

EngineeringNews



DEAN'S MESSAGE

The Rowan University College of Engineering continues to produce this valuable commodity: engineers who are creative, innovative, well grounded in theory and able to address real-world challenges. Entrance into professional positions and graduate school validates our record, with placement rates hovering between 95 and 97 percent for the past five years.

Our focus remains on shaping the future, with faculty serving as outstanding models as they educate tomorrow's engineers.

In this newsletter, you'll read about our successful students and their professors, including those working in the growing area of bioengineering. Our research and engineering clinics include drug-delivery systems, spinal-cord regeneration, tissue engineering, Alzheimer's disease identification, human body engineering and biomedical device design, all factors that need to be addressed by engineering and the medical community.

I hope you enjoy this newsletter's highlights. Please contact us if you would like to explore opportunities to work together. We welcome your energy and interest as we address the challenges of tomorrow.

Regards,

Dianne Dorland
Dianne Dorland
 Dean of Engineering

College of Engineering student takes top honors at "The Happiest Place on Earth"

For many people, kids and adults alike, Disney is a magical place. For David Lester, it is a dream come true.

The Rowan University senior electrical and computer engineering major fulfilled a long-time ambition of working for the entertainment giant during the summer after winning the annual Walt Disney Imagineering 18th ImagiNations Design Competition held in June at Imagineering headquarters in Glendale, Ca.

Lester and three students from Rutgers University and The College of New Jersey comprised the Rowan-sponsored team that took first place and "best in show" for "Disney's Spaceport," a complete and highly interactive theme park set in the mid-28th century with an entirely original storyline and characters. The four landed summer internships with the organization and worked on hush-hush projects for Disney in California.

A program designed and sponsored by Walt Disney Imagineering, the creative arm of all Disney Parks and Resorts worldwide, ImagiNations requires teams to demonstrate their creative, technical, artistic and business skills by design-

ing a ride, attraction, hotel or land within an existing Disney theme park or resort. The Rowan team beat out more than 130 other teams from around the world.

"We see students win awards all the time, but this stands out," said Dr. Linda Head, associate professor of electrical and computer engineering. "Not only did David and his team capture a worldwide competition, but they did it for one of the most recognizable organizations ever."

The group members, who have known each other for anywhere from a few years to most of their lives, worked for a year on their concepts and presentations, which were evaluated by a team of Imagineers in California.

"It was definitely a lot of work, but it never felt like work," said Lester, who is now working on a senior engineering clinic with Walt Disney Imagineering, collaborating on a revolutionary method of ride control. "Now we have our feet in the door, and now we can keep working toward our future. All of us absolutely want to work for Disney. No question. It's just an amazing place."

"It was definitely a lot of work, but it never felt like work"



ABOVE: Electrical and computer engineering senior **David Lester** (second from right) and team, who took home first place and "best in show" honors at the 18th ImagiNations Design Competition, received congratulations from Mickey Mouse himself.

LEFT: **David Lester** (second from left) worked with a New Jersey-based team to design the winning futuristic theme park "Disney's Spaceport."

New medical school to impact Rowan Engineering

The College's bioengineering education and research initiatives are poised to expand with the creation of Cooper Medical School of Rowan University.

In June 2009, New Jersey Gov. Jon Corzine announced an executive order authorizing the Rowan/Cooper partnership, which will establish South Jersey's first four-year, allopathic medical school.

Based at Cooper's Health Sciences Campus in Camden, the medical school is expected to welcome its first class of students in fall 2012.

According to the Association of American Medical Colleges, truly effective bioengineering programs – both for research and training – have been collaborative efforts between schools of engineering and medicine. Dr. Dianne Dorland, dean of the College of Engineering, sees the potential in partnering with the future medical school.

"The Cooper Medical School of Rowan University will build on our bioengineering concentration and offer new growth areas like biomedical engineering," Dorland said. "As schools within one university, Engineering and the Medical School will actively engage in cross-disciplinary ventures, collaborating with engineering clinics and seeking joint funding for research. This will only strengthen our curriculum and give our students greater access to engineering roles in the medical field."

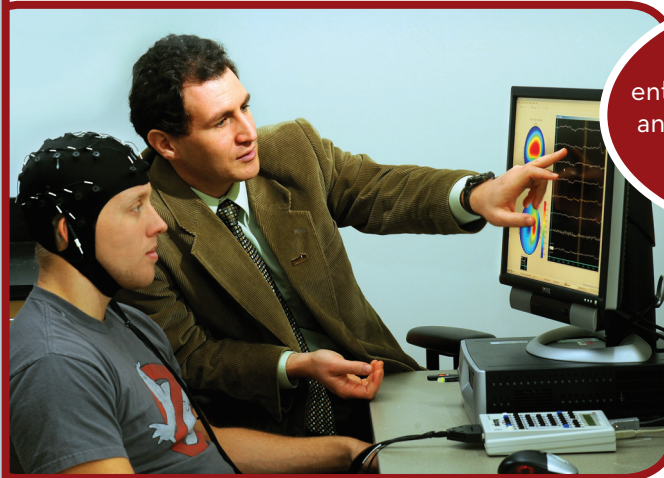
Rowan University President Dr. Donald J. Farish addressed attendees at a ceremony held this fall to celebrate the medical school partnership.



College of Engineering faculty make diverse advances in bioengineering

From developing safer automobile standards to detecting Alzheimer's disease at its earliest stages, the College of Engineering is involved in a wide array of bioengineering research with a common goal – to improve the quality of life.

Dr. Robi Polikar, associate professor of electrical and computer engineering, hopes his research will aid community clinics and hospitals in identifying Alzheimer's disease. Partnering with the University of Pennsylvania and Drexel University, Polikar determined that early detection could be accurately gauged by studying a patient's brain activity using electroencephalogram (EEG) data. He is working with the company Neuronetrix, Inc. of Louisville, Ky., to market a hand-held device that could analyze this data.



"Research, engineering design, entrepreneurial opportunities and real-world impact – they all come together in our engineering clinics."

Dr. Robi Polikar, associate professor of electrical and computer engineering, is studying brain-computer interface technology, which enables student subject Nickolas Kowalski to control computer functions using only his thoughts.

Polikar's team has also launched a new study using a brain-computer interface, which takes EEG signals from a user and, through the user's thoughts only, controls computers or other electronic devices. Polikar said this technology would allow those who have lost motor control, like quadriplegics, to gain some control of their lives.

"Our work is perhaps a textbook example of what 'bioengineering' really is – a joint effort by engineers, computer scientists and medical professionals to solve major public health problems," Polikar said. "These projects, just like virtually all bioengineering efforts, are truly and naturally multidisciplinary."

Dr. Stephanie Farrell, associate professor of chemical engineering, has been part of another collaborative research study with physicians at the Medical University of Graz in Austria. The team is investigating ways to mitigate feeding tube clogging for young children. Farrell also has exposed students to bioengineering through her clinics, which have explored drug-delivery systems and human body engineering.

Dr. Jennifer Kadlowec, associate professor of mechanical engineering, and Dr. Eric Constans, associate professor and chair of the Mechanical Engineering program, have partnered with the Center for Injury Research and Prevention at the Children's Hospital of Philadelphia on studies aimed at improving vehicular safety. Several of these projects have assessed the mechanical behavior of child-size crash dummies to create even more accurate safety test devices.

Another mechanical engineering professor has taken his bioengineering research in an entrepreneurial direction. Assistant Professor Dr. Thomas Merrill launched the start-up company FocalCool based on a catheter design he developed to cool blood and possibly reduce organ damage in the event of a heart attack. Merrill has utilized the talents of Rowan students, several of whom he has employed, to support his business endeavor.

"Research, engineering design, entrepreneurial opportunities and real-world impact – they all come together in our engineering clinics, emphasizing the value of Rowan's educational experience for students," Dr. Dianne Dorland, dean of the College of Engineering, said.

New professor bolsters bioengineering research

Two novel clinic experiences have students researching spinal cord and lower back disc regeneration methods under the direction of new faculty member Dr. Jennifer Vernengo.

The newly appointed assistant professor of chemical engineering plans to blend her bioengineering expertise with teaching, giving students more exposure to engineering's roles in science and medicine.

Vernengo earned a Ph.D. in chemical engineering from Drexel University in 2007. She then joined Synthes USA, a West Chester, Pa.-based medical device company, as a

scientist working on developing biomaterials for bone replacement. She admittedly missed the academic environment. The opportunity to both teach and involve undergraduates in bioengineering research attracted Vernengo to Rowan.

"I knew that students would be my focus," Vernengo said. "At many colleges, as a professor, you don't get that interaction with students. I knew that I would find that at Rowan, and I could offer students more about bioengineering through new clinic projects."

One of those projects is a clinic on spinal

cord regeneration, which is a continuation of Vernengo's post-doctoral work at Drexel University's College of Medicine. She and three undergraduate students are investigating a drug-delivery system to promote healing after a spinal cord injury. Their focus is on releasing therapeutic proteins into the injury site using an injectable hydrogel, a jelly-like material employed in tissue engineering. The hydrogel has a flexible nature that mimics real tissue in the human body. The hydrogel can slowly release proteins into the surrounding tissue and may promote neural regeneration.

Her second clinic involves two students synthesizing a new, biodegradable polymer, a chemical compound formed by linked molecules. The polymer would ultimately replace tissue and heal damaged vertebral discs in the lower back. According to Vernengo, this method is unique in that the polymers can be injected non-invasively using a needle.

Vernengo said the clinic program has been a great way to do research and share it with undergraduates. "This sets Rowan apart. The opportunities they have to do this kind of work at the undergraduate level are unique," she said.



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Dr. Jennifer Vernengo (center), assistant professor of chemical engineering, conducts drug-delivery system research with students **Tatsiana Sokal** and **Carl Beigie**. Vernengo is leading two new clinics on spinal cord and lower back disc regeneration.

Dusseau bridges research and teaching

When you travel around the region, bridges studied by civil and environmental engineering Professor Dr. Ralph Dusseau may be part of your journey.

"I love bridge research because bridges are one of the most important change agents that man has ever created," said Dusseau. "A single bridge, like the Brooklyn Bridge, can transform two independent cities, like Brooklyn and New York, into one united city – New York. Bridges have literally changed the geography of the world and they continue to do so."

In 2000-2004, Dusseau was project manager and co-principal investigator of a \$1-million project funded by the Delaware River Port Authority. Dusseau led a team in measuring vibration frequencies of the Betsy Ross, Ben Franklin and Walt Whitman bridges and developing a computer model of the bridges to predict how the bridges will respond to traffic, wind, earthquakes and more. During a

recent sabbatical, Dusseau created a bridge research laboratory in Rowan's South Jersey Technology Park to further measure and compute frequencies of those bridges.

The founding chair of Civil and Environmental Engineering at Rowan, Dusseau earned the 2000 "Educator of the Year award" from the American Society of Civil Engineers, New Jersey Section (given to one civil engineering educator in New Jersey annually).

Dusseau, who has more than 30 years of engineering experience, said that he enjoys working at Rowan "because of the emphasis on teaching and the close connection between teaching and research."

He does more than teach undergraduate students. Dusseau also coordinates the 30-credit-hour online Master of Engineering Management program, for which he established a 10-course sequence for



Civil and environmental engineering Professor Dr. Ralph Dusseau, seen here at the Delaware Memorial Bridge, has created a new laboratory to further research into the region's bridges.

students, four of them taught by full-time professors. The growing program draws students nationwide into two tracks: Project Management and Construction Management.

For more information on Rowan Engineering degree programs, visit www.rowan.edu/engineering.



College of Engineering students lent their time and talents for a good cause during the Canstruction event held this fall. Rowan and the New Jersey Chapter of the American Institute of Architects sponsored the annual design competition, which challenges students to design sculptures out of donated canned goods. This fall's contest used 4,800 cans, which were donated to local community food programs.

Celebration 2010 to honor College of Engineering milestone

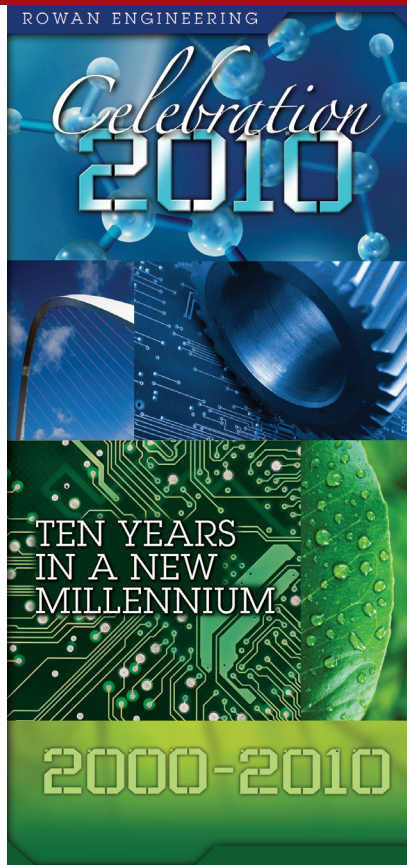
Just 10 short years ago, the College of Engineering produced its first graduating class. One decade and 838 alumni later, the College has planned "Celebration 2010," a yearlong series of events to recognize a decade of Rowan Engineering graduates.

Upcoming "Celebration 2010" events include:

- Engineers Week (Feb. 14-20, 2010)
- Career Fair (Feb. 23, 2010)
- Industry Day (March 26, 2010)
- Scholarship and Industrial Partnership Appreciation Event (October 2010)

In April 2010, a "Celebration 2010" reception will bring Henry Rowan, past and present faculty and staff, alumni and industry leaders together to recognize the 10th anniversary of the first graduating class.

For more information, visit
www.rowan.edu/engineering/celebration2010.



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