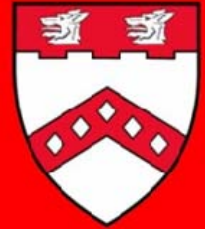


# CCEE NEWS

Civil, Construction, and Environmental Engineering  
[www.ce.ncsu.edu](http://www.ce.ncsu.edu)



## In This Issue:

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- Paul Zia Distinguished Lecture
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## Department Head's Message



The Fall semester is off to a smooth start. We were able to start off the year with a welcome back ice cream social for students, faculty and staff thanks to the generous support of **FDH Engineering**. There is a lot that is new in Mann Hall. First, it is a pleasure to extend a warm welcome to three new faculty: Dr. **Ed Jaselskis**, the **Jimmy D.**

**Clark Chair in Construction**, Dr. **Mohammad Pour-Ghaz** who recently completed his PhD at Purdue, and Dr. **Emily Zechman** who joins us from Texas A&M. In addition, Mr. **Matt Poisel** has joined us as an extension specialist after having completed his M.S. in Construction in our department. You can read more about each of our new faculty in this issue. Second, congratulations to Dr. **Sankar Arumugam** who has been promoted to Associate Professor with tenure. Sankar works at the interface of climate and water management focusing on large-scale hydroclimatology. You can learn more at <http://www.ce.ncsu.edu/faculty/sankar-arumugam>. Third, we have made a number of changes to the space in Mann Hall to increase utilization and efficiency as we await the opportunity to move to Centennial Campus. The lobby now features four student computer work areas equipped with computers and large monitors. A work area has also been added to the Shelco Lounge on the fourth floor. Finally, we have constructed eight new faculty offices since last year while moving some graduate students to offices in Daniels. More changes are in store this year as we renovate lab space in Burlington.

Interest and demand for our programs continues to be strong. Our graduate enrollment has reached a record of 359 students, including 110 in the PhD program and 87 students working on Masters Degrees through distance education. We are offering 15 distance education courses this semester and have plans for an additional 14 next semester. At the undergraduate level, we have approximately 930 students interested in pursuing degrees in Civil, Construction, and Environmental Engineering.

As you can read in this issue, we had a very successful design competition sponsored by **Kimley-Horn**. Twenty-five

students competed for prizes over an intense but educational and rewarding weekend. We also arranged a trip for 12 students to the George Washington Bridge as part of a student enhancement program sponsored by the **Crowder Enhancement Fund**.

Also described in this newsletter is the 10<sup>th</sup> annual Zia Lecture. This was as special year as we celebrated the 50<sup>th</sup> anniversary of Dr. **Paul Zia** having joined NC State in 1961. Dr. Zia, Distinguished University Professor Emeritus, former Department Head and member of the National Academy of Engineering, has served the department, the university, the profession and society in an exemplary manner throughout his career, and I am proud to be associated with the same department as Paul.

The major story for this academic year is the drastically reduced budget. We are working with about \$390,000 (6.2%) less this year relative to last year while the demand for our programs has increased. This has meant a 25% reduction in teaching assistants, larger class sizes, reductions in staff support, deferred maintenance, and an overall difficult atmosphere as we try to work through the year. The budget is causing some fundamental restructuring in how we operate.

While the budget situation is difficult, I want to maintain an upbeat attitude and focus on our successes and all of the things that we do so well. I have just completed a power point presentation that describes activities in the department including our academic programs and research highlights across the department. We continue to be a leader in research on many aspects of society's infrastructure, working across disciplines at scales ranging from nano-scale to field-testing and monitoring. Please check out the presentation at ([www.ce.ncsu.edu/about](http://www.ce.ncsu.edu/about)) and let me know what you think.

Thanks again for your interest and continued support; it means a lot to us.

Morton A. Barlaz  
**Professor & Head**

### About the cover:

Students from Venezuela, Ecuador, Guatemala, and Costa Rica visited this summer for the **Civil Engineering Practicum**, organized by Dr. **John Stone** and hosted by the **CCEE Department** (see article on page 8). The photo shows faculty and students participating in the Practicum during a field trip to the Raleigh rail yard of the **North Carolina Department of Transportation**. AMTRAK operates passenger service between Raleigh and Charlotte using locomotives and passenger cars provided by NCDOT. NC 1869, shown in the picture, is an F59PH locomotive with a 3,000 horsepower engine. Ph.D. student **Brandon Graver** presented a paper based on emissions measurements of this and other NCDOT locomotives at the Air & Waste Management Association Annual Meeting (see article on page 16).



### Billy Edge Elected as ASCE Technical Region Director

Dr. **Billy Edge**, Professor in the Department of Civil, Construction, and Environmental Engineering, has been elected to a three-year term as a Technical Region Director of the American Society for Civil Engineers.

The Technical Region is comprised of all ASCE members who have joined one or more of ASCE's Institutes. ASCE Institutes include: Coast, Oceans, Ports, and Rivers Institute; Environmental & Water Resources Institute; Construction Institute; and several others. Technical Region Directors represent these members and institutes on the Society's Board of Direction.

Duties of an ASCE Technical Region Director include chairing the Technical Region Board of Governors, dialogue with constituents and participation in meetings of the Board of Direction and other official assignments. The Technical Region Board of Governors, comprised of members from each ASCE institute, reviews activities of the Institutes and disseminates best practices among them.



Dr. Billy Edge

Founded in 1852, the American Society of Civil Engineers (ASCE) represents more than 140,000 members of the civil engineering profession worldwide and is America's oldest national engineering society.

Professor Edge is a Distinguished Member of ASCE. He is interested in sustainable engineering practices in the coastal environment, coastal engineering, dredging technology, coastal zone management, hydraulic engineering, and modeling of coastal processes. Professor Edge directs the **Wave Energy Research Program** at the **Coastal Studies Institute** in Manteo, NC.

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### FDH Engineering Sponsors CCEE News

**FDH Engineering, Inc.**, is the proud sponsor of *CCEE News*. FDH Engineering, Inc., a multi-discipline consulting firm founded in 1994, has a national presence, having worked on projects throughout the United States as well as Puerto Rico, the Virgin Islands, South America, Korea and Japan. Its staff includes more than 130 professionals at the forefront of their industry in structural engineering, geotechnical engineering, water resources engineering and non-destructive testing. Additionally, FDH offers a broad array of services to the construction industry, including construction management, sustainable engineering and LEED consulting services. FDH has offices in Baton Rouge, LA and St. Louis, MO in addition to its headquarters in Raleigh.



#### Contributions Sought for Johnston Fellow Fund

In honor of Dr. **David Johnston**, the **Edward I. Weisiger Distinguished Professor Emeritus in Construction Engineering and Management**, who retired in December 2010, the Department has established a fund for an award to be given to an outstanding graduate student in the CEM program. The student each year will be referred to as the Johnston Fellow. This award will be given either to an existing student or to help attract a new graduate student to the CEM program. Providing financial support to a deserving CEM grad student is the perfect way to honor Dr. Johnston as his priority was and always will be the student. If you are interested in contributing to this fund, please contact Lora Bremer, Director of Development for the department at 919-513-0983 or send checks payable to NC State Engineering Foundation to NCSU CCEE, Box 7908 Mann Hall Raleigh, NC 27695.





### Ed Jaselskis Joins Department as the Inaugural Jimmy D. Clark Distinguished Professor



Dr. Edward J. Jaselskis

**Dr. Edward J. Jaselskis** has joined the CCEE Department as the inaugural **Jimmy D. Clark Distinguished Professor** in Construction Engineering and Management (CEM). His appointment was effective June 1, 2011.

The Clark professorship was established in 2007 by **Jimmy D. Clark**, a registered professional engineer and a 1974 civil engineering alumnus. Clark is the owner and president of **Guy M. Turner, Inc.**, which was founded in

1924 and is based in Greensboro, NC. The company has 10 offices in seven states and specializes in heavy rigging, specialized transportation and crane services. Clark is a member of the NC State Engineering Foundation Board of Directors and is chairman of the university's Board of Visitors. Clark is also a member of the Dean's Circle, the Student Aid Association and the Alumni Association.

Dr. Jaselskis has conducted research in the areas of construction project success and advanced information technologies with funding provided by federal (National Cooperative Highway Research Program and National Science Foundation), state (Iowa DOT), and industrial sponsors (Weitz, Western Summit, and the Construction Industry Institute). He recently completed a NSF project to learn how ancient engineers succeeded in building roads and other structures on the steep and unstable mountains of the Andes and how to apply this knowledge to modern engineering practice. He is now working on a Construction Industry Institute project to research and document innovative practices for managing indirect construction costs to the mutual and shared benefit of both owners and contractors. He expects future research to involve the use of smart construction techniques such as virtual project management, building information modeling (BIM), and laser scanning to more efficiently design and build construction projects. As a near-term goal, he plans to create a Tele-Engineering and Management

Laboratory and perform research in the area of tele-presence and the use of distributed virtual project teams to manage construction projects.

Dr. Jaselskis currently teaches the Legal Aspects of Construction course (CE 464/564). He plans to teach a graduate level preconstruction engineering and management course in the spring. In the future, he would like to teach a course related to advanced construction technologies.

With regard to relevance of his research and teaching to societal needs, Jaselskis states, "learning how to design and build projects more sustainably is key to meeting our growing societal needs in such areas as water, energy, food, and infrastructure." His research involves "the use of technologies that can be implemented to reduce the time and cost to build projects and improve their quality."

The quality of NC State's CEM program was a key factor in attracting Dr. Jaselskis to his new position. According to Jaselskis, the CEM program "has a rich tradition dating back to the early 1950's." He is pleased to "be a part of this great program" and to have the "opportunity to learn, share, and continue to build the program." Furthermore, he is "honored to be the first holder of the Jimmy D. Clark Distinguished Professorship."

He received his bachelor's degree in general engineering from the University of Illinois at Urbana-Champaign in 1980; his master's degree in civil engineering from the Massachusetts Institute of Technology in 1982; and his PhD in civil engineering from the University of Texas at Austin in 1988. Between the MS and PhD degrees, he worked for Exxon as a cost and schedule engineer in New Jersey and field engineer on an open pit coal mine project in Colombia, South America. He has also worked for Perkins and Will, an architectural engineering firm, as an electrical designer and for Bechtel, an international construction company, as a civil field engineer. Among his professional service activities, he served as Chief Editor of the *ASCE Journal of Construction Engineering and Management*. In recognition of his many accomplishments as a senior leader in construction engineering, he was inducted into the **National Academy of Construction** in October 2011.



### Emily Zechman Joins Environmental Engineering and Computing & Systems Faculty



**Dr. Emily Zechman**

**Dr. Emily Zechman** joined the faculty of the CCEE Department in August 2011 as an assistant professor. She came to CCEE from the Department of Civil Engineering at Texas A&M University, where she had been an assistant professor since 2007. This is Dr. Zechman's second stint at NCSU. She was a Ph.D. student and a postdoc in CCEE for a combined six years. "I am excited to call the Triangle area and NC State my home again," said Zechman. She rejoined the department because of its strong water resources and environmental program and "a one-of-a-kind computing and systems group."

Recent awards received by Dr. Zechman include 2011 Honorable Mention at the U.S. Environmental Protection Agency's National Expo for Sustainability Design; Best Research-Oriented Paper Awards for 2010 and 2011 from ASCE's *Journal of Water Resources Planning and Management*, and recognition as a 2010 ASCE Outstanding Reviewer for the *Journal of Hydrologic Engineering*. Her academic background includes BSCE and MSCE degrees from the University of Kentucky, and a PhD in Civil Engineering from NC State.

Dr. Zechman's research goal is to answer the question: "How do human behaviors and choices impact the performance of engineered infrastructure systems?" Water resources infrastructure systems are built to serve the public, and the performance of these systems depends on how communities use them. As a result, there are feedbacks among the natural resources that power infrastructure, consumers, and the infrastructure itself. Dr. Zechman is developing a new area of research called sociotechnical systems analysis that couples engineering and environmental models with simulation of the social behaviors of individual residents. This research has application to exploring how people respond when a water distribution system is contaminated and how they conserve water in response to drought management restrictions. Dr. Zechman plans to develop a new graduate course for Spring of 2012 that will "provide graduate students with a unique opportunity to explore new models of the complex behaviors of the public as they interact with engineering infrastructure systems."

Dr. Zechman's research will provide new insight regarding how social dynamics influence the performance of infrastructure systems. Through this new knowledge and discovery, engineers such as Dr. Zechman and her students can find better ways to manage infrastructure systems to ensure the sustainability of water resources and protection of public health.

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### Matt Poisel Joins Department as Construction Lecturer & Extension Specialist



**Mr. Matt Poisel**

**Mr. Matt Poisel** joined the CCEE Department in April as a Lecturer and Extension Specialist in the Construction Engineering and Management group. His interests include: technology applications to construction; Occupational Safety and Health Administration (OSHA) safety training; construction certification training, including certificates from the American Concrete Institute and OSHA; small business development in construction; construction industry training and continuing education; and construction industry partnerships for education. His teaching includes CE 466 - Building Construction Engineering and CE 468/568 - Construction Engineering Lab. He is active with student groups, serving as faculty advisor to the National Association of Home Builders (NAHB) student chapter, co-advisor to Association of General Contractors (AGC) student chapter, and advisor to ASCE student chapter Steel Bridge team.

A Raleigh native and an NC State graduate, Mr. Poisel was happy to accept this opportunity to "help the department and the university through working with students." He enjoys the "entrepreneurial spirit of the extension program" which allows him to "pursue my interests in construction."

*(continued on next page)*



### Dr. Mohammad Pour-Ghaz Joins Structures and Mechanics Faculty



**Dr. Mohammad Pour-Ghaz**

**Dr. Mohammad Pour-Ghaz** joined the CCEE Department this fall as an assistant professor in the structures and mechanics group. Factors that attracted him to his new position include joining a “known program with successful faculty,” the opportunity to participate in a “collaborative and friendly environment,” and the local area being a “very good place to live.”

Dr. Pour-Ghaz studies the durability of reinforced concrete materials and structures with the goal of better understanding the deterioration mechanisms and distress factors affecting concrete infrastructure. His studies aim at developing mechanistic models for accurate service life prediction of concrete infrastructure and developing test methods for fundamental material characterization. Examples of deterioration mechanisms include corrosion of steel in concrete, freeze-and-thaw, chemical attack, salt ingress, and effects from moisture. In related work, he studies the effect of lightweight aggregate and chemical additives on long-term performance of concrete. To support his research on deterioration of concrete, Dr. Pour-Ghaz is developing new electrical imaging techniques, sensing skins for concrete elements, and self-sensing concrete materials.

This research contributes to the safety of structures, such as bridges, by providing methods for service life prediction and sensing and monitoring solutions for continuous and real-time health monitoring. Such monitoring would identify deterioration mechanisms that are not detected by conventional testing methods. Thus, this type of monitoring will provide engineers with tools for estimating the remaining service life of the concrete structure, and for scheduling repair and maintenance.

This semester, Dr. Pour-Ghaz is teaching CE214 Statics. In the spring, he will teach a new graduate level course on Advanced Concrete Infrastructure Behavior. The new course will cover a wide range of advanced topics including non-linear fracture mechanics, heat and mass transfer, and composite materials design. This course will help students to better understand the material-level behavior of reinforced concrete elements and their effect on structural behavior.

Dr. Pour-Ghaz earned his B.S. in Civil Engineering from Tabriz University, Iran, in 2003, after which he practiced as a research engineer in the area of nondestructive testing of composites and concrete in a research and development company in Concord, Canada. After receiving his M.S. degree in 2007 from Carleton University, Canada, he attended Purdue University where he earned his Ph.D. in Civil Engineering with an emphasis in concrete materials. While at Purdue, he received the William L. Dolch award for outstanding research in material science and the Magoon award for excellence in teaching.

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#### *Poisel (continued from page 5)*

As an undergraduate at NC State, Mr. Poisel majored in Civil Engineering (Structural Concentration) and Construction Engineering and Management, thereby earning two B.S. degrees. Moreover, he earned an undergraduate minor in Entrepreneurial Thinking. He continued for a M.S. in Civil Engineering at NC State within the Construction Engineering and Management program. His work experience includes internships with POLYCON Construction Group and United Forming, Inc., and working as a coop student for Newport News Shipyard. Recognition for his achievements include a 2009 nomination by the CCEE Department for the Outstanding Senior Award for Leadership, the 2009 American Council of Engineering Companies (ACEC) Future of Engineering Award, and membership in Tau Beta Pi, the engineering honor society.

**Visit our new Online Store** where you can now order T-shirts, sweatshirts and other items with the CCEE logo. Go to the CCEE website ([www.ce.ncsu.edu](http://www.ce.ncsu.edu)) and scroll down to the bottom for a link to all the selections. You can also view samples of some items in **Toni's office (MN 203)** - Stop by and take a look!





### Paul Zia Distinguished Lecture A Success



Mr. Bart Riberich and Mr. Lee Slade take turns at the podium.

these stadiums to design, manufacture, and install the mechanical equipment that provides “the magic behind the movement” and has provided similar services for large movable building components of many other noted public and private projects.

The lecture began with an historical review of movable components from the Roman Coliseum onward and then described the advantages of movable parts. For instance, the predominance of movable roofs for soccer matches is driven by that sport’s requirement of playing on natural grass, which necessitates opening up the field to sunlight or rolling the field out from under the stadium. Other advantages of movable components include the comfort of the occupants, aesthetics, environmental benefits, and economizing on utilities. The last portion of the lecture focused on plans and dreams for the future.

The 10<sup>th</sup> **Paul Zia Distinguished Lecture** was held on September 26, 2011 at the McKimmon Center. The lecture was given jointly by **Lee Slade** and **Bart Riberich**. Mr. Slade is Senior Principal of **Walter P. Moore**, consulting structural engineers headquartered in Houston. Mr. Riberich is President of **Uni-Systems, LLC** of Minneapolis. They spoke on “Engineering Transformative Structures – The Emerging Field of Kinetic Architecture.” Mr. Slade’s firm has been the structural engineer of record for several of North America’s most breathtaking retractable roof stadiums for National Football League and Major League Baseball teams as well as many other notable conventional buildings. Mr. Riberich has collaborated on



Dr. Paul Zia (foreground) and others listen to the Paul Zia Distinguished Lecture.



Reception and dinner at the State Club.

The afternoon opened with a tribute to Dr. Zia upon the 50<sup>th</sup> anniversary of his joining the department as an expert in prestressed concrete. Approximately 375 people attended the three-part, three-hour lecture event, including students from the Science, Technology, Engineering, and Math (STEM)-themed middle school on Centennial Campus, near the **Constructed Facility Laboratory (CFL)**. The CFL is the sponsoring organization for the annual series. The day began with Mr. **Slade** and Mr. **Riberich** spending time in the classroom. The day concluded with a dinner honoring the speakers at the State Club.



### Department Hosts Central and Latin American Students for Summer Practicum

The NC State Department of Civil, Construction, and Environmental Engineering hosted students from the Universidad Católica Andres Bello (UCAB), Caracas Venezuela, for a three-week summer practicum. Three years ago the Practicum expanded to include students from Universidad Metropolitana in Caracas, and this year students attended from Ecuador, Guatemala, and Costa Rica.

The CE Practicum began in the summer of 2001 when UCAB Dean of Engineering **Jose Ochoa** (then Head of the UCAB CE Department) contacted **Downey Brill** and proposed the concept. Since 2001, except for two summers, 20 to 30 senior students have attended each Practicum. These excellent students now work throughout the US, Europe and South America. Several students and UCAB faculty members have returned to CCEE for graduate degrees. Masters degrees were earned by **Jose Zubillaga**, **Antonio Marsal**, and **Michel Inserny**. **Alessandro Di Geronimo** is currently working on his MS. Practicum alumni **Luis Mata** and UCAB faculty member **Francisco Morera** earned PhD's.



Participants in the 2011 Summer Practicum with NC 1869, a recently rebuilt F59PH passenger rail locomotive, at NCDOT's Raleigh rail yard.

The CE Practicum offers participants a wide range of one and two-day seminars, laboratories, and field trips which emphasize practical applications in Civil, Construction and Environmental Engineering. In 2011, the faculty and their topics were: **Matt Poisel** and **Rudi Seracino** (reinforced concrete design and lab), **Dillon Lunn** and **Matt Poisel** (concrete structure testing), **Chris Bobko** (nanotechnology of concrete materials), **Min Liu** (lean construction methods), **David Johnston** and **Matt Poisel** (construction engineering lab), **Joe DeCarolis** and **Tarek Aziz** (sustainable energy concepts), **Detlef Knappe** (water quality and purification), **Mike Leming** and **Roberto Nunez** (construction engineering and management), **George List** (railroad engineering), and **Billy Williams** (advanced traffic control methods). The Practicum was complemented by teaching and research assistants **Ingrid Arocho**, **Travis Cox**, **Janelle Hygh**, and **Brian Narron**.

The students rounded out their academic work with some cultural experiences. They enjoyed a picnic at Lake Johnson, competed at a local bowling alley/bistro, and visited local shopping centers. Some students took weekend trips to Washington and nearby Chapel Hill and Durham. All students enjoyed the night life of downtown Raleigh and the NCSU campus.

According to Dean Ochoa, "the Practicum has become a milestone" as UCAB students enter their senior year. "Although only a few can make it, applications are well over the capacity for the program." For some, the Practicum is the first opportunity for students to visit the U.S., where "they can experience firsthand the American way of life and the high tech labs which are lacking in our universities." Ochoa goes on to state, "I cannot be thankful enough to Downey Brill for his initial support and to George List and Morton Barlaz for the continuity of theirs; to the CCEE faculty who year after year spend their time with our students and, last but not least, to John Stone, who made the first Practicum possible and whose dedication and commitment every year have made the program the success it is."

According to CCEE Department Head Morton Barlaz, "The Practicum is one more way we can extend our programs to a global community," adding that "it is always a pleasure to host a group of such motivated students."





### Honors, Awards, and Events

- ◆ Dr. **Rudi Seracino** (CCEE) and Dr. **Kara Peters** (MAE) were awarded \$30,000 from the NASA Graduate Student Researchers Program for a project entitled "Acousto-Optic Detection using Fiber-Bragg Gratings for the Purpose of Structural Health Monitoring." PhD candidate **Nehemiah Mabry** received the fellowship and will evaluate the technical feasibility of optical sensors as a non-destructive evaluation technique for detection of damage to fiber-reinforced polymer smart materials.
- ◆ Dr. **Billy Edge** has been elected to serve a three-year term (2011-14) as a Technical Region Director of the American Society for Civil Engineers (see article on page 3). Professor Edge is a Distinguished Member of ASCE. Professor Edge is interested in sustainable engineering practices in the coastal environment, coastal engineering, dredging technology, coastal zone management, hydraulic engineering, and modeling of coastal processes.
- ◆ The research of Dr. **Morton Barlaz** and Ph.D. student **Jim Levis** was featured in the *Raleigh News and Observer* on Monday, June 20. Their recently published research is based on the fact that when biodegradable materials are disposed in landfills, they release methane, a greenhouse gas, to the environment. As a result, biodegradable packaging materials may be doing more harm than good in some cases. The full article was published in *Environmental Science and Technology*.
- ◆ Dr. **Sankar Arumugam** was promoted to Associate Professor with tenure this summer. His research is at the interface of climate and water management focusing on large-scale hydroclimatology. He teaches several courses, including CE 383 - Hydrology and Urban Water Systems, CE 586 - Engineering Hydrology, CE 796A - Stochastic Methods in Water and Environmental Engineering and CE 796B – Hydroclimatology.
- ◆ Dr. **Morton A. Barlaz**, professor and Head of CCEE, was invited to serve on a U.S. Environmental Protection Agency (EPA) Science Advisory Board (SAB) panel on review of methods for estimating carbon dioxide emissions from biogenic sources. As currently defined, such sources include landfills. Dr. Barlaz's expertise includes refuse decomposition in landfills, integrated solid waste management and anaerobic bioremediation.
- ◆ **Brianne Ryen**, Graduate Student Services Manager in CCEE, received the Pride of the Wolfpack award in August. The Pride of the Wolfpack Award recognizes NC State employees for a special or unique contribution to their college/unit or the University. Ms. Ryen was recognized for "her pleasant attitude, helpfulness, dependability, and a great sense of responsibility."
- ◆ Dr. **H. Christopher Frey** was reappointed by U.S. Environmental Protection Agency Administrator Lisa Jackson to a second three-year term on the Clean Air Scientific Advisory Committee (CASAC). CASAC advises EPA on science pertaining to the National Ambient Air Quality Standards. Frey is currently chairing CASAC's Lead Review Panel and is a member of CASAC's Ozone Review Panel.
- ◆ **Brandon Graver**, a Ph.D. student, won 2<sup>nd</sup> Place for Best Paper at the Ph.D. level at the Annual Meeting of the Air & Waste Management Association in Orlando, FL this past June. Graver's paper was on the energy use and emissions of a plug-in hybrid vehicle (see related story on page 16).

The CCEE December 2011 **Commencement Ceremonies** will be held at **2:00 PM** on **Friday, December 16** at the **McKimmon Center** on the NCSU campus. The Commencement Address will be given by Dr. **John Fisher**, Chairman, **FDH Companies**. Dr. Fisher has a long distinguished career in civil engineering which has encompassed both private industry and academia. His specialty in coastal processes and engineering has carried him worldwide to work on the most difficult of problems and to testify in many legal proceedings. He is involved with all aspects of consulting, contracting, and corporate matters and was a former professor of Civil Engineering at NC State University from 1982-2003.



### In the Spotlight: Computing & Systems

*The Department of Civil, Construction, and Environmental Engineering (CCEE) is comprised of six “groups” that represent key disciplinary areas. The groups include: **structural engineering and mechanics; water resources and environmental engineering; transportation systems and materials; computing and systems; geotechnical and geoenvironmental engineering; and construction engineering and management.** This is the fourth in a series of articles that profile each of these groups.*

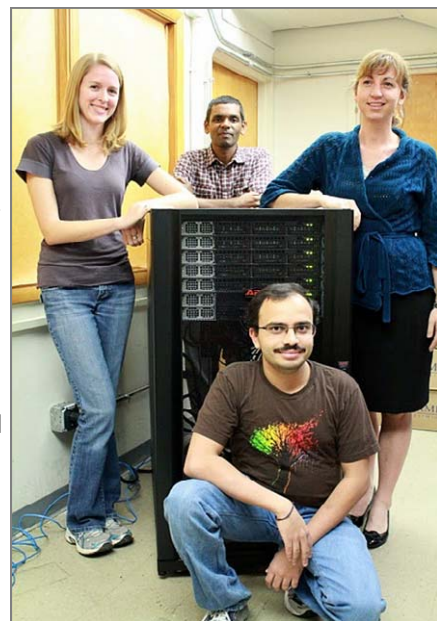
**Computing & Systems (C&S)** is a unique interdisciplinary program within CCEE that promotes the development of computing and systems methodologies for civil engineering problem solving. Like other engineering disciplines, civil engineering relies on models to assess the quality of design decisions that affect everyone. Better models and computational approaches lead to physical infrastructure designs that use less energy, conserve water, deliver goods faster, and support higher loads. Current research is devising entirely new approaches to engineering design, which represent considerable advancements in the state of the art for both engineering and computing. New approaches to solve highly complex problems using intensive simulation models are now becoming practical through a combination of powerful optimization techniques, such as genetic algorithms, and high performance computing systems that can quickly sift through many thousands of hypothetical designs. New models and simulation approaches are needed and are being developed to facilitate critical decision-making about energy infrastructure and alternative energy sources, predict water shortages impacted by climate change, and protect both the infrastructure and the communities that depend on it.

Computing and systems have long been areas of strength in CCEE, evolving into a formal program over a decade ago—one of the few in the country. Supporting the program are 10 faculty members, who represent the core areas in C&S including simulation and optimization, complex systems, decision analysis, high performance computing, and software engineering, as well as traditional areas of civil engineering, including construction, environmental, geotechnical, structural, transportation, and water resources engineering.

The C&S program has both an academic and a research component. Academically, it offers two undergraduate and 10 graduate courses and administers a graduate program for growing numbers of students in the department.

In addition to following traditional civil engineering paths, numerous graduates of the C&S program move on to successful careers with technology companies (for example, Intel, Microsoft, SAS, and IBM), federal research labs (Department of Energy, Environmental Protection Agency, and National Aeronautics and Space Administration), and academic positions. Proximity to Research Triangle Park gives students numerous opportunities for internships with local computing and networking companies, and with organizations such as the Renaissance Computing Institute (RENCI) and Research Triangle Institute (RTI).

Ties within the university, for example, with the Department of Computer Science and the Operations Research Program, enhance the experience of C&S students. In addition to its academic role, the program supports the maintenance and operation of the computer hardware and software infrastructure for department wide computational research and teaching. In addition, the C&S program actively maintains a High Performance Computing Laboratory (HPCL) that currently consists of four computing clusters totaling over 400 processor cores and several high end workstations. HPCL supports the research and teaching missions of the C&S program.



**A new 192-core computer cluster launched in September 2011 in the High Performance Computing Laboratory**

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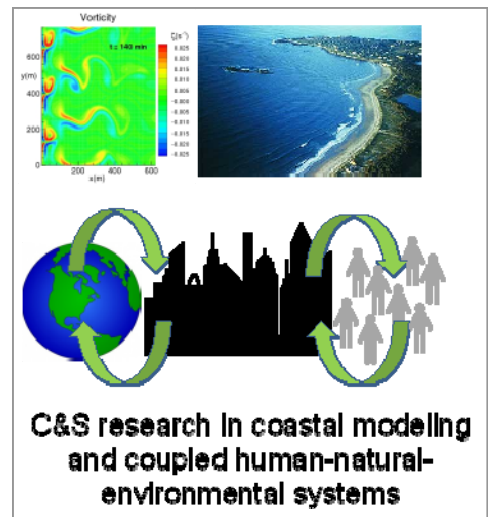


### Computing & Systems *(continued)*

#### Research Activities

The research program has a number of dimensions, with support from federal, state, and private sources, and with projects that range from theory to practice in all of the traditional areas of civil engineering. A key enabling technology in much of the group's research is the use of high-performance, networked computer systems that work together to solve problems cooperatively, and that drastically reduce the time required to get solutions. With underlying research in high performance computing, heuristic search, and numerical simulation, these resources are applied to long-standing design problems that confront engineers and policy makers. The potential of the identified infrastructure improvements is sweeping, and includes everything from resilient water supply systems to energy efficient design of buildings. Some examples of ongoing C&S research activities are:

- *Energy efficient buildings:* Investigating ways to improve energy efficiency of buildings by coupling innovative optimization methods with building information models in the architectural and engineering design processes.
- *Verification of real-time systems:* Developing techniques to verify the timing requirements of embedded, multiprocessor computer systems for active structural control and seismic protection of buildings.
- *High performance simulation-optimization frameworks:* Developing parallel algorithms and associated software frameworks to support real time optimization and inverse modeling for water distribution networks, groundwater transport, and seismic building design.
- *Infrastructure resilience:* Integrating system-wide resilience metrics with decision models and search algorithms to prioritize infrastructure investments and improve lifeline service resilience.
- *Leak detection & source characterization in water distribution networks:* Detecting leaks and contaminant sources in water distribution networks by integrating hydraulic simulation models and data with modern search algorithms that are enabled by high performance computing technologies.
- *Integrated waste management:* Developing, testing, and applying a novel life-cycle-based municipal solid waste management decision-support tool for generating integrated waste management plans that consider cost, energy and material consumption, environmental impacts and potential carbon prices.
- *Watershed management and climate change:* Developing data and modeling tools that are integrated with optimization methods to support water sustainability and adaptive watershed management considering land-use and climate change effects.
- *Coupled human-environment-infrastructure systems:* Assessing sustainability, resilience, and public health impacts of critical civil infrastructure systems such as water supply networks as they interact with society and natural resources using agent based modeling techniques and search methods enabled by high performance computing.







## Brief Notes from Student Groups in CCEE

Student groups in CCEE have had an active start to the academic year. A sample of their accomplishments to date and plans for the year follow.

### Engineers Without Borders-USA



EWB is currently participating in many exciting activities. The chapter is conducting research for the technical and cultural aspects of three projects: Bolivia Water, Sierra Leone Water and Sierra Leone Renewable Energy. A team of two students and a professional mentor will travel to Allentown, Sierra Leone for the Renewable Energy Project. There the team will meet with the local community and gather data for the project. The Fifth Annual Golf Tournament fundraiser will take place in the spring of 2012. The chapter also volunteers with Habitat For Humanity, Interfaith Food Shuttle and is conducting several food drives for local soup kitchens. For more information on the chapter, please visit [www.ewbnscsu.org](http://www.ewbnscsu.org).

### American Concrete Institute



American Concrete Institute®  
Advancing concrete knowledge

Sixteen student members of the NCSU-CCEE Student Chapter of the American Concrete Institute (ACI) just returned from the ACI Fall Convention in Cincinnati, OH (see article on page 15). The NCSU student team composed of **Heath Kent, Brian Beaver, Michael Lopez, Travis Wetteroff, and Baxter Mclean** took third place in the International Pervious Concrete Design competition among 35 student teams from various US and Latin-American engineering schools. In the upcoming months, the chapter will travel to Norfolk Grumman Shipyard in Norfolk, VA. The chapter is planning a trip to Ecuador or Panama during the 2012 Spring Break and will participate in the ACI International Convention in March 2012 in Dallas, TX.

### Association of General Contractors



In October, the AGC student chapter hosted seminars by **Mark Mehalovich** and **Tonya Beesley** from **Baker Concrete Construction** and by **Dave Simpson** from the state chapter of AGC. Students went bowling in September and are planning a trivia night and a site visit to a local construction project.

### Air & Waste Management Association, NC Safewater, and Professional Engineers of North Carolina



AIR & WASTE MANAGEMENT  
ASSOCIATION  
North Carolina State Student Chapter  
South Atlantic States Section

The North Carolina State Student Chapters of the Air & Waste Management Association, NC Safewater, and Professional Engineers of North Carolina provided three review sessions for the Environmental portion of the Fundamentals of Engineering exam.

The A&WMA chapter hosted three speakers during the fall semester. They will send students to the Annual Meeting in San Antonio, June 19-22, 2012, and are currently identifying funding needs and potential funding sources.



### Professional Engineers of North Carolina

In the Fall semester of 2011, the PENC student chapter held seminars presented by alumni and professionals from the Raleigh area. The chapter is looking forward to a presentation by the NCSU Dean of Engineering, Dr. **Louis Martin-Vega**, on November 22. Students plan to host a pig pickin' and sponsor a Krispy Kreme Challenge Team, and the chapter is working to involve students from other engineering disciplines.





### Undergraduate Student Field Trip to New York City



The Brooklyn Bridge with the Manhattan skyline in the background.

On October 13<sup>th</sup> and 14<sup>th</sup>, a group of twelve seniors from the civil engineering and construction engineering and management degree programs, accompanied by members of the faculty, **Dr. Rudi Seracino** and **Mr. Irving Nazario**, traveled to New York City to visit the George Washington Bridge and other famous civil engineering landmarks. This trip was made possible by the very generous support of an alumnus of this department, **Mr. Otis Crowder** (BSCE-construction option '70). The students were selected on the basis of their academic standing and the essays they wrote in which they expressed what such a trip would mean to their professional development. Preference was also given to students who had not traveled out-of-state on another departmental sponsored activity.

On arrival early the first day, the group visited the George Washington Bridge Port Authority Administration headquarters, which is located at the New Jersey anchorage of the bridge. **Andrea Giorgi Bocker**, chief resident engineer, and **Hector Eugui**, supervisor of maintenance planning, escorted the group on an extensive tour of the bridge, which they explained is the busiest bridge in the world. Highlights included watching a video of film shot during the 1920's of the construction of the bridge, a descent into the bottom of one of the anchorages where the individual suspension wires are looped around eye bars embedded in the rock, and an ascent by elevator and stairway to the very top of the tower located on the New Jersey side, 604 feet above the Hudson River.

That same day the group traveled by subway to the Borough of Brooklyn to visit with students at the City Polytechnic High School. One of CCEE's alumni, **Thomas Perry** (BSCE '94), is a board member of this new public school. After a slide and video presentation on NC State, the NCSU students held a panel discussion about our program and life on campus. There was quite a lively exchange, with the high school students asking many questions about the University. Afterward, the group walked through Brooklyn Heights where there are many fine examples of brownstone row houses from the late 1800's. The day concluded with a walk over the Brooklyn Bridge and a visit to City Hall, the Woolworth Building, and the construction site of the 105-story One World Trade Center tower, slated to be the tallest building in the United States and one of the tallest in the world.

The next day was occupied with a walking tour of Midtown Manhattan that included visits to the Empire State and Chrysler buildings, the main branch of the New York Public Library, Grand Central Terminal, and Central Park.

During transit to and from the airport, the students saw the many types of bridges that connect the boroughs of the city to each other. This was truly a wonderful opportunity for the students to see first-hand how some of this country's major infrastructure has been built and operated.



### Students and Faculty Hike and Raft in NC Wilderness



**Students and Faculty Embark on a Rafting Trip**

Fifteen graduate students and faculty embarked on the second annual whitewater rafting trip on Friday August 12. Dr. Morton **A. Barlaz** organized an inaugural whitewater rafting trip last summer. Participants this year included Dr. Barlaz, Dr. and Mrs. **Vernon Matzen**, Dr. **Anders Damgaard**, Dr. **Francis de los Reyes**, Miguel de los Reyes, **Florentino de la Cruz**, **Yuan Fang**, **Kirsten Hiortdahl**, **Cindy Hun**, **Bahareh Karami**, **Jason 'JP' Patskoski**, **Allison Reinert**, **Charles Schreiner**, **Anthony Shriner**, **Harinder Sing**, and **Hua Zhang**.

The group arrived in Almond, North Carolina Friday night and set up camp. On Saturday, the group hiked on trails in the gorgeous Smokey Mountains National Park. Sunday was the big day, featuring rafting on the Nantahala River. The group divided into 5 person and 1 person rafts under the guidance of Dr. Barlaz and an additional kayaker to help with safety. The first Class 2 rapid is

always a combination of fear and excitement, but all of the groups made it to the lunch spot without any problems. All of the groups decided to try the Class 3 rapids and almost everyone stayed in their raft.

Students in the group were especially grateful to Dr. **Barlaz**, Mrs. **Barlaz**, Dr. **De Los Reyes** and the **Matzens** for keeping them safe and fed!

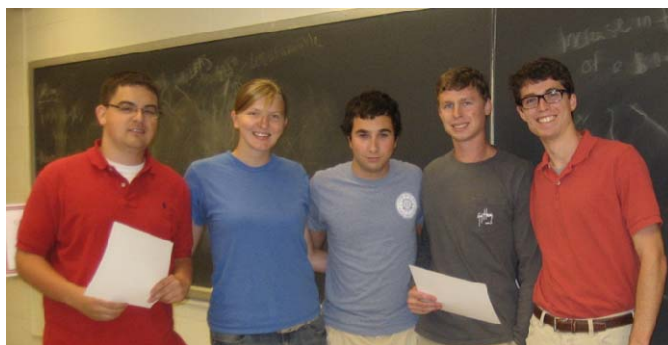
### Kimley-Horn and Associates Sponsor Second Annual Student Consulting Experience



On September 23 to 25, the CCEE Department hosted the second annual NC State Consulting Experience **KHAmptition**, sponsored by **Kimley-Horn and Associates**.

Twenty-five students formed five teams to prepare competitive design proposals

for a high rise, mixed use building on Fayetteville Street. In response to a realistic eight page Request for Proposals (RFP), the students worked 48 hours straight to prepare and present their proposals including a feasibility study (building design, possible tenants, and site constraints), construction approach (phasing plan and elevation drawings), and cost data (property purchase price, construction cost estimate, forecast revenue stream, and break even time). **Richard Rohrbaugh**, **Chad Beck** and others from KHA evaluated the team proposals and presentations. Rohrbaugh and Beck debriefed the teams and said that it was a close competition and the differences between the first and third place teams were small. Rohrbaugh said, "You all did a very admirable job.... some of the concepts are great, creative, and bring energy to the idea." He also cautioned the teams that in projects they should consider various stakeholders in addition to the client and to include impacts on local businesses, parking requirements, and what is needed downtown. Students responded that the proposal competition was challenging and that they appreciated the opportunity to work with the consultants on a real life proposal. The winning team was CAPSM - **James Cox**, **Phillip Pressley**, **Elizabeth Scott**, **Warren Atkinson**, and **Marc Mueller**. Each received a KHA scholarship.

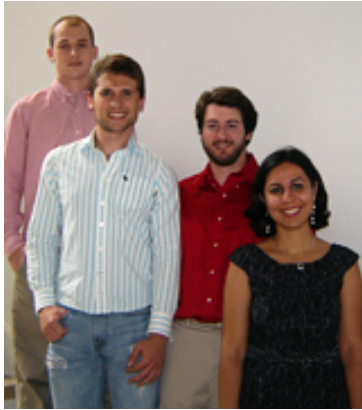


**Members of the winning team include Phillip Pressley, Elizabeth Scott, James Cox, Warren Atkinson, and Marc Mueller**





### Institute for Transportation Engineers (ITE) Student Members Place Second in Traffic Bowl



**Tyler Fowler, Zachary Bugg,  
Thomas Chase, and  
Katy Salamati**

A team of four CCEE graduate students, all of whom are research assistants with the Institute for Transportation Research and Education (ITRE), recently placed second in the Institute of Transportation Engineers (ITE) Traffic Bowl, a Jeopardy-style game in which college students from across the United States and Canada answer transportation-related questions.

**Thomas Chase, Tyler Fowler, Katy Salamati,** and team captain **Zachary Bugg** advanced to the International Championship, held during the ITE Annual Meeting in St. Louis, MO, after the team won first place in the Southern District Traffic Bowl last spring—NC State's first win at that level in six years of competition. In the first round, Chase, Fowler, Salamati, and Bugg defeated the University of Delaware and defending international champion Texas A&M University in the third overtime to reach the title game. They ultimately tied the University of Toronto for second place in the final round, losing to Brigham Young University. A total of 58 teams from across the U.S. and Canada participated in this year's Traffic Bowl, making NC State's team a standout for reaching the top three.

Team members enjoyed not only a competitive game at the ITE Annual Meeting, but also attended numerous technical sessions, networked with students from the other teams, and met with transportation professionals.

### ACI-NCSU Student Chapter Shines at the ACI Fall Convention

Sixteen (16) students, all members of the **NCSU-CCEE Student Chapter of the American Concrete Institute (ACI)** just completed a successful trip to the ACI Fall Convention in Cincinnati, OH. In addition to participating in career development interviews, technical presentations, and social events, the NCSU student team composed of **Heath Kent, Brian Beaver, Michael Lopez, Travis Wetteroff,** and **Baxter Mclean** walked away with a third place in the International Pervious Concrete Design competition (among 35 student teams from various US and Latin-American engineering schools). **Dr. Michael Leming**, a pioneer in the resurgence of pervious concrete utilization in the US, offered valuable technical advice to the students during preparations for this successful performance. The NCSU delegation was led by **Roberto Nunez** (Faculty Advisor), **Matt Poisel** (Lecturer), **Jake Hofmann** (ACI-NCSU Chapter President), and **Travis Cox** (Chapter Graduate Student Advisor). For the past six months, all student members of the NCSU delegation including **Andrew Steele, Alan Herndon, Adam Walton, Adam Bryan, Nick Blaser, Michael Lopez, Luke Perkins, Lauren McCauley, Kristen Measimer,** and **Josh Hauser** worked very hard in all aspects of the planning and execution of this project, and deserve credit for the success achieved. The ACI-NCSU Chapter expresses its gratitude for their support and generosity to the following friends and sponsors: the **ACI-NC Chapter, the CCEE Department, Baker Construction, Sanford Contractors, Archer Western, S&ME, Gilbane, IQ Contracting, Kimley-Horn and Associates, Jason Pace,** and **Richard Rohrbaugh.**



**Student chapter of the American Concrete Institute  
wins Third Place in the International Pervious  
Concrete Design Competition.**



### Students Present Air Pollution Research at Air & Waste Management Association Annual Meeting

The NC State Chapter of the Air & Waste Management Association (A&WMA) attended and presented nine technical papers in the main program of the Association's Annual Meeting during June 21-23 in Orlando, Florida. **Wan Jiao**, a PhD student, presented her research on modeling human exposure to fine particles in the atmosphere. **Xiaozhen Liu** presented results from her Ph.D. dissertation regarding how to determine which emission sources contribute the most to exposure to fine particles. Dr. **Chris Frey**, faculty advisor of the chapter, presented a paper co-authored with undergraduate student **Spencer Pierce** on techno-economic evaluation of coal and natural gas-fired power plants with carbon capture systems.

Several papers focused on vehicle emissions. Co-authored with five students and one post-doctoral research associate, Dr. Frey presented procedures for and results from incorporating Portable Emissions Measurement Systems (PEMS) into CE 476/576 Air Pollution Control and CE 479/579 Air Quality. Students learned to use the PEMS to measure the real-world activity, energy use, and emissions of vehicles ranging from compact sedans to large SUVs. The resulting data are useful for quantifying how emissions vary with driver behavior, road type, traffic conditions, and vehicle technology. **Bin Liu**, a Ph.D. student, presented on the use of PEMS data for 35 vehicles collected by Dr. Frey's group to evaluate the U.S. Environmental Protection Agency's newly released highway vehicle emissions factor model, MOVES. Master's student **Yuanfang Sun**



**Brandon Graver receives 2nd Place Best Ph.D. Paper Award**



**Wan Jiao, Xiaozhen Liu, Brandon Graver, Dr. Chris Frey, Bin Liu, Yuanfang Sun, and Dr. Taewoo Lee**

presented on the repeatability of in-use vehicle emissions measurements collected under varying traffic conditions. Postdoctoral research associate, **Dr. Taewoo Lee**, presented a paper on comparison of vehicle emissions measured at specific sites versus those measured during vehicle trips. **Dr. Lee** is with the National Institute of Environmental Research and spent a year as a visiting scholar at NC State. Ph.D. student and chapter president **Brandon Graver** presented a paper on modeling the energy use and emissions of plug-in hybrid vehicles and a second paper on measurement of fuel use and emission rates for passenger railroad locomotives. He also won the 2<sup>nd</sup> place award for the best paper

in the main technical program by a Ph.D. student for his work on hybrid vehicles.

In addition to participating in the main technical program, several NCSU students presented posters in the student paper competition. The annual meeting provides a unique opportunity for students to network, and the location in Orlando also allowed for some fun at Disneyworld. Student travel support for this meeting was provided by the **Research Triangle Park (RTP) Chapter** and the **South Atlantic States Section (SASS)** of A&WMA.



### CCEE Advisory Board Holds Annual Meeting

The Advisory Board of the Civil, Construction, and Environmental Engineering Department met on September 26th at the McKimmon Center. The Board now consistently holds fall meetings in conjunction with the events of the **Zia Lecture** which allows board members to be active participants in all Zia Lecture activities. Additionally, as has become a fall meeting custom, the Board met with the CCEE Departmental Fellows during a luncheon to share information on Board and Department activities. The Board and Departmental Fellows received a briefing on the Department from Department Head, Dr. **Morton Barlaz** and enjoyed the presence of College of Engineering Dean **Louis Martin-Vega** who joined the group for lunch and the briefing.



Mike Gwyn

The Board's morning meeting consisted of two primary segments of Student Interaction and Feedback and Board Committee Reports with a focus on Public Relations. Dean Martin-Vega shared updated College of Engineering activities with the Board.

The Board welcomed new board and systems member Dr. **Jim Wilson**. Dr. Wilson is a former Department Head of Industrial Engineering and Systems (ISE) at NC State and is still on the faculty in ISE. He is a welcome addition to the Board bringing a related academic perspective as well as that of former department leadership. **Mike Gwyn** (BSCE '80 Construction option; MSCE '94) concluded his time as Chair of the Board and handed over Board leadership to incoming Chairman **Mike Creed** (BSCE '73).



Mike Creed

The next meeting of the Advisory Board will be held in April of 2012 where the Board anticipates welcoming the new members, **Hans Warren** (BSCE Construction option '84), President of Warco Construction, Inc., **Pam Townsend** (BSCE '84 and MSCE '87), VP of AECOM, and **Heather Denny** ('95 BSCE), President of McDonald York Building Company.

**Investing in the Department:** We ask you to invest in our future and make a commitment to CCEE. Your gift will have a tremendous impact in helping us take CCEE to a new level of excellence. As a result, we anticipate having better educated and prepared students entering the work force which will raise the visibility and build the stature and prestige of the CCEE Department. There are many ways to give to the Department. Whether an annual gift, an endowed gift, or a one-time gift, it will have a significant impact on current as well as future students and faculty at NC State University.

Checks should be made payable to: **NC State Engineering Foundation, Inc.**  
designated for CCEE and mailed to:

**North Carolina State Engineering Foundation, Inc.**  
**Campus Box 7901, Raleigh, NC 27695-7901**

You can also use your credit card to make a gift.

Log onto: <http://www.engr.ncsu.edu/foundation/index.php>

To talk to someone or for additional information, contact:

**Lora Bremer**, CCEE, Director of Development • **Phone:** 919-513-0983 • **Email:** [lora\\_bremer@ncsu.edu](mailto:lora_bremer@ncsu.edu)

[www.ce.ncsu.edu](http://www.ce.ncsu.edu)





### 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 at the same time educating our students. This program provides participating firms with name recognition for recruiting and business opportunities, demonstrates to students ways that they can use their degrees after graduation and provides information on employment opportunities.



#### Balfour Beatty

**Balfour Beatty Construction** has a long-standing relationship with the University and was pleased to be September Firm of the Month. CCEE students enjoyed pizza from Mellow Mushroom and time spent with Balfour Beatty employees in Mann Hall. In all, the students felt that Balfour Beatty raised the bar a little higher for future firms citing they enjoyed the time spent with team members, all of whom are NCSU alumni.

Over the past decade, Balfour Beatty has shaped the landscape at NCSU with the construction of Wolf Village; additions and renovations to Berry, Becton & Bagwell Residence Halls; and upgrades to Gold, Syme, Welch, Turlington, Alexander, Wood Halls A, B and C, Tucker, and Owen residence halls. In 2010, Balfour Beatty, in partnership with Barnhill Construction, was awarded the Centennial Campus Student Housing project, which includes an 1150-bed, 470,000-square-foot apartment style student housing complex and a 20,000-square-foot dining facility and structured parking deck to be located on the east side of the Oval at Centennial Campus. The project will be completed in 2014.

Balfour Beatty's commitment to NCSU extends beyond brick and mortar. Their leadership and excellence in giving back to the communities they serve is commendable. At NCSU, Balfour Beatty has given generously to the **Paul Zia Lecture** and **Student Education Fund**, provided significant financial support for the Lonnie Poole Golf Course, established a \$100,000 "Balfour Beatty Construction Scholarship" for NCSU students in 2010, and has been a partner for the NCSU Center for Student Leadership or "LeaderShape" program. **Johnny Rankin**, President of Balfour Beatty's Raleigh office says, "Giving back to the communities where we work and live is an integral part of our culture. We are proud to be part of the great things happening at NC State by participating in the celebration of student achievement and campus growth."

So far, 11 NCSU graduates have gone on to become a part of the Balfour Beatty family. Balfour Beatty recruits top talent through various sources, one of which is providing challenging, rewarding, and enjoyable internship opportunities for college students. In fact, **Katie Massengill**, a Construction Engineering and Management student, is currently a Balfour Beatty intern. Through the Internship program experience, participants are assigned to business units as appropriate to their area of study, and are appointed a mentor. If you are interested in finding out more about how to become involved in Balfour Beatty's intern program, visit their booth at the Spring and Fall career fairs on campus or inquire on NCSU's career center website.

Balfour Beatty is the Southeast's 2<sup>nd</sup> largest general contractor and has North Carolina offices in Raleigh and Charlotte. They continually rank among the best U.S. contractors for quality, sustainability, and innovation and were named as one of FORTUNE magazine's top 100 Best Companies to Work For in 2010 and 2011.



### Firm of the Month: Views from Participating Firms



Norfolk Southern is more than just tracks and trains. It's a team

—more than 28,000 strong, working together to maintain our position as one of the premier transportation companies in the world. Over the past few years, Norfolk Southern has experienced unprecedented periods of growth, increasing the need for talented and dedicated individuals for a wide variety of employment opportunities. In a recent Business Week survey, our company was ranked as one of the top 50 “Best Places to Launch Your Career.” We are proud to offer competitive salaries, great benefits, and exciting adventures as **NC State University** students prepare to begin their careers.

Norfolk Southern is one of only a few Class I Railways in North America. We operate approximately 21,000 route miles in 22 states and the District of Columbia. Norfolk Southern serves all major eastern container ports and connects with rail partners in the West, linking customers to markets around the world. We are a large organization employing people across numerous departments including Transportation Operations, Network and Service Management, Engineering, Mechanical, Communications and Signals, Information Technology, Strategic Planning, Marketing, Revenue Accounting, Human Resources and more. Our broad variety of departments create a need for a diverse group of talented employees in many areas.

As you are finishing your education, Norfolk Southern has a world of opportunities for current college students to consider. Our **cooperative education programs** and **internships** provide an opportunity to apply what you learn in the classroom in real-world situations. We use a hands-on approach and challenge co-ops and interns with a variety of responsibilities. Students will gain exposure to a work environment within their field of study and have an opportunity to enhance their resumes. In addition, during the program students will acquire new skills that will be helpful during the transition from the academic world to the working environment. We invite you to visit our company website, [www.nscorp.com/careers](http://www.nscorp.com/careers) to learn more. The site contains a wealth of information about our company, the Co-op/Intern Program, and future career opportunities.

Norfolk Southern is honored to have received recognition as one of NC State's “Firms of the Month.” We look forward to welcoming new **NC State** students to our recruiting events as they prepare to launch their careers. Visiting our company website is a first step in joining the “Thoroughbred of Transportation.”

### Sponsors Sought for Transportation Research Board (TRB) Meeting Reception

The **Transportation Research Board (TRB)** Annual Meeting, held in Washington, DC each January, is the largest gathering of transportation professionals and academics in the world. Traditionally, top universities hold receptions during the meeting for students, faculty, alumni and friends to attract top notch students and faculty to their programs, reinforce and create new networks, meet new potential sponsors, and increase the visibility of the school in general and its transportation programs in particular. The **Civil, Construction, and Environmental Engineering Department** and the **Institute for Transportation Research and Education (ITRE)** will host an event at TRB this January. Last year, close to 200 guests attended our reception, including company executives, senior officials from the US, and North Carolina Department of Transportation and a number of international academics and professionals. If you are interested in becoming a corporate sponsor of the TRB reception, please contact:

**Ms. Lora Bremer** [lora\\_bremer@ncsu.edu](mailto:lora_bremer@ncsu.edu) or **Ms. Christie Vann (ITRE)** [cdvann@ncsu.edu](mailto:cdvann@ncsu.edu)

## Alumni and Development

### Alumni Updates

- ◆ **Amr Abdel-Aziz** (Ph.D., '03) established his own environmental consulting firm in Egypt, INTEGRAL Consult. He is a Member of the Methodologies Panel of the Clean Development Mechanism (CDM) Executive Board at the United Nations Framework Convention for Climate Change (UNFCCC), a lead reviewer for Annex I parties national communications and greenhouse gas emission inventories, a Lead Author of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) as a member of Working Group III on mitigation of climate change, and a member of the IPCC Emission Factor Editorial Board. Dr. Abdel-Aziz is an adjunct Assistant Professor in the Engineering Department of American University in Cairo where he teaches air pollution courses.
- ◆ **Bill Eleazer** (BSENE, '92; MSCE '94), a supervising engineer in the Miami, FL office of Brown and Caldwell, has been with the company for 16 years. His work focuses on water and wastewater treatment. He has spent the last several years focused on Miami's \$200 million greenfield South Water Reclamation Plant and a \$100 million renewal at the Miami North Plant. In 2007 he spent a year-long sabbatical in Peru.
- ◆ **Wael Elseaidy** (PhD '95) is a founder and CEO of Medstreaming LLC, a leading provider of medical computing and IT solutions in a variety of clinical domains. Headquartered in Seattle, WA, the company has additional offices in Chicago, India, and Cairo.
- ◆ **Gopal Kakivaya** (PhD '96) is a Distinguished Engineer working at Microsoft Corporation on SQL Azure, part of the company's cloud-computing initiative. He has spent over 15 years working at the forefront of Microsoft's distributed-computing efforts and has received more than 25 patents on various aspects of computing. Gopal lives in Sammamish, WA, with his wife and two children.
- ◆ **Sujay Kumar** (PhD '02) is a scientist at the Hydrological Sciences Laboratory at NASA's Goddard Space Flight Center studying land surface components of the global hydrological cycle and its feedback to other earth system components. He lives with his wife Priya, who is a mechanical/aeronautical engineer, and his year and a half old son Naren.
- ◆ **Haibo Zhai** (PhD '08) is currently a Project Manager in the Department of Engineering and Public Policy at Carnegie Mellon University. He mentors and coordinates a team of PhD students, postdoctoral fellows and research staff. He was recently appointed as a member of the Transportation Research Board's Standing Committee on Transportation and Air Quality (ADC20) and as a Co-Chair of Committee Paper Review for TRB's annual meeting.
- ◆ **Ted Ziegler** (BSCE '05) worked for J.S. Thompson Engineering, Inc. for 11 years before founding Spectra Engineering & Design, PLLC in May 2011. The new company specializes in residential structural engineering.

**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: [lora\\_bremer@ncsu.edu](mailto:lora_bremer@ncsu.edu)

Name, Mailing & Email Address  
Company Name & Address  
Work & Cell Phone Numbers  
Degree, Major & Class Year  
Announcements

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. This issue was produced by Chris Frey, Editor and Bonnie Diaz, Managing Editor. Additional contributors to this issue are: Mort Barlaz, Billy Edge, Lora Bremer, Tasnim Hassan, Kitty Hiortdahl, Irving Ignazio, Ed Jaselskis, Kumar Mahinthakumar, Roberto Nunez, Matt Poisel, Mohammad Pour-Ghaz, Nagui Roupail, Rudi Seracino, John Stone, Billy Williams, and Emily Zechman.