

ENGINEERING By Design

News from Rowan University College of Engineering

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SOUTH JERSEY TECHNOLOGY PARK

Think of the possibilities!



Rowan University's College of Engineering is making plans to bring the undergraduate experience to new levels. The College has been busy:

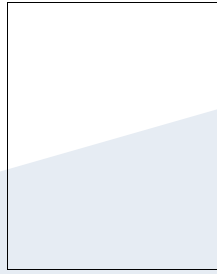


- Working up proposals to extend research projects into real-life development and commercialization.
- Strengthening partnerships with the local industries that benefit from the College of Engineering's exemplary research and development programs.
- Tapping into federal and state grants to bring new experiences and opportunities to the students as they prepare for careers in sciences and technology.
- Dreaming of a day when the proposed technology center will be part of Rowan's campus.

It may not be long now. The University has been awarded \$6 million by the New Jersey Economic Development Authority to begin plans for the "South Jersey Technology Park at Rowan University." This is the initial phase for the technology center and business incubator that have been proposed by the University. *For more about the possibilities, see page 6.*

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Thoughts from the Dean

Rowan passed several major milestones this summer and we are moving into fall 2001 with a renewed sense of excitement and expectation. One year ago the College was in the midst of intense preparation for the site visit which culminated in ABET accreditation for all of our engineering programs. Rowan University, at #29, ranked among the top comprehensive colleges and universities in the North region, as defined by U.S. News and World Report Best Colleges Fact Sheet. The South Jersey Technology Park has been funded with a \$6 million start-up grant.

Accreditation by ABET provides national recognition for Engineering at Rowan and Steve Chin provides an historical perspective on page 3. We celebrate with a College reception on Friday evening, October 26 to recognize the outstanding achievements of faculty, staff and students. The College received almost five applications for every freshman seat this year, and accreditation will enhance the perception of Rowan Engineering by regional high school students.

Although national rankings should be used carefully, the U.S. News Report provides valuable support that Rowan University continues to climb in perception and value. Only two years ago the University ranked #51, so steady movement upward to #29 is positive and Rowan Engineering has contributed significantly. Note that only two other public institutions in the Northeast rank ahead of us in the top tier.

Rowan's potential (and part of our College mission) for economic development in South Jersey was a critical consideration for the New Jersey Economic Development Authority, the funding authority for this start-up phase of the technology center. In the next nine months a small team from Rowan will be working closely with consultants from the University City Science Center to develop the structure of the tech center so that we may move into the implementation phase. The tech center will provide needed expansion room for the engineering clinics, offering added opportunities for students and increased industry interaction.

These changes create challenges, but more importantly provide opportunities to effectively and rapidly advance the college, taking us to the next level among the nation's outstanding engineering colleges.

Rowan Engineering enters the fall semester with 441 students enrolled, including 120 freshmen, the class of 2005! We have 22 graduate students both part-time and full-time, and expect 84 seniors to target graduation in the spring. This newsletter is packed with reports from the summer, faculty activities, recent grants and honors. We hope you enjoy the issue and share in our enthusiasm for Rowan Engineering in this exciting time of growth and change!

The Road to Accreditation

by Associate Dean Dr. Steven Chin

The history of Rowan Engineering can be traced to July 6, 1992 when Henry and Betty Rowan announced their pledge of an endowment of \$100 million, with a challenge to build a new and innovative College of Engineering. In June of 1993, the National Advisory Council for Development of the College of Engineering was created to assist in developing hallmarks for the program.

Since that time, the engineering programs have undergone steady refinement and improvement based on feedback from internal and external constituents. These changes were carefully documented, resulting in a Self-Study report for each program. These were delivered to the Accreditation Board for Engineering and Technology (ABET) in June 2000 for careful review by an evaluation team consisting of practicing professionals from industry, academe and government. During their on-site visit on October 29-31, 2000, the team verified the information in the institution's self-study, reviewed course materials and student work, and interviewed students, faculty and administrators.

Rowan Engineering passed a significant milestone this summer when the Accreditation Board for Engineering and Technology (ABET) officially accredited all engineering programs retroactive to October 1, 1999. Accredited status signifies that an engineering program has met the defined quality standards, and that its graduates are prepared to begin professional practice.

Introducing

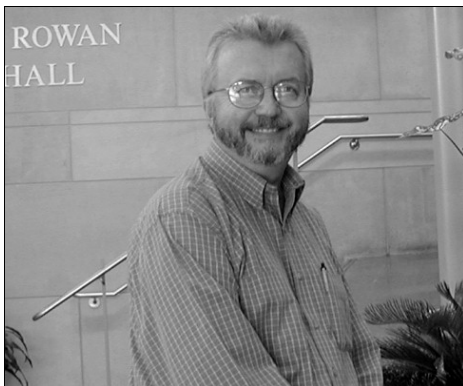


Yusuf Mehta

Yusuf Mehta is the newest faculty member in the Department of Civil and Environmental Engineering. Mehta worked as a post-doctoral associate at University of Florida after he earned his Ph.D. in civil engineering at Penn State University in 1999. He earned his M.S. in civil engineering from the University of Oklahoma in 1994 after completing his B.S. at University of Mumbai, India in 1993.

Mehta specializes in construction materials and the design, management and rehabilitation of pavement. He is an active member and reviewer of the journals of the American Society of Civil Engineers, Transportation Research Record and the Association of Asphalt Paving Technologist.

Bernard Pietrucha



Before coming to Rowan's College of Engineering, Bernard Pietrucha worked for Bell Laboratories/Lucent Technologies and AT&T. Previous to that, he was employed by RCA's Solid State Division. Pietrucha also served in the U.S. Air Force from 1967-1971. He was test engineer for 13 NASA and U.S. Air Force spacecraft launches and conducted launch operations for two NASA scientific missions.

Pietrucha received a Ph.D. in electrical engineering from Rutgers University in 1986, specializing in the physics of semiconductor devices. Currently he is a member of the Institute of Electrical and Electronic Engineers (IEEE) and is Technical Program Chair for the 2002 IEEE International Reliability Physics Symposium.

A SUMMER OF EXPLORATIONS:



CEE Senior Lisa Callahan surveys the streambed.

Projects like this have tremendous benefits to the surrounding communities, explained Karen Dorris of NJDEP.



CEE seniors Greg McGrath and Jeff Puterbaugh learn the fine points of stream flow measurement from Tim Reed of the US Geological Service (USGS).

Stream Restoration Project - The Chestnut Branch of the Mantua Creek

Rowan's backyard is the site of study for a team of students who are working on a plan to stabilize the stream that runs through the campus. Streambank erosion along the Chestnut Branch created a natural laboratory for students to collect data and begin to plan a remedy to the problem. With guidance from the Gloucester County Planning Division and NJDEP, students began creating a detailed survey and taking a water quality sampling. "The restoration project will improve water quality in the creek and downstream water bodies," explained faculty advisor Professor Joseph Orlins (CEE). "This work will be very useful to the Division of Watershed Management for future water quality improvement activities in this watershed," said Karen Dorris, Watershed Manager for NJDEP.

Wadsworth Dam Hydrologic Investigation

Last spring a team of Rowan's CEE students met with Wayne Groff, owner of the Wadsworth Dam, one of the privately owned, small to medium-sized dams in the state. Without the costly but necessary engineering studies and remediation designs, these dams have been deteriorating, explained Groff's daughter Kimberly, who is a Project Manager for Earth Solve, a private consulting firm involved in the project. "Rowan's contribution to this project has been invaluable," she said. By working with local agencies, including the Mantua Creek Watershed Association and NJDEP's Dam Safety Office, Rowan Engineering is helping to find a solution to restore the Wadsworth Dam. "The computer model generated by students will show the dam's compliance status," explained Groff. "Their work on this community-related issue could serve as a model for similar projects."

Rowan Engineering Hallmark: *Undergraduate Research Experience*

"Active research experience is considered one of the most effective ways to attract talented undergraduates and retain them in careers in science and engineering – including careers in teaching" said Professor Kauser Jahan (ChE). The NSF awarded Jahan a three-year grant for her proposal to involve undergrads in pollution prevention research.

P2 (Pollution Prevention) was the focus of this summer's RUE projects for the nine students who came to campus to work on specific research projects. The engineering students, from Villanova, Cornell, Virginia Tech, University of Wisconsin, Madison, University of Rochester, Florida Institute



of Technology, Florida State University, Rutgers, and Rowan, were involved in supervised research that included: precious metal recovery from hazardous waste; project -feasibility studies on supercritical fluid extraction of edible oils, and solar alternatives for the Rowan University Bookstore.

In addition to their supervised projects, the participants had opportunities to observe similar "real-life" projects at the Sony Music Company and at

ROWAN'S BACKYARD AND BEYOND



The experiences: Work with a drill crew, collect and store samples, design test methods, analyze and display data, draft reports, present findings

The goal: Design basic tools to solve environmental problems faster and better

The pay-off: The methods this Rowan team develops could be adopted for use at other contaminated sites



The Rowan team: CEE seniors Julie Oropalo, Dan Zelechowski, Greg McGrath, Biology junior Kathy Brozina and CEE grad student Brad Summerfield.

Go West, Young Engineers...

It wasn't just the glacier, or the moose-sighting that brought thrills to the team of Rowan Engineers who spent part of their summer in Alaska and Oklahoma. "This trip provided unique experiences in research and field work that aren't usually part of an undergraduate experience," said Brad Summerville (CEE Grad student). "I never learned so much in so short a time," said junior Kathy Brozina (Biology).

The team, under the supervision of faculty advisor Professor Jess Everett (CEE), traveled west to take part in a project funded by the Air Force Center for Environmental Excellence (AFCEE). The mission was to determine whether natural processes were



improving, or cleaning up, sites that had been contaminated.

Working with a drill crew on four sites, two in OK and two in AK, the team sampled soil taken from levels down to 40 feet below the surface. They were looking for reduced bio-iron and sulfur, "the by-products of the microorganisms that are 'cleaning-up' the contamination," explained CEE senior Greg McGrath.

Back at Rowan, the team is analyzing the samples and working to improve test methods to make them easier to replicate.

a solar panel manufacturing facility. "Research experiences like these expose undergraduate students to the creativity of the research process," Jahan said, "and enable them to apply the knowledge they've acquired from their formal coursework."

Faculty who participated in the RUE program were: Co-PI: Jess W. Everett (CEE), Joseph Orlins (CEE), Stephanie Farrell (ChE), Mariano Savelski (ChE), Robert Hesketh (ChE), Kathryn Hollar (ChE), Linda Head (ECE), Raúl Ordóñez (ECE).



Attracting Women into Engineering 2001

Rowan engineering gave this year's AWE participants more than purchasing power as they introduced the young ladies to the R & D behind cosmetics. The new module, as well as a favorite - the soda bottle rocket module, were 2 of the workshops coordinated by Professor Kauser Jahan (CEE) and her colleagues Professors Kathryn Hollar (ChE); Jennifer Kadlowec (ME); Linda Head

(ECE); and Beena Sukumaran (CEE). The week-long experience ended in a formal closing ceremony with a keynote address by Rowan's new provost, Dr. Helen-Gee Giles. This year's program was sponsored by Exxon-Mobile, AACU (American Association of Universities and Colleges) and Rowan University.



Think of the possibilities...

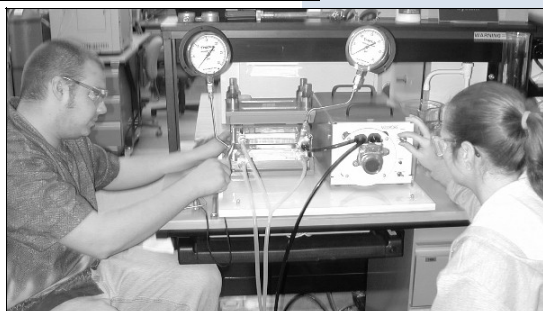
The labs, classrooms - even the corridors of Rowan Hall - are bursting with ideas, research, and projects ready to be expanded. "A technology park is a win-win proposition," commented Professor Stewart Slater (Chair, ChE). Faculty, students, and local industry will reap the benefits of a technology park that can offer scientific, technical and business expertise, cutting-edge research facilities and affordable lab and office space.



Rapid Prototyping — "With access to a rapid prototyping facility that has the right capabilities, an entrepreneur can expect to have a prototype of a new product idea in no time," explained Professor John Schmalzel (Chair, ECE). "Turn-around times can be reduced from weeks to days--or even hours," he said. "Mechanical assemblies and packages can be produced as parts directly from the engineering drawings. Custom electronic systems can be produced using reconfigurable elements that are co-developed with the rest of the application software. The look and feel of a device can be evaluated using a virtual reality environment that allows visual, aural, and tactile interaction. These capabilities, and others, are the ones that clients would expect to find in the South Jersey Technology Park."



Scale-up Capabilities — "A pilot plant fermentation and cell culture facility at the tech center will provide students with valuable experience in cutting-edge research and production strategies in the development of new pharmaceuticals," said Professor Kathryn Hollar (ChE). "Scale-up for bulk production and downstream purification of proteins are some of the challenges that biotech and pharmaceutical companies are currently facing," Hollar said. In a pilot plant facility, students will be able to develop strategies for scaling up from a bench-scale reactor to much larger bioreactors. Separation units like the microfiltration unit used in the Junior/Senior Clinic can be linked to bench-scale or pilot-scale fermentors as a first stage in purification of valuable protein products.



Expanded Work Space—Large amounts of computing power are needed to generate computational simulations of how the network structure of polymers form. Professor Paris von Lockette (ME) involves his students in the virtual synthesis and optimization of polymers. In order to facilitate this research - the "smart design of improved polymeric materials," von Lockette plans to build a Beowulf Cluster, a network of stand-alone computers that are tied together by their network cards and operate as a low-cost parallel computer. Lack of space is a key limitation in this high-tech learning opportunity. The tech center would provide space for these powerful computers and for the large machines students will use to test the properties of the materials they design.



The High-Tech Workforce Excellence Grant, funded by the State of NJ, was awarded to Rowan University. The three-year grant will provide the means to focus, coordinate and enhance the programs in Material Science that are coordinated through Rowan's College of Engineering and the Department of Chemistry and Physics. The project, "Expanding the Educational Opportunities for Undergraduates in the Study of Advanced Materials for Commercial Applications" will be developed and implemented by a large contingency of faculty who have already helped to establish excellence throughout Rowan University's science and engineering programs.

"Materials work is central to many different disciplines," explained Engineering Professor Robert Krchnavek (ECE). "NJ is full of companies that depend on materials work to develop the next generation of products." The goal of this project is to address the needs of the high-technology sector which depends on the continued development of new materials. "Most people probably don't realize how important materials are to advancing technology," said Krchnavek, co-director of the project. "Material Science and Engineering is not a well-understood career path," he said. "If a student has multiple interests, say mechanical engineering and biology, there is a strong possibility that materials work will be an exciting career path."



Students who participate in the multidisciplinary program will be able to follow the complete cycle of materials science. They will be involved in:

- Conception
- Research design
- Synthesis
- Measurement of physical properties of materials
- Explanation for those properties
- Successful application.

The new program will focus on motivating students to pursue careers in material science. New courses and advanced learning opportunities are being developed within the engineering, physics and chemistry curricula. This summer Rowan will implement a Summer Institute in Materials Science for high school students *and* their teachers. Scholarships will be offered to qualified students of minority and under-represented populations. State-of-the-art instruments will be acquired to continue the hands-on hallmark of Rowan Engineering.

Faculty involved in this collaborative program are: Physics Professors S. Lofland, (Program Director), J. Hettinger, M. O'Halloran, E. Knoesel; Chemistry Professors R. Newland, K. Ramanujachary, L. Stephans; SSI Professor J. Caldwell; Engineering Professors R. Krchnavek (ECE, Co-director), J. Newell (ChE), and P. von Lockette (ME).

ROWAN PARTNERS WITH WILLIAMSTOWN H.S. ENGINEERING ACADEMY



They have accepted the challenge and responsibilities. They are "pre-engineers," a group of high school students who have enrolled in Williamstown High School's "Engineering Academy". In 1999, the first group of freshmen entered the program.

This summer, after the second year of their commitment, they spent time in Rowan Hall. Engineering technician Mark Showers put together a program that gave the students a look at the work of engineers. The young students had an introduction to: Civil Engineering (Surveying using theodolites and trigonometry); Chemical Engineering (Applying and measuring polymer coatings); Mechanical Engineering (Experiences with

Solidworks®, the Vertical Machining Center and AutoCAD drawing.); Electrical and Computer Engineering (Circuit Boarding); and Physics (Intro to Astronomy).

Williamstown High's innovative 4-year academy program puts students through a rigorous science curriculum and 3 summers of enrichment/enhancement. Rowan Engineering is providing the hands-on clinic experiences that follow the second year. The College of Engineering will continue the partnership by "hiring" about half of the third year students as summer interns. "But the most important aspect of this program," said Daryl Taylor, science teacher at Williamstown High, "is the automatic admittance to Rowan of any of our kids who successfully complete our 4 years of curriculum (with a B+ average) and score 1200 or better on their SAT's."

Clarke Scholars



Pictured at the Clarke Scholarship presentation are: (l to r) Professor John Chen (ME); recipients Carolyn Hampton, Dona Johnson, and Jason Rivera; and Professor TR Chandrupatla (Chair, ME).

Three Rowan freshmen are recipients of the Lucy and Charles W.E. Clarke Scholarship. The Clarke Scholarship is awarded through the American Society of Mechanical Engineers (ASME). The funds were granted to the College's Department of Mechanical Engineering for exemplary support of Rowan's ASME student section activities. The \$6000 scholarship money was divided among the three freshmen that were selected for their strong records of accomplishment and their interest in pursuing mechanical engineering as a possible major.

Engineering Expo 2001

Rowan's Engineering Expo 2001 provides industrial partners with the opportunity to interview May 2002 Engineering Graduates – both BS and MS students. These students will be graduating with a BS degree in Civil/Environmental, Chemical, Electrical/Computer, or Mechanical Engineering. Graduate students will be obtaining an MS in Engineering. This Fall recruiting event will be held on Thursday, November 1, 2001 in Rowan Hall.

Alumni Corner

*Attention -
All Graduates:*

*We're looking for ways to keep connected with you! Please send your email address to Dr. Heidi Newell
hnewell@rowan.edu*

Thank you.

FACULTY NOTES

At the American Society for Engineering Education (ASEE) Meeting in Albuquerque, NM, (June 24-28) ChE Professors Kevin Dahm and James Newell were selected to receive the Professional Interest Council (PIC-III) Award for Outstanding Paper Submitted to the 2001 ASEE Annual Conference. The winning paper, titled "Baseball Stadium Design: Teaching Engineering Economics and Technical Communication in a Multi-Disciplinary Setting," was nominated for the award by the Engineering Economy Division of ASEE. They will formally receive the award at the Conference Awards Banquet at the 2002 Conference in Montreal next June.

The paper was accepted for publication in the Journal of SMET Education.

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