ROWAN UNIVERSITY
EngineeringNews
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DEAN'S MESSAGE

The College of Engineering is invested in being a premier leader in teaching and learning. We share a sense of mission and responsibility because we are more than just an aggregate of individuals with combined strengths and experience. Our shared understanding, coupled with our curriculum, provides hallmark experiences and results. Our goal is to manage future opportunities for optimum benefit – a strategy for legacy. Key to this strategy is the recruitment of outstanding students and strong industrial affiliates.

Students and business partners are aware of our national reputation. This year the College rose to 16th in the 2008 rankings of undergraduate engineering programs by *U.S. News & World Report* (172 institutions).

Rowan students experience real-world challenges and industrial partnerships through our clinic environment, which promote innovation and entrepreneurship. And we meet workforce challenges by providing valued graduates who quickly contribute to their employers and the global environment.

I hope you enjoy the highlights of our work featured in this newsletter.

Regards,

Dianne Dorland

Dianne Dorland
Dean of Engineering

Award-Winning Prof Collaborates on NSF Work

Collaborating with Camden County College (CCC) under a $175,000 National Science Foundation (NSF) grant, the College of Engineering is working on a program that will bridge the two schools' engineering programs and introduce students to system-on-chip (SoC), a new concept in the area of electronics that integrates all components of a computer or other electronic system into a single integrated circuit, or chip.

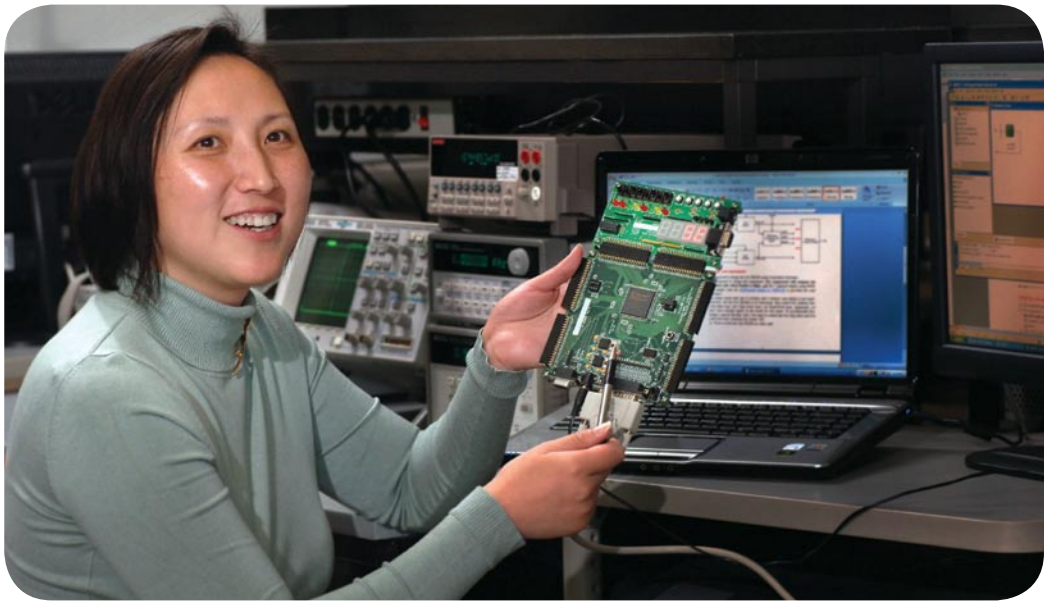
> "The collaboration with Camden County College, where some transfer students are drawn from, encourages more students to pursue ECE."

The two schools will use the funding to develop teaching materials on SoC technology, including lab experiments and system-design projects, with a focus on their contribution to SoC product design. These materials will impact courses across the existing Rowan electrical and computer engineering (ECE) and CCC engineering science curricula.

Dr. Gina Tang, Rowan ECE associate professor and project principal investigator, is collaborating on this research with Rowan's Dr. Linda Head, ECE associate professor, and Dr. Ravi Ramachandran, ECE professor, and Dr. Lawrence Chatman, coordinator of the Engineering Science and Technology Department at CCC.

Tang, who recently received the Christian R. and Mary F. Minority Junior Faculty for research, said the NSF project will focus on establishing experimental modules that can be used with the curricula of both schools. The team is also developing an educational video to use for college freshmen and K-12 outreach programs as a method to excite students about engineering and system design.

"We truly believe that this approach will optimize student learning and help them develop a strong foundation to carry over for subsequent coursework. In addition, the collaboration with Camden County College, where some transfer students are drawn from, encourages more students to pursue ECE," Tang said.



Dr. Gina Tang *is collaborating to develop curriculum modules that will introduce students to SoC.*

Students RISE to the Occasion during Engineering Program

Some people like them dunked in milk.

For 37 New Jersey high school students this summer, though, eating Oreos was secondary to "engineering" them. The students, participants in the RISE (Rowan's Introduction for Students to Engineering) program, had to dip the Oreos in chocolate, covering the cookies completely with a coating of the same thickness each time.

According to Dr. Kevin Dahm, associate professor of chemical engineering, the students soon began to quantify the situation in attempting to produce a number of coated cookies that were all the same.

"The session broadened ideas of what chemical engineers do and what skills they need," Dahm said. "And they could eat the Oreos at the end."

The chocolate project was just one of the hands-on activities that brought participants from as close as Glassboro and as far away as Monmouth Beach, N.J., to Rowan Hall for the two-day RISE program.

Following an initial team-building exercise in which each group constructed the highest Jenga tower possible in 10 minutes, students built Lego® robots and bottle rockets, toured the campus and spoke with faculty and staff in the College of Engineering.

During the summer RISE program, area high school students learned about engineering through a chocolate project, among other hands-on activities.

According to Melanie Basantis, director of outreach, the College has had calls requesting a program for high school students similar to Attracting Women to Engineering, which is geared toward middle school girls. RISE responds to that request.

The program evaluations indicated that the students thought the bottle rockets were "amazing," the food was great and they wanted to stay longer. Basantis said that next year's program will incorporate this year's lessons learned while stressing the same level of hands-on activities and close interaction between professors and students.

Rowan Engineers on Board with New State Biodiesel Project

Rowan University College of Engineering professors and students are on board for a project with the New Jersey Department of Environmental Protection (NJDEP) and NJ TRANSIT that eventually may lead to less pollution in the Garden State skies.

Dr. Anthony Marchese, Dr. Krishan Bhatia and Dr. Robert Hesketh, and three graduate students are working under a $149,000 grant from the NJDEP to measure emissions from two different diesel locomotives operating on eight different fuel blends, four of which are based on a 20-percent soybean oil derivative.

The team, which received the grant in March for a one-year project, has been conducting tests at NJ TRANSIT's Meadows Maintenance Complex in Kearny. Plans are underway to conduct tests soon on trains along NJ Transit rail lines lines on existing tracks at times when traffic is light, such as during the middle of night. The Rowan group expects the testing to continue into summer 2008.

"The goal is to accurately quantify the effects of biodiesel — which is made from vegetable oils or animal fat — on exhaust emissions from diesel locomotives representative of the current NJ TRANSIT diesel locomotive fleet," Marchese said. "We also want to determine whether NJ TRANSIT can operate its fleet on biodiesel blends without sacrificing reliability and fuel efficiency." NJ TRANSIT currently uses #2 diesel (summer and winter blend), a standard petroleum-based diesel fuel.

NJ TRANSIT consumes approximately 12.5 million gallons of diesel fuel yearly. Should this project generate positive results, and if NJ TRANSIT uses a 20-percent biodiesel blend, up to 2.5 million gallons of petroleum diesel could be displaced by non-petroleum fuels. That could lead to potential environmental and health benefits, including reduced exposure of New Jersey residents and the New Jersey environment to the adverse affects of diesel emissions.

Engineering professors and students are measuring emissions from diesel locomotives operating on different fuel blends.

Engineers Seek to Reduce New Jersey Road Accidents

Rowan engineers are committed to making New Jersey roads safer.

As the first part of a study funded by the N.J. Department of Transportation (NJDOT), Dr. Yusuf Mehta, associate professor of civil and environmental engineering, and his team have analyzed fatal accidents in the state. "The idea was to get a better understanding of why these accidents were happening," Mehta said.

The team began by talking with the New Jersey State Police, NJDOT, emergency medical services providers and the Motor Vehicle Commission to understand what data the groups collect and how they record it. The group found that while extensive information about accidents is available through various New Jersey crash databases, the data sets are seldom linked.

According to Mehta, the investigators initially felt that a central database might be the best way to share information among the interested agencies. They then discovered that changing a few protocols about how information is shared would provide all groups with comprehensive data that could lead to additional suggestions about improving road safety.

The second phase of the project focuses on using the gathered data to determine ways to reduce accidents. Dr. Clay Gabler, associate professor and director of the School of Biomedical Engineering and Sciences at Virginia Polytechnic Institute and State University in Blacksburg, Va., and a former Rowan engineering professor, will investigate why teen and elderly drivers in New Jersey have such unusually high crash and fatality rates. "One early finding from the study is that nearly one out of every five young drivers – 15 to 20 years old – who was involved in fatal crashes had been drinking," Gabler said. "This is particularly troubling as the legal drinking age in New Jersey is 21."

"Our ultimate goal is to provide recommendations to the Motor Vehicle Commission to reduce fatalities," Mehta said.

> "One early finding from the study is that nearly one out of every five young drivers – 15 to 20 years old – who was involved in fatal crashes had been drinking."
>
> – Dr. Clay Gabler

Peter Festa** (left), a senior civil and environmental engineering major, analyzes accident data with with **Dr. Yusuf Mehta.

Rowan Engineering Offers New Online Master's Program

A new online program in engineering management has become part of the Rowan master's degree options, and 16 students have declared their intent to pursue the 30-credit degree program.

The program is a hybrid, giving Rowan graduate students the opportunity to meet with professors weekly while completing their courses via computer. Dr. Ralph Dusseau, professor of civil and environmental engineering and master's program coordinator, said the face-to-face option makes the program unique.

"What appeals most about the program is the flexibility," said Rowan graduate student Joseph Lopez (ECE '07), an electrical engineer at the Naval Surface Warfare Center in Philadelphia. "The coordinators understand that working engineers have hectic schedules; therefore the online course structure gives us the opportunity to get a degree while not losing focus on work."

"Students feel a master's degree is an important part of their future career so that they have the knowledge base to help them move into positions of leadership in engineering firms," Dusseau said. "The program should appeal to both the local population and to people living out of state."

Dr. Brian Lefebvre Relishes Role at Rowan

Dr. Brian Lefebvre

As an assistant professor of chemical engineering, Dr. Brian Lefebvre enjoys teaching undergraduate students and carrying out real-world research with them.

"Rowan is a good fit for me," Lefebvre said. Here he has the opportunity to see his students get excited about research on such topics as pharmaceutical drug purity, alternative fuels and protein production.

"I like to help undergraduate students as they begin to tackle real-world research projects. Many schools only have graduate students interacting with the faculty on research, with select undergraduates assisting the graduate students. Here at Rowan, each undergraduate has the opportunity to conduct research," said Lefebvre, who also serves as the advisor for Rowan's student chapter of the American Institute of Chemical Engineers.

Throughout his research, Lefebvre has always found it necessary to combine many sciences. "I liked all of the sciences – mostly biology – but I couldn't see using bio without using math and engineering to solve big problems," he said. "I wanted to use it all."

And so he has. Before coming to Rowan, Lefebvre teamed chemical engineering with his interest in biology to study the production of biodegradable plastics as an undergraduate at the University of Minnesota. After earning his Ph.D. at the University of Delaware, he worked as a postdoctoral researcher at the University of Pennsylvania in biochemistry and biophysics.

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The Fourth Annual Mini Pumpkin Chunkin' Competition on October 26 called for contestants to construct a human-powered catapult capable of hurling a pumpkin at a goal post about 75 feet away. Teams from Rowan Engineering and Williamstown High School won in different categories of the competition.