ROWAN ENGINEERING

Building on Excellence

ANNUAL REPORT

2012-13

Rowan University

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Message from the Dean

The Rowan University College of Engineering has been breaking ground in engineering education since its inception in 1996.

And 17 years later, we continue to break ground — both figuratively and literally.

On July 1, 2013, the New Jersey Medical and Health Sciences Education Restructuring Act went into effect. That Act designated Rowan University as the State's third public research institution. That designation opens more doors for the College of Engineering to expand academic offerings, build new partnerships with industry, and focus even more strongly on bringing to market products that develop from our research. The Act also enables us to expand bachelor's, master's and doctoral offerings — we begin a program in biomedical engineering in 2014. And the designation enhances our strong track record of funding from organizations such as the National Institutes of Health and the National Science Foundation.

The Act also integrated with our University the School of Osteopathic Medicine in Stratford, N.J., and partnered Rowan with Rutgers-Camden to create a College of Health Sciences in Camden, N.J. Today, Rowan is just one of two schools in the nation with both M.D. and D.O.-degree-granting programs. Those medical programs, coupled with the College of Health Sciences, the new biomedical engineering major and the start of doctoral programs, offer more educational opportunities for our students. They also help ensure the academic, health care, business and fiscal wellbeing of our State.

With new programs and new opportunities, the College of Engineering looks forward to doubling its enrollment to 2,000 students as it opens its second building on Rowan's Glassboro campus. New Jersey's Building Our Future Bond Act, a referendum approved by voters last fall, awarded Rowan $117 million, approximately $46 million of which will be used to construct Engineering's second facility, adjacent to our existing building. This new building will help us accept more of the exceptionally talented students we have been forced to turn away each year due to logistical constraints and prepare them to tackle tomorrow's engineering challenges.

Rowan Engineering has indeed been breaking ground since 1996. Today, we continue to build on nearly two decades of excellence. This annual report outlines some of the past year's highlights.

Dr. Anthony Lowman,
Dean

Laying the Foundation

During the summer of 1992, then-Glassboro State College received an extraordinary pledge of $100 million from Henry and Betty Rowan.

In return for this gift, we were charged with the task of building an innovative, cutting-edge engineering school that would prepare exceptional engineers equipped to meet the challenges of the future and committed to making the world a better place. The school also would be the catalyst for economic growth in the region.

Dr. James Tracey, founding dean of the College, led the team who created this innovative engineering program. Tracey previously served as dean of sciences and engineering and director of the Institute for Research in Science and Engineering at the University of Texas in San Antonio and had been a faculty member at five other institutions in the United States and abroad.

The founding dean, department chairs and other faculty charted the future of the Rowan University College of Engineering, which would deliver a unique hands-on, minds-on approach to engineering education, featuring the College's hallmark interdisciplinary engineering clinics.

More than 20 years later, Rowan University and the College of Engineering have witnessed an unprecedented transformation. Not only did the Rowans' generosity give birth to a groundbreaking engineering school, it established new standards for donors who also continue to enrich the University — which expanded to feature a range of new facilities, programs and majors — and higher education throughout the country.

The Rowan University College of Engineering continues to capture national attention and the Rowans' stunning gift continues to revolutionize the University and the region.

Opposite page: Henry Rowan views the 7-foot bronze likeness of himself that was unveiled during a ceremony in December 2012, commemorating the 20-year anniversary of his historic $100 million gift to then-Glassboro State College.

Henry M. Rowan Hall, which opened in 1998, formed the foundation of the Rowan University College of Engineering. The College's second building will soon emerge as major new landmark on campus.

Supporting Engineers on the Path to Success

Catherine Ni, '00, who is engaged in long-term strategic planning at Lockheed Martin, also is committed to the future of Rowan Engineering students.

Catherine Ni, ’00, deputy director of strategic planning, Lockheed Martin Missiles and Fire Control, Orlando, Fla.

Although I earned my degree in mechanical engineering, 13 years later I’m translating technology into business strategies, planning for the long-term future of Lockheed Martin.

In my strategic planning role, I work to ensure that this $8-billion business will continue to grow and provide cutting-edge defense systems, sensors and services to meet the needs of our military, as well as innovative solutions for global security. I do this by leading our strategic planning process, investment decisions and technology assessments to ensure that they align with our growth strategy.

I started on this path after graduation, when Lockheed Martin in Moorestown, N.J., placed me in a two-year leadership development program. Since then, the company offered me many assignments in a range of areas.

Although my focus today is largely business related, I draw consistently on the background I developed at Rowan.

Through its engineering clinic projects and program, the College laid the foundation for my career, helping me develop excellent technical skills and showing me how to execute a project by bringing together diverse engineering disciplines and resources.

I have remained connected to the College and currently serve on the Dean’s Advisory Council. During the 2011-12 academic year, my husband and I began funding an annual scholarship for Rowan’s engineering students.

We need to show students that engineering and technology provide limitless opportunities and career paths.

Although I’m in Florida, I continue to seek ways to contribute to Rowan. As a recipient of one of the College’s PRIDE (Partners with Rowan in Developing Engineers) 2000 scholarships, which were provided to each member of the College’s inaugural class, it’s my responsibility to give back to the institution that contributed to my success today.

Forging New Pathways

Gina Tierno, ’15, chemical engineering major, Washington Township, N.J.

During my freshman year, I began working with faculty and my classmates to establish the campus chapter of the American Society of Naval Engineering (ASNE), which was chartered this fall.

For the last three summers, I have worked as a chemical engineering intern with the U.S. Navy. My favorite thing to do is network — I love to talk to everyone. Because of my enthusiasm, Navy employees asked me after my first internship whether I wanted to start this local chapter at Rowan.

The organization will enable students to learn not only about naval engineering but also about working for the government. Engineering students often hear about industry careers but not a lot about opportunities with the government. There are so many benefits they may not know about, and I want to spread the word. I think a lot of students are interested in helping our country and making a difference.

At Rowan, I also have been able to get involved in many other activities. I serve as a certified leader and leadership mentor through the Freshman Leadership Involvement Program. I am a member of the Society of Women Engineers, the American Institute of Chemical Engineers and Engineers Without Borders. In addition, I am the College’s special projects coordinator, helping to establish new campus programs. I also have been an academic senator representing the College of Engineering in the Student Government Association.

Rowan University has given me a great outlet to express myself in leadership roles. I love to lead and start new things, so I chose a school where I would have these opportunities.

In addition to participating in many other campus activities, Gina Tierno, ’15, joined with faculty and her fellow students to launch the campus chapter of the American Society of Naval Engineering.

Shoring Up the Future of the New Jersey Coastline

Beena Sukumaran (left) and students Matthew Rossett, '14, and Samantha Kamper, '14, assess the damage left by Superstorm Sandy at the Jersey Shore.

Dr. Beena Sukumaran, professor and chair of Civil & Environmental Engineering

Although I was initially relieved when Superstorm Sandy left the Glassboro area with little damage late in October, television images demonstrated widespread destruction elsewhere in the state. I thought the most meaningful way in which I could make a difference after the storm was by using my engineering knowledge and volunteering my time and skills.

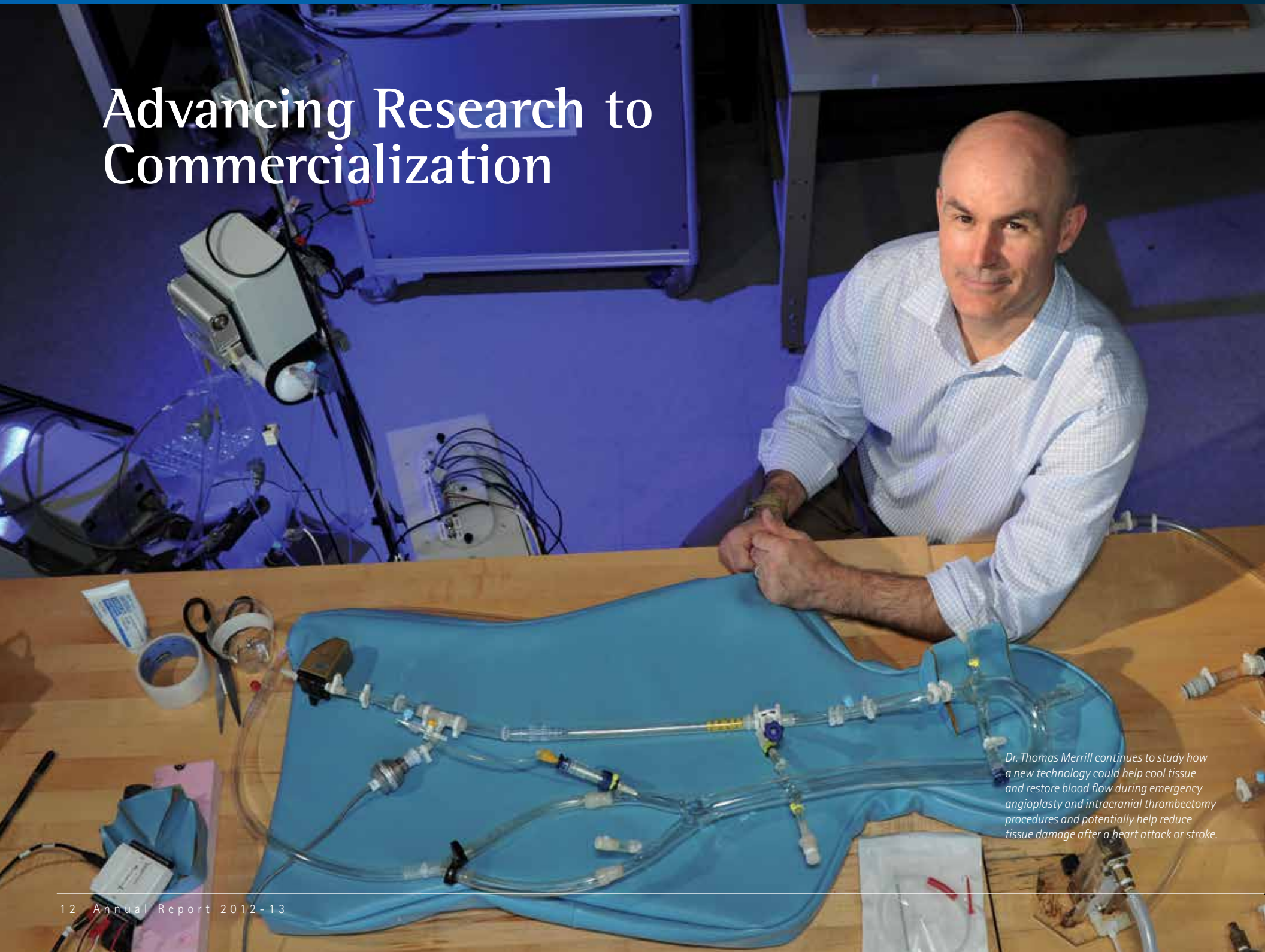
Soon after the storm, I met with an assessment committee in Atlantic City as a member of Geotechnical Extreme Events Reconnaissance (GEER), which is supported by the National Science Foundation. We began visiting Atlantic City and Brigantine to document damage; however, access was limited as we traveled north. I also contacted my students about assisting with efforts at assessing structural damage at the Shore, and they were eager to get involved. Gradually we were able to tour the areas and document our findings in Atlantic City, Long Beach Island, Seaside Heights and other Shore communities.

We continued the project in our spring engineering clinics, quantifying coastal erosion using geographic information systems images before and after the storm. We also examined design strategies that could minimize damage in the future.

In engineering there is a huge emphasis on social responsibility. When we design any type of structure, we must ensure that the structure is safe. It's also our responsibility as educators to teach future engineers about design strategies that can be employed to mitigate the damage from more frequent and destructive storms as a result of climate change.

Student participation was critical in passing on this philosophy to the next generation of engineers.

Advancing Research to Commercialization



Dr. Thomas Merrill continues to study how a new technology could help cool tissue and restore blood flow during emergency angioplasty and intracranial thrombectomy procedures and potentially help reduce tissue damage after a heart attack or stroke.

Dr. Thomas Merrill, associate professor of mechanical engineering and CEO and co-founder, FocalCool LLC, Mullica Hill, N.J.

For the last several years, we have been studying how the CoolGuide Catheter, designed by our company, FocalCool LLC, can rapidly cool tissue and restore blood flow during emergency angioplasty and intracranial thrombectomy procedures to help prevent tissue damage after a heart attack or stroke.

Collaborations and private and federal grants have fueled our quest. Our newest grant from the National Institutes of Health (NIH) for $270,000 will fund our heart research with investigators at Emory University and Reperfusion Therapy Inc., both in Atlanta.

In addition, a five-year $200,000 NIH grant is helping us develop innovations — and great innovators. Dr. Jennifer Kadowec, professor and chair of Mechanical Engineering, and I are leading research with partners at Cooper Medical School of Rowan University, Camden, N.J., and Harvard University, Cambridge, Mass., that will use team-based design teaching practices to create medical solutions that can be translated from an engineering laboratory to a hospital bedside.

Rowan not only provides the facilities for research leading to commercialization but also the raw human intellect. We have had 12 biomedical interns in our lab; several now work in the biomedical field, and two are pursuing medical degrees.

Furthermore, Dr. Anthony Lowman, the College's dean, and Dr. Kenneth Blank, vice president for Health Sciences, have experience in commercialization of medical products — a huge benefit for people like me. Already the College has expanded the number of invention disclosures arising from its engineering clinics program.

Rowan University encourages future innovators. When students see commercialization at work, it speaks to them about possibilities beyond the corporate or government path, where they can branch out and explore their own ideas.

I hope students can mix and craft their experiences at Rowan to pioneer new concepts. The top problems our society faces — whether they relate to medical costs or energy — depend on innovation.

To help reduce the risk of seatbelt-related injuries in automotive crashes, mechanical engineering major Mark Schneider, '13, of Swedesboro, N.J., developed an innovative new seatbelt, and fellow mechanical engineering majors Stephan Brinckmann, '13, of Clinton, N.J., Mia Korngruen, '13, of Cranford, N.J., and William Sansalone, '13, of Pittsgrove, N.J., joined him in researching the device. In this photo, Schneider explains the product to a panel of judges during the Business Plan Competition sponsored by the Rohrer College of Business in March, underscoring important ties between engineering education and entrepreneurship.

Testing the Waters in Engineering

Millville Memorial High School teacher Richard Zucal and Rowan students Matt Tovinsky, Tarynn Huitt, Gina Tierno, and Dave Krause (back row, left to right) join Millville freshmen Robert Smith (front row, left) and Joe Nelson as they watch the high school team's underwater robot perform during the SeaPerch competition.

As families, teachers and school administrators crowded the bleachers in the Esbjornson Gymnasium, we hosted a novel swim meet in April for the most unlikely creatures: remote-controlled underwater robots.

Built by middle and high school students for South Jersey's first regional SeaPerch competition, the robots offered their creators a one-of-a-kind sneak peek into science, technology, engineering and math careers as they built and tested their devices.

This event, coordinated by the College and the Naval Air Systems Command in Lakehurst, N.J., was one of many that continue to showcase the College's commitment to engaging students in the excitement of engineering.

With spectators' cheers echoing from the gymnasium walls, students plunged their creations into the pool and intently watched them motor through the watery depths during speed trials and an obstacle course. In Rowan Hall, the robots underwent creativity and engineering evaluations.

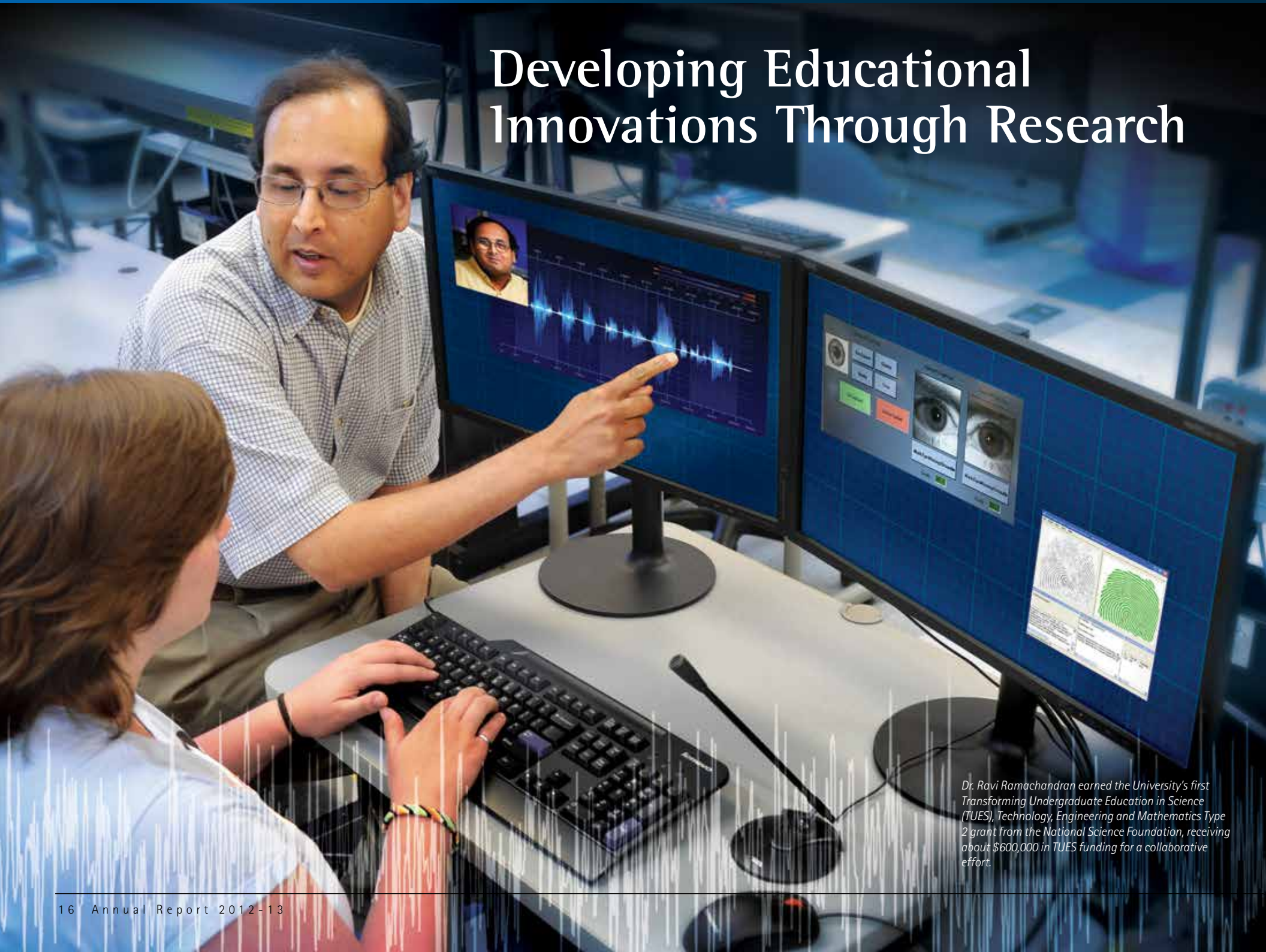
The following groups participated in the event: Burlington School District, U.S. Sea Cadet Lakehurst Squadron, Manchester School District, Harrington SeaPerch Club in Mt. Laurel, Marine Academy of Technology and Environmental Science (MATES) in Ocean County, Lacey Township School District, NJ ROTC Colts Neck Cadets and Millville School District, all in New Jersey.

The Burlington School District's Sea Knights, a middle school team, and the MATES high school team captured top honors. The winners went on to compete in the National SeaPerch competition in Indianapolis, where Burlington's Sea Knights took first place in the middle school obstacle course.

Regardless of the outcome of the underwater challenge, all of the students emerged as winners — gaining hands-on experience and knowledge that they will carry with them into the future.

Engineers on Wheels, an innovative program that sends Rowan Engineering'sspecially equipped vans into the area to introduce engineering concepts toK-12 students, shared the excitement of engineering with those attending this year's Philadelphia Science Festival in April. This 10-day event celebrates science and technology in everyday settings, inspiring participants to look at the world around them with a sense of curiosity. Bringing together more than 100 partners, this annual event was presented by The Dow Chemical Company and organized by The Franklin Institute.

Developing Educational Innovations Through Research



Dr. Ravi Ramachandran earned the University's first Transforming Undergraduate Education in Science (TUES), Technology, Engineering and Mathematics Type 2 grant from the National Science Foundation, receiving about $600,000 in TUES funding for a collaborative effort.

Dr. Ravi P. Ramachandran, professor of electrical and computer engineering

I was extremely happy when I received Rowan's first Transforming Undergraduate Education in Science (TUES), Technology, Engineering and Mathematics Type 2 grant from the National Science Foundation.

This collaborative effort between Rowan, Bucknell University and Tennessee State University received approximately $600,000 in funding. Rowan will be able to use $356,654 to share its educational innovations with other schools while researching advances in biometrics.

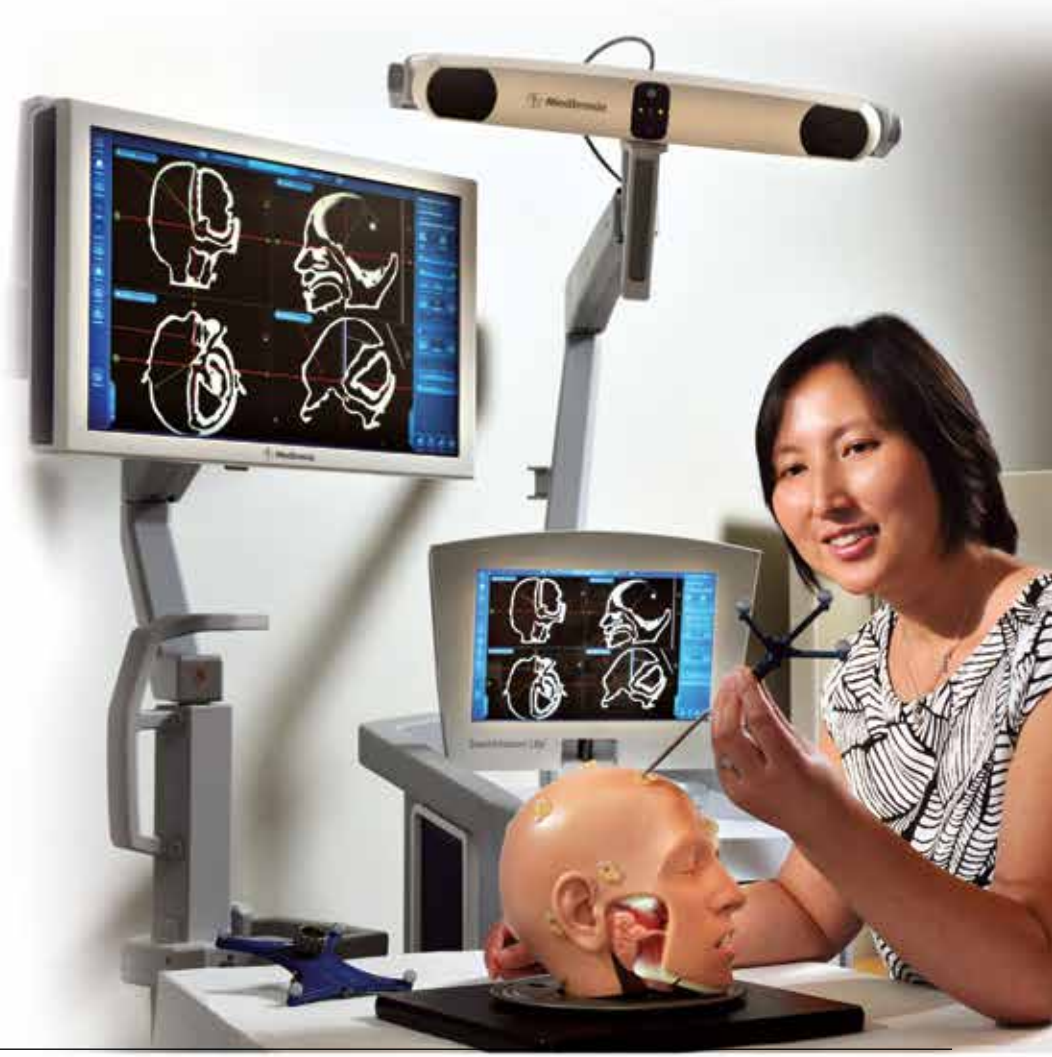
Biometrics — an important global resource in cybersecurity, crime investigations and other applications — offers the ability to recognize and authenticate people through their physiological features, such as face, iris, signature, speaker and fingerprint recognition.

This project will vertically integrate a multi-year interconnected biometrics curriculum — from middle school through four years of undergraduate education — enabling students to begin with well-structured experiments at the lower levels and continue on to increasingly complex projects at higher levels.

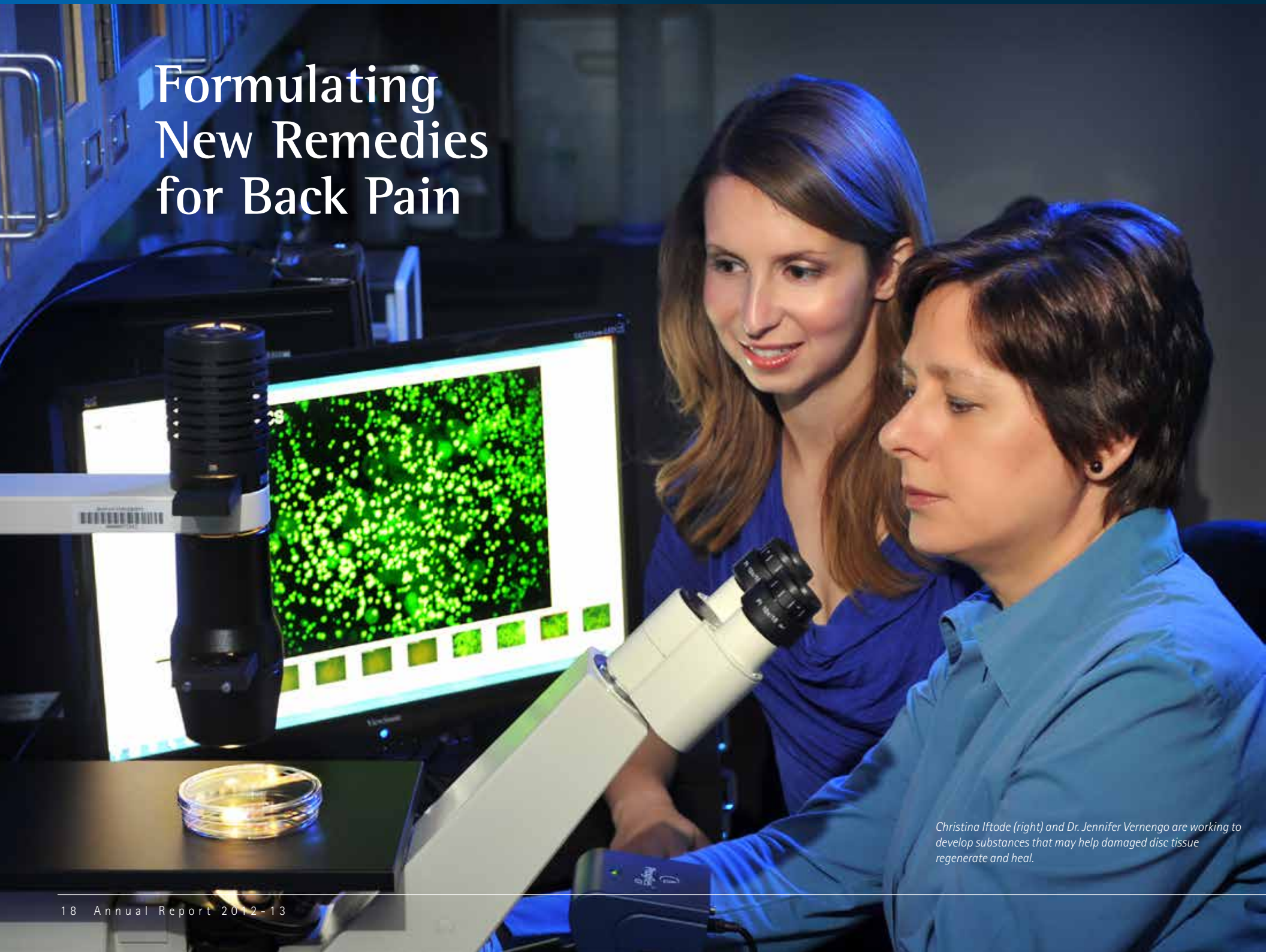
Through this model, universities without sufficient resources to create a new undergraduate biometrics program will be able to offer biometrics experiments throughout a four-year electrical and computer engineering (ECE) curriculum. As the lead institution for this project, Rowan will partner with Gloucester County College and Pitman and Washington Township high schools in New Jersey.

Dr. Steven Chin, associate dean; Dr. Kevin Dahm, Chemical Engineering; and Drs. Robi Polikar and Gina Tang, Electrical and Computer Engineering are working with me on this project. In addition, graduate ECE students Megan Frankle,'12; Robert Mudrowsky, '10; Steve Rieger,'12; and Demiyan Smirnov,'12 are contributing to the research. These students worked on the project as undergraduates through the clinic program along with Sara Davis,'12. We are reporting our progress during conferences, in published papers and on the project website and the Connexions website (cnx.org).

Dr. Gina Tang, associate professor of electrical and computer engineering, is collaborating with Dr. H. Warren Goldman, chairman and chief of neurosurgery and Anthony L. Aita, neurosurgical technical coordinator, Cooper University Hospital, to develop a wearable surgical navigation system. This technology would enable surgeons to simultaneously view the surgical field along with the surgical navigational progress through a near-to-eye display in addition to other system enhancements for the field.



Formulating New Remedies for Back Pain



Christina Iftode (right) and Dr. Jennifer Vernengo are working to develop substances that may help damaged disc tissue regenerate and heal.

Dr. Jennifer Vernengo, assistant professor of chemical engineering

Back pain is one of the most common medical problems. I began researching solutions for this condition during my undergraduate years and continued this work during graduate school and as a Rowan researcher and professor.

Although my initial work focused on developing materials to replace the degenerated disc that causes pain, I'm now concentrating on creating implants that will help tissue regenerate and heal.

This research gives me the opportunity to take what I love — learning about polymers — and use that in medicine, applying it to a problem that impacts so many people. Other researchers have conducted similar research with moderate success, but many of their materials are expelled easily or migrate in the spine.

I'm trying to fill that gap by developing an injectable biomaterial for the intervertebral disc that supports cell life and adheres to the tissue so it stays in place. With this research, we hope to bring intervertebral disc tissue engineering closer to making a clinical impact. To support our work, we recently received $315,933 in funding from the National Institutes of Health.

Rowan is a great setting for this research. I love engaging undergraduate students in this work, and I find it rewarding that a number of students who worked on my projects have continued on to pursue graduate research or careers in biomaterials.

Rowan also provides access to a number of valuable collaborators. Dr. Cristina Iftode, associate professor of biological sciences, is a major contributor to the biological aspects of this project. Dr. Jennifer Kadlowec, professor and associate chair of the Mechanical Engineering program, is focusing on the mechanical components of the research. The addition of the Cooper Medical School of Rowan University and Rowan University School of Osteopathic Medicine is strengthening our collaborations and research.

I'm grateful to be able to partner with such great scientific collaborators who will help me make a difference in the field.

Reaching for the Future

Dr. Anthony Lowman, Dean, Rowan University College of Engineering

Henry M. Rowan Hall, the first building of the Rowan University College of Engineering, formed a solid foundation for our innovative and nationally ranked undergraduate program.

We recently broke ground on our second building, which will accommodate more than 2,000 students, thanks largely to $45.9 million in state support. This state-of-the-art structure will allow us to continue to further develop our innovative educational programs and enable even more students to access these programs. Additionally, we are developing many new educational and research programs and will double our faculty size over the next five years.

We are actively recruiting faculty for all of our engineering disciplines, including our new biomedical engineering program, which will enroll its first class in fall 2014.

Additionally, we are enhancing our current graduate programs at the master's level and are in the process of developing our first doctoral programs.

Our current and new faculty will continue to concentrate on research and educational programs that emphasize translational research that leads to the development of technologies that serve societal problems. We will maintain our focus on projects sponsored by the National Science Foundation, National Institutes of Health, Department of Energy and Department of Transportation. We also remain committed to expanding our industrial ties, leveraging the industrial research we perform in our engineering clinics program and emphasizing collaborations with mission-oriented agencies such as the U.S. Department of Defense.

As we work toward the future, we are building on the vision of excellence set by Henry Rowan, founding dean Dr. James Tracey and the founding chairs, who established this program.

The architects of this program developed an outstanding engineering school, producing engineers who are in high-demand in graduate programs and industry throughout the region and beyond.

Opposite page: As a few members of the Rowan Engineering Society of Automotive Engineers (SAE) mini-Baja team, Andrew Clayton,'13 (left), Rohith (Russ) Gowda, '14, and Danielle Cristino, '14, fine-tune their vehicle, Dr. Anthony Lowman, dean of the College (second from left), and Dr. Eric Constans, chair of Mechanical Engineering and team advisor, assess their progress. At this year's SAE competition at Tennessee Tech University, in Cookeville, the team won second prize for maneuverability as well as other honors.

In Gratitude

Thank you to our generous donors, who help make the Rowan University College of Engineering an outstanding nationally recognized engineering program.

Engineering Alumni

David J. Bound, ’08
David, ’01, M’03, and Christina M. Bowen, ’01
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Christopher A. Burke, ’06
Stephanie Michelle Camilo, ’11
Philip Castro, ’12
Michael D. Ciocco, ’01, M’02
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