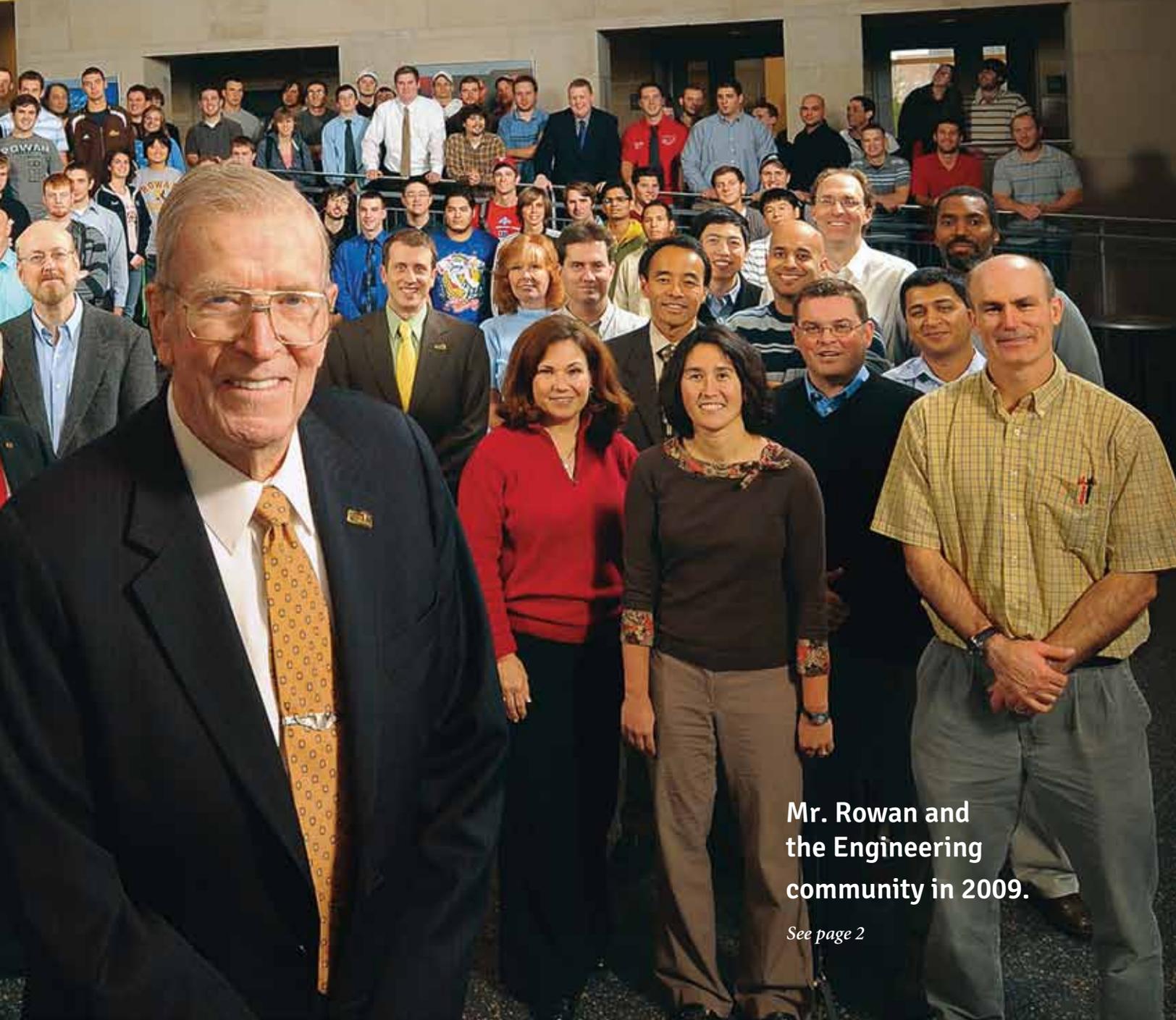




Engineering News

HENRY M. ROWAN COLLEGE OF ENGINEERING



**Mr. Rowan and
the Engineering
community in 2009.**

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Henry M. Rowan Family Foundation commits \$15M to College of Engineering

Increase access. Create programs. Innovate in the classroom and laboratory. Expand Partnerships.

The Rowan University College of Engineering will be able to do all of that – and more – thanks to a \$15-million gift from the Henry M. Rowan Family Foundation.

The Foundation made the gift, which will establish a permanent endowment, in December 2014. At that time, Rowan President Dr. Ali Houshmand announced the University will name the College the Henry M. Rowan College of Engineering.

“This endowment will transform our College of Engineering,” said Dr. Anthony Lowman, dean. “This will enable us to build on an already exceptional program, to grow as a national – and international – leader in engineering education and research. This contribution will forever change Engineering at Rowan University and impact our community as well as our students.”

South Jersey industrialist and philanthropist Henry Rowan and his family have a long history of supporting the University. In 1992, Mr. Rowan and his late wife, Betty, donated \$100 million to what was then known as Glassboro State College, with the sole caveat that the school create an engineering program that improved engineering education. The College of Engineering did just that, restructuring how students are educated; emphasizing a hands-on, minds-on approach to teaching; introducing its hallmark engineering clinics, which span eight semesters; building long-term partnerships with government agencies and Fortune 500 firms; and earning national recognition before it even graduated its first class.

The College has continued to grow in size, programs and recognition, and its plans for the future are ambitious, including breaking ground for a new building this spring that will enable enrollment to double to 2,000.

“The Rowans’ 1992 gift was truly a transformational one for then-Glassboro State College. This will be equally transformative for the College of Engineering, elevating the program’s stature around the globe,” Lowman added.

Said Virginia Rowan Smith, vice president of the Henry M. Rowan Family Foundation, “Very soon after my parents made their historic gift, the University honored their primary request – to create a College that transformed engineering education. The College of Engineering has continued to grow in scope and prestige. This endowment will provide critical resources to ensure that Rowan University meets the increasing demands of students and their employers and that it prepares competitive students who will lead in their professional careers.”

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(ABOVE) Mr. Rowan and his family gather for the 2005 College of Engineering graduation of his grandson, Manning J. Smith IV.



(LEFT) 2014 College of Engineering graduate Phillip Eric Thompson discusses his research with Mr. Rowan.

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“This new, remarkable gift . . . will support critical programs in the College, including our newly established Engineering Ph.D. program and the Henry M. Rowan Globalization Fellowship Program. It will enable us to grow our cutting-edge research programs, such as our unique virtual reality lab. Equally important, the endowment will enable Rowan University to expand scholarship support as it increases access for some very exceptional students in our region, in the State and beyond,” Houshmand said.

These programs have all begun in earnest in the College. In 2013, The Henry M. Rowan Family Foundation provided funding to establish the Engineering Ph.D. program, which welcomed its first students in January 2015, as well as the Globalization Fellowship Program, which provides opportunities for engineering students to study and intern abroad. The College research awards have already exceeded last years with the research designation in place and Rowan will open its newest virtual reality facility at the South Jersey Technology Park, in Mantua Township, New Jersey, this semester, expanding work with organizations such as NASA, the U.S. Navy and other public and private entities. The scholarships will enable the University to increase access for students.

“As we work to carry on the legacy of Mr. Rowan, we can think of no more appropriate and permanent tribute than a College of Engineering that bears his name and celebrates the lasting impact his generosity continues to have on students and on our region,” said Houshmand.

Added Smith, “We are so pleased that through this gift the name of Henry M. Rowan will be forever associated with excellence in engineering education.”

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Dean's Message

Our College is in the midst of unprecedented expansion. With the launch of new degree programs, continued growth in research and our ongoing commitment to excellence in undergraduate education, we are making great strides on our way toward a world-class engineering program.

As we fulfill our vision for the future, we proudly will be known as the Henry M. Rowan College of Engineering. The recent \$15-million contribution from The Henry M. Rowan Family Foundation establishes a permanent endowment exclusively for the College and connects the name of Henry M. Rowan with Rowan Engineering forever.

The imprint of the Rowan family's generosity is reflected across the College. Last year, The Henry M. Rowan Family Foundation provided funding to establish the College's inaugural Ph.D. program, which welcomed its first students this year, as well as the Henry M. Rowan Globalization Fellowship Program. The contribution also enabled us to grow our cutting-edge research initiatives and expand our joint efforts with corporate and government sponsors, which you'll read about in the pages that follow.

While we are working tirelessly to create a comprehensive college of engineering, we remain true to our heritage as a leader in undergraduate education. A record 375 first-year students joined us in fall 2014, along with eight new faculty members. Our undergraduates will embark on a diverse, multidisciplinary educational experience and take advantage of endless opportunities to learn and explore. To support the continued expansion of our enrollment and faculty, we also are constructing our new \$76 million engineering facility, and we expect to open the new facility in January 2017.

As you read about these and other notable developments, I think you'll see why these are truly exciting times for Rowan Engineering!

Anthony Lowman, PhD
Dean

College of Engineering pursues strong research agenda

Whether it's creating a new generation of sustainable plastics, helping build high-performing roadways, applying mathematical models to cancer treatment or more, cutting-edge research is on the rise in the Henry M. Rowan College of Engineering.

At Rowan Engineering, the focus is on sponsored research, which connects the College's world-class faculty members with business, industry and government partners and funders to solve real-world challenges. Following its state designation as a research institution in 2013, the College experienced strong growth in sponsored research. During 2013-14, the College received \$2.6 million in research awards. That number was already eclipsed in the fall of the current academic year as the College moved closer toward achieving its seven-year goal of \$25 million in annual research funding.

Helping to advance Rowan's innovative research agenda are engineering faculty members such as Dr. Joseph Stanzione, III. Working with a team of 11 engineering students, Stanzione is focusing on utilizing renewable resources from woody biomass to parent the next generation of plastics. The team is looking to convert cellulose, hemicellulose and lignin into materials that could be fashioned into soldiers' water canisters, helmets and firearms as well into as high-performance

parts for military vehicles. Their efforts are being supported by the U.S. Army under a five-year, \$2.1-million cooperative agreement.

Currently, Stanzione's team primarily is studying lignin. The structural component of the cell walls of trees and a natural polymer, lignin is a major waste product of the pulp and paper industry, which primarily uses it as a low-value, solid fuel. One of the primary chemical building blocks derived from lignin today is vanillin, the major component found in the extract of vanilla and natural vanilla flavoring. The Rowan Engineering team is strategically modifying vanillin and other lignin-derived molecules to sustainably develop renewable plastics – sustainable both environmentally and economically.

Their efforts are supporting the Army's goal of becoming less dependent on other nations, including how it obtains feedstocks such as petroleum for plastics, coatings and composite materials.

"They want to get away from using foreign oil. They want to explore all avenues to develop the newest and most advanced plastics, coatings and composites. And they want to develop these materials in a sustainable manner," said Stanzione, assistant professor of chemical engineering, who is collaborating on the work with researchers at Aberdeen Proving Ground in Maryland.



Dr. Joseph Stanzione, III is conducting research on the use of renewable resources to develop a new generation of plastics.

Rowan team contributes to safer roadways

As drivers head to work and back home, they can thank Dr. Yusuf Mehta for helping make the journey a safe one. Mehta and his team of Rowan students are collaborating with researchers from across the country to study the asphalt pavements people travel every day. Their aim is to transform the science of pavement engineering to help build high-performing, environmentally friendly roadways, while saving taxpayers money in the process.

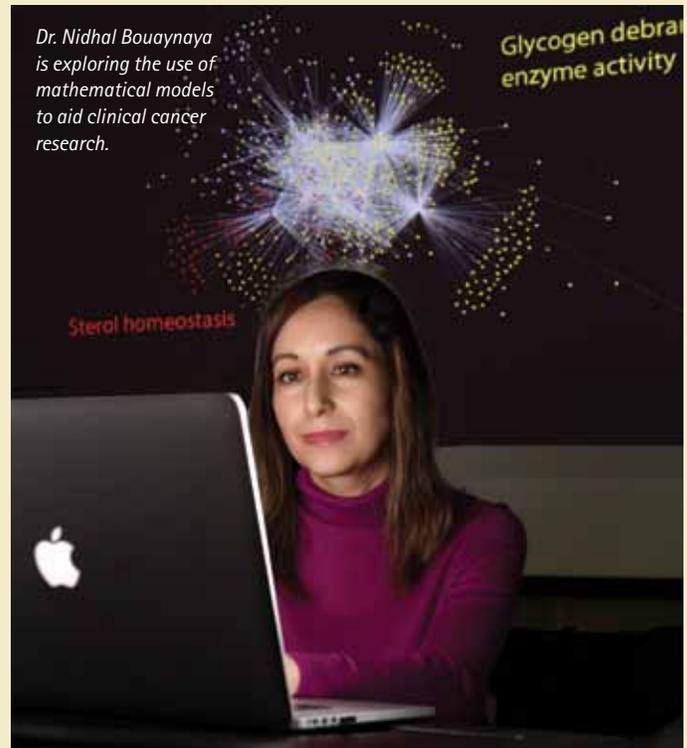
Mehta, who oversees an asphalt lab in the South Jersey Technology Park in Mantua Township, New Jersey, is studying the environmental impacts of recycled asphalt pavement under a \$452,490 grant from the New Jersey Department of Transportation (NJDOT). His research team, which also includes investigators from Columbia University and Stony Brook University in New York, is working to identify all non-roadway applications, including aboveground applications, for the reused asphalt that are safe for people and the environment and comply with federal and state environmental guidelines.

In fall 2013, the NJDOT also awarded Mehta \$450,000 to investigate alternatives to nuclear density testing of soils, a common but expensive quality control process during construction. In nuclear density testing, engineers use gamma rays to determine the density of a material. An optimum density is critical to achieving better-performing roadways. Because nuclear density contains numerous risks, the procedure is riddled with logistical issues, which in turn are associated with high financial costs.

If a more cost-effective alternative were discovered through Mehta's lab and field evaluations, his research could prevent the additional spending and difficulties associated with this type of testing. "Nuclear density testing has strict protocols of usage," said Mehta, associate professor in the Department of Civil & Environmental Engineering. "The NJDOT wants to find an alternative that is repeatable and accurate. It is willing to explore all options and has kept a very open mind."



Dr. Yusuf Mehta (right) working with a student at the South Jersey Technology Park.



Research combines engineering and biology to improve health care

The dynamic field of system biology involves the computational and mathematical modeling of complex biological systems. This emerging engineering approach is being applied in novel ways to enhance biomedical scientific research and improve patient treatment. At Rowan, Dr. Nidhal Bouaynaya, assistant professor of electrical and computer engineering, is breaking new ground in this innovative discipline. Her research is focused on the application of mathematics and statistics to tackle nonlinear, multidimensional biological problems.

Under a \$1.2-million grant from the National Institutes of Health, she is studying problems related to the systems biology of cancer, with emphasis on the dynamics of molecular networks. Her most recent work relates to mathematical modeling and control of genetic regulatory networks, in order to force them away from undesirable cellular states, such as metastasis, and into desirable ones. Cooperating with her are researchers from the University of Alabama-Birmingham School of Medicine and the University of Illinois at Chicago.

"Our goal is to use mathematical models to examine the dynamics of genetic networks and better hypothesize what genes are causing cancer," said Bouaynaya. "This ultimately will contribute to the development of enhanced biological markers in clinical cancer research."



Dr. Mark Byrne heads the new Department of Biomedical Engineering.

Dr. Mark Byrne chairs new Department of Biomedical Engineering

When Dr. Mark Byrne weighed an offer to join the Henry M. Rowan College of Engineering, he kept returning to one thought: opportunity.

The offer to become the inaugural chairman of the Department of Biomedical Engineering meant he could help develop a program at the award-winning College from almost day one, building and leading a department that would impact engineering education for years to come.

The offer to bring his research to the University meant he could continue his work on polymers and drug delivery and more in the expanding South Jersey Technology Park, where he also will house OcuMedic, Inc. That is the drug-delivery company originally based in Auburn, Alabama, for which he is co-founder and chief technology officer.

“The opportunity to start and build a program on undergraduate and graduate levels was exciting,” said Byrne, who joined the administration in the fall after serving as the Daniel & Josephine Breeden Distinguished Associate Professor in the Samuel Ginn College of Engineering at Auburn University in Alabama. “This University is poised to remain strong in education as it becomes a leader in research as well. The mission, strategic plan and direction where Rowan wants to go aligns with what I’ve been doing the last 10 years. This University and its transition into further research pursuits as well as the commercialization of that research really were a good fit for me.”

And rightly so. An experienced educator who for years has over-

seen strong research programs, Byrne has mentored more than 70 undergraduate and graduate students working in his labs. Today, under a \$400,000 grant from the National Institutes of Health, he is engineering the architecture of polymers that are used as contact lens medical devices to control the release of glaucoma medication. He also is researching nanoparticles for drug delivery, using biology to control and target medicines, among other initiatives.

Byrne – who also held research appointments at the University of Texas at Austin, Oak Ridge National Laboratory and Purdue University, among other places – is a leader in the field of biomaterials engineering, controlled therapeutic delivery, pharmaceutical engineering, polymer engineering and medical devices. Awarded for his work in teaching and research, Byrne has licensed a number of innovative technologies and holds numerous patents. The National Science Foundation and U.S. Department of Education, among other organizations, also have funded his research.

Highly published in peer-reviewed publications, Byrne has given more than 210 scientific conference presentations and invited lectures and has held a number of leadership roles in professional organizations, currently serving on four editorial boards.

He earned his Ph.D. and M.S.Ch.E. in chemical engineering from Purdue University and his B.S. in chemical engineering with a biomedical engineering minor from Carnegie Mellon University.

Alumni Profile: Walt Walker pursues his passion for the environment

To cut his personal energy use, he recently sold his car. His idea of a vacation is traveling to the Philippines to help a group of villagers install a groundwater treatment system. In his spare time, he volunteers throughout the Philadelphia region in neighborhood cleanups and urban green development projects. Walt Walker is a true green enthusiast in every aspect of his life, personal and professional.

A two-time College of Engineering alumnus ('05, M'06), Walker became passionate about the environment during his time at Rowan. As a civil engineering major, Walker had the opportunity to work on a clean water project in Bangladesh during his senior year. This experience helped propel him to graduate school at the University, where he focused his studies and research in the field of environmental engineering, collaborating closely with Dr. Kausar Jahan of the Department of Civil and Environmental Engineering.

"My five years at Rowan really planted the seeds for what I have become," said Walker, a recipient of the 2014 Distinguished Young Alumnus Award. "When I was an undergraduate, the College of Engineering offered me a wealth of opportunities to learn about and experience many different aspects of the engineering field. When I

entered the graduate program, Dr. Jahan took me under her wing and involved me in her environmental research projects. I was truly inspired by the practice of environmental engineering and knew this is where I wanted to be."

Today, Walker works as an environmental engineer with Cardno BCM in Plymouth Meeting, Pennsylvania, making the hour-long commute from his Philadelphia home by train and bus. In his role at Cardno, he is engaged in a wide range of projects involving the design and installation of water and wastewater treatment systems in municipalities throughout the local region.

Cardno also has been very supportive of Walker's dedication to community service. He is president of the Philadelphia Chapter of Engineers Without Borders, a non-profit organization that partners with developing communities to design and build sustainable engineering projects, specifically in the areas of water supply and sanitation/public health. His volunteer efforts have taken him to developing countries such as El Salvador and Guatemala. Most recently, he used his two weeks of vacation time at Cardno to travel to the Philippines, where he stayed in a small village and helped design and install a much-needed water infrastructure system for 800 villagers.



Engineering alumnus Walt Walker ('05, M'06) is helping advance sustainable engineering at home and abroad.

Rowan Engineering senior says hello to Japan – and her future career

Like many of her classmates, Gina Tierno spent her summer interning. Unlike her classmates, Tierno was halfway around the world.

Tierno, a senior chemical engineering major from Washington Township, New Jersey, spent her summer break in Tsukuba, Japan, working for Sekisui Chemical Company.

Once she arrived in Japan, Tierno started working on a groundbreaking project: non-invasive pipe rehabilitation. This new system begins with a resin application to a damaged underground pipe. The resin then acts as a repairing agent. This process eliminates the need for time-consuming excavation and costly pipe replacement.

The project allowed Tierno to work with exciting new equipment and put her skills from the classroom to use. She brushed up

on her organic chemistry, and she learned new, advanced lab techniques.

In Japan, Tierno saw more than just the inside of a lab. Although the work she performed in the lab was critical to her growth as an engineer, the sights she saw and life lessons she learned changed her as an individual.

She climbed the daunting Mt. Fuji, went to a robot show and took a multitude of business trips.

Spending more than three months in a country where she didn't know the language challenged Tierno. A natural communicator, she discovered innovative ways to connect with others. Despite the language barrier, she made great friends.

Tierno learned a big lesson on her trip: the importance of adaptability – both inside and outside of the lab. "I learned to keep



an open mind, try new things and appreciate different customs," said Tierno. "I may have been far away from New Jersey, but I learned that kindness, eagerness to learn and tradition are universal."

It was a life-changing trip for Tierno. Now, she's planning for graduation this May – and her next trip to Japan.