

**NC STATE**

Engineering

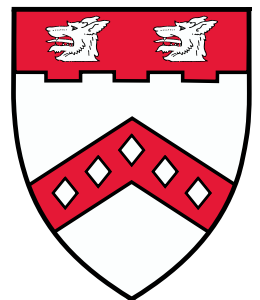
# CCEE NEWS

**DEPARTMENT OF CIVIL , CONSTRUCTION, AND  
ENVIRONMENTAL ENGINEERING**  
NORTH CAROLINA STATE UNIVERSITY | FALL 2014



## **ZIA LECTURE FEATURES THE ENGINEERS BEHIND 1 WORLD TRADE CENTER**

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*CCEE News is published by the Department of Civil, Construction, and Environmental Engineering to share information among faculty, staff, students, alumni and friends of the Department.*



## **IN THE SPOTLIGHT**

### **TRANSPORTATION AND EMISSIONS MODEL**

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A model being developed by CCEE researchers will predict vehicle emissions to help find ways to reduce them.



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## **ABOUT THE COVER**

This year's Paul Zia Distinguished Lecture featured four engineers who helped lead the design and construction of 1 World Trade Center.



# LETTER FROM THE DEPARTMENT HEAD MORTON A. BARLAZ



Welcome to the Fall 2014 newsletter. I always enjoy the opportunity to provide an update on all that is going on in the department. We welcomed about 190 new undergraduates to the department as well as about 100 new graduate students in August. It is fun to watch the excitement and curiosity on the faces of students entering Mann Hall.

This is an exciting year as we welcome many new faces. Dr. **Alex Albert** is our newest faculty member in construction and brings expertise in construction safety. Dr. **Michael Borden** is in the structures area and focuses on computational mechanics. Dr. **Doug Call** joins us in the environmental area with expertise on energy from waste. Dr. **Dan Obenour** is in water resources and works on surface water quality. Mr. **Steve Welton** has joined the department as a lecturer in structures and construction. Mr. **Ben Smith** started during the last academic year as a construction extension specialist and lecturer. Finally, Ms. **Barbara Simerson** recently filled our bookkeeper position and will be the first point of contact for many who enter Mann Hall. Read more about our new faculty inside the newsletter. In addition to new people, we used the summer to make improvements to the main office and student program offices. Come visit and see the changes.

Congratulations to Drs. **Emily Berglund** and **Min Liu** who were both promoted to associate professor with tenure and to **Rudi Seracino**, who was promoted to professor. We bid a fond farewell to Dr. **Vernon Matzen**, who retired in May. Vernon joined the department in 1977 and has served the faculty and students with

great dedication. He had been the department's associate head and director of graduate programs since 2007 and was named an Alumni Distinguished Professor for teaching excellence in 1993.

We started the semester with our traditional welcome back ice cream social for all of our students and thank **FDH Engineering** for their sponsorship. I used the opportunity to meet with new undergraduates to the department and encouraged them to take advantage of the programs that make NC State a great university, including our student organizations and undergraduate research. We have been working hard to introduce students to the department and have established a short orientation session during the first week of classes.

This newsletter features research briefs from our faculty, highlighting how we are working to improve public welfare and environmental sustainability.

We continue to develop our web site and just posted a series of videos highlighting the department. I have also updated the PowerPoint presentation that describes our academic and research programs. Please check out the videos and presentation ([www.ce.ncsu.edu/about](http://www.ce.ncsu.edu/about)) and let me know what you think.

As you read this newsletter, I hope that you get a sense of all of the wonderful activities in our teaching, research, and extension programs. As everyone is aware, we continue to suffer from decreasing budgets. I have explained budget reductions in past letters and asked our friends and alumni for help. Many of you have responded and your contributions are sincerely appreciated. Private support must increase to simply continue, not to mention enhance, what we do. Please make a contribution to the department an annual event. Your gifts provide help with the special things that make us excellent. We need your support as we continuously work to excel in all that we do. Thank you.

A handwritten signature in black ink, appearing to read 'M. Barlaz', with a long, sweeping horizontal line extending to the right.

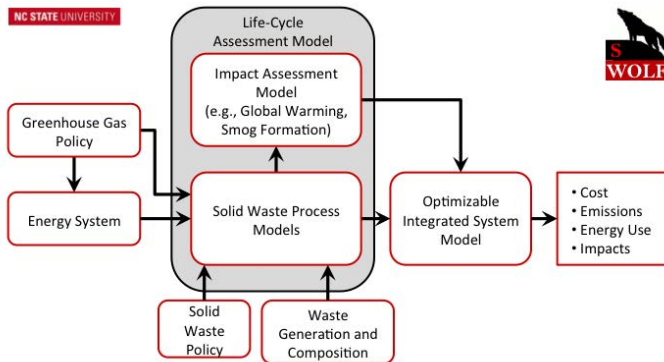
Morton A. Barlaz  
CCEE Department Head

## CCEE AT NC STATE SUSTAINABLE INFRASTRUCTURE FOR SOCIETY

**\$17.9 million** in research expenditures  
**149** ongoing research projects  
**11** winners of CAREER and other NSF young faculty awards  
**49** faculty  
**339** graduate students  
**768** undergraduate students



## State-of-the-art transportation and emissions model to support policy evaluation



SWOLF Modeling Framework

## NC State researchers lead the way on integrated solid waste management

Faculty and students at NC State are leading research to analyze the cost, energy and environmental implications of municipal solid waste management alternatives. This has resulted in development of the Solid Waste Optimization Life-Cycle Framework (SWOLF) ([go.ncsu.edu/swolf](http://go.ncsu.edu/swolf)), which is funded by the National Science Foundation (NSF) and the Environmental Research and Education Foundation (EREF). Alternatives for solid waste management — including those for waste collection, materials recycling, composting, anaerobic digestion, thermal conversion, and landfills — can be analyzed by SWOLF. The model considers changes in population, waste composition, and future changes to the U.S. energy grid, which will affect the benefits associated with material and energy recovery from municipal waste. SWOLF is designed to help decision-makers explore and evaluate solid waste systems and plan for future improvements. The SWOLF research team includes Drs. **Morton Barlaz**, **Joe DeCarolus**, **Jim Levis** and **Ranji Ranjithan** of CCEE; Dr. **Anders Damgaard** from the Danish Technical University; graduate students **Keith Hodge**, **Megan Jaunich**, and **Phillip Pressley**; and undergraduate students **Eliana Gaston** and **Dylan Hahn**. Current work includes conducting a case study for Wake County, NC and establishment of an NSF-sponsored international virtual institute for solid waste management life-cycle modeling. •

Cars and passenger trucks use significant amounts of fuel and emit air pollutants that are harmful to human health. Researchers at NC State, in collaboration with Arizona State University (ASU), have developed a new framework to accurately predict emissions of individual vehicles as they operate on a large road network. A new traffic simulation model, DTAlite, takes into account the second-by-second acceleration, cruising, deceleration, and idling of thousands of vehicles operating on the network. Within DTAlite is a new high resolution computationally efficient vehicle emissions model, MOVES Lite, that predicts tailpipe emissions of carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), hydrocarbons (HC), and carbon dioxide (CO<sub>2</sub>) based on speed, acceleration, and road grade. The emissions model was validated based on comparisons to measurements made by NC State of emissions from 100 light duty gasoline vehicles. The new modeling framework allows researchers and policy makers to explore the effects of vehicle technology, emissions regulations, demand management, changes to infrastructure, and traffic control on energy use and emissions. The project, sponsored by a U.S. Environmental Protection Agency STAR grant, was led by Drs. **H. Christopher Frey** of CCEE, **Nagui Rouphail** of the Institute for Transportation Research and Education, and Dr. **Xuesong Zhou** at ASU, with contributions from graduate students including **Bin Liu**, **Shams Tanvir**, **Abseen Anya** (MSCE, 2013) and **Hassan Swidan** (MSCE, 2011). •



Sampling of tailpipe exhaust from a passenger car.

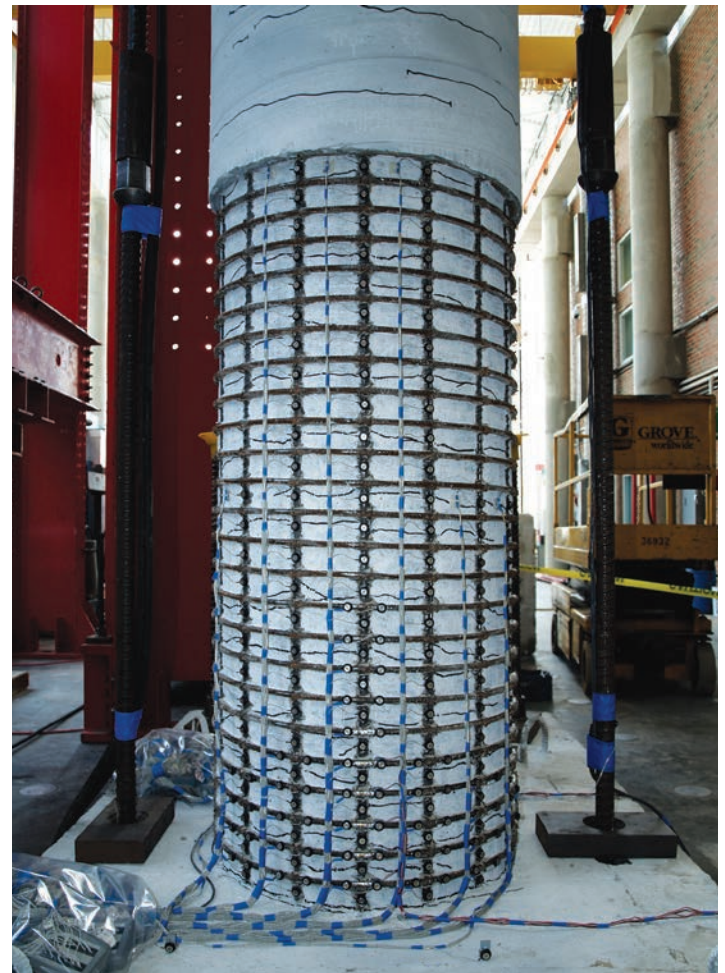




Top: Jet engine gas turbine (Courtesy of Honeywell Aerospace).  
Bottom: Close up of a gas turbine combustor liner with a premature crack.

## Safer and efficient seismic design of bridge columns

Research at NC State funded by the Alaska Department of Transportation and Alaska University Transportation Center has resulted in new approaches to characterize earthquake damage in bridge columns. At the CCEE Constructed Facilities Laboratory (CFL), an advanced instrumentation system was used to monitor the 3D position of markers that were placed on reinforcing steel embedded in bridge columns. The recorded motions of the columns during laboratory seismic testing were instrumental to understanding how bridges behave during strong earthquakes. The research team, which includes Drs. **Mervyn Kowalsky** and **Jim Nau**, and PhD students **Chad Goodnight** (BSCE, 2009) and **Yuhao Feng**, developed analysis and design recommendations for Alaska DOT engineers that will allow them to more accurately define concrete bridge behavior in earthquake-prone regions, resulting in more efficient designs. •



Instrumentation of a column with 3D motion monitoring markers.

## CCEE researchers develop advanced material models for improving gas turbine jet engines

Operation of gas turbine engines exposes engine components, such as combustor liners, to temperatures of over 1600°F. Despite the use of high temperature resistant superalloys for manufacturing these liners, repetitive high temperature exposure can reduce liner life from the expected 10,000 hours to as low as 2,000 hours. Improved performance of these engines can be achieved through design optimization facilitated by numerical analysis using advanced material models. PhD students **Raasheduddin Ahmed** and **Paul Barrett** (BSCE, 2009), under the supervision of Dr. **Tasnim Hassan**, have developed an advanced material model through a project sponsored by Honeywell Aerospace, Phoenix, Arizona. The material model developed by these researchers will enable Honeywell to predict engine performance more accurately and thereby make informed design choices to improve the overall performance of gas turbine engines. •





Top: Driving simulator used in the research; Bottom: Six-and nine-panel white and blue and green highway signs

## Highway Logo Signs and Safety

Blue highway logo signs notify drivers of food, gas, and lodging at an upcoming interchange. Green guide signs notify drivers of the distance to upcoming cities and roadways. The Federal Highway Administration limit is six logo panels per blue sign. North Carolina would like to use nine logo panels per blue sign and asked NC State researchers to evaluate the safety implications of this change. Dr. **Dave Kaber** from Industrial and Systems Engineering, Dr. **William Rasdorf** from CCEE, and Dr. **Joe Hummer** from Wayne State University, along with ISE graduate students **Carl Pankok** and **Wenqi Ma**, performed the investigation. Using a driving simulator, 40 participants completed a daytime freeway driving task during which they

were asked to identify various logo and guide signs. Drivers' attention allocation, lane deviation, and speed deviation were recorded during the task. Although drivers typically spent more time looking at blue logo signs compared to green guide signs, they accurately identified information on all sign types. No significant difference was found in the time spent looking at nine-logo versus six-logo blue signs. Most importantly, when drivers encountered a nine-logo sign, there was not enough speed and lane deviation to affect driving safety. Thus, the research team has advised NCDOT that nine-panel logo signs do not significantly decrease safety when used on interstate highways. •

# NEW RESEARCH

In the past few months, CCEE faculty members received 19 research awards totaling over \$4 million, which will allow 18 faculty members, and the graduate and undergraduate students and postdoctoral researchers working with them, to study a diverse range of vital systems. These projects are sponsored by the US, NC and California Departments of Transportation, US Environmental Protection Agency (EPA), Health Effects Institute (HEI), National Science Foundation (NSF), National Cooperative Highway Research Program (NCHRP), National Security Agency (NSA), Transportation Research Board (TRB), and Water Resources Research Institute (WRRI).

**DR. SANKAR ARUMUGAM**, as principal investigator, and **DRS. NING LU** (Electrical and Computer Engineering), **JOE DECAROLIS**, **KUMAR MAHINTHAKUMAR**, and **TUSHAR SINHA**, received a \$1.2M NSF CyberSEES Grant to enhance the sustainability of water and energy systems based on climate information and cyberdata innovation. Dr. Arumugam is also the principal investigator for a WRRI-funded project on drought assessment and management for North Carolina.

**DR. CHRIS BOBKO** is the principal investigator of a new NSF grant. Dr. Bobko will study the strength and fracture toughness of the ingredients of cement materials through a combination of Focused Ion Beam (FIB) micromachining techniques and nanoindentation. The FIB micromachining will be performed at NC State's Analytical Instrumentation Facility to create novel sample structures including micropillars and microbeams. Nanoindentation equipment will be used to measure the miniscule loads required to break these tiny structures. Outcomes of the research will contribute to the design of more sustainable and resilient cementitious materials.

**DR. EMILY BERGLUND** received funding from the Laboratory for Analytic Sciences as part of a collaborative team with experts in computer science and psychology to develop models of how data scientists answer open questions. Dr. Berglund has also received funding from the NSA Science of Security Lablet at NC State to explore the effects of behavioral norms and security policies on the security of computational systems. In collaboration with computer scientists, she will create models of computer users and administrative policies to explore how practices such as setting passwords and updating security software affect the vulnerability of cyberinfrastructure.



Loose mix asphalt undergoing long-term aging in an oven.

**DR. H. CHRISTOPHER FREY**, as principal investigator, along with **DRS. ANDREW GRIESHOP** and **NAGUI ROUPHAIL** and a team of other faculty at NC State, the University of North Carolina at Chapel Hill, North Carolina Central University, and the Desert Research Institute, have received a grant from HEI to measure human exposure to air pollution near roadways. Data will be collected by the team at locations on Interstate 40 near RDU airport and around a major intersection in Durham. This data will be used to build better models of the influence of vehicle traffic on air pollution exposure that will help improve transportation decision-making.

**DR. ANDREW GRIESHOP** is the NC State principal investigator on a project sponsored by U.S. EPA that also has partners across the US, Canada and India. The goal of the project is to reduce the impacts on human health and the environment from solid fuel use in rudimentary stoves in developing countries. Indoor use of solid fuels for cooking produces high levels of indoor pollution that severely affect health. The team is conducting experimental cookstove change-outs in two rural areas in India and will quantify the benefits of newer cooking technologies on fuel use, air pollution emissions, and exposures.

**DR. TASNIM HASSAN** has funding on an NSF Grant Opportunity for Academic Liaison with Industry (GOALI) to enhance the deformability of sheet metals used in automobile manufacturing. For example, by simultaneously applying bending and tension loads on AISI 1009 steel, the ultimate elongation under tension can be increased. Material properties will be studied with the goal of manufacturing lightweight and economic automobiles with reduced environmental impact.





This page, from left to right: Micropillar of cement paste ready for nanoindentation testing, an air quality monitoring site on I-40 to be used for NC State research, and a smoky traditional stove at use in a rural Indian home

**DRS. MERVYN KOWALSKY** and **RUDI SERACINO** are starting a new project funded by the California DOT to study the behavior of high strength steel reinforcement for use in the seismic design of bridge structures. They will apply advanced non-contact instrumentation to characterize the stress-strain curve of ASTM A706 Grade 80 steel, including its behavior under cyclic loading. Material samples from steel mills across the country have been collected for the research. Over 800 tests will be conducted to provide bridge engineers with the data needed to analyze and design structural components.

**DRS. MORTON BARLAZ, JOSEPH DECAROLIS, JAMES LEVIS, AND RANJI RANJITHAN** received an NSF grant to establish the International Institute for Solid Waste Management Life-Cycle Modeling (<http://go.ncsu.edu/iswm>) to study solid waste management (SWM) life-cycle assessment (LCA) in collaboration with researchers at the Danish Technical University (DTU). The institute will provide resources, instructional content, and opportunities for collaboration among solid waste LCA researchers, educators, practitioners, and students from around the world.

**DR. RICHARD KIM**, as principal investigator, and **DR. CASSIE CASTORENA**, are leading a team of researchers from Arizona State University, Western Research Institute, and Nichols Consulting Engineers on a project funded by the NCHRP to develop a calibrated and validated procedure to simulate the long-term aging of asphalt mixtures. Comparisons between samples collected from pavements throughout the US and laboratory-aged materials will enable development of models and laboratory methods to represent the long-term aging of asphalt mixtures under field conditions.

**DR. GEORGE LIST** received funding from TRB to more effectively incorporate trucks into the highway capacity manual (HCM). Trucks can cause dramatic reductions in traffic flow and speed compared to an auto-only condition. Dr. List is also working on two projects funded by a USDOT-Sponsored Research Center at the University of Maryland to enhance freight reliability and provide educational opportunities focusing on high speed rail transport. The first project will provide advanced tools to determine the efficiency and reliability of freight transport activities and to assess the impacts of infrastructure investment on improving those performance metrics. The second project will create a short course on high speed rail.

CCEE faculty have received other funding in the last few months.

**DR. MARGERY OVERTON** received additional funding from NCDOT to continue a long-term shoreline monitoring study at the Oregon inlet terminal groin. **DR. DETLEF KNAPPE** received funding from WRRRI to identify the occurrence and treatment options for 1,4-dioxane in drinking water, and also received an NSF GOALI grant to study sources and control options for 1,4-dioxane in the Cape Fear River watershed. **DR. H. CHRISTOPHER FREY** received funding from NCDOT to measure the air pollutant emissions of head-end power diesel engines used in passenger railroad locomotives owned by NCDOT and operated by Amtrak. **DR. RICHARD KIM** received funding from NCDOT for two projects. In the first, he will study the variability in chip seal construction and its impact on asphalt performance. In the second, with **DR. CASSIE CASTORENA**, he will compare the performance of full depth asphalt pavements to pavements that use an aggregate base. •



## Albert joins faculty in Construction Engineering and Management



Alex Albert

Dr. Alex Albert joined CCEE in August 2014 as an assistant professor in Construction Engineering and Management. He earned his PhD in civil engineering from the University of Colorado at Boulder in 2013 and a master's degree in structural engineering from Lehigh University in 2010.

Prior to entering academia, Dr. Albert worked as an enterprise resource planning (ERP) coordinator, planning engineer, and as a design intern. Dr. Albert's research background is in the area of construction safety. His recent research focuses on developing innovative strategies to transform construction hazard recognition. Dr. Albert's other research includes: (1) the exploration of a risk-based contingent liability model for electrical transmission and distribution line safety investments; (2) modeling the role of social networks in situational awareness and hazard communication; (3) methods for optimal safety knowledge transfer; (4) determination of psychological factors that affect risk-taking behavior in construction; and (5) application of augmented reality for classroom teaching and safety training.

Dr. Albert is currently teaching CE 466 Building Construction Engineering, and his future course plans include CE 565 Construction Safety Management and CE 766 Building Construction Systems. He also plans to bring his industry and research experience into the classroom by exposing students to contemporary construction challenges and presenting the latest research findings and solutions.

## Mike Borden joins faculty in Structural Engineering and Mechanics



Mike Borden

Dr. Mike Borden joined CCEE in August 2014 as an assistant professor in Structural Engineering and Mechanics. He received his PhD in 2012 from the Computational Science, Engineering, and Mathematics program at the University of Texas at Austin (UT). As a PhD student, his research focused

on developing computational methods at the intersection of computational geometry and engineering analysis that enable more efficient simulation of complex material and structural processes. His research provided methods that facilitate the transfer of computer aided design (CAD) descriptions to analysis software. He also developed numerical tools for the prediction of failure modes in complex three-dimensional structures. In his most recent position as a postdoctoral fellow at the Institute for Computational Engineering and Sciences (ICES) at UT, he developed predictive tools for material and structural failure. Dr. Borden plans to continue exploring computational methods and technologies that unite analysis and design. He will apply these methods to develop predictive computational models that allow engineers to design and study advanced materials and complex structures.

Prior to attending UT, Dr. Borden worked for five years as a computational scientist at Sandia National Laboratories, where he developed high-performance computational tools for engineering analysis and design. He received an MS in computational and applied mathematics from the University of Texas at Austin, an MS in civil engineering from Brigham Young University, and a BS in civil and environmental engineering from Brigham Young University.

## Doug Call brings expertise in microbial fuel cells



Doug Call

Dr. Doug Call joined CCEE in August 2014 as an assistant professor in Water Resources and Environmental Engineering. He obtained his PhD in environmental engineering from Penn State University, where he researched an innovative technology to simultaneously treat and convert wastewater

into electricity. The technology, microbial fuel cells (MFCs), derive electricity directly from naturally present, waste-degrading bacteria. His MS (also completed at Penn State) and PhD work on electrode materials and reactor designs laid the foundation for the first pilot-scale MFC in the US. In addition, using a suite of molecular biology tools, he provided new insights into the unique bacterial communities and identified the key microbial players that power MFCs. After finishing his graduate studies, he remained at Penn State as a postdoctoral scientist, where he examined the ability of bacteria to convert carbon dioxide into methane when supplied electricity as “food.” This process is a potential green method of storing excess renewable electricity as methane gas. In his recent position as an assistant professor at Syracuse University, he continued research on MFCs for wastewater treatment, while exploring new areas where the microbe-electrode interface can be used to address environmental problems.

A native of Virginia Beach, Dr. Call is excited to return to the mid-Atlantic region and join the NC State faculty. In particular, he is interested in expanding his research at NC State to address nutrient (nitrogen and phosphorous) removal from wastewater, greenhouse gas mitigation from engineered environments, and energy production from ocean salinity gradients, such as those found along the North Carolina coast. Dr. Call is also excited about integrating his energy-water nexus interests into the classroom by developing a new course on the intimate connection between these two limited resources.

## Water quality expert Dan Obenour joins faculty



Dan Obenour

Dr. Dan Obenour joined CCEE in October 2014 as an assistant professor in Water Resources and Environmental Engineering. Dan is a recent PhD recipient from the University of Michigan, where he conducted research on the hypoxia (low dissolved oxygen) problem in the northern Gulf of Mexico.

This work provided new insights into how the severity of hypoxia has changed over the last three decades, and it has substantially updated our understanding of how watershed nutrient loading reductions can affect the size of the hypoxic zone in the future. More generally, Dr. Obenour is interested in how probabilistic modeling approaches can be used to provide for better understanding and management of complex environmental systems. In his most recent position, based at NOAA's Great Lakes Environmental Research Laboratory, Dr. Obenour focused on eutrophication issues in Lake Erie. He looks forward to expanding his research to address water quality issues in North Carolina in the coming years.

Dr. Obenour has an extensive background in environmental and water resources engineering. As a master's student at the University of Texas at Austin, he developed GIS approaches for creating, managing, and visualizing hydrologic and hydraulic modeling information. As a consultant, his experience encompassed drinking water, wastewater, and water resources design projects. However, his primary consulting focus was on watershed and water quality model development. His interest in modeling inspired him to pursue a PhD, where he developed geostatistical and Bayesian modeling approaches for improving our understanding of how human actions impact aquatic systems.



## Ben Smith joins Construction Engineering and Management program as lecturer



Benjamin Smith

Mr. Benjamin Smith, PE has returned to NC State in CCEE as a lecturer and extension agent in the Construction Engineering and Management program. He received his Bachelor of Science in mechanical engineering at NC State in 2003, and received a Master of Civil Engineering, focusing in construction, also from NC State, in 2011. Smith

has over 10 years of experience in the construction industry as an engineer and contractor on a variety of concrete and structural restoration projects.

His current research and extension interests focus on sustainability and repair of existing infrastructure, as well as construction business development. "I have a great interest in preserving existing structures, and determining the best way to re-use or re-purpose existing infrastructure to meet current [societal] needs."

Smith is looking forward to working with faculty who mentored him during his graduate career. His current teaching plans include a new course, Introduction to Construction Engineering, and CE 367 Mechanical and Electrical Systems in Buildings, where he will have the opportunity to share his industry experiences with students.

## Structural engineer, consultant Steven Welton joins department as lecturer



Steve Welton

Mr. Steven Welton, PE has returned to NC State in the Civil Engineering Department as a lecturer. He joins the department with over 24 years of experience as a structural engineer and with over 14 years of having his own structural engineering consulting firm. Welton began his engineering education

at NC State in 1984. After completing his BSCE in 1988, he continued at NC State and obtained an MCE in 1992. After working for several different firms and gaining diverse structural engineering experience with different types of buildings and structures, Welton founded his own consulting firm of Welton Structural Design, P.C. (WSD) in 2000. Projects completed by WSD are both new and renovations of existing buildings that include schools, institutional buildings, office buildings, and anti-terrorism/force protection building upgrades. Welton is a registered professional engineer in North Carolina, Virginia, and West Virginia.

Welton has participated in all aspects of project development including investigations, schematic design, value engineering, contract documents, construction administration, and special inspections. His understanding and experience with the entire building design and construction process provides him with a unique perspective that he looks forward to sharing with students.



## NC STATE PAUL ZIA DISTINGUISHED LECTURE ON 1 WORLD TRADE CENTER DRAWS MORE THAN 600 ATTENDEES



Soaring to a height of 1,776 feet above lower Manhattan, 1 World Trade Center is the tallest building in the Western Hemisphere. This iconic structure was the focus of the 13th annual Paul Zia Distinguished Lecture held on September 22, 2014 before an audience of over 600 at NC State's McKimmon Center. The lecture, titled "Rebuilding the World Trade Center," was jointly presented by four leaders of the design and construction effort. The event was hosted by CCEE, the Constructed Facilities Laboratory and the NC State Engineering Foundation.

**Dr. Ahmad Rahimian**, an internationally recognized expert in tall buildings and director of building structures at WSP USA, began the lecture with the creative design process for the tower, drawing on more than 30 years of structural design experience. **Yoram Eilon**, senior vice president of building structures at

Dr. Ahmad Rahimian discussing the creative design process





Paul Zia (left) and College of Engineering Dean Louis Martin-Vega

WSP USA, followed with a presentation of the specific structural design details. Next, **Allan M. Paull**, senior vice president of civil and structural engineering, and **Juan Estevez**, senior project manager, both of Tishman Construction, an AECOM company, presented examples of the tower's many unique construction features. Their presentation highlighted the challenges associated with construction on such a massive scale within the densely populated and restrictive space of lower Manhattan.

Support from 35 corporate sponsors enabled the Zia Committee, chaired by **Dean Penny** (BSCE, 1983) of Kimley-Horn and Associates, to contribute additional funds to the Paul Zia Educational Fund Endowment. The educational fund provides scholarships to graduate engineers in structural engineering as well as underwriting the costs of the Paul Zia Distinguished Lecture series in order to keep it free to the public. In addition, the Paul Zia Student Enhancement Fund provides funding for activities that enhance the graduate student experience, such as research conference participation. Individuals or corporations wishing to contribute to the Paul Zia Education Fund or Student Enhancement Fund are encouraged to contact Lora Bremer, senior director of development and alumni engagement, at [lfbremer@ncsu.edu](mailto:lfbremer@ncsu.edu). •



From left, Rahimian, Estevez, Paull and Eilon answer questions from the audience.



► 1 World Trade Center

# AWARDS

*CCEE faculty and students have received university, national, and international awards and honors and other forms of recognition in recent months.*



Paul Zia

**DR. PAUL ZIA** was selected as a Titan of the Industry by the Precast/Prestressed Concrete Institute (PCI). According to PCI, Titans of the Industry are individuals "who have had a profound effect on the precast/prestressed concrete industry." Dr. Zia received his award at the 60th Anniversary PCI Convention

on September 6-9, 2014 in National Harbor, Maryland.

**JIM RISPOLI**, professor of practice with the Center for Nuclear Energy Facilities and Structures since 2009, has been elected to the National Academy of Construction. He was one of 29 selectees, of a field of over 260 prospects, chosen for membership in 2014, and joins the Academy roster of 187 members.

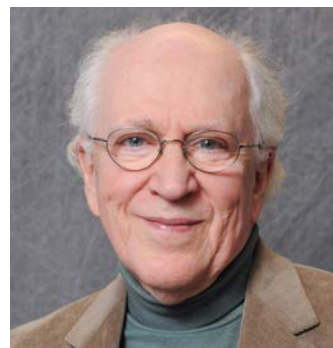


Richard Kim

**DR. RICHARD KIM**, Distinguished University Professor, is president-elect of the Korean-American Scientists and Engineers Association (KSEA). KSEA has over 6,000 voting members. Dr. Kim will serve as the 44th president between July 1, 2015 and June 30, 2016. He will chair the 2015 US-Korea

Conference on Science, Engineering, and Entrepreneurship in Atlanta, Georgia between July 29 and August 1, 2015 under the theme of "Pursuing Excellence with a Servant's Heart." Dr. Kim was also featured in a June 2014 article in *Asphalt: The Magazine*

of the *Asphalt Institute*, where he provided answers to questions about his career and research related to pavement preservation.



Kerry Havner

**DR. KERRY HAVNER**, professor emeritus of civil engineering, was elected Fellow of the Engineering Mechanics Institute (EMI). Fellows are selected based on "accomplishments, achievements, or scholarship." According to his nomination materials, Dr. Havner's "work in both crystal plasticity and continuum plasticity puts him among the very best mechanics scholars." Dr. Havner was inducted at the EMI 2014 conference on August 7, 2014 in Hamilton, Ontario, Canada.



Brina Montoya

**DR. BRINA MONTOYA** won the T.K. Hsieh Prize for her paper entitled "Dynamic response of liquefiable sand improved by microbial-induced calcite precipitation." The paper, co-authored by Professors Jason DeJong and Ross Boulanger from the University of California, Davis, was published in 2013

in *Geotechnique*. The Hsieh Prize recognizes the best paper published by the Institution of Civil Engineers in London in the field of structural and soil vibration caused by mechanical plant, waves or seismic effects.





# HONORS

**DR. TAREK AZIZ** received an Outstanding Teacher Award from the College of Engineering in recognition of his creative and innovative teaching practices. Dr. Aziz has been a teaching assistant professor in the department since 2010 and recently was appointed coordinator of undergraduate advising in CCEE. His teaching style is inspirational and motivational, according to student feedback included in his nomination.

**DR. JAMES W. LEVIS** (PhD, 2013), a research assistant professor, won the first place PhD Dissertation Award from the Air & Waste Management Association for his dissertation entitled "A Mathematical Programming Life-Cycle Assessment Model for Solid Waste Management Decision Making."

**MS. NINA CARAWAY** and **MS. LILIANA VELASQUEZ MONTOYA**, two PhD students in the department, were named as Global Change Fellows to the Southeast Climate Science Center (SE CSC). The Global Change Fellowship is a year-long opportunity for graduate-level scientists and social scientists across a variety of disciplines to engage monthly on topics including science communication, structured decision analysis, and professional development opportunities. Caraway is advised by Dr. **Sankar Arumugam** and Velasquez Montoya is advised by Dr. **Margery Overton**.

**AMIR BOTROS**, a PhD student advised by Dr. **Sami Rizkalla**, won third place in the Engineering Division of the Ninth Annual Graduate Student Research Symposium held at NC State on Wednesday, March 26. Botros' poster was titled, "Development of Rational Design Methodologies for Dapped Ends of Prestressed Concrete Thin-Stemmed Members." Ten students from the department participated in the symposium, including **Zahra Aghazadeh, Kai Feng, Farnam Ghasemzadeh, Brandon Graver, Amr Helal, Rachel Ingham, Haritha Malladi, Mohamed Nafadi**, and **Punith Naik**.

**INGRID AROCHO**, PhD candidate, received a travel grant from the National Science Foundation to participate in a workshop on writing basic research proposals, held at the 2014 Construction Engineering Conference in March in Seattle, WA. Arocho's advisor is Dr. **William Rasdorf**.

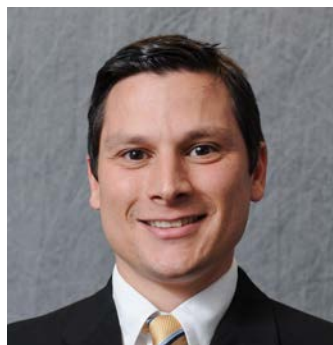


Christopher Frey

also quoted in the trade press regarding his June 26, 2014 letter to the EPA Administrator, as chair of the EPA Clean Air Scientific Advisory Committee (CASAC), communicating CASAC's advice to lower the National Ambient Air Quality Standard for ozone.

**DR. H. CHRISTOPHER FREY**

was interviewed by the Associated Press in August for a story picked up by major national news organizations pertaining to interaction between the U.S. Environmental Protection Agency and external scientists who serve on its advisory committees. Dr. Frey was



Joseph DeCarolis

Do Electric Drive Vehicles Matter to Future US Emissions," in the journal *Environmental Science and Technology*.

**DR. JOSEPH DECAROLIS**

gave an interview on NPR / WUNC regarding his research on the impact of electric drive vehicles on overall CO<sub>2</sub>, SO<sub>2</sub>, and NO<sub>x</sub> emissions in the U.S. His findings that electric drive vehicles (EDVs) have little impact on reducing national US emissions were published in a recent article, "How Much



The symposium gave students a chance to gain experience in preparing and delivering presentations, and to showcase research to the engineering community.

## Water Resources and Environmental Engineering Symposium features 36 student presentations

The Water Resources and Environmental Engineering (WREE) Group held its 13th Annual Spring Symposium on Friday, March 7 at NC State's Hunt Library. The Symposium featured 36 student poster presentations. Dr. **Marc Edwards** of Virginia Tech delivered a keynote talk entitled, "The Washington D.C. Lead Crisis and its Aftermath."

The symposium provides an opportunity for students to gain experience in preparing and delivering presentations and enhances the visibility of the WREE program with the professional community. Furthermore, nearly 20 prospective students visited during the symposium and met with faculty and current students.

Student posters covered a wide range of topics, including air pollution, drinking water treatment, energy systems, fluid mechanics, hydroclimatology, life-cycle analysis, solid waste management, wastewater treatment and water resources. Most of the presenting students are graduate students, though some undergraduates also delivered presentations. For example, **Sara Troutman** presented a poster on drinking water treatment processes.

The symposium organizing committee, comprised of graduate students, was chaired by **Rachel Ingham**. Faculty members **Sankar Arumugam**, **Francis de los Reyes**, **Ranji Ranjithan**, and **Emily Berglund** served as advisors.

The symposium was supported by eight sponsors. Silver Sponsors included the **Environmental Research & Education Foundation**, **FDH Inc.**, **Hazen and Sawyer**, **McKim & Creed**, and

**Smith Gardner**. Bronze Sponsors included **Dewberry** and **SCS Engineers**. The **Research Triangle Chapter** of the **Air & Waste Management Association** also sponsored the event.

Over 20 professionals from area companies, government agencies, foundations, and professional societies served as judges for best poster awards. Judges included **Angela Walsh**, **Art Werner**, **Beau Hodge**, **Charles Archer**, **David Garrett**, **David Mobley**, **Eric Nesbit**, **Eric Solano**, **James Gregg**, **Jeff Thompson**, **Joan Smyth**, **John Carman**, **Jon Williams**, **Karen Marsh**, **Kenneth Waldroup**, **Lauren Wellborn**, **Michael Hays**, **Mike Wayts**, **TJ Lynch**, **Tony deAngelo**, and **William Hall**. Poster award winners were:

- 1st Prize: **Joseph Weaver**, "Effect of Variable Shear on the Formation of Aerobic Granules in an Eccentric Couette Microreactor," advised by Drs. **Francis de los Reyes** and **Joel Ducoste**.
- 2nd Prize: **R. Matthew Jenny**, "Challenges in Designing a UV-LED Reactor for Disinfection: Why CFD should be your best friend," advised by Dr. **Joel Ducoste**
- 3rd Prize: **Elisa Arevalo**, "Removal of Perfluorinated Compounds by Anion Exchange Resins: Identifying Effective Resin Regeneration Strategies," advised by Dr. **Detlef Knappe**.

The 14th Annual WREE Spring Symposium will be held on March 6, 2015. Companies interested in sponsoring the event should contact Lora Bremer at [lfbremer@ncsu.edu](mailto:lfbremer@ncsu.edu). •



# "We are Women in Engineering" networking program brings 17 women students to NC State from across North America

The "We are Women in Engineering" (We are WE) Networking Luncheon and Seminar was hosted by CCEE on March 6-7, 2014. Along with 23 local participants, 17 women students from across the U.S. and Canada received travel awards. Travel support was provided by **McKim & Creed, FDH, NC State Engineering Foundation, the National Science Foundation (NSF)**, and CCEE. The NSF support was from a Broadening Participation Research Initiation Grant in Engineering (BRIGE) for which Dr. **Brina Montoya** is the principal investigator.

The first day included a workshop on conducting research in civil engineering, a tour of the NC State campus, a keynote seminar, and a panel discussion. Dr. **Jeanne VanBriesen**, professor of civil and environmental engineering at Carnegie Mellon University, presented the We are WE seminar. She holds

a BS in education and a MS and PhD in civil engineering from Northwestern University. Dr. VanBriesen shared her career path as a teacher, graduate student, and professor. She talked about the balance between family and academics, the joys of being a professor, and the importance of finding mentors. Panelists Dr. **Brina Montoya**, Dr. **Cassie Hintz**, and PhD student **Zahra Aggazadeh** answered questions about research, graduate school, working with advisers, and transitioning from industry to academics.

On the second day, participants attended either the Water Resources and Environmental Engineering Spring Symposium, the Structural Engineering & Mechanics Symposium, or the



The We are WE seminar included networking, a keynote seminar and a panel discussion.

Geotechnical Engineering Poster Session. Students met individually with professors throughout the day to discuss research and graduate school opportunities.

Three of the visiting women enrolled in graduate school at NC State in the fall 2014 semester. The We are WE student committee was chaired by **Victoria Lopez**, an MS student. The We are WE program will be held again in spring 2015. Individuals and organizations interested in supporting the We are WE Program can contact the NC State Engineering Foundation through **Lora Bremer**. For information about applying to attend the program, please contact Dr. **Emily Berglund** at [emily\\_berglund@ncsu.edu](mailto:emily_berglund@ncsu.edu). •

# STUDENT NEWS



Students at the spring 2014 ACI Convention in Reno with their advisor, Mr. Roberto Nunez (second from right).

## American Concrete Institute (ACI)

Eleven students from the ACI student chapter attended the Spring Convention in Reno, Nevada, in March 2014. Members participated in a student competition, attended committee meetings, attended seminars, shared in social events, and participated in career development opportunities. The objective of the student competition was to design and construct a fiber reinforced concrete bowling ball, which was tested for accuracy and strength. NC State sponsored two student-led teams, and one team finished 8th overall. NC State was recognized as an "Excellent University" by the American Concrete Institute for 2013. The award recognizes outstanding student certification programs, student participation in yearly competitions, and student attendance in ACI technical committees and training events.

## Association of General Contractors (AGC) and National Association of Home Builders (NAHB)

In February 2014, AGC invited general contracting companies to the James B. Hunt Library for a networking social. Skanska, the company that completed construction of the library in early 2013, sponsored a presentation about construction management of the project. In March, AGC and NAHB members participated in the annual Service Raleigh event by gardening at municipal parks in Raleigh. The chapters visited a Bordeaux project at Nash Community College and an Adolf & Peterson jobsite at the

new Cameron Village apartments. Presentations were given at chapter meetings by invited speakers, including **Bill Pope** of Pope Custom Homes and **Gary Hill**, president of the North Carolina Homebuilders Association. The AGC and NAHB student chapters hosted a fundraiser and invited companies in the construction and civil engineering industry to an afternoon of kickball.

During fall 2014, the AGC and NAHB chapters are planning to participate in the Shack-A-Thon for Habitat for Humanity, National Steel Day at Buckner Steel, and tours of construction sites in the Raleigh area. The chapter will raise funds to participate in the NAHB Residential Construction Management Competition, which will be held in January 2015.

## American Society of Civil Engineers (ASCE)

Thirty-one members of the ASCE student chapter attended the annual Carolinas Conference held at the Citadel in Charleston, South Carolina, in March. The students participated in the concrete canoe competition, steel bridge competition, surveying competition, geotechnical competition, balsa wood bridge competition, quiz bowl, and an ethics essay. The NC State team placed in the t-shirt design and concrete canoe competition.

The ASCE chapter attended several events hosted by the ASCE NC Eastern Branch Younger Members Group, including a professional panel discussion and Adopt-a-Stream. The chapter also attended site tours offered by Balfour Beatty at a hospital in Clayton, and TA Loving at a multi-use facility in downtown Raleigh. The chapter participated in Service Raleigh in March and monthly Science, Technology, Engineering, and Mathematics (STEM) Fridays at Weatherstone Elementary School in Cary. Chapter members led elementary students in learning activities, such as building bridges and towers with marshmallows and toothpicks. Members also served as judges in the Science Olympiad at Weatherstone in March.



30 CCEE students gathered for a team photo around the 2014 NC State Concrete Canoe, Red Terror, at the Carolinas Conference in Charleston, SC, in March 2014





H. Christopher Frey, Brandon Graver, Gurdas Sandhu, Bin Liu, Maryam Delvarrafiee, Jiangchuan Hu, and Xiaohui Zheng at Long Beach Convention Center

## Air & Waste Management Association

**Bin Liu, Brandon Graver, Gurdas Sandhu, Jiangchuan Hu, Mary Delavarrafiee, Xiaohui Zheng,** and faculty advisor **Dr. H. Christopher Frey** jointly presented five papers at the Annual Meeting of the Air & Waste Management Association in Long Beach, CA during June 24-27. The six students each received a Travel Award from the Research Triangle Park chapter of A&WMA. **Jim Levis** (PhD 2014) won 1st place for best PhD dissertation, and **Behdad Yazdani** (MS ENE 2013) won 2nd place for best MS thesis. This year, the student chapter is actively preparing for the June 22-25, 2015 annual meeting, which will be held for the first time in Raleigh at the Convention Center. On August 26, the chapter elected new officers and Mr. **Rahul Thaker** of the NC Division of Air Quality encouraged students to participate in the 2015 annual meeting.

## Chi Epsilon

**Demi Gott** (BSCE 2014) served as the chapter president during the 2013-2014 academic year and attended the National Chi Epsilon Conclave in Salt Lake City, Utah, in March 2014. In April, Chi Epsilon inducted six civil engineering students as new members: **Carmelina Pappalardo, Jackson Pitofsky, Margaret Scott, Gregory Myers, Cedrick Butler,** and **Timothy Kloecker**. Civil engineering students serving as 2014-2015 Chi Epsilon officers include President **Catherine McMillan**, a graduate student in environmental engineering; Vice President **Jackson Pitofsky**, a senior; Secretary **Mitchel Otis**, a senior; and Marshal **Carmelina Pappalardo**, a senior.

## Geo-Institute Graduate Student Organization (GI GSO)

Six geotechnical graduate students traveled to Atlanta in February 2014 to present their research at the annual ASCE GeoCongress.

PhD candidate **Kai Feng** presented his research on numerical simulations of microbial induced calcite precipitated sands in an oral presentation, and **Zahra Aghazadeh Ardebili** was a finalist in the student poster competition. In March, the geotechnical graduate students organized a poster session that was held in combination with the Structural Engineering and Mechanics Symposium. The G-I GSO hosted **Dr. Jason DeJong**, a professor in the Department of Civil and Environmental Engineering at the University of California, Davis. G-I GSO also held several social events, including a Chinese New Year celebration and a graduation potluck.

## Institute for Transportation Engineers, American Society of Highway Engineers, and American Railway Engineering and Maintenance-of-Way Association (ITE/ASHE/AREWA)

Thirty-six students attended the Transportation Research Board annual meeting in Washington, D.C. in January 2014. Students presented their research and explored hundreds of poster presentations, podium sessions, and workshops. A student chapter of the American Railway Engineering and Maintenance-of-Way Association (AREMA) was initiated and added to the transportation student group this past fall. The joint student organization, ITE/ASHE/AREWA, hosted a seminar by **Craig Groce** (BSCE 1972), of Moffatt & Nichol, who spoke about rail track design, maintenance, operations, and current projects. ITE/ASHE/AREMA was recognized by NCDOT for continued commitment to the adopt-a-highway program. For the past 16 years, students have worked with transportation engineers from local offices to clean Jones Franklin Road, south of I-440, twice per year. In April, **Elizabeth Hunter, Briana Phillips,** and **Shannon Warchol** participated in the Southern District ITE Traffic Bowl tournament in Georgia, winning 2nd place. Graduate students **Dylan Horne** (BSCE 2013) and **Shannon Warchol** presented their research at the North Carolina Section of ITE (NCSITE) annual meeting in Charlotte.

## Professional Engineers of North Carolina (PENC)

During the Spring 2014 semester, the student chapter of PENC held Boy Scout Engineering Day, a social at Raleigh Brewing Company with the PENC Central Carolina Chapter (CCC), and monthly meetings with local engineering firms. In fall 2014, PENC plans to kick off its new mentoring program and host workshops for career development. The chapter will host the PENC Golf Tournament, which will be sponsored by AMEC, and take a field trip to visit a landfill with Smith & Gardner Engineers. •

# Spring 2014 Baccalaureate Ceremony

The spring 2014 departmental baccalaureate ceremony was held on Saturday, May 10, 2014. Undergraduate degrees were conferred upon 116 students, including 90 in civil engineering, 13 in construction engineering and management, and 13 in environmental engineering. Master's degrees were conferred to 50 students, including 44 in civil engineering and six in environmental engineering. Four doctor of philosophy degrees were conferred.

**Joel Shuford** delivered the valedictory address and plans to attend graduate school at NC State to focus on water resources. **Demi Gott** delivered the Chi Epsilon address. Demi plans to work in the area at a civil engineering firm.

The commencement address was given by **Henry Lucas**, (BSCE 1973, MSCE 1977), co-founder and president of Engineering Consulting Services (ECS), Ltd. ECS provides geotechnical, environmental, construction material, and

facilities consulting and services. Mr. Lucas highlighted the importance of accepting difficult assignments, developing managerial skills, and communicating honestly with clients and colleagues. He reminded students, "Graduation puts you at the starting line of the race, not at the finish line." Mr. Lucas concluded by encouraging students to work diligently and accept challenges. •

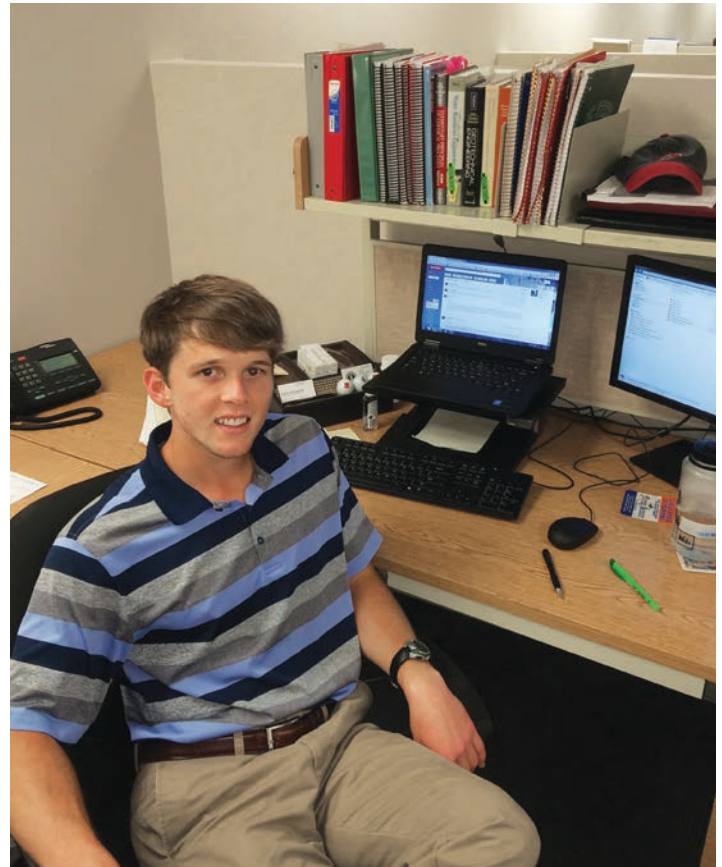


Henry Lucas delivers the commencement address.

## Hazen & Sawyer sponsors employee graduate study and research in CCEE

The Raleigh, NC office of **Hazen & Sawyer** (H&S) has developed a Research Internship Program that enables an employee to pursue a full-time graduate degree in CCEE and collaborative research with H&S engineers and CCEE faculty. H&S covers tuition and fees and provides time to work at CCEE facilities on research. Although H&S is a multinational environmental engineering and services company, this program is unique to its Raleigh office and to CCEE. "The post graduate intern program allows the student to get real world experience while obtaining an advanced degree," according to H&S Vice President **Alan Stone** (BSCE, 1987; MSCE, 1989). Fellow H&S Vice President **Michael Bullard** (BSCE, 1984; MCE, 1986) believes that the program "is an opportunity to score a 'triple win' for the university, our employees, and our company."

The first program graduate, **Hunter Long** (MS ENE, 2012), worked with Drs. **Joel Ducoste** and **Tarek Aziz** on a life-cycle assessment of anaerobic co-digestion of fats, oils, and grease with municipal wastewater solids. The second participant, **Clark Maness** (BS ENE, 2014), started an MS in civil engineering this fall and will work with Drs. **Detlef Knappe** and **Francis de los Reyes** on the impacts of thermally hydrolyzed waste activated sludge on wastewater treatment facilities. A key benefit of the program, according to Stone, is that it "presents the perfect opportunity for the university and Hazen and Sawyer to collaborate on cutting edge research directly pertinent to the water industry." •



Clark Maness at Hazen & Sawyer office in Raleigh, NC





CCEE students and Dr. William Rasdorf (front) at Cesky Budejovice in front of the Sampson fountain.

## Civil Engineering Summer 2014 Study Abroad Prague, Czech Republic

From May 10 to June 22, a group of 20 students from CCEE participated in the 4th Civil Engineering Summer Study Abroad program in Prague, Czech Republic.

Rising senior **Adam Cox** called the trip a “once in a lifetime opportunity.” The group utilized the facilities of NC State’s only international satellite campus at the Prague Institute, which provided housing and classroom facilities, program support, and language translation assistance. Centrally located in this historic medieval city, the Prague Institute was an ideal learning and cultural immersion center for the program. Rising senior **Britton England** was excited to “get to live in another country that is vastly different from the United States,” also adding “Prague is beautiful!”

The students were accompanied by Professors **William Rasdorf** and **Rudi Seracino**. Students enrolled in CE 301 Civil Engineering Surveying and Geomatics, CE 327 Reinforced

Concrete Design, taught by Rasdorf and Seracino, respectively, and courses offered by the Prague Institute. The Prague experience focused on three themes: (1) high-density city evolution and development with an emphasis on architecture; (2) city planning emphasizing long term urban development; and (3) public transportation networks including rail, street cars, and buses.

Students took tours and visited museums that emphasized the development and evolution of Prague infrastructure and cultural and historic aspects of the Czech Republic. For example, the group visited the old Prague Wastewater Treatment Plant Museum. Several social activities were organized including visits to religious, cultural, and historical sites, and unique tourist attractions in Prague and Kutna Hora. The Institute hosts also arranged a three-day field trip to the historic towns of Cesky Krumlov and Cesky Budejovice, south of Prague. •





Clockwise from top left: Glenn Kistler (BSCE, 1982) (5th from the left) hosts the site visit for Dr. Jim Nau's (on right) CE 426 Steel Design Class at Alliance – Building One, Spencer Rogers (kneeling) demonstrates the growth and survival abilities of dune grass, and Mason Inlet as seen from the Shell Island Resort at Wrightsville Beach.

## Field trips bring classroom experiences to life

Undergraduate students in CCEE participated in several field trips during the spring semester to complement their classroom education.

A group of about 20 undergraduate and graduate students traveled to the North Carolina coast for a field trip on Saturday, March 22. The trip was part of the CE 487 Introduction to Coastal and Ocean Engineering course. The trip was led by Dr. **Beth Sciaudone**, a teaching assistant professor in CCEE, and **Spencer Rogers**, a coastal construction and erosion specialist with the North Carolina Sea Grant program.

The group visited Kure Beach and Wrightsville Beach near Wilmington to learn about coastal erosion, beach nourishment and coastal structures. At multiple stops along these beaches, students learned about the efforts to preserve historic Fort Fisher, considerations for sustainable coastal building construction, and the evolution of the beaches in the region.

The trip concluded with a visit to Mason Inlet, which provides a crucial link between the Intracoastal Waterway and

the Atlantic Ocean. The inlet was relocated northward in 2002 to its position of 15 years earlier, to protect development on the north edge of Wrightsville Beach. The project also created a bird sanctuary. Students learned about the engineering design of the project, as well as its intended and unintended effects on the coastal system.

On April 11, students from **Steve Welton's** CE 420 Structural Engineering Project class visited the site of Alliance – Building One, which is being constructed on NC State's Centennial Campus. The students were able to see the steel framed structure of the five-story building and the foundations for the adjacent concrete parking garage. These building components closely matched elements of the students' senior design project. The tour was led by **Glenn Kistler** (BSCE, 1982), President of J.D. Beam, Inc., who is the General Contractor for the project. Kistler also hosted a separate site visit for Dr. **Jim Nau's** CE 426 Steel Design Class on April 22. •



# Celebration of 60th anniversary of Construction Engineering and Management program

The CCEE Department celebrated the 60th anniversary of its Construction Engineering and Management program with events on April 8 and 9, 2014. The celebration began on April 8th with a panel discussion at the Hunt Library. The program, entitled "The Changing Times of Construction – Where the Industry is Headed," was facilitated by **Tony Warner** (BSCEC, 1966). The panelists included **Dean Arp** (NC Representative, House District 69), **Betsy Bailey** (Professional Engineers of North Carolina), **David Crawford** (American Institute of Architects), **Matt Green** (Centurion Construction for Construction Financial Management Association), **Marty Moser** (Barnhill Contracting for Associated General Contractors), and **Ken Portnoy** (Balfour Beatty Construction). Perspectives were offered from the designer, contractor, and owner viewpoints. NC Department of Transportation Secretary **Tony Tata** summarized the panel discussion and also provided his thoughts on the future of the construction industry. Chancellor **Randy Woodson** welcomed attendees and provided remarks on the importance of the industry to the University.

A reception and banquet followed with **Tom Bradshaw** as the master of ceremonies and **Peter M. Lehrer** (BSCEC, 1963) as the guest speaker. Former Construction Program Head Dr. **David W. Johnston** (BSCEC, 1966; MSCE 1968; PhD, 1972) provided a historical journey through the evolution of construction education at NC State, starting in 1895. The presentation was highlighted by pictures of alumni, faculty, and Mann Hall collected over the decades. A BSCE-Construction Engineering Option was started in 1927, suspended during WWII, and restarted as a BS in Construction in 1949. In 1954, the BS in Civil Engineering Construction Option was initiated and was renamed to the BSCEM degree in 1995. Johnston noted various anniversaries - 119th, 87th,



The 60th anniversary of the Construction Engineering and Management program was celebrated with discussion and dinner.

65th or 60th - could be argued, but 60th was chosen because it reflects the founding of the current accredited degree. The program history can be found on [go.ncsu.edu/CEM\\_history](http://go.ncsu.edu/CEM_history).

**Berry Jenkins** (BSCE, 1965), representing the Carolinas Associated General Contractors (AGC), presented the AGC Outstanding Senior in Construction award to CEM student **William Smith**. **Joseph Rucker** (BSCEC, 1979), representing the General Contractors Association Raleigh, announced scholarships and made a presentation to CEM student **Samuel St. Claire**. The annual CCEE Golf Outing and Dinner were held on April 9th. About 250 people attended the panel discussion, 136 attended the anniversary dinner, and 120 attended the golf outing. The organizing committee included **Tom Bradshaw**, **Lora Bremer**, Dr. **Ed Jaselskis**, Dr. **David Johnston**, **Kellie Renzi** (BSCEM, 2012), **Pamela Townsend** (BSCE, 1984; MSCE, 1987), **Tony Warner**, **Reulali Orgut**, **Blair Bordeaux** (BSCEM, 2003), **Maggie Weeks** (BSCEM, 2005), and **Roberto Nunez** (MCE, 1988). •

# Firm of the Month: Views from Participating Firms

*The idea for the Firm of the Month was suggested by the CCEE Departmental Advisory Board. The Firm of the Month program is our way of thanking and promoting our corporate partners while educating our students about current engineering practice. This program provides participating firms with name recognition for recruiting and business opportunities, demonstrates to students the ways that they can use their degrees after graduation, and provides information on employment opportunities.*



**Freese and Nichols, Inc.** (FNI) was excited to participate as the Firm of the Month for September 2014. We also hosted two pizza parties and held an open house student event at our Centennial Campus office. FNI President and CEO **Bob Pence**, PE, answered students' questions and talked about what it's like to work at FNI. Our engineers gave presentations and discussed current topics at AWWA-WEA and ASCE student chapter meetings. Founded in 1894, FNI is a professional team of more than 500 employees, including engineers, scientists, geologists, architects, planners, technical professionals and support staff. Dedication to employees is a top priority at FNI and we are proud to offer a family- and community-oriented culture that we hope many Wolfpack students will one day experience. FNI is a Malcolm Baldrige National Quality Award recipient, the Best Large Civil Engineering Firm to Work For by *CE News*, and a Best Company to Work For in America according to the Society for Human Resource Management and the Great Place to Work Institute.



**Simpson Engineers & Associates** (SEA) was honored to be chosen as "Firm of the Month" by North Carolina State University's Department of Civil, Construction, and Environmental Engineering. **David B. Simpson** (BSCE, 1981), Jr., president and CEO of Simpson Engineers & Associates, will always be grateful for the education and solid engineering foundation that he received while attending NC State. As a 1981 graduate, Mr. Simpson has experienced first-hand the incredible opportunities the school offers. NC State graduates comprise over 25 percent of the staff of SEA. As a continued supporter of the College of Engineering, SEA has sponsored the Paul Zia Distinguished Lecture as well as other events within the college. Mr. Simpson also sits on the CCEE department advisory board. SEA looks forward to continuing to support the efforts of the school and hopes to utilize many of the graduates of engineering programs.



**McKim & Creed**, one of the top 500 design firms in the U.S. according to ENR, is delighted to be chosen as the Firm of the Month for October. Both **Herb McKim** (BSCE, 1973), PE, PLS, and **Michael Creed** (BSCE, 1973), PhD, PE, are NC State graduates (along with 45 other employees), and when they established McKim & Creed in 1978, they never dreamed that one day they would lead a 350-person engineering, surveying and planning firm headquartered on the Centennial Campus of their alma mater. From our Centennial Campus location, we enjoy interacting with the students of the Civil, Construction, and Environmental Engineering Department (several of whom we hope will become future employees) and truly believe that the enthusiasm, creativity, and resourcefulness we have seen from these students bode well for the future of engineering and its contribution to our communities. We are proud of the work we do and were pleased to have an opportunity to share examples of our work with the students and faculty.



**Crowder Construction Company** was honored to recently participate as Firm of the Month. Being Firm of the Month was an excellent opportunity to promote employment and future leaders at Crowder and to expand our client base in the Raleigh market. We were proud to display our projects and programs on the walls of Mann Hall; we consider it an honor to support the Pack! Crowder has an active Cooperative Education program; many of our co-ops have come to work for us full time and are now training new students, which keeps the Wolfpack pride growing throughout Crowder. Crowder is an ENR Top 400 General Contractor serving the Southeast for over 60 years. Projects are completed by design-build, engineering, procurement and construction (EPC), construction manager and traditional methods. Crowder has self-performance capabilities on water/wastewater facilities, heavy civil projects, electrical projects, federal and landfill/digester gas-to-energy projects and solar.



# Letter from the **Chair of the Department Advisory Board**



Heather Denny

The end of summer is an exciting time for the many young adults who are beginning their college career. Think back to the first day that you walked into Mann Hall, perhaps with some trepidation and perhaps taking for granted the opportunity to study at NC State. Today, as NC State continues to grow, the department is working to maintain excellence in a time

of decreasing state support. Clearly we are succeeding. Throughout this newsletter, there are great stories about the accomplishments of our students, faculty and alumni, and they all begin with the start of the first semester. This year alone, the department was able to add some of the very best new faculty in the country.

During our spring Industry Advisory Board meeting, we continued to stress the importance of engaging the public and in telling our story. The department is:

- Preparing workforce-ready students,
- Conducting world-changing research, and
- Accelerating job creation.

In addition to telling the story, we need your help to publicize the needs of the Department of Civil, Construction, and Environmental Engineering. Our students are still walking into Mann Hall to use the same facilities that we used many years ago. We all know that equipment and technology continue to progress and we need to make sure that our students and faculty have the best tools as they move forward. You are our link to the community: please help us create awareness of the need for a new building so that the College of Engineering can complete the Engineering Oval on Centennial Campus and unite all engineering students on one campus.

How can you become more involved? We have an active Industry Advisory Board as well as a group of Departmental Fellows. The Departmental Fellows are a group of people who are interested in the department and willing to contribute a little time to interact with students and faculty in support of our threefold mission of education, research and extension. If you are interested in participating, then please let me or Dr. Barlaz know. This past spring, we started a monthly email to the Fellows and Advisory Board with updates on new hires, awards and other news about the department. If there is a particular area of interest, please let us know.

We look forward to your engagement and conversation.

Heather Denny (BSCEC '95)

*President and CEO*

McDonald York Building Company

hdenny@mcdonaldyork.com

*The Department receives valuable input from its Advisory Board. The Board maintains and fosters relationships with students, faculty, the Dean of the College of Engineering, the community, alumni and supporters. The Advisory Board assists the department head in achieving department goals and objectives and provides counsel and advice from its unique perspective. The Board also advocates for the Department with the College of Engineering, the university and the community. Board members are also typically engaged in other ways, such as advising students in design courses, helping to connect faculty with industry stakeholders, and development. The Advisory Board meets each semester. Members serve for a four-year term.*

The following distinguished alumni and friends of the Department currently serve on the Board:

**Sepi Saidi**, BSCE 1993  
SEPI Engineering & Construction

**Bill Pope**, BSCEC 1983  
Pope Custom Homes

**Suzanne M. Beckstoffer**,  
BSCE 1982  
Newport News Shipbuilding

**Richard Rohrbaugh**, BSCE 1981  
Kimley-Horn and Associates

**Thomas W. Bradshaw, Jr.**  
Formerly Secretary of  
Transportation  
NC State Ports Authority

**David Simpson**, BSCE 1981  
Simpson Engineers &  
Associates, P.C.

**Heather Denny**,  
BSCEC 1995 (Chair)  
McDonald-York Building Co.

**Stacey Smith**, BSCEC 1992,  
MCE 2004  
Smith Gardner, Inc.

**Barry Gardner**, BSCEC 1975  
Shelco Construction Co.

**Alan Stone**, BSCE 1987  
Hazen & Sawyer

**John Jenkins II**, BSCE 1990  
Stewart Engineering

**Hans Warren**, BSCEC 1984  
Warco Construction, Inc.

**Christopher Murphy**,  
MSCE 1999  
FDH Engineering, Inc.

**Tony Warner**, BSCEC 1966  
Warner Construction

**Dan Pleasant**, BSCE 1972  
Dewberry

**Dr. James Wilson**  
NC State University  
Edward P. Fitts Department of  
Industrial and Systems  
Engineering

# ALUMNI NEWS



Donna Hollar

**DONNA HOLLAR** (PhD 2011), assistant professor of construction management at East Carolina University, received an Early Career Award from ELECTRI International to investigate "Best Practices for Journeyman Transition to CW/CE Supervisor." ELECTRI International works to help electrical contractors

meet today's demands and tomorrow's challenges by funding, conducting, coordinating, and transforming research results into meaningful and useful educational and consulting programs.

**PHIL LEWIS** (PhD 2009) is an assistant professor in the School of Civil and Environmental Engineering at Oklahoma State University. His research includes characterization of the impact of prefabrication on productivity in building electrical construction.



Behdad Yazdani

**BEHDAD YAZDANI** (MS ENE 2013) won the 2nd place MS Thesis Award from the Air & Waste Management Association (A&WMA) for his thesis entitled "Road Grade Quantification Using GPS in On-Board Vehicle Emission Measurements." Mr. Yazdani is with Trinity Consultants doing air quality and permitting work in Baton Rouge, LA.

**JUNYU ALLEN ZHENG** (PhD, 2002) is a full professor at South China University of Technology in Guangzhou, China. Prof. Zheng won the 2013 Chinese National Distinguished Young Scholar Science Fund awarded by the National Science Foundation of China. Only 3 to 4 awards are given nationally each year to young distinguished scholars (younger than 45 years old) in the environmental science field. Prof. Zheng also recently published a book on emission inventory methods.

**G. TODD HODGES** (BSCE, 1964), president and owner of H.M. Kern Corporation, has been awarded the 2013 Carolina Association of General Contractors (AGC) Pinnacle Award for Renovations to the Chatham County Courthouse. This award is the most prestigious recognition in the Carolinas construction industry honoring the work of general contractors.

**MIKAYLA D. HIGGINS** (BSENE 2011) and **MATTHEW S. ARMSTRONG** (BSCSC 2011) were recently married. Mikayla will be working toward her master's degree in environmental science and engineering in the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill. Matt is employed at Oracle Americas, Inc in Morrisville. The couple reside in the Raleigh area.

**CHRISTIAN BOWEN JACKSON** (BSENE 1999) was named Young Engineer of the Year – Florida Engineering Society (Broward Chapter) 2013 and has received numerous awards in the last few years, including Young Professional Practice Leader of the Year – Reynolds, Smith & Hills 2012; American Council of Engineering Companies (ACEC) Engineering Excellence Award National Finalist Recipient for the Water Resources Category, 2010; Florida Institute of Consulting Engineers (FICE) Engineering Excellence Award Grand Award Recipient for Water Resources Category, 2010; Southeast Construction's Best of 2010 – Award of Excellence in Civil/Public Works; Project of the Year from the American Society of Civil Engineers (ASCE) Broward Branch, 2010; Stormwater Solutions Top Projects, 2010.

**DEAN KEITH BINGHAM** (BSCE 1978) retired from the Goldsboro Area Office of the US Department of Agriculture (USDA) Natural Resources Conservation Service on January 3, 2014 after a 36-1/2 year career serving as a CE with the agency.

## Share Your News

Keeping your contact information current enables us to keep you up to date on events in the department and elsewhere. Have a professional or personal update? We would like to hear from you!

Please send us your latest news (e.g., career accomplishments, awards, recognitions, marriage, births, retirement) so we may share your news in future issues. Send the following information and/or news stories to [lfbremer@ncsu.edu](mailto:lfbremer@ncsu.edu):

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**Company Name and Address**  
**Work and Cell Phone Numbers**  
**Degree, Major and Class Year**  
**Announcements**



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For more information, contact:

**Lora Bremer, CCEE, Director of Development**

**Phone: 919.513.0983**

**Email: [lfbremer@ncsu.edu](mailto:lfbremer@ncsu.edu)**

The advertisement for Engineering Online is divided into two main sections. The top section features a photograph of a large group of graduates in red caps and gowns, with some raising their hands in celebration. Below this photo is a red banner with the text "ENGINEERING ONLINE" in white, followed by a right-pointing arrow and the text "PROVIDING QUALITY DISTANCE EDUCATION PROGRAMS TO ALUMNI AND PROFESSIONAL ENGINEERS SINCE 1978". The bottom section features a photograph of a woman with blonde hair and glasses, wearing a dark jacket, leaning over a desk and writing on a blueprint. On the desk are several rolled-up blueprints and a red mug. To the left of the woman, the text "Degree Programs Designed to Meet the Needs of Professional Engineers" is written in a serif font. Below this, the text "ONLINE MASTER'S DEGREE PROGRAMS" is written in a bold, sans-serif font, followed by "Master of Civil Engineering" and "Master of Environmental Engineering" in a smaller font. At the bottom of the advertisement, there is a black bar with the text "NC STATE Engineering" on the left and "EngineeringOnline.ncsu.edu" and "www.ce.ncsu.edu/academics" on the right.

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