of paths to reach students, teachers and the community," Dorland said. "We want teachers who reach girls and boys throughout their early academic career to expose them to the excitement of engineering."

Dr. Yusuf Mehta Paves the Way

Dr. Yusuf Mehta, an associate professor of civil and environmental engineering, got hooked on paving after taking a colleague's suggestion that he choose asphalt for his Penn State doctoral dissertation.

He has been working on the topic ever since.

This semester, Mehta is teaching advanced pavement analysis and evaluation. His goal is to channel his students' energy toward a new understanding of roads. "If they see a failure in the road, and they think backward to what went wrong, I've done my job," he said.

When he's not teaching, Mehta may be found working on one of his grant-funded studies, including two projects for the N.J. Department of Transportation. One is a pavement catalog for the state. "The grant is to demystify the design guide," he said. The other is to investigate underlying causes of road fatalities.

Mehta also coordinates Rowan's Engineers Without Borders - USA™ (EWB - USA) campus chapter. With fellow staff and students, he facilitated last October's regional EWB - USA conference on campus, and as a result, he will be part of arranging an even larger northeast regional EWB - USA conference at Rowan this fall.

When he finishes other work, Mehta hurries back to pavement projects. "Asphalt — there's so much to it," he said. "It stinks, it's black and it's goeey, but it fascinates me."



Dr. Yusuf Mehta

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During a ceremony held in January, **Dr. Donald Farish**, Rowan University president, signed his name to the beam that tops the Samuel H. Jones Innovation Center, the first building of the South Jersey Technology Park at Rowan University.