Civil & Environmental Engineering

Rowan University

WAVES

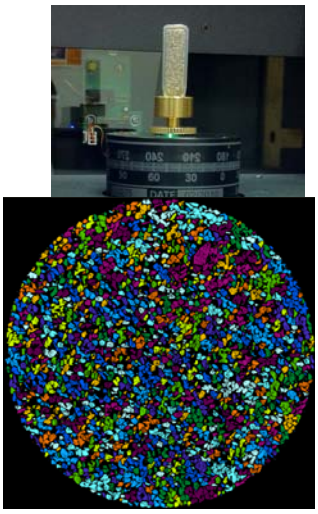
FALL 2011

CEE Highlights

- Hands-on Education
- Undergraduate Research Experiences
- Service Learning
- Global Education
- Green Engineering Experiences

INSIDE THIS ISSUE:

Soil Stability during an Earthquake



Using the NSF funded SkyScan Micro-Computed Tomography system, two graduate students, Steve Thomas and Casey Hurt, under the supervision of **Dr. Beena Sukumaran**, have been exploring how sand particles assemble and shear. This can be very beneficial in predicting if the sand will liquefy, which is when the soil loses its shear strength and is unable to support any loads. This project has laid the foundation for international research opportunities with the Engineering Mechanics Department at Université Paul Verlaine in Metz, France. The X-ray system has also created opportunities to collaborate with engineering companies and other collegiate disciplines such as Physics, Mechanical Engineering, and Chemical Engineering.

Clean Water for El Salvador

Engineers without Borders under the guidance of **Dr. Jess W. Everett** has been working on a water quality project in La Ceiba, El Salvador since early 2007. A seven member team – consisting of six students and a professional mentor-traveled to La Ceiba in June, 2011 to continue their work. During the trip, the team worked with the community to install ten bio-sand filters and monitor the success of previously implemented filters. The team discovered filters from past trips to be functioning beyond expectation, eliminating 97.5% of contaminants found in local drinking water. Students plan to travel to La Ceiba in January 2012 to implement more filters.

Innovative Educators

Active Explorers

Multidisciplinary Researchers

RECYCLED CONCRETE

Dr. Douglas Cleary has been investigating the barriers to the use of recycled concrete aggregates in Portland cement concrete. As sources of virgin aggregate are diminished, the New Jersey Department of Transportation is looking at the potential to use crushed concrete as a replacement aggregate. Crushing and reusing old concrete also reduces the burden on landfills. Dr. Cleary and his student team have now started field trials of concrete made with recycled aggregates. Many of these trial installations have been placed as part of ongoing maintenance efforts around the Rowan campus. The objective of the work is to determine what limitations, if any, would need to be placed on the uses of recycled aggregate concrete.

STRUCTURAL REHABILITATION

Dr. Ralph Dusseau and his three clinic students – Diane Wurst, Mike Plescia, and Tim Miller – completed a study of Hanger 8 at Millville Airport for the Delaware River and Bay Authority (DRBA). The goal of this study was to determine the best way to rehabilitate Hanger 8, which is a timber truss hanger with timber columns. Recommendations and cost estimates were prepared for DRBA regarding possible rehabilitation methods for this historic hanger.

2011 NJ ASCE EDUCATOR OF THE YEAR AWARD

Dr. Beena Sukumaran is the recipient of the 2011 NJ ASCE Educator of the Year award. This award is presented to an outstanding educator who has contributed substantially to the field of civil engineering. Dr. Sukumaran initiated and established both Rowan's ASCE and SWE student chapters. She is also a firm believer in Service and Experiential Learning and most recently initiated the "*Engineering Innovators without Borders*" program. The first team developed product, the Human Powered Grain Crusher *won the global IEEE President's Change the World Competition*.

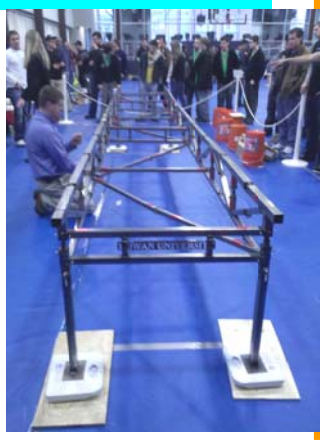
Message from the Chair

Welcome to an exciting academic year. Even though the campus and Rowan community faced some challenges at the start of the school year with Hurricane Irene, we are off to an exciting start. We have seen a growth in our undergraduate and graduate student numbers and believe this is a testament to our reputation and outstanding curriculum taught by a dedicated faculty. The Civil and Environmental Engineering Program has seen a strong growth in areas of national priority such as sustainable development, green design, material recycling, community outreach and global engagement. This newsletter highlights our activities in these areas by our current students, alumni and faculty. I hope you find the activities described as exciting and inspiring as I do and understand that this only reveals a sample of the outstanding efforts our students, alumni and faculty are engaged in. I hope you will share in my pride and enthusiasm as we start this new academic year and as we look forward to a successful academic year.

CEE GOES GREEN

The CEE faculty are taking a strong lead in green engineering initiatives. Faculty continue to conduct research in green engineering topics that range from algae derived biofuels, energy audit initiatives in South Jersey to the use of green or recycled materials in construction. The CEE faculty are taking bold initiatives to "GREEN" all the core Civil Engineering courses such as Statics, Dynamics, Solid Mechanics, Materials, Fluid Mechanics, Systems, Structural Design, Geotechnical Engineering, Transportation Engineering, Graphics and Surveying, Water Resources Engineering and Environmental Engineering. A dynamic website is being setup for educators to have access to course materials including problems, lecture slides and other relevant information. The site also provides information to the students on how they can become GREEN citizens.

ASCE ACTIVITIES



The steel bridge team, led by **Charles Cunliffe**, competed in ASCE's Metropolitan Conference held at Farleigh Dickinson in April, 2011. This is the 6th straight year that Rowan has entered a bridge in the competition. Although the team did not qualify for the National Competition as they had hoped to, they learned valuable engineering lessons throughout the year long design and fabrication process.

The ASCE student chapter participated in several outreach and service activities. This included a K-12 outreach event for 11th grade Camden High School students. The students conducted an egg drop experiment. Students were split into teams and given a limited supply of materials to design a structure to protect their egg when it was dropped off the second story of the Engineering building. A similar project was also conducted during a CHAMPS (Creating Higher Aspirations and Motivations Project) outreach event. The ASCE student chapter also hosted a K-12 outreach event for Bridgeton's Quarter Mile School 7th grade students allowing them to design their own magnetic levitation (Maglev) cars out of foam board. In addition, ASCE members judged NJ Project Lead the Way activities at High Technology High School.

Research that Makes a Difference

Research with local and global impact

Cutting Edge Research

Contemporary Undergraduate Research

Materials Testing Laboratory

This year, **Dr. Riddell** has moved his research into a new lab space. The multidisciplinary materials lab is being used by faculty from Civil and Environmental Engineering, Chemical Engineering, and Mechanical Engineering. This set up fosters collaboration between departments and allows more efficient use of equipment and fixtures. In the figure, CEE students Adam Croker ('11) and Brandon Farrell ('11) are evaluating high temperature mechanical properties of a polymer that is under consideration for use in solar heating panels.

AMRL Certified Binder Laboratory at the South Jersey Technology Park

The Rowan University Construction Materials Laboratory at the South Jersey Technology Park was certified by the AASHTO Materials Reference Laboratory in August 2011 primarily for binder testing. It is one of four AMRL certified laboratories for binder testing in the state of New Jersey. The laboratory has capabilities to provide services for a broad range of binder testing such as Performance Grading and Multiple Stress Creep and Recovery. In addition, the lab is certified to run extraction and recovery of binders as well as determine asphalt binder content by the ignition method. The certified binder laboratory is managed by **Aaron Nolan** and supervised by **Dr. Yusuf Mehta**.

Restricted-Use License for Suspended NJ Drivers

A research project between **Dr. Mehta** and Dr. Clay Gabler from Virginia Polytechnic Institute, funded by the New Jersey Department of Transportation, has as its goals to conduct an analysis of the issues and implications of implementing a restricted-use license program for suspended New Jersey drivers. The original intent of license suspensions was to improve highway safety by getting “bad drivers” off New Jersey roads. However, in New Jersey and many states, license suspensions have evolved into a system where this sanction is frequently given for non-driving offenses, e.g. failure to pay child support. The research project will detail key issues associated with restricted-use license programs, and identify states with effective restricted-use license program legislation and administration.

Polymer Modified Binder Technology Transfer workshop

Dr. Mehta hosted a workshop at Rowan University with all stake holders on Thursday, March 17, 2011 to share the results of the Polymer Modified Binder research. The workshop included different mechanical tests for characterizing modified and unmodified binders, and the impact of the various modifications on their laboratory performance. The binder workshop was attended by personnel from New Jersey DOT, Federal Highway Administration, Federal Aviation Administration, consultants, and Hot Mix Asphalt Paving Contractors.

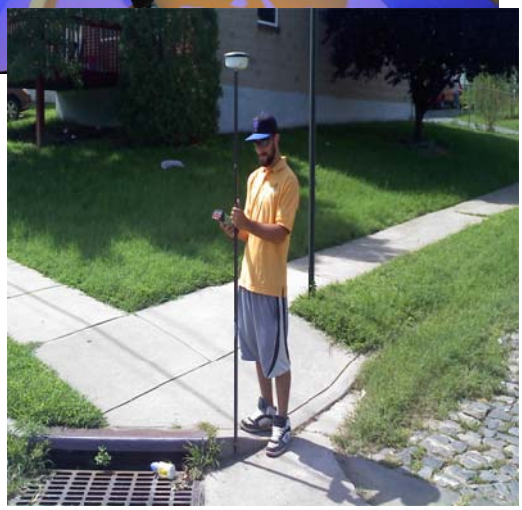
Interdisciplinary Research

The College of Engineering at Rowan University promotes interdisciplinary research. The CEE program are engaged in a variety of exciting endeavors with other disciplines within and outside the college.

NSF Funding for Virtual Technology

Dr. Beena Sukumaran (Co-PI) partnered with Dr. Shreekanth Mandayam (PI) from the Electrical and Computer Engineering department to obtain NSF funding to acquire a Cave Automated Virtual Environment (CAVE), a room-sized cube equipped to create an immersive, navigable and interactive virtual reality experience.

Dr. Yusuf Mehta (Co-PI) and Dr. Shreekanth Mandayam received a $424,962 grant from the Economic Development Authority to support its 3-D virtual reality work on the effects and mitigation of natural disasters in urban settings. The goal of the project is to demonstrate the application of an immersive, interactive and navigable tool using 3-D virtual reality systems for modeling flooding and remediation in specific neighborhoods in Camden and Vineland.



Dr. Jess Everett is partnering with Dr. Hong Zhang from Mechanical Engineering to develop a peanut shell briquette compressor through Rowan's Engineering Innovators Without Borders (EIWB), which has its mission to develop low-cost devices that can improve the quality of life in the developing world. This particular project is focused on the Gambia. In that developing country, deforestation is an issue, and that impacts something as basic as cooking. Fewer trees = less wood to burn to heat food. Recognizing Gambians have plenty of peanuts available-and hence peanut shell waste-the EIWB team uses the available waste to produce fuel. Students designed a relatively simple device and an easy-to-follow process that compresses peanut shells into briquettes. Those briquettes are a great substitute for wood and can be used effectively for cooking. The briquette maker is inexpensive, easy-to-use, low maintenance—perfect for replication. Other devices that have been developed through EIWB include a bike powered grain crusher, soil tiller and a tree climber.

Student Achievements

Outstanding Leadership

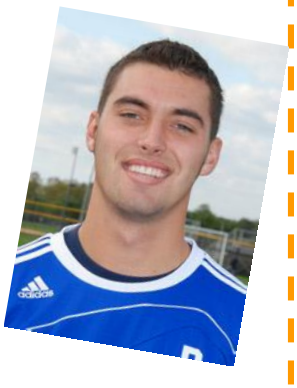
Diane Wurst (Class of 2011) won the 2010 NJ ASCE student scholarship. She participated in an NSF REU offered through the Network for Earthquake Engineering Simulation (NEES). She conducted research at Lehigh University on a project that focused on full-scale testing of a structural health monitoring (SHM) process . She was formerly ASCE President of the Rowan University chapter. She will be attending graduate school at the University of Delaware.

Excellence in Extracurricular Activities

Darren Reger (Class of 2011) was accepted at UT Austin, Virginia Tech, Johns Hopkins and UC Berkeley with assistantship for graduate studies. He will be attending UC Berkeley starting Fall 2011. Darren had several publications related to his undergraduate research. In addition, he had also done a study abroad semester at the University of Edinburgh during his 4-year period of study at Rowan.

Service to the Global Community

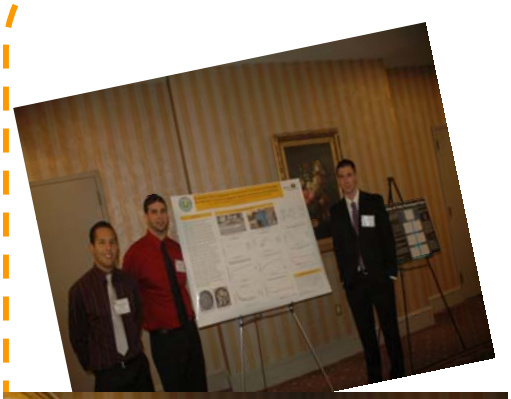
Charles Cunliffe (Class of 2011) not only shows academic prowess but is also a well decorated athlete. Charles holds many positions and received several honors including serving as the Men's Soccer Team Captain, NJAC Goalkeeper of the Year, Eastern College Athletic Conference (ECAC) Metro Defensive Player of the Year and First Team ECAC Metro All-Star. He is currently pursuing his graduate studies at Rowan University. He is also the recipient of the NCAA graduate scholarship.

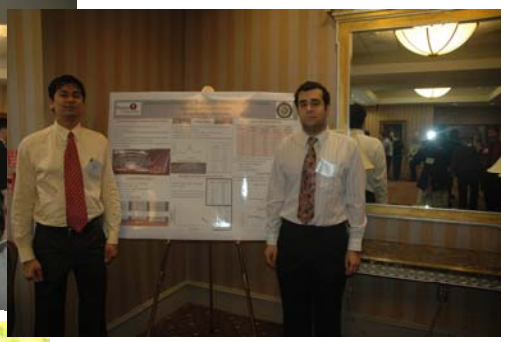


Academic Excellence

Rachel Edelstein (Class of 2012) is currently the student chapter President of American Society of Civil Engineers. She is also a member of Engineers Without Borders, a Resident Assistant on campus and a member of the Bantivoglio Honors Concentration. She has received the Rowan University Trustee Scholarship and the Grand Lodge Knights of Pythias Scholarship. She plays the violin outside of school.

Best Paper Awards





Rowan University's CEE student teams had a strong showing at the Delaware Valley Engineers' Week Council Best paper awards and won four awards. The paper titles and authors are listed below:

- **Darren Reger, Eric DuBois, Rickie Caudill, Thomas Burns,** and **Daniel Kehr** for their paper titled "Evaluation of the Impact of Reclaimed Asphalt Pavement on the Low Temperature Laboratory Performance of Hot Mix Asphalt."
- **Greggory Stevenson, Andrew Melici** and **Alejandro Zapata** for their paper titled "Compaction of Granular Soils Using Superpave Gyratory Compactor at Higher Confining Pressures."
- **Samuel Henry** and **Jeremy Soto** for their paper titled "A Study to Evaluate the Differences in Peak Strain Readings as a Potential Tool to Predict Evidence of Crack Initiation."
- **Robert Ilaria, Kurt Grusmark,** and **Keith Roller** for their paper titled "Correlation between MSCR Results and Polymer Modification of Binder."

Sarah K. Bauer (Class 0f 2013) won the Best Paper award at the Mid-Atlantic Renewable Energy Association 2011 Sustainable Obtainable Symposium for her paper "Nutrient Removal by Various Microalgal Species from Different Municipal Wastewater Treatment Plants." Sarah is also the recipient of the 2011 Thomas N. Bantivoglio Honors Research Fellowship. She is conducting research on nutrient removal from local wastewater treatment plants using algae.

Redefining Outreach Activities

Engineers on Wheels

Engineers on Wheels – an innovative outreach program directed by **Dr. Kauser Jahan** and funded by "Edison Venture Funds" gained momentum this year as many trips were made to schools in the state. The vans — "wrapped" with a dramatic engineering scene — are equipped inside with a handful of stations with computers and display panels where the students can view demonstrations on engineering fundamentals and work on projects in various disciplines. Rowan engineering students developed the activities, lesson plans and handouts for Engineers on Wheels. "Schools have limited money for educational field trips these days. Engineers on Wheels will not only bring the 'field trip' to the students, the project also will help students learn about a possible career field at a time when school districts are feeling a financial pinch."

Leaders in

K-12 Education

ENGINEERING CLINIC FOR TEACHERS

The Engineering Clinic for Teachers program directed by **Dr. Kauser Jahan**, had 74 participants from all over the state. The workshop allowed teachers to gather hands on experiences in various types of engineering. Participants were also exposed to teaching pedagogy lectures. A field trip to the Atlantic County Utilities Authority Wind Farm and Wastewater Treatment Plant allowed participants to see sustainable engineering practices in the South Jersey Area. This workshop is funded by the Edison Venture Funds.

The College *of* Graduate and Continuing Education

Contact cgce@rowan.edu for more information about any of the following programs.

M.S. in Engineering

Enrollment in the traditional Master of Engineering program remains strong attracting both international and local students. The program has both full time and part time students.

Online MEM Program

Enrollment in the online Master of Engineering Management (MEM) program remains strong. For the six MEM courses that were offered in Summer 2010, Fall 2010, and Spring 2011, there were an average of 44 students per course. During these same three semesters, approximately 20 students graduated from the MEM program. The MEM program can be completed in just five consecutive semesters with two 8-week courses per semester.

Certificate of Graduate Studies (COGS) in Sustainable Engineering

An online Certificate of Graduate Studies (COGS) in Sustainable Engineering was launched in Spring of 2011. Please contact Dr. Kauser Jahan (jahan@rowan.edu) for more information.

Leaders in

Graduate Education

CEE Alumni

The CEE program is very proud of their alumni

Greg Kuczynski (Class of 2009) works for Gannett Fleming. Greg received a NCAA Postgraduate Scholarship for track and field. The recipients are student-athletes in their final year of intercollegiate athletics competition that excel both academically and athletically. Greg was named the 2008 *Philadelphia Inquirer* Cross Country Academic All-Area Performer of the Year and to the Academic All-Area Team.

Benjamin Powell (Class of 2009) is currently working for the United States Air Force and has just completed his pilot training at Laughlin Air Force base, which was extremely demanding. Before he started his pilot training, he worked for the Civil Engineering squadron. He will be moving to Offutt Air Force Base in Nebraska, where he will be flying the Boeing RC-135.

Emily Stidworthy Navin (Class of 2001) is a geotechnical engineer with the St. Louis District of the Army Corps of Engineers. She earned a Master of Science in geotechnical engineering in 2003 and a Master of Business Administration in 2007 from Virginia Tech. Emily worked as a consulting engineer for Froehling & Robertson, Inc. in Roanoke, Virginia, before joining the St. Louis District. She lives in St. Louis with her husband Michael, also a geotechnical engineer, and their son Jack.

Rosie Wolk (Class of 2003) is currently employed by Consulting Engineer Services located in Sewell, NJ and is currently a project manager of residential and commercial developments throughout Southern New Jersey. Rosie supervises all engineering aspects including surveying, grading, drainage, utilities, environmental planning, permitting and review and approval by Township, County and State agencies. Rosie specializes in drainage and basin design which has become a large part of the design process with the implementation of the Best Management Practices. Rosie lives in Sewell, NJ with her husband and three children.

Joseph Scalfaro (Class of 2001) is currently employed by James J. Anderson Construction Company as a project engineer. Upon graduation, Joe worked as a project engineer with DMJM aviation and has since transitioned to the Heavy Highway Construction industry. He has worked on several multi-million dollar federal and state highway projects and currently is finishing the rehabilitation of Runway 9R 27L at the Philadelphia International Airport. Joe's responsibilities are numerous, but has great pride in implementing and managing Topcon's MMGPS grade control system. Joe currently resides in Monroeville, NJ with his wife and best friend, Dawn.

CEE Alumni
SERVICE BEFORE SELF

Caitlin Terry (Class of 2005) is currently working as a project engineer for the Nuclear Power Division of The Shaw Group and recently received her Professional Engineering license. Caitlin is passionate about volunteering in developing world countries and takes unpaid leaves from her company to serve overseas. She will be spending time in Nepal, training a local engineer on water supply related issues and in Haiti, drilling a well for an orphanage.

Homecoming & Family Weekend
October 19-23, 2011

If you are interested in making a donation to Rowan University please visit The Rowan University Foundation website at: rufoundation.org/ for more details.

The CEE faculty would like to thank all their alumni who have *contributed to the continuing success of the Civil and Environmental Engineering Program through their generous financial support. Alumni contributions help to fund student scholarship programs and student chapter activities. We look forward to your continuing support and hope to see more names in the future. The following are names of CEE alumni who gave their consent to be recognized:*

Name	*Class of*
Jennifer L. Holland (Peterson)	*2000*
Claire D. Steager	*2000*
Emily Navin (Stidworthy)	*2001*
Amy Levan (Ross)	*2001*
Stephen Gomba	*2002*
Jesse N. Condon	*2002*
Chasity L. Williams	*2002*
Laura C. Miller	*2003*
Philip J. Lewis	*2004*
Crystal L. Leavey (Mattson)	*2004*
Walter A. Walker III	*2005*
Lauren Coe (Darroch)	*2005*
John C. Liddle	*2006*
Ryan McGowan	*2007*

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INNOVATIVE STUDIES ON ALGAE DERIVED BIOFUEL

The U. S. Department of Energy has awarded Rowan Engineering a $750,000 grant for the project "Algae-Derived Biofuels." Dr. Kauser Jahan, calls algae "one of the most promising alternatives" to traditional biodiesel fuel. The Rowan University study is two part. One part is to study the effect of membrane technology on the growth of algae. Membrane technology, which already is used for a variety of purposes, involves the use of membranes to filter or separate materials and for gas delivery.

Dr. William Riddell, her Co-PI will conduct studies on the second part, namely Life Cycle Analyses for select algae separation processes and will determine the most efficient and environmentally friendly way to manufacture biodiesel fuel from algae.