ENGINEERING By Design

News from Rowan University College of Engineering

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Anaheim, CA - Local company MHB Products showcases newly patented Clutch Knobs at the Annual NAMM Winter Trade Show.

Below: MHB Products inventor Fred Hovermann introduces the product to Hugh McDonald, bassist for Bon Jovi .

Killington, VT - Local company UpHill Enterprises, Inc, brings new product to NSAA Trade Show.

VENTURE CAPITAL FUND YIELDS YOUNG ENTREPRENEURS

The Rowan College of Engineering Venture Capital Fund has netted $50,000 in grant money since its inception in the fall of '98. The grants come from the National Collegiate Inventors and Innovators Alliance (NCIIA), whose mission is "to nurture a new generation of innovators by promoting curricula designed to teach creativity, invention and entrepreneurship."

Nurturing that spirit is the goal of the College, as students work their way through the Engineering Clinic Sequence. By the time students are halfway through the 4-year, 24-credit sequence, they have the skills to "embark on a completely original, entrepreneurial enterprise." As juniors and seniors, the students can compete for funds to make their entrepreneurial dreams a reality. To date, 16 projects have been funded.

Turn to Page 2 and read about the most recent successes.

Inside This Issue

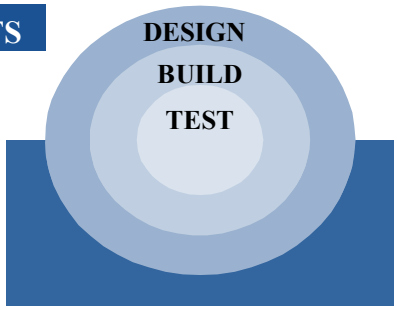
VENTURE CAPITAL FUND YIELDS PATENTS

When reality settled in, Rowan graduate student Fred Hovermann (ME '01) and Peter Ferrara (ME '01) had their invention registered with the US Patent and Trademark Office. The idea for their unique guitar tuning knob was hatched at the start of their Senior Design Clinic Project. They applied for Rowan's $2500 Venture Capital Fund for a project they hoped fit the criteria: "a novel idea that was worth pursuing." It did. They acquired another grant, $11,000 from the NCIIA, and soon had a patent lawyer filling out the papers. Today their "clutch knobs" have "patent pending" status. With the grant money, they formed their company, MHB Products, and traveled to California to set up a booth at the 2002 Winter Trade Show of the National Association of Music Merchants (NAMM).

Our clinic experience gave us a chance to take an idea and show what we could do with it, said Ferrara. He and Hovermann used the College's resources to create the computer-generated sketches and proto-type that helped them "fine-tune" their tuning knobs. Their trip to the Patent Office brought them to the realities of entrepreneurship.

Ferrara, now a graduate student at Penn State said, "I didn't want this endeavor to stop at the end of the semester." They got some good encouragement from the experts.

"We're more confident than ever that people within the music industry have a real interest in our clutched machine heads," said Hovermann.



Field tests...that's where the action will be during the next ski season for Rowan juniors Jeff Gladnick, (ECE) Matthew Eberhardt (ME) and Peter Boyle (ME). The team took their product to the 2002 National Ski Area Association (NSAA) Trade Show. People wondered why no one had thought of this idea. Their patented invention is a low-cost footrest that could easily be installed on ski lift chairs to accommodate snowboards.

The product was another Design Clinic idea that was funded by Rowan's Venture Capital Fund. When this project won a second grant of over $8000, the team set to work finalizing a product that will comply with the ski industry's codes and requirements. Business and marketing concerns were being addressed. Their company, Uphill Enterprises, Inc. was born. "It would not be possible to pursue this opportunity at other schools," said Eberhardt.

Young Innovators Get Inspiration from Rowan ASME

A group of 30 students from Camden Academy Charter School came to Rowan Hall for an "egg drop", the culmination of a day-long event hosted by students from Rowan's Chapter of the American Society of Mechanical Engineers (ASME). Before the drop, the students attended three workshops - Math, Science and An Introduction to Engineering. The visit was just one of many events that are part of the on-going mentoring program for minority students that was established by the Rowan Chapter of Alpha Phi Alpha.

Dean of Students William Myers explained that this particular visit stressed the importance of science and math, and exposed the group to other African-American and Latino students from the College of Engineering.

"The kids asked a lot of questions, especially about the engineering college," said Rowan junior Rabon Jones. Then they had a chance to put some engineering principals to work as they packed their eggs and created parachuting devices for the drop. "They really got involved in the activity," Jones said, adding that they invited the group back in the spring for a rocket launch. Rowan students involved in the event were: Kiacha Christi, Rodney Johnson, Rabon M. Jones II, Brent Mitchell and Desiree D'Orazio. Dean Myers and J.T. Mills, from Rowan's Educational Opportunity Fund/Minority Achievement Program, supervised the sessions.

Thoughts from the Dean

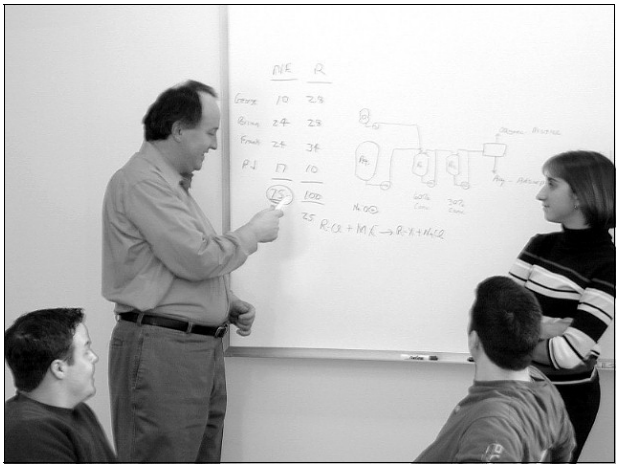
Applications for admission to Rowan University are strong this spring. Our undergraduate students seek an education that is grounded in experience. One of the hallmarks of this experience is our unique engineering clinic structure. This year, there were 62 different engineering clinics in the Fall Semester, with 65 different clinics operating this Spring. The faculty have attracted significant support, which is reflected by our current funding: In these first seven months of FY02, we have had 15 proposals funded at just under $1 million, with 32 active grants at a total funding of $3.2 million. In terms of new activity, faculty submitted 44 proposals to date, so we anticipate a strong year by the end of FY02. Another significant aspect of this grant activity is collaboration across campus. Many of the proposals, both currently active and submitted, involve faculty from different collegiate units, such as Communications, Education or Liberal Arts and Sciences. Rowan faculty prize interaction and recognize the value added when we tap into our diverse campus resources.

We anticipate that external funding will also be energized through opportunities associated with the South Jersey Technology Park. The campus saw continued interest and enthusiasm for the Park during the High Tech Summit II on October 5, 2001. A wide range of participants from the region provided insight into the potential for the combined high tech incubator and technology center. And recently quoted in Tech News, Caren Franzini, Executive Director of the New Jersey Economic Development Authority, said, "We did a market analysis of South Jersey and found out a lot of great things. Much to the disbelief of many people in North Jersey, there are a lot of technology companies in South Jersey." Rowan Engineering will fuel this technology development. Anthony Marchese, Associate Professor of Mechanical Engineering, serves part-time as Special Assistant to the Executive Vice President of University Advancement, Dr. Philip Tumminia. He provides support from the College of Engineering for the Technology Park development during this critical early planning stage.

Business and Engineering are forging new links as well. The College hosted a seminar on entrepreneurship presented by Dr. Mark Weaver, the new Rohrer Chair for Entrepreneurial Studies and Executive Director of the Center for Innovation and Entrepreneurship in the College of Business. Lively discussion of entrepreneurial activities and the development of initiatives by our joint faculty proved that entrepreneurship is another of the hallmarks of our engineering program. Working with the College of Business will allow engineering students to develop marketing strengths and business plan skills, and learn how to seek investors. Forging ahead with innovative thinking, the College of Engineering continues to build its legacy!

Dianne Dorland

Students are learning about the challenges of emerging technologies. They are seeing firsthand how even the most successful companies have room for improvement, innovation and initiative. -*Kevin Dahm (PI ChE)*



There's a continual dialogue about the trade-offs of the design parameters and the economics...and the time that it takes to do these things. -*Peter Joyce*

By the end of the semester we hope to design a process that has the potential of saving companies millions of dollars. After all, that's what engineering is for - to make a product cheaper, easier, and more environmentally friendly. -*Brianne Wissel*

I knew coming into Rowan Engineering that I would have the opportunity to work on industry-sponsored projects, but I hadn't anticipated working directly with the CEO of a company on the rise. -*Frank Panna*

I'm learning that a whole lot of work is needed to be an entrepreneur. You not only need a great idea, but a very strong work ethic- as well as some creative insights on how to finance your ideas. -*George Speck*

"One thing students don't appreciate is the impact one individual can have," commented Professor Kevin Dahm (PI, ChE). "Peter Joyce is a prime example; he found a niche that no one was filling. He took the risks, and he is making a significant impact."

A team of Rowan students is learning firsthand about the effects one person can have in the world of industry. This opportunity comes by way of rising entrepreneur Peter Joyce, whose company, Value Recovery, Inc., is developing new uses for a well-established technology, Phase-Transfer Catalysis (PTC). The company has developed a unique technology for removing byproducts from dilute aqueous streams and converting them to salable chemicals.

Joyce is funding a Junior/Senior Clinic where students will work to create a detailed design for a continuous PTC flow sheet that will enable an evaluation of critical process parameters such as catalyst recycle, phase ratio, distribution of components within the phases and control strategies.

All of these are important for establishing process economics and understanding the impact that different parameters can have on the bottom line. The student team, ChE students Brianne Wissel, Frank Panna and George Speck will evaluate the best methods and systems to accomplish this. Their work will provide a long-term model that can be used for processes not yet envisioned.

This kind of research had traditionally fallen on the shoulders of the large chemical companies. Large chemical companies were not innovating as quickly as they had been able to in the past, Joyce explained. "Cutbacks in R&D staff, capital expenditures and related infrastructure have, in essence, created an opportunity," he said. "Today more and more start-up companies are beginning to find these kinds of niches to take up the slack."

Value Recovery, Inc. was conceived to fill such a niche. Joyce and co-founder Marc Halpern, a world-renown PTC chemist and the owner of PTC Organics, Inc., began this effort in early 1999. Unfortunately, this was a few years too early for the South Jersey Technology Park at Rowan University. Needing wet lab space, the company built a demonstration lab at the Pureland complex in Bridgeport, NJ. Joyce turned to Rowan's College of Engineering for resources and development capabilities. "I see this as a natural marriage of eager students and good technical talent that can get the work done," he said.

"Even though this is a project for academic credit," said Dahm, "the students have a real customer in Peter Joyce. They are solving a practical design problem and they are using modern computing tools to do it." The students will use HYSYS and PRO-II for their process design project. "These are both commercially available process simulators that are widely used in industry," Dahm said.

Co-PI's for this project are ChE Professors Robert Hesketh, Mariano Savelski, and Stewart Slater (Chair).

The Federal Aviation Administration (FAA) has called on the College of Engineering for help in creating new pavement design standards for airport facilities across the country. A multidisciplinary team, led by Professor Beena Sukumaran (CEE), is collaborating with the FAA on the project. "This is a project of national and international significance," said Sukumaran. "We'll be coming up with new design standards for airport pavements that must be capable of handling the next generation of aircraft." Sukumaran's expertise in the finite element modeling of soil led to a $45,000 grant for the two-year project.

The Rowan team is developing better models that will be compared to the field results generated at the FAA's large-scale pavement test facility in Atlantic City. The test facility is capable of simulating aircraft weighing up to 1.3 million pounds, with different wheel configurations and wheel loads. The Rowan team is creating three-dimensional finite element models to make predictions about the effects of those conditions.

Rowan's team will also develop a three-dimensional finite element model of a flexible pavement. This model would allow prediction of flexible pavement performance under repeated wheel loadings. Results from the work will be validated using test results from the pavement test facility. These results will also be used to update airport pavement design standards, directly benefiting airport operators.

Students involved are: Amip Shah (ME), Disha Sheth (ECE), and ME graduate students Vishal Kyatham and Nishant Chamala (*above*).

Campbell Soup Company, Camden, NJ, is sponsoring a Junior/Senior Clinic Project that brings chemistry to the kitchen, the industrial kitchen that is. A student team is pioneering an investigation of the use of a novel baking technology for the production of savory snacks. If successful, this baking technology will result in more efficient production of snack crackers that satisfy consumer demand for high quality, good taste and nutrition. The team designed the novel baking process during the fall semester and will begin testing this spring.

Team members are: ChE students Laura Sorrentino, Brendon Bohnert and Bob Campbell; and ECE students Stacey Bush and Charles Marrero. The ChE professors on the project are: Co-PI's Stephanie Farrell and Stewart Slater (Chair), and Robert Hesketh, Mariano Savelski, and Kathryn Hollar.

(*Above*) Bohnert and Bush assemble a stainless steel fluidized bed.

Biothane Corporation and Biothane Systems International are leading companies in the field of biological treatment of industrial wastewater. Biothane's wide range of technologies and services allows them to utilize the most suitable biological or physical/chemical process to solve a particular problem. The company's US headquarters are located in Camden, NJ. They are currently sponsoring a clinic project for investigating an innovative membrane process for wastewater sludge processing. A team of Junior/Senior engineering students will work on the project, guided by Professor Kauser Jahan (CEE), graduate student Agnieszka Pierkiel and Biothane Technology Manager Jelte Lanting (*above*).

A collaboration between Rowan University and **PSEG** brought expanded opportunities for students and faculty from the College of Engineering and the College of Liberal Arts and Sciences. Throughout the summer and fall, the multi-disciplinary team developed logical fault trees to help PSEG analysts evaluate potential system failure modes in subsystems at the Hope Creek Nuclear Power Plant.

This was a novel opportunity for students to consult and provide project engineering support. Their "client", PSEG, worked closely with the teams, providing training and background information to help them create reliability modeling for four major subsystems at the generating station located in Lower Alloway Creek Township, NJ. This summer, student leaders directed their teams in the collection of raw data and analysis for the steam extraction system, reactor feedwater system, reactor recirculation system, and electro-hydraulic control system. During an engineering clinic, the students completed the modeling and compiled the final reports that were presented to PSEG in Nov.

Faculty involved in this collaboration were: Dept. of Chemistry and Physics Professors Jeffrey Hettinger, Cathy Yang and K. Ramanujachary; College of Engineering Professors John Schmalzel (ECE, Chair) Peter Jansson (ECE), Shreekanth Mandayam (ECE) and Anthony Marchese (ChE).

NOTES FROM THE COLLEGE

Rowan students Aaron Gerber and Steve Gomba, working under the guidance of Professor Yusuf Mehta (CEE), evaluate mixture properties used in the design of flexible pavements. They are using the College's newly acquired Superpave Gyratory Compactor to design Superpave (Superior Performing Pavements) asphalt concrete mixtures.

RESEARCH GRANTS

Professor Yusuf Mehta (CEE) has been awarded a grant from the Rhode Island Department of Transportation. The $24,000 is funding a Junior/Senior Clinic for an analysis of pavement cracking and road conditions in Rhode Island. The goal of this study is to accurately determine the condition of the roads and the dominant failure mechanisms. Visual surveys will be conducted at 15 sites within the state. Subsequently, the data from non-destructive testing conducted by Rhode Island DOT will be analyzed to determine the cause of cracking.

Professors Robert Hesketh (ChE) and Anthony Marchese (ME) will undertake a project to evaluate emission reduction strategies for diesel powered school buses and heavy duty diesel vehicles (HDDVs). The NJ Department of Transportation (NJDOT) - Department of Research and Technology has awarded a $458, 000 grant to fund the research. A variety of fuel types, mixtures, additives and exhaust treatment systems will be tested to determine the optimum configuration for various routes and roads that a school bus would typically travel. A team of Rowan University faculty with substantial research expertise in combustion, chemically reacting systems, membrane separations and air pollution will monitor the testing, analyze the data and report the results. In addition to the school bus testing, a parallel study will be conducted to review and compare idle reduction technologies for HDDVs. NJDOT will provide three school buses for this experimental study. The buses will be instrumented and tested at the U.S. Army Aberdeen Test Center.

HONOR SOCIETY

The New Jersey Epsilon Honor Society has been recently established at Rowan University's College of Engineering. To be considered eligible for membership, engineering students must be in the top fifth of the senior class or top eighth of the junior class. In addition, students must demonstrate exemplary character and have performed a service project for the College. An induction ceremony is being planned for this spring.

The formation of the New Jersey Epsilon is the precursor to the establishment of a Tau Beta Pi chapter at Rowan University. Tau Beta Pi is the national honor society for engineering students. The organization requires that an honor society exists and operates under its policies and guidelines for two years before the formal establishment can occur. We are looking forward to being the New Jersey Epsilon chapter in the near future!

Looking Ahead…

April 12-14
The Rowan Student Chapter of The American Society of Mechanical Engineers hosts the 2002 ASME Regional Student Conference

June 3-26
Research Experience
For Undergraduates

June 18-21
Williamstown High School
Experiences in Engineering

July 8-12
Attracting Women to Engineering

Faculty News

The 2001 International Conference on Engineering Education was held in Oslo, Norway. Representing Rowan University were (*l to r*) Professors Stephanie Farrell (ChE), Kauser Jahan (CEE) and Anthony Marchese (ME).

Prof. Jahan presented two papers:
"Research and Design Experiences throughout the Curriculum," co-authored by Professors Robert Hesketh (ChE) and John Schmalzel (ECE); and "Attracting Women into Engineering," co-authored by Professors Beena Sukumaran (CEE), Linda M. Head (ECE) and Jennifer Kadlowec (ME).

Professor Robi Polikar (ECE) has been involved in theoretical development as well as various applications of signal processing, artificial intelligence (AI) and neural network research. Polikar is also working on developing a novel method for incremental training of neural networks for automated pattern recognition, classification and identification applications. His initial work in this area will be published in the Special Issue of IEEE Transactions on Systems, Man and Cybernetics for Knowledge Management.

His most recent submissions include:

"Artificial Intelligence Methods for Selection of an Optimized Sensor Array for Identification of Volatile Organic Compounds" (Journal and Reference Info: Sensors and Actuators (B)); *December 2001.*

"An Incremental Learning Algorithm for Supervised Neural Networks" (Journal: IEEE Transactions on Systems, Man and Cybernetics - Special Issue on Knowledge Management); *At press.*

"A Generalized Likelihood Ratio Technique for Automated Analysis of Bobbin Coil Eddy Current Data" (NDT&E International); *At press.*

NSF GRANTS

Professor Stephanie Farrell (ChE) was awarded a grant from the National Science Foundation (NSF) for her proposal to develop and integrate applied drug delivery coursework and experiments throughout the Rowan Engineering curriculum. Seven modules will introduce students to multidisciplinary engineering principles through experiments for the design, preparation, characterization and analysis of drug delivery systems. A variety of drug delivery systems are explored: tablets, ointments, membrane systems, microcapsules, osmotic pumps and supercritical fluid-processed particles. Co-PI's are: ChE Professors Stewart Slater (Chair), Robert Hesketh, and Mariano Savelski.

Professor James Newell (ChE) was awarded an NSF Grant for his proposal: "Hands-on Learning in an Interdisciplinary Material Science Curriculum." The grant will allow the refitting of some large scale testing equipment like the Instron Ultimate Tester, so that Mechanical, Civil, and Chemical engineering students can test the strength of large objects like concrete beams and rebars. "Most labs have small versions of this equipment, but students never see the real thing until they get to industry," said Newell. "Now, they will use full scale equipment while in school." This will also expand Rowan's materials testing capabilities, Newell added, which could help attract clinic projects and be incorporated into the proposed technology center."

A $400,000 NSF Grant was awarded to Rowan University to help enhance South Jersey's high-tech work force by providing scholarships for students in the College of Engineering and Computer Science Department. Scholarships are open to full-time undergraduate and graduate students enrolled in engineering or computer science.

Rowan is responding to the nationwide demand for more engineers and computer scientists in emerging high-tech fields. "This grant will help Rowan further prepare sufficient numbers of high-tech workers for that imminent growth," said Dr. Steven Chin, Associate Dean of the College of Engineering and Project Director for the grant. "Many initiatives, such as the proposed South Jersey Technology Center at Rowan University, ongoing improvements to the infrastructure in the region, and a wonderful environment, point to economic growth in South Jersey. We expect much of that growth will be in technology fields, and Rowan wants to do all it can to educate the future workers for those fields."

RECENT RECOGNITIONS

Students Place in National Contest

A team of Rowan students placed 3rd in the 2001 Green Engineering Poster Presentation Contest. Their entry, titled "Economic Feasibility Study on the Supercritical Fluid Extraction of Edible Oils," illustrated the process of replacing hexane, a flammable and toxic organic solvent, with high-pressure carbon dioxide, a non-toxic gas, in the extraction of oil from peanuts.

This interdisciplinary project was the collaboration of Rowan ChE students Mike Gifford, Walter Maluchnik, graduate student William Kearsley and Elizabeth Biancani (ME, Villanova). Biancani conducted some of the research for this project during Rowan's Research Experiences for Undergraduates (REU) this summer.

Delaware Valley Engineers Week

Amip Shah and Disha Sheth received an award at the Delaware Valley Engineers Council Banquet at Villanova University on February 23. Their paper, "Suitability of Using California Bearing Ratio Test to Predict Resilient Modulus," was co-authored by CEE Professor Beena Sukumaran and graduate student Vishal Kyatham. The paper will also be presented at the Airport Technology Conference in Atlantic City in May.

World Conference on Computer Intelligence

A team of Rowan students will present the results of their engineering clinic work at the World Conference on Computational Intelligence - International Joint Conference on Neural Networks, to be held in Honolulu in May. Professor Robi Polikar (ECE) and ECE students Stefan Krause, Anthony Marino, Mike Moreton and graduate student Jeff Byorick collaborated on "Learn++: A Classifier Independent Incremental Learning Algorithm For Supervised Neural Networks." The paper will also be published in the conference proceedings.

Attention -

Class of 2001

The second annual Salary Survey will soon be sent to you. We're aiming for 100% participation in an attempt to get a look at the "real" world.

Thanks for Your Help!

Remember Vern????

Vern Schwanger is an M.S. student in the Industrial Engineering Department at Penn State University. He is employed by the Industrial Engineering Department as a laboratory teaching assistant, where he supervises lab sessions and grades lab reports.

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So what's new with YOU?

Promotion?
Wedding Bells?
Diapers?

Send us an update!

Help us stay in touch!
Let us know where you're working or going to school. Send contact information to Dr. Heidi Newell at hnewell@rowan.edu

After you let us know what's exciting in your life, check out your friends by visiting the Alumni Link on the College of Engineering Homepage.

ENGINEERING By Design

News from Rowan University College of Engineering

Dean
Dr. Dianne Dorland
Associate Dean
Dr. Steven Chin
Writer /Editor
D. A. Barsotti

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Address: **Rowan Hall**
201 Mullica Hill Road
Glassboro, NJ 08028

Phone: 856-256-5300

E-mail: engineering@rowan.edu

Web Site: www. engineering.rowan.edu