

# EngineeringNews



## A MESSAGE FROM OUR DEAN

Our College of Engineering's ongoing strategic planning contributed to significant interdisciplinary initiatives. This planning built on our strengths and present paths for development and growth. As a result, we have a dynamic set of options guiding us for innovative projects and potential ventures. This process required an investment in time, which is not new in Engineering, and led to some extraordinary accomplishments.

Are you aware of the scope and depth of projects that are emerging from the College of Engineering? Have you participated in a recent career fair? Supported a clinic project? Attended a Henry M. Rowan Speaker Series event? Our latest speaker was Leanne C. Wagner, vice president of Strategy, Technical Operations and Product Supply for Wyeth Pharmaceuticals, and she gave an outstanding view on the "Next Chapter for Biopharmaceuticals."

It is a remarkable time for Rowan Engineering. I invite you to visit us here in Glassboro to see firsthand the extraordinary talents in our College.

Regards,  
Dianne Dorland, Dean  
College of Engineering

## Engineering Team Getting Salmon in the Pink *Hopes Work Will Impact Chilean Fish Industry*

Work is going swimmingly for chemical engineering Professor Zenaida Otero Gephardt and engineering students who are developing natural ways to get Chilean white, farm-raised salmon in the pink.

Gephardt and students Danielle Baldwin (CHE), of Toms River; Elizabeth DiPaolo (CHE), of Wenonah; and William Henderson (CEE), of Bricktown, are using supercritical fluid extraction to remove pigment from algae. They then are transforming that pigment into a substance to feed to salmon to change their hue to one more familiar - and appealing - to consumers worldwide. Currently, the fish industry uses synthetic forms of astaxanthin or very costly natural astaxanthin to color salmon, but natural astaxanthin is too expensive for many salmon farmers to use. The work at Rowan is intended to lower significantly the cost of obtaining astaxanthin from natural sources.

The Rowan team has worked with a professor from Chile on the project. Gephardt spent six weeks in Chile last summer teaching and conducting research at the Universidad De La Serena in La Serena. In the fall, Joel Barraza, a mechanical engineering professor from Universidad Catolica del Norte in Coquimbo, spent five weeks working with Gephardt at Rowan. Gephardt, who was invited to Universidad De La Serena by professors who knew of her work, explained that salmon are not naturally pink in and of themselves. They are pink because of the pink food (such as algae and shrimp) that they feed upon in their natural state in the ocean.

But salmon farms (large cages that may hold a hundred thousand salmon) don't offer and can't provide the amount of pink-tinged natural wildlife that so many salmon would need to consume. Gephardt's team members are part of an engineering clinic project hoping to remedy the situation.

If they can, they may make a difference in some economies. Gephardt noted the salmon farmers are competing in a world market ripe with pink salmon. "When people think of salmon, they think pink," she said.

Chile, a coastal South American country which in 2002 exported 375,013 tons of farmed salmon, would like to further its standing in the salmon industry.

"There is a push in the country to strengthen the salmon industry," Gephardt said. "This is a collaboration where we can make a difference."



*Engineering students are working with Professor Zenaida Otero Gephardt to develop an inexpensive natural way to turn white salmon pink.*



Photos by Avi Steinhart courtesy of the Courier-Post

# Rowan Engineers Host Design and Discovery Day

Wrapped in paper and secured with tape and string, an egg was cushioned for a long drop as a team of Girl Scouts launched it from the third-floor bridge inside the Rowan Engineering building. Excited eyes watched as the package fell to the floor below, and triumph followed as the egg emerged without a crack.

The egg drop, one of the activities that 94 Girl Scouts of the South Jersey Pines experienced as part of Rowan's recent Design and Discovery program, introduced participants to engineering and its possibility as a career choice.

Fourth through eighth graders from 12 Girl Scout troops started their day in teams building towers out of newspaper and tape. Throughout the day they took part in a series of activities facilitated by members of Rowan's student chapters of the Society of Women Engineers (SWE) and the Society of Automotive Engineers.

Hands-on projects were chosen, explained event co-coordinator Mark Showers, formerly with the College of Engineering and now with Rowan Facilities, to introduce engineering disciplines: chemical engineering through making lip gloss and "slime," mechanical engineering through the egg-drop experiment and both civil and electrical/computer engineering through a bridge-building computer simulation.

Long-time Girl Scout board member Deborah Ayars, founder of A-TECH Engineering in Vineland, N.J., served as keynote speaker and challenged the girls to consider engineering for their future.

SWE President Amanda Simermeyer, a sophomore mechanical engineering major from Burlington, N.J., said, "The day was an opportunity to show kids these simple things, but to do it precisely so they could see the engineering role in it."



*During the Design and Discovery event at Rowan Hall, Girl Scouts enjoyed various hands-on activities such as an egg drop.*

## Winter Sports Get a Lift From Rowan Alums' SnoRhino

SnoRhino, the ski-lift retrofit designed by a team of Rowan Engineering entrepreneurs, made its big-time debut on the Aspen, Colo., slopes during the X Games this winter.

The route from Rowan to Aspen started in 2001 when Peter Boyle (ME, '03), Matthew Eberhardt (ME, '03) and Jeffrey Gladnick (ECE, '03) created the device as a Rowan Engineering clinic project to enable snowboarders and skiers to share a chairlift.

The team used \$2,500 from Rowan Engineering's Venture Capital Fund, contributed by the National Collegiate Inventors and Innovators Alliance (NCIIA), for the initial work. NCIIA also awarded the team \$8,375.

The investment paid off. The team members applied for a patent, started manufacturing the device via their Uphill Enterprises firm, assembled a sales team and introduced SnoRhino at resorts across the country. Sales staff arranged the SnoRhino appearance at the X Games.

Engineered to last and installed in less than a minute, SnoRhino provides two snowboard rests perpendicular to those used for skis, protecting equipment from possible damage due to the different positions and allowing snowboarders, or snowboarders and skiers, to ride a chairlift comfortably together.

Anthony Marchese, mechanical engineering professor, said, "We have sponsored the development of more than 25 student inventions in the past five years through our venture fund.

The hard work of the SnoRhino team and high visibility of the product have in many ways set the bar for future teams."



*Members of the SnoRhino team demonstrate their product.*

The inventors appreciate the opportunities they had at Rowan as students and the support they've received as alumni.

Noted Gladnick, "Rowan University's overwhelming support was fundamental to our success. In fact, the University continued to let us use engineering facilities after we graduated, and staff members were happy to help us well after normal business hours. For that we are eternally grateful."

## State Workforce Grant Stimulates Materials Research at Rowan University

In a Rowan laboratory, students under the guidance of James Newell, associate professor of chemical engineering, examine the broken surfaces of a composite with a scanning electron microscope. This state-of-the-art device, which magnifies 1,000 times more than a regular optical microscope, makes it possible for the team members to understand the limits of the composite material, a modified version of the fiber used in Kevlar™. That understanding in turn will guide their work to develop a polymer that some day will be used to build bridges and other structures.

The scanning electron microscope is a critical tool in the team's work, and Rowan owns the equipment thanks to a three-year, \$1.45-million New Jersey Commission on Higher Education High Technology Workforce Excellence Grant. The grant ushered in a new

“ In materials work, we often are working at the boundaries between traditional disciplines. This is where some of the most exciting research is being done and where new discoveries will be made. ”

**Robert Krchnavek,**  
Co-director of the materials research program and  
an associate professor of electrical and computer engineering

phase in materials research - like the work on the Kevlar™ composite - at the University, and it also enabled Rowan to leverage \$225,000 in additional funding from the National Science Foundation.

The grant, now in its final year, has fostered cutting-edge, interdisciplinary work in the College of Engineering and the College of Liberal Arts & Sciences, under the direction of Samuel Lofland, associate professor of physics. It has helped fund opportunities for Rowan undergraduate students to be part of research using equipment typically not available until graduate school.

In addition to the Kevlar™ composite studies, the Workforce Excellence

Grant has enabled the University to purchase a thin film deposition system that allows coatings thinner than a human hair to be applied to a substrate. Students working with Robert Krchnavek, co-director of the materials research program and an associate professor of electrical and computer engineering, are using the technology to investigate possible improvements to current manufacturing methods for computer hard drive and magnetic recording media, which will be tested by Lofland and his students.

Paris von Lockette, an assistant professor of mechanical engineering, and his students are putting the grant funding to use as well. They are tackling such projects as self-tuning vibration dampers that would be used for airplane turbine engines. Von Lockette said that with damper additions planes will shake less

and passengers will be more comfortable. The chemicals that synthesize the rubber used in the dampers were purchased with the funding.

The work doesn't stop, of course, in the engineering building. The College of Engineering is sharing equipment and ideas with the students and faculty in the College of Liberal Arts & Sciences and hopes to develop a materials research concentration.

Professors and students see the benefit of such cooperative work. Krchnavek commented, "In materials work, we often are working at the boundaries between traditional disciplines. This is where some of the most exciting



*Paris von Lockette adjusts a tunable vibration damper, which is part of the ongoing materials research work at Rowan.*

research is being done and where new discoveries will be made.”

In addition to funding new projects for Rowan professors and students, the grant also has helped fund outreach work, such as the three-year-old Rowan University Summer Institute in Materials Science that will be held again this year. New Jersey high school students compete for the opportunity to come to Rowan to enjoy hands-on experiments, such as looking at fly eyes through the scanning electron microscope and taking field trips to local manufacturers such as Sony Music in nearby Pitman. In addition, a component for high school science teachers provides ideas and information for them to take back to their classrooms.

The cross-college synergy from the Workforce Excellence Grant continues to bear fruit. Informal conversation between von Lockette and Lofland, for example, already has resulted in a collaborative grant in materials science from the National Science Foundation, and professors have submitted other proposals for materials work at the University.

Newell summarized the resulting benefits for students, "They are gaining experience in things that they're really going to use - they're ready to go into industry knowing about the state of the art in materials research."

# Rowan Prof and Engineering Grad Study Safety of SUVs



Clay Gabler

SUVs - sports utility vehicles - are among the hottest vehicles on the road. According to a study by a Rowan professor and alumna, they also are among the biggest threats to pedestrian safety.

Mechanical engineering Professor Clay Gabler and alumna Devon Lefler (ME, '00, '01) found that pedestrians struck by light trucks and vans (LTVs), including SUVs, suffer a higher fatality rate than those struck by a traditional passenger car. The Journal of Accident Analysis and Prevention recently published their study, "The Fatality and Injury Risk of Light Truck Impacts with Pedestrians in the United States."

Gabler, an internationally recognized expert in vehicle crash safety, and Lefler, now an associate engineer at Dade Behring, in Glasgow, Del., found that "A pedestrian struck by a van is nearly three times more likely to suffer fatal injury than a pedestrian struck by a car. Pedestrians struck by large SUVs are twice as likely to die as pedestrians struck by cars."

Gabler and Lefler analyzed traffic accident statistics for SUVs, pickup trucks, full-sized vans and minivans for their study, which is the first of its kind focusing on pedestrians.

Lefler noted, "As LTVs and SUVs become increasingly popular, it is important to know the effect that their presence will have on the safety of not only passengers in other vehicles but also the most vulnerable of road users - pedestrians."

## Engineering News

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Dianne Dorland  
Dean

Steven Chin  
Associate Dean

Melanie Basantis  
Outreach Director

Cicely Enright  
Writer

Patricia Quigley  
Editor

Craig Terry  
Photographer

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Send correspondences and inquiries to:

College of Engineering,  
c/o Editor-Engineering News  
Rowan University  
201 Mullica Hill Road  
Glassboro, NJ 08028-1701.

### Contact:

856-256-5300  
856-256-5350 (fax)  
engineering@rowan.edu  
www.engineering.rowan.edu

**Postmaster:** Send address changes to  
College of Engineering  
c/o Editor-Engineering News  
Rowan University, 201 Mullica Hill Road,  
Glassboro, NJ 08028-1701.



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