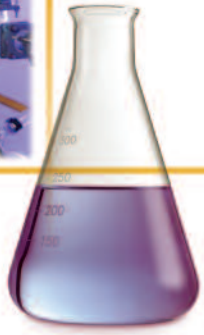


ROWAN UNIVERSITY
COLLEGE OF ENGINEERING

2010 — 2011 ANNUAL REPORT



FACES OF
INNOVATION

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Message From the Dean

From the beginning, the Rowan University College of Engineering promised to produce an extraordinary breed of engineering graduates equipped to face the distinctive challenges of the 21st century.

As you browse through these pages, you will see the many elements that have contributed to our success in achieving this goal during the last 15 years: faculty innovation and dedication to teaching, tireless staff support, strong partnerships with industry and, last but not least, our students' commitment to making a difference.

The future holds even more promise.

The Cooper Medical School of Rowan University will open its doors to its first class in September 2012. This is an exciting opportunity for the College of Engineering to contribute to medical advances through interdisciplinary research collaborations. Our engineering faculty members are working with physicians at Cooper University Hospital on projects that will result in innovative healthcare solutions. With this partnership, the College of Engineering will contribute to the training of future generations of clinicians prepared to meet the needs of residents in a state challenged by a shortage of physicians.

Our work with business and industry continues to grow, and we are indebted for the role they have played in our success. Industry support has led to increased outreach opportunities to promote engineering to K-12 students. For example, this year PSEG generously supported Rowan's Introduction for Students to Engineering and Engineering Clinics for Teachers, igniting the enthusiasm of high school students and K-12 teachers with the excitement of engineering. Industry collaborations are critical in meeting the global need for more engineers to solve societal issues, and we invite all interested parties to join us in this effort.

We look forward to making more of a difference beyond our community as our outreach efforts extend far beyond our region. Rowan Engineering is making a positive impact on developing countries through organizations such as Engineers Without Borders, enabling students and faculty to solve engineering problems in these countries, and Engineering Innovators Without Borders, allowing them to create and test products that may make the lives of people half a world away easier and safer.

As you read this annual report, our accomplishments will come alive through profiles characterizing the many faces of Rowan Engineering. We hope you enjoy these stories and will be inspired to join in our many initiatives and activities. I invite you to visit us on campus so we may discuss the many collaborative opportunities available at the Rowan University College of Engineering. ■




Steven Chin, Ph.D., P.E.
Interim Dean

Paving the Road to Success

My passion for transportation engineering started when I worked on the Rowan Engineering Clinic reclaimed asphalt pavement project. My ultimate goal is to become a university professor, which was a realization that I came to when I was allowed to help with junior-level classes this year.

During my sophomore year, I studied abroad at the University of Dundee, Scotland, and I had the opportunity to meet people, not only from the United Kingdom, but also from Cyprus, Russia, China and many other places. The experience of these new cultures helped to broaden my perspective.

I was accepted into my dream school, the University of California, Berkeley, for my graduate studies, and I will work there as a graduate student researcher in transportation engineering. I definitely owe a portion of my success to the encouragement that I received from Rowan faculty and my advisor.

I've had many excellent professors over the course of my education at Rowan, and I will take the experience I've gained to graduate school and to my career. I hope to make them proud when I become a professor myself. ■



The Harris Building on the Geddes Quadrangle, University of Dundee, Scotland.

Snapshot: Darren Reger, '11

Major:	B.S. Civil and Environmental Engineering
Hometown:	Middletown, N.J.
Next Step:	University of California, Berkeley — master's program, Transportation Engineering; graduate student researcher
Activities:	Tau Beta Pi national engineering honor society Sigma Alpha Lambda National Leadership and Honor Society Golden Key International Honour Society Engineers Without Borders University of Dundee, Scotland — study abroad Co-authored, published and presented research papers

Implementing Advanced Technology to Aid Communities

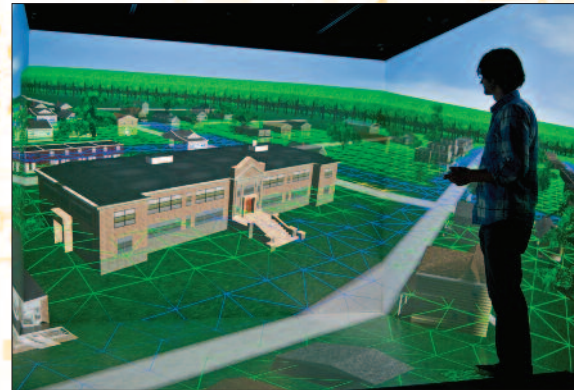
City of Camden officials reached out to us because they needed data visualizations of pipe water inflow and outflow to help them address their flooding problems. We sent out our team of civil engineers and collected pipe data to map out the terrain.

This allowed us to use the Cave Automated Virtual Environment (CAVE®) to identify problem areas where water would accumulate.

We recently received a \$424,962 grant from the U.S. Economic Development Administration to extend this pilot study.

During the next stage of the project, which I will work on as a graduate student, we will look at the integrity of the pipes Camden workers installed and the network they have established and see whether we can create a simulation and visualization so they can see in real-time changes they can make and how they would affect their problem. With the grant, we also will expand this project into a suburban area of Vineland.

We hope to be able to develop software that we can take into the market to allow us to create a simulation for a city that needs help in solving a challenge such as traffic congestion. We will be able to model that and, we hope, help the city with that problem. ■



George Lecakes, '09, M'11, a research associate at Rowan University, operates the Camden virtual reality simulation where students created 50 blocks of Von Neida Park in 3D. This project is funded currently by the U.S. Economic Development Administration. He is using the simulation to view the amount of water that accumulated in the 32nd Street area of Camden.



Snapshot: Steven Beaudoin, '11

Major:	B.S. Electrical and Computer Engineering
Hometown:	Frederick, Md.
Next Step:	Rowan University College of Engineering — master's program, Electrical and Computer Engineering
Activities:	Thomas N. Bantivoglio Honors Concentration U.S. Economic Development Administration virtual reality remediation, Camden, N.J. — project team member



Reaching Out to the Community and Beyond

I decided to become an engineer in sixth grade, when I went to the Attracting Women Into Engineering workshop at Rowan and made lip gloss. It was really fun, and I later realized that it involved a lot of chemistry.

As I study chemical engineering at Rowan, my educational experience is helping me serve a larger goal than just my career through outreach in my local community and in other countries. With the Society of Women Engineers and Tau Beta Pi, the national engineering honor



Through Engineering Innovators Without Borders, students work on projects for developing countries that have included a device that turns peanut shells into briquettes that can be used for cooking.

society, I'm involved with service for K-12 students in the community. I'm also serving people in other countries through Engineers Without Borders. For our clean water project, we're developing and installing biosand filters to improve water quality in the small community of La Ceiba in El Salvador. Serving others through engineering at Rowan is a rewarding experience because I've learned about engineering disciplines outside of my own major, and I've been an integral part of empowering very deserving communities, like La Ceiba, to achieve a higher quality of life. Rowan has opened a lot of doors for me, and I want to show everyone what Rowan has to offer while giving back locally and globally. ■

Since 2003, Rowan students have completed projects for Engineers Without Borders in locations such as Thailand, The Gambia and El Salvador.



Snapshot: Brigid Burgin, '12

Major:	Chemical Engineering
Hometown:	Mantua Township, N.J.
Activities:	Tau Beta Pi national engineering honor society — president Thomas N. Bantivoglio Honors Concentration Engineers Without Borders — president Society of Women Engineers — treasurer College of Engineering blogger

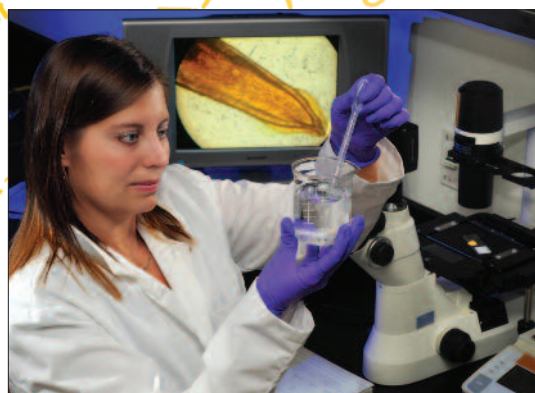
Advancing Medical Solutions

We are working with a Cooper University Hospital orthopedic surgeon, Dr. Robert Ostrum, who asked that we develop an antibiotic patch for surgery. If we're able to develop this biodegradable polymer patch, infection will be prevented by implanting the patch under the skin. If used in knee or shoulder surgery, the patch will remain underneath the skin after surgery to prevent bacterial growth for two to three weeks. Then — because it's biodegradable — it will dissolve completely.

With our advisor, Dr. Jennifer Vernengo,

we've been working with a couple of different materials and different ways to release the antibiotic in small lab-scale patches. We're looking into two or three polymers that we can possibly use to optimize the properties of the polymer so it is flexible, releases antibiotic for two to three weeks, doesn't stay in the body too long and releases the right amount of antibiotic each day.

Infection is a potential complication with orthopedic surgery, and delivering the antibiotic would minimize the risk. If we optimize this and it becomes used in practice, it will help countless people. It will save time and money and alleviate pain. ■



Dr. Mary Staehle, assistant professor of chemical engineering, and her students are studying the planaria flatworm to learn more about the process of regeneration and neurodegenerative diseases.

Forging New Relationships

With the establishment of the Cooper Medical School of Rowan University, the Rowan University College of Engineering is breaking new ground in health and bioengineering. Six faculty members in the College of Engineering — representing chemical, civil and environmental, electrical and computer, and mechanical engineering — hold joint appointments with Cooper Medical School of Rowan University. Rowan Engineering faculty helped develop curriculum for the new medical school and already are engaged in collaborative research activities with Cooper. This strong partnership will stimulate new areas of research and open new frontiers at Rowan University.



Snapshot: Dana Demiduke, '12

Major:	Chemical Engineering
Hometown:	Pitman, N.J.
Activities:	Tau Beta Pi national engineering honor society Society of Women Engineers — events and fundraising coordinator American Institute of Chemical Engineers



Opening Doors of Opportunity

Rowan gives students the opportunity to become engineers from the moment they step on campus.

This is done through the engineering clinics offered from your freshman year through senior year. Clinics gave me a good foundation in how to approach a problem, look at it objectively, take into account all of the different variables and come up with a solution. They also taught us that the problem did not end there. Clinics drove home the point that we always need to test our solutions. Testing allowed us to come to a better conclusion so we could improve continually. That's probably the best thing I received from my Rowan education. It has helped me progress professionally in my career.

Rowan also offers many opportunities to grow as a person. As a Rowan student, I wrote a diversity grant to the national American Society of Mechanical Engineers chapter that allowed us to receive \$1,500. With that money, we created a program that invited at-risk students from charter schools to campus. We performed engineering workshops with them and introduced them to what they needed academically to pursue a career in engineering.

I have since created a nonprofit organization called

Beyond Boundaries Education Services in Newark, N.J., with another Rowan alum, Kiacha Christy, '05. We conduct engineering programs in schools and help teachers develop learning modules for students in grades six through eight. This gives students a different take on math and science and helps teachers think outside the box in applying hands-on activities to the topics they're teaching.



Girl Scouts build newspaper towers at a workshop led by Rowan University's student chapter of the Society of Women Engineers. Such hands-on activities introduce visiting students to the field of engineering.



Snapshot: Rodney Johnson, Ph.D., '03

Education:

B.S. Mechanical Engineering, Rowan University
M.S. Mechanical Engineering, Drexel University
Ph.D. Mechanical Engineering, Drexel University

Positions:

PSEG, Newark, N.J. — supervising test engineer
Beyond Boundaries Educational Services,
Newark, N.J. — co-founder

Conceiving New Applications for Technology

During the last semester of my undergraduate studies, Zach Grady, '11, and Joe Ridgeway, '11, electrical and computer engineering majors, approached me. They needed someone with mechanical engineering experience to help design and construct the Rubik's Cube-Solving Robot they envisioned as their clinic project.

In engineering programs, hands-on projects like this are important because you learn a lot more after you take concepts off the paper and make them work in the three-dimensional world. Students want to be engineers in the first place not only because they like to design, but also because they like to build and interact with the finished product.

This project shows that engineering can be applied in any aspect of life, whether solving trivial games or the world's problems. It also allows us to connect to a younger generation. A lot of high school students have no idea what engineering is. Seeing something fun and colorful, such as a toy robot that solves a Rubik's Cube, and knowing 20- to 21-year-olds created this machine interests and inspires students to pursue engineering. Society and Rowan University need more new, young,

creative minds in engineering. ■



Students build bottle rockets during TeenTech, an event sponsored by the American Association of University Women and Rowan University College of Engineering.



Snapshot: Karl Dyer, '10, graduate student

Major:	Master's program, Electrical and Computer Engineering
Education:	B.S. Mechanical Engineering, Rowan University
Hometown:	Barrington, N.J.
Activities:	South Jersey Technology Park Advisory Board member Golden Key International Honour Society 2010 Indoor Aerial Robotics Competition — 2nd place

Strengthening Connections

We're excited about our relationship with the Rowan College of Engineering. After I became a member of the Rowan University Foundation Board of Directors in 2010, I was looking for additional ways to strengthen that relationship, and I was honored to be asked to join the College of Engineering Dean's Advisory Council. We also are working with the College in its outreach endeavors and currently sponsor an engineering clinic.

PSEG is the second largest commercial nuclear facility in the United States. With our plans for the facility, we will need highly qualified engineers and are very fortunate to have an institution like Rowan in our backyard. Although young, the College of Engineering has established itself as a top-flight program.

Rowan students graduate with very good critical thinking skills. The clinic-based approach — with students working in multidisciplinary teams — is directly applicable to our business. Furthermore, as a regionally based company, we're able to recruit folks whose roots are in this area, and that has a lot of value to us.

As we look to the future, we want to nurture this relationship with Rowan University so we can become a consistent pathway for graduates. We're looking to offer people a challenging and rewarding work environment.

What we gain is that this talent stays close to home and supports our local economy. ■



High school students learn about opportunities in engineering while touring PSEG Nuclear in Hancocks Bridge as part of RISE (Rowan's Introduction for Students to Engineering).



Snapshot: Robert Braun

Position:	PSEG Nuclear, Hancocks Bridge, N.J. — senior vice president
Board Positions at Rowan University:	Rowan University Foundation Board of Directors Rowan University College of Engineering Dean's Advisory Council

Saving Brain Tissue

When someone has a stroke, brain tissue will die if it's not perfused with adequate blood flow.

One exciting approach to saving this tissue is to cool blood to reduce the cell death process. We've created a catheter technology that can be placed inside a vessel in the brain, delivering cooled blood at 28°C and reducing brain tissue temperatures.

The National Institutes of Health awarded us a \$207,000 grant to develop that technology and test it preclinically during the next year. If we demonstrate rapid brain cooling, we'll have the opportunity to seek additional funding for testing in a clinical setting.



Jennifer Akers, '02, a research scientist for FocalCool LLC, experiments with a tissue-mimicking prototype of the heart's capillary network.

Rowan University has helped me significantly by providing outstanding laboratory facilities and skilled employees. We also benefit from a close relationship with the Rohrer College of Business that is helping us go after additional funding and create a business strategy for our technology.

I'm not the only one performing such research in the College of Engineering. My colleagues around me — studying new asphalt materials to nanotechnology — are pursuing similar grants to develop their own technologies.

For me, our work truly follows the spirit of Henry Rowan himself, continuing the legacy of his donation to establish the College of Engineering. ■

Snapshot: Thomas Merrill, Ph.D.

Positions:

Rowan University College of Engineering — assistant professor, Mechanical Engineering
FocalCool LLC, South Jersey Technology Park — chief executive officer and co-founder

Remembering the Past and Looking to the Future

After 12 years of working with two outstanding engineering deans and, most recently, an outstanding interim dean, I recently stepped down as chairman of the College of Engineering Dean's Advisory Council.

During these years, we have been on a fantastic journey where I have been able to watch and participate in the creation and development of a school of engineering that is the model of what such an institution should be.

Henry Rowan's vision for the College of Engineering became the centerpiece of an expanding and growing institution that now includes a new science building, the South Jersey Technology Park and Cooper Medical School of Rowan University. Certainly the outstanding success of the College of Engineering made this easier and even may have made it possible.

The College did not achieve its national reputation by accident, and without its excellent faculty, the College would not have achieved it at all. Of the College's many strengths, I rank the high caliber of the faculty at the top of the list. The faculty's commitment, energy and brilliance set a very high standard for future faculty, and our professors motivate each and every student they encounter.

If anyone questioned whether the best and brightest would come to a fledgling engineering school, that question has been answered as we continue to attract top students.

Current and new engineering faculty continue to reposition the four engineering programs by integrating areas such as sustainability and bioengineering into core curricula. I'll miss interacting with the professors I have enjoyed knowing during my time on the Dean's Advisory Council.

No one can forecast exactly where the Rowan University College of Engineering will be in another 12 years, but I think we can predict that it will continue to lead in engineering education and attracting faculty who will inspire students. As the South Jersey Technology Park grows, we expect even more research opportunities for the College of Engineering. Furthermore, joint collaborations with the new Cooper Medical School of Rowan University will lead to breakthroughs in medical devices and move both Cooper Medical School and the College of Engineering to new levels of recognition. ■



Chester W. Dawson
Past Chairman, Dean's Advisory Council



In Appreciation

Thank you to our generous donors who help make the Rowan University College of Engineering one of the most respected engineering schools in the country.

Our donors include the following:

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College Soars in Rankings

In its *Best Colleges* 2012 edition, *U.S. News & World Report* ranked the Rowan University College of Engineering 16th (tied) among all colleges and universities whose engineering programs offer a bachelor's or master's degree as their highest degree. The College ranked seventh in the nation among public schools in that category.

The Chemical Engineering program was ranked third (tied) and was the top public school program in the country. The Mechanical Engineering program took eighth place in the rankings.



INNOVATION STARTS HERE



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