



Engineering News

HENRY M. ROWAN COLLEGE OF ENGINEERING



Rowan CREATEs solutions to roadway problems

In just six months, a new facility at the South Jersey Technology Park at Rowan University will be able to determine the effects of 20 years' worth of wear and tear on roadways.

The Center for Research and Education in Advanced Transportation Engineering systems (CREATEs), funded by nearly \$5 million in grants and contracts from the State of New Jersey, the U.S. Department of Defense/Army Corps of Engineers and the New Jersey Department of Transportation, will house a new Heavy Vehicle Simulator (HVS).

The only such piece of equipment dedicated for university research in the Northeast United States, the HVS is capable of simulating two decades of highway traffic, airplane traffic and more in only a quarter to half a year, enabling researchers to assess the status of existing structures and evaluate the potential of new materials and how they will hold up to cars, trucks and airplanes.

Dr. Yusuf Mehta, a professor of civil and environmental engineering, will head the Center, where he plans to conduct work for the Garden State and other states, government agencies and businesses. The structure will open by fall 2016.

CREATEs will include a 50-foot by 90-foot structure that will house equipment, offices and space to run tests, as well as an outdoor testing environment that can be designated for specific types of

materials and clients.

Within its first two years of operation, the center will employ between five and 10 professionals who will conduct testing for asphalt, concrete, soils and other design and construction materials. The HVS will enable researchers to evaluate such topics as soil failure, moisture impact and road structures. Such testing will ensure quality of materials and introduce economic efficiencies.

While there is no absolute substitute to determine how a material will hold up as opposed to an actual 20-year field performance of a roadway, Mehta said CREATEs and the HVS "close that gap."

"Who's got 20 years?" he said. "This answers some part of the question about roadways. Lab results are good, but the HVS can demonstrate what actually will happen in the field. This tests reality. That is why it is so valuable."

Mehta expects CREATEs to boost the economy as well as research initiatives at Rowan. In addition to creating jobs, he said it will meet the needs of states, manufacturers and contractors. "CREATEs will drive innovation," Mehta said, "enabling Rowan Engineering to help clients explore new products that can be more easily validated. As the only university in the Northeast with this facility, we're going to attract manufacturers, jobs and highly skilled employees."



Dean's Message

We see growth in the Henry M. Rowan College of Engineering every day, growth that points to the excellence of our academics, the achievements of our students and the power of our programs.

That growth comes in many forms — student awards, increased research funding, new academic offerings and new partnerships, among them.

This semester, two of the highlights of our College point to where we have come from and where we are going, to growth that marks Rowan Engineering as a leader.

I am happy to report that *U.S. News & World Report* for 2016 ranked our College tied for 28th place among 214 undergraduate programs in the nation. That ranking represents a jump of six points over last year's, when we place 34th in the nation. It is especially gratifying that those rankings are based on surveys of deans and faculty from other institutions and that those voters recognize the quality of our faculty and students, the strength of our program, and our innovation in engineering education and research.

I also am pleased to report that construction of the new building for our College is progressing. Steelwork is almost complete on the new facility, which will connect to the existing Rowan Hall. When the building is completed, we will be able to nearly double our enrollment to 2,000 students.

This year has been exceptional for our College in many ways. You can read about more of our achievements in this issue of our newsletter.

Anthony Lowman, Ph.D.
Dean

Australia, Philippines and Turkey provide backdrop for a global perspective at Rowan Engineering

The Henry M. Rowan College of Engineering continues to grow. During the course of the next several years the College will expand its physical footprint at the Glassboro campus and the South Jersey Technology Park. This capital expansion will accommodate increasing enrollment and programmatic offerings. In addition, the College has expanded its outreach programs to include more international programs.

Last May, 10 students from the Rowan student branch of the Institute of Electrical and Electronics Engineers (IEEE) traveled to Australia for the Australian American IEEE Student Branch Exchange program. The program developed by senior electrical and computer engineering major Jeff Eker in collaboration with students from James Cook University, Australia, set out to connect students at both institutions while providing them with valuable global networking opportunities.

In Australia, students participated in a sumo robot competition, as well as a sensor hack-a-thon event. The students also took tours of four universities and participated in four industry tours, including one at Lockheed Martin Australia.

Last summer, Rowan entered into a five-year exchange agreement with the University of the Philippines, Dillman that provides students and faculty at both schools with an opportunity to study, research and work at the other. Lita Abele, member of the Rowan University Board of Trustees and native of the Philippines, initiated the program.

Recently, Dr. Robi Polikar, department head of Electrical and Computer Engineering, received a North American Treaty Organization (NATO) grant. The grant provided funding for the NATO Advanced Study Institute on Energy Security held Oct. 4 to 11 in Antalya, Turkey. In addition to serving as the conference director, Polikar presented on the topic of computational intelligence for energy security. Associate Dean for External Affairs Sean Fischer served as the event coordinator.

Throughout the program, participants from nine nations engaged in scholarly discussions about physical and cyber security of energy infrastructure, smart and micro-grid technology, renewable and alternative energy, computational intelligence, geopolitical risk factors and energy security policy.

Engineering News

Volume X, Issue I • Spring 2016

Dr. Anthony Lowman	Dean
Dr. Steven Chin	Vice Dean
Sean Fischer	Associate Dean
Patricia Quigley	Editor/Writer
Casey Shea	Writer/Project Manager
Craig Terry	Photographer
Traci Belli-Downing	Graphic Designer

Engineering News is published two times a year by the Henry M. Rowan College of Engineering to highlight the achievements of its faculty, staff and students. We welcome comments and suggestions. Send correspondence and inquiries to:

Henry M. Rowan College of Engineering
c/o Editor, *Engineering News*
Rowan University
201 Mullica Hill Road
Glassboro, NJ 08028-1701

Contact:
856-256-5300
856-256-5350 (fax)
engineering@rowan.edu
www.rowan.edu/engineering

Engineering, med students seek solutions to health issues

Students in the Henry M. Rowan College of Engineering are used to collaborating with those across other engineering disciplines. During the summer, they collaborated across campuses, joining with Rowan University School of Osteopathic Medicine students in the selective Rowan Bioengineering Scholars Program.

Eight students from COE and SOM were part of the intensive six-week summertime program funded by a five-year grant from the National Institute of Biomedical Imaging and Bioengineering of the National Institutes of Health and supported by non-government organization VentureWell. Designed to provide insight into health care solutions of the future, the program placed the students in the classroom and in clinical settings in Cooper University Hospital's Emergency Department and Neonatal Intensive Care, Adult Intensive Care and



Alyssa Brandley, Biomedical Engineering, (left) and Alison Toback, School of Osteopathic Medicine, were among the students who presented their research to Cooper doctors, nurses and administrators.

Trauma units — encouraging them to pursue a biodesign approach to real-world problems.

Cooper clinicians, educators and researchers worked in conjunction with Rowan faculty to support students who tackled such topics as “Decreasing Fluid Loss via Skin in Premature Babies” and “Improving Blood Pressure Monitoring for Obese Patients.”

Dr. Jennifer Kadlowec, a Rowan mechanical engineering

professor and department head and biomedical engineering professor; mechanical engineering associate professor Dr. Thomas Merrill; and Cooper's Dr. Robert Hirsh, assistant professor of anesthesiology, are co-principal investigators on the project. According to Kadlowec, the program originally was designed just for engineering students, but the medical students “translated” health care terms and concerns for the

engineers and provided a different perspective.

During the course of the program, professors introduced students to the biodesign process, particularly how to identify needs; students were immersed at Cooper, determining health care needs; teams learned about practical skills, such as forming a startup company, intellectual property, business and regulatory perspectives; and professors worked with the students to further assess their ideas and develop a plan and their presentations.

Kadlowec said teaming the two disciplines has great potential. “Engineers by nature and training are problem solvers, but they need to know what the problems are. In this program, they didn't just get to solve a problem handed to them, they also learned to discover and address a problem. This will make them better engineers and better researchers and collaborators.”

Engineering professor tackling New Jersey's pothole problem

The clunks. The swerves. The flat tires.

New Jersey is not alone in coping with potholes, but the New Jersey Department of Transportation definitely is invested in solving the problem in conjunction with the Henry M. Rowan College of Engineering.

Dr. Parth Bhavsar, assistant professor of civil and environmental engineering, recently received funding from the NJDOT in partnership with the New Jersey Institute of Technology to develop the solution: a portable

mobile data collection device.

The device will be attached to existing NJDOT vehicles and consist of a camera sensor and dedicated short-range communication platform.

Dr. Nidhal Bouaynaya, associate professor of electrical and computer engineering, is working with her team of students to develop the appropriate image-processing algorithm that will effectively measure the size and depth of the potholes.

Dr. Yusuf Metha, professor of civil and environmental engi-

neering, is integrating a temperature sensor with the device that can collect pavement surface temperature information, an important parameter required to monitor pavement performance.

Bhavsar, along with his team of students, is working to develop the critical component of the device, the communication platform. The platform will prioritize data transmission using various communication protocols based on the characteristics and importance of the type of data.

Once the device is attached to

a vehicle, the sensor camera and communication platform may provide NJDOT the opportunity to use its existing vehicles already on the road to measure potholes and inform NJDOT staff about major potholes. This information should help NJDOT prioritize and speed up repairs.

“Pothole repairs are just the start. This device has the potential to save states millions of dollars and help them to maintain existing infrastructure in ways they have never previously been capable of,” Bhavsar said.

Prof leads national effort to promote LGBTQ equality in STEM

Chemical engineering professor Dr. Stephanie Farrell is leading a national team working under a \$299,998 National Science Foundation Early-concept Grant for Exploratory Research to advance the role of members of the lesbian, gay, bisexual, transgender and queer community in science, technology, engineering and math fields.

Under an award recently presented to the American Society for Engineering Education for the project titled “Promoting LGBTQ Equality in Engineering through Virtual Communities of Practice,” Farrell is teaming with engineers and sociologists from ASEE and Rice, Temple and Michigan Technological universities in pioneering this work, which links diversity research with a faculty development initiative to advance

LGBTQ equality in STEM.

According to the grant recipients, research shows that diversity among students and faculty is crucially important to the intellectual and social development of all students, and STEM students and professionals experience a “chillier climate” than their peers in other fields. Their project aligns with NSF’s goal to promote a more diverse STEM workforce by promoting equality in the LGBTQ community — a group that has been underserved by other efforts to increase diversity in the profession.

Farrell and her team will conduct research that explores the aspects of STEM culture that serve as impediments to LGBTQ equality, training STEM leaders and working via a virtual environment to build support. The project includes a two-tiered

structure, in which two “meta-trainers” in the fall trained a team of 20 community leaders. Those leaders will lead Safe Zone workshops and establish communities to promote LGBTQ inclusion in academic STEM departments. These workshops will raise awareness for LGBTQ inclusion and create a network of allies to foster a supportive environment for LGBTQ individuals in engineering. Farrell said the team plans to train at least 200 faculty members nationwide through the workshops.

Additionally, the team will establish a virtual community in which faculty will work together to identify approaches and develop and implement action plans to promote LGBTQ equality in their own departments and identify best practices for transforming the climate in STEM.