

CCEE NEWS

DEPARTMENT OF CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING

COLLEGE OF ENGINEERING • NORTH CAROLINA STATE UNIVERSITY • SPRING 2012



A CLASS ACT JOHN BRANTLEY

*The recently retired RDU International Airport
director continues to inspire students*

NEW FACULTY 04

CCEE DEPARTMENT HISTORY 20

ENGINEERS WITHOUT BORDERS IN BOLIVIA 27

**NC STATE
UNIVERSITY**



**125
YEARS**

IN THIS ISSUE

Editor: H. Christopher Frey

CCEE Publicity Committee: H. Christopher Frey (Chair), Chris Bobko, Bob Borden, Lora Bremer, Matt Evans, Tasnim Hassan, Ed Jaselskis, Paul Khosla, Kumar Mahinthakumar, Billy Williams, Emily Zechman

Contributors to this issue are: Morton Barlaz, Chris Bobko, Bob Borden, Roy Borden, Lora Bremer, Matt Evans, Tasnim Hassan, Ed Jaselskis, David Johnston, Paul Khosla, Kumar Mahinthakumar, Jim Nau, Irving Nazario, Nagui Roupail, John Stone, Billy Williams, Emily Zechman

Production Staff: Jenny Weston, Nate DeGraff, Sarah Stadler, Natalie Brown, College of Engineering

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.



A LOOK BACK

MANN HALL HISTORY PAGE 20

Old Mann Hall had been the home of the department since 1928. Nationwide expansion of facility and infrastructure construction in the 1950's boosted student enrollment and created cramped conditions. Initiation of the Interstate highway program in the late '50s further fueled the need for a modern facility for education and research.



DEPARTMENT NEWS PAGE 04

Learn what is new within CCEE and catch up on all the latest happening with our department.

- **NEW FACULTY** PAGE 04
- **TRANSPORTATION RESEARCH BOARD ANNUAL MEETING** PAGE 06
- **FACULTY SERVICE** PAGE 09



STUDENT NEWS PAGE 25

Find out what engineer students at NC State are doing to improve their communities and their world.

- **DECEMBER GRADUATION** PAGE 25
- **ENGINEERS WITHOUT BORDERS IN BOLIVIA** PAGE 27
- **STUDENT GROUPS** PAGE 28



ALUMNI & DEVELOPMENT NEWS PAGE 29

Catch up on recent news from alumni and professors. Learn what they are doing in our world today.

- **FIRM OF THE MONTH** PAGE 32
- **ALUMNI UPDATES** PAGE 33

ABOUT THE COVER TERMINAL 2 OF RDU INTERNATIONAL AIRPORT (Image courtesy Raleigh-Durham Airport Authority) ➤ See related story about former RDU Director John Brantley on page 19

MORTON A. BARLAZ



THE SPRING 2012 semester is in full swing and going well. Please extend a warm welcome to our newest faculty members, Dr. Andy Greishop, who works in the environmental area on emissions of particulate matter, and Dr. Brina Montoya in the geotechnical area who works on soil improvement. With the addition of Andy

and Brina, we have added 5 faculty, a lecturer and an extension specialist in the last 12 months which is allowing the department to widen the areas in which we can teach and perform research, even as Mann Hall bursts at its seams.

In December, we celebrated graduation for 80 undergraduates, 48 Masters students and 6 who completed their PhDs. We were honored to have Professor Emeritus Dr. John Fisher as our graduation speaker. Having retired from NC State and sailed around much of the world, John is now Chairman of the Board of **FDH Engineering**.

This newsletter conveys some of what we are able to do in each of our programs. As described in an article on the role of practitioners in our teaching program, I want to thank all of those who have volunteered their time to come to the classroom and share their knowledge on a special topic. The department hosted a luncheon for about 25 practitioners who worked with our students in the classroom during the Fall 2011 semester.

We present some information on the department's research programs in each newsletter. This newsletter features the Transportation Group which includes work on both Transportation Systems and Transportation Materials. Previous issues have featured stories about our research in Computing and Systems, Geotechnical Engineering, Structural Engineering and Mechanics, and Water Resources and Environmental Engineering. We will feature Construction Engineering and Management in the next newsletter. Until then, please take a look at our presentation summarizing departmental programs and send me any thoughts (www.ce.ncsu.edu/about).

As you will read in the newsletter, we are so much more than teaching and research. Our faculty are active in service to the

profession in many venues as described in an article by Dr. Chris Frey. Our faculty are also working to improve infrastructure not only in the U.S, but also in developing countries as described in an article on latrine maintenance by Dr. Bob Borden.

While we focus on the present and future plans, it is important to remember our past and how we developed into who we are today. Thanks to Edward I. Weisiger Distinguished Professor Emeritus Dr. David Johnston, we can read the latest installment of the department's history in this edition.

It is with great sadness that I inform you of the death of Dr. Ed Gurley. Ed joined the Department of Engineering Mechanics as an assistant professor in 1964 and stayed with us until his retirement in 1997.

In closing, I have written much about our budget cuts in past newsletters. We are living with a new reality of inadequate support for teaching assistants, faculty and staff. As a department, we will nevertheless persist and as you read this newsletter, I hope that you get a sense of all of the wonderful activities going on in our teaching, research, and extension programs. We have over 9000 alumni and over 6000 friends reading this newsletter. If each of you would consider giving what you are able, then we would have a tremendous multiplier effect. No gift is too small and we appreciate knowing that you would like to help support the department. Your gifts provide help with the special things that make us excellent, whether it is field trips for undergraduates, allowing graduate students to make a presentation at a national conference or helping to recruit and retain the best students and faculty in the world. We need your support as we strive for excellence in times of decreasing public funding for our mission. 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
Department Head

Dr. Brina Montoya Joins CCEE Department

"I was attracted to the CCEE department largely because of their very supportive environment for collaborative research."



DR. BRINA MONTOYA joined the faculty of the CCEE department in January 2012 as an assistant professor. She came to CCEE after finishing her Ph.D. in Civil Engineering from the University of California, Davis, where she also received her M.S. She completed her B.S. at California Polytechnic State University, San Luis Obispo

in 2003. While at UC Davis, Montoya received the "Excellence in Geotechnical Engineering Award" endowed by Prof. Idriss, and was a Professor for the Future fellow. Before attending graduate school, Montoya worked for a geotechnical consulting company, Lowney Associates, Inc., for 3 years, where she was responsible for conducting subsurface field investigations, laboratory testing, geotechnical analyses and design for residential, commercial, educational and public works projects throughout the San Francisco Bay Area.

When asked about her decision to join the faculty at North Carolina State University, Montoya remarked, "I was attracted to the CCEE department largely because of their very supportive environment for collaborative research," adding, "the faculty is enthusiastic about research, [and] they are very creative with their research ideas." She notes that the Raleigh area was also attractive because of its central location to both the mountains and the coast, allowing her to continue her outdoor hobbies.

Montoya's research interests focus on biologically mediated soil improvement. This process harnesses the metabolism of native bacteria in the soil to induce cementation that binds soil grains together. The cementation increases the strength and stiffness of the soil to improve its engineering response when loaded. This natural cementation process is an alternative to

some current ground improvement processes involving chemical permeation grouting. Montoya has found that the biological cementation process is easily controlled to varying degrees of cementation, leading to a known evolution of strength with an increase in cementation. By controlling the degree of cementation, engineers are able to improve soil behavior without dramatically affecting the seismic site response of the soil.

Montoya's research suggests new avenues for the incorporation of sustainable practices in geotechnical engineering. By providing a natural method of soil improvement, the carbon footprint of the treated soil is reduced compared to soils improved by cement-based grouts. Sustainability and resiliency are also addressed in Montoya's work because the treatment methods continue to heal soil systems even after loading (including extreme events like an earthquake). Her research so far has been focused on improvement of soil for seismic loading, but Montoya adds, "there are many potential applications for biologically mediated cementation that I am excited about, from improving building materials to reinforcing vulnerable coastal environments."

This semester, Montoya is teaching the undergraduate "Engineering Behavior of Soils and Foundations" course, and in this course, she is hoping to identify undergraduates that are interested in working as undergraduate research assistants. "I have had a lot of success with undergraduate research projects in the past," says Montoya, "and I'd like to encourage great undergrads to stay and to continue their education by getting a graduate degree here at NCSU." Next year she will teach a new graduate-level course where students will learn how soil behavior is affected by the soil mineralogy, the soil-fluid-electrolyte systems, the contact mechanics, and the electromagnetic and bio-geochemical properties of the soil. •

Dr. Andy Grieshop Joins CCEE Department

His research focuses on interactions between energy use and the environment and, more specifically, on improving our technical understanding of the emissions and atmospheric transformations of air pollutants.



DR. ANDY GRIESHOP joined the faculty of the CCEE Department in January 2012 as an assistant professor. He came to CCEE from the Institute for Resources, Environment and Sustainability and the Liu Institute for Global Issues at the University of British Columbia in Vancouver, British Columbia, where he was

a Postdoctoral Research Fellow from 2008-2011. Grieshop cites “the range of dynamic research and teaching,” “the clear dedication to improving engineering education” and “the opportunity to collaborate with people within the department and across campus” as factors that attracted him to NCSU and CCEE. Grieshop was also attracted to the area’s “huge amount of activity in environmental research,” “great weather,” “a burgeoning local food scene” and “lots of opportunities for outdoor recreation and cultural activities.”

Grieshop’s research focuses on interactions between energy use and the environment and, more specifically, on improving our technical understanding of the emissions and atmospheric transformations of air pollutants. He is currently working on two projects. The first project aims to quantify the emissions, indoor pollutant concentrations, and health and climate impacts of a cookstove replacement program in rural India. The objective of the second project is characterize the particulate matter emitted by heavy duty natural gas engines. He is developing new techniques to efficiently measure important properties of air pollutants. His work integrates laboratory and field based experimentation, with complimentary modeling and policy analysis efforts to address environmental problems.

Grieshop’s research is motivated by significant national and international policy challenges. For example, over 70 million Americans live in cities that do not meet the national ambient air quality standards for fine particulate matter. Globally, poor indoor air quality is associated with approximately two million premature deaths annually. Poorly ventilated and high emitting cookstoves are a key contributor to poor indoor air quality for approximately three billion people. Grieshop’s work aims to help determine how we can improve these statistics, both in the U.S. and abroad.

Grieshop’s contribution to air quality research has been recognized nationally. In 2010, he was invited to participate in the Dissertation Initiative for the Advancement of Climate-Change Research (DISCCRS) Symposium, sponsored by the National Science Foundation and National Aeronautics and Space Administration. In addition, in 2009, he was invited to participate in the Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS) jointly sponsored by several U.S. Federal agencies. As a doctoral student at Carnegie Mellon University (CMU), he was the project manager for the 2006 Stephen Omer Lee Outstanding Engineering and Public Policy (EPP) Project Award-winning project. His academic background includes a BS in Mechanical Engineering (ME) from UC-Berkeley, an MSME from CMU and a Ph.D. in ME and Engineering and Public Policy, also from CMU.

Grieshop is teaching CE 373 “Fundamentals of Environmental Engineering” this spring. He is developing a graduate-level course focusing on aerosol science to be offered in the Fall. Grieshop will work with Dr. Chris Frey to broaden the course offerings in air quality and air pollution control. He is in the process of recruiting graduate students to work with him in establishing his laboratory and is very interested in hearing from motivated undergraduate students who would like exposure to research in the air quality/environmental engineering fields. •

CCEE Continues High Profile Role at TRB Annual Meeting

The TRB reception provides an opportunity for the faculty and students to say “thank you,” strengthen existing collaborations, create new collaborative opportunities, and meet new potential sponsors.

THE HISTORY of the Transportation Research Board (TRB) traces back to President Lincoln’s establishment of the National Academy of Sciences in 1863. As a division of the National Research Council (NRC), the mission of TRB is “to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal.” The cornerstone of this mission is the TRB Annual Meeting held in January of each year in Washington, DC.

This year’s meeting was held on January 22-26 with a record 11,000 participants from around the world and over 4,000 presentations in approximately 650 sessions and workshops. As has been the case for many years, CCEE’s presence and impact was significant at this critically important gathering of transportation leaders and innovators. The NC State contingent included students, professors, alumni, and supporters.

The department’s student chapter of the Institute of Transportation Engineers (ITE) traveled en masse to DC. In total, 32 students made the trip, including many first time attendees. Personal costs were kept low through the generous support of the North Carolina Section of ITE, the Transportation Founder’s Fund, and the Southeastern Transportation Center (STC) as well as the chapter’s fundraising activities. Chapter president **Katy Salamati** provided leadership from the start of planning in early fall until all student attendees were safely back in Raleigh. Special events for student members included the STC reception on Sunday, a reception on Monday at ITE Headquarters and an opportunity for students to meet International ITE President, Zaki Mustafa, and a TRB Young Professionals reception on Tuesday.

The student chapter was featured prominently at the annual Council of University Transportation Centers (CUTC) banquet. The CUTC banquet was held Saturday evening in the historic Omni Shoreham hotel. During the banquet awards ceremony, Salamati received the Center for Transportation and the Environment student of the year award and chapter vice president **Zach Bugg** received the STC student of the year award.

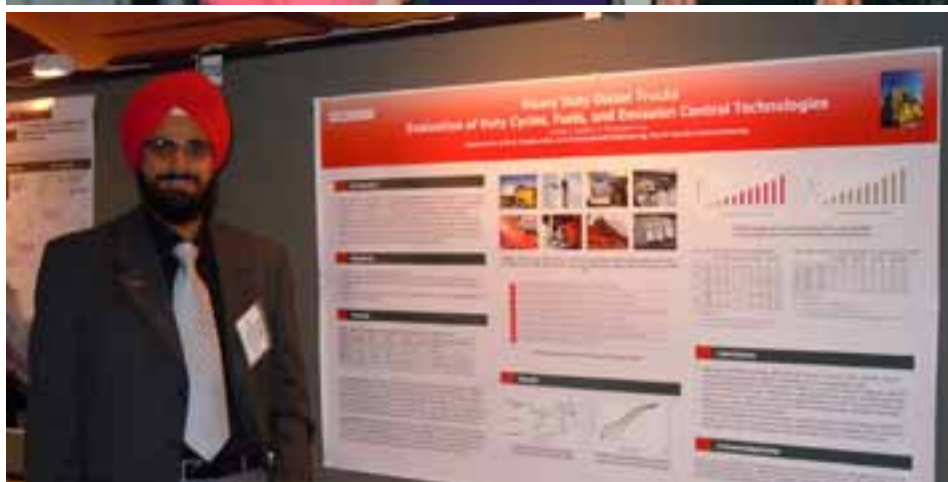
CCEE students were also strongly represented in TRB technical sessions. Selection to present at these sessions is based on rigorous peer review of submitted research papers. The success

of CCEE student participation in poster and podium presentation sessions is a testament to the quality of our students and the excellence and importance of the research they conduct. In total, over forty papers were presented by researchers affiliated with the department, with more than half of these co-authored by student researchers.

CCEE faculty serve as active members of numerous standing technical committees. These committees provide leadership in focused research areas by preparing research needs statements, publishing research circulars, publishing calls for papers and reviewing paper submissions, and conducting research workshops. Although committee work is ongoing throughout the year, all committees hold their principal gathering during the annual meeting.

A high point of the 2012 TRB annual meeting was the reception for alumni, friends, and supporters hosted by CCEE and the Institute of Transportation Research and Education (ITRE). The reception was held in the Marriott Wardman Tower Lobby from 5:30pm – 7:30pm on Monday, January 23.

The TRB reception provides an opportunity for the faculty and students to say “thank you,” strengthen existing collaborations, create new collaborative opportunities, and meet new potential sponsors. The reception also increases the national and international visibility of NC State University and its transportation-related programs. Over 100 guests joined current faculty, staff, and students at this year’s reception. The reception would not have been possible without the generous help of our sponsors. **Norfolk Southern** was the Platinum level sponsor. Gold sponsors included: **AECOM, Fortress Systems International, Kimley-Horn and Associates, Kittelson & Associates, McKim & Creed, and Toyota**. Silver sponsors included: **CDM Smith, Dowling Associates, Forensic Engineering, HNTB, Lochner, Mulkey Engineering, PB World/Parsons Brinkerhoff, Planning Communities, Ramey Kemp & Associates, Sensys Networks, Stantec, Traffax, and TransTech**. Bronze sponsors included: **DigiWest, Martin/Alexiou/Bryson, R.M. Clarke Consulting, Troxler Electronics Labs, UNC Charlotte, and Vanasse Hangen Brustlin**. •



Photos: Students at the Reception. ➤ PhD student Gurdas Sandhu presenting a poster. ➤ Zach Bugg and Katy Salamati with Their Student of the Year Certificates (also shown, Dr. Nagui Roupail (left center) and James Martin (right)). ➤ Sami Rizkalla, Ann Hartell, and Downey Brill

CURRENT EVENTS

THE 11TH ANNUAL WATER RESOURCES AND ENVIRONMENTAL ENGINEERING (WREE) SYMPOSIUM was held on **Friday, March 16, 2012** in Mann Hall. The symposium featured over 40 student posters. Dr. Arpad Horvath of the University of California at Berkeley was the keynote speaker.

LUNCHEONS FOR ALUMNI AND FRIENDS of the Department with CCEE Department Head Morton A. Barlaz are planned for **May 1** in Greensboro, NC and **May 11** in Charlotte, NC. More information will be posted at www.ce.ncsu.edu or contact Lora Bremer at lora_bremer@ncsu.edu.

THE 2012 TRANSPORTATION FOUNDERS FUND SPEAKER SERIES will be held on **April 12, 2012** on Centennial Campus at NC State. This year's event features a panel discussion on "Future Transportation Funding Options & Strategies," and presentation of the C.E. "Ed" Vick, Jr. Transportation Founders Fund Graduate Scholarship. To RSVP, or for more information, contact Christie Vann, ITRE, 919-515-8896 or email cdvann@ncsu.edu.

THE LIN WIGGINS MEMORIAL GOLF TOURNAMENT will be held **Monday, April 23, 2012** at the Eagle Ridge Golf Course. All proceeds benefit the Lin Wiggins Memorial Scholarship Fund at NCSU. Register online at www.linwiggins scholarship.com

Ed Jaselskis Inducted into National Academy of Construction



Dr. Ed Jaselskis, the Jimmy D. Clark Distinguished Professor in Construction Engineering and Management was inducted into the National Academy of Construction. Dr. Jaselskis' induction is in recognition of his "significant contributions to construction industry advancement through research in construction project success, innovative construction technologies and engineering public policy."

Prior to joining the faculty at North Carolina State in 2011, Dr. Jaselskis was a professor at Iowa State University. He holds degrees from the University of Illinois Urbana-Champaign, Massachusetts Institute of Technology, and the University of Texas at Austin. He has

held numerous academic positions, as well as various positions for ASCE's Journal of Construction Engineering and Management. He has received several professional recognitions, including the Construction Industry Institute's Outstanding Researcher of the Year Award.

The National Academy of Construction is an independent organization made up of industry leaders whose present or past professional career over a period of years demonstrates outstanding contributions to the effectiveness of the engineering and construction industry. •

Photo: Dr. Jaselskis (right) receives plaque honoring his induction into the National Academy of Construction

Frey Receives Environmental Educator Award from Air and Waste Management Association



Dr. H. Christopher Frey, a professor in the Department of Civil, Construction, and Environmental Engineering, has been selected by the Air and Waste Management Association's (A&WMA) Board of Directors to receive the 2012 Lyman A. Ripperton Environmental Educator Award.

Frey will be recognized with the award at A&WMA's 105th Annual Conference and Exhibition in June. The award is given each year to an influential educator in an air pollution control field.

The award is unique, A&WMA says, because recipients must be able to teach with rigor, humor, humility and pride. The award winners are

known by the accomplishments of their students.

Frey has made significant research and teaching contributions in the areas of air pollution emissions, exposure and risk assessment, and systems analysis of energy technologies. His classes include Air Quality, Principles of Air Quality Engineering, and Environmental Exposure and Risk Analysis. Frey also serves on the US Environmental Protection Agency Clean Air Scientific Advisory Committee and on the Board of Environmental Studies and Toxicology of the National Research Council.

Frey earned his BS in mechanical engineering in 1985 from the University of Virginia, his MS in mechanical engineering in 1987 from Carnegie Mellon University, and his PhD in engineering and public policy in 1991, also from Carnegie Mellon. He joined the faculty at NC State in 1994. •

Awards & Honors

- **Dr. Michael Leming**, Associate Professor and Coordinator of Undergraduate Advising, was selected by the College of Engineering for the 2012 George H. Blesis Outstanding Undergraduate Advisor Award. The Blesis award honors engineering faculty members for advising, counseling and mentoring students. According to Leming, “This was a particular honor since George was a Construction Faculty member.” Leming’s award will be recognized at the 2012 Spring Faculty Meeting and his name will be engraved on a permanent plaque in Page Hall.
- **Drs. Joel Ducoste and Francis de los Reyes III** were among 100 outstanding national researchers invited to the National Academy of Engineering (NAE) Keck Futures Initiative conference held in Irvine, CA in November 2011. The conference brought together top early and mid-career researchers from academia, industry, and government. This year’s theme was Ecosystem Services. Ducoste and de los Reyes were members of conference study groups on Sustainable Food Production Systems, and Diseases and Ecosystem relationships, respectively.
- **Dr. Y. Richard Kim** was elected in Fall 2011 as a Fellow of the American Society for Civil Engineers (ASCE). Fellows are practitioners, educators, mentors, and leaders who have contributed significantly to the Civil Engineering profession. Fewer than 5% of ASCE members are Fellows. In addition, Kim delivered the keynote speech at the 7th International Conference on Road and Airfield Pavement Technology in Bangkok, Thailand on Aug. 4, 2011. Dr. Kim’s talk was on “Challenges and Opportunities in Developing Sustainable Asphalt Pavement.”
- **Dr. Jim Nau** is the College of Engineering recipient of the 2012 Board of Governors Award for Excellence in Teaching. The award recognizes Nau’s success in providing outstanding educational experiences over many years. Nau will be formally recognized at a luncheon hosted by Provost Warwick Arden in April.
- **Dr. Morton Barlaz** is among those featured in a promotional video about the Environmental Research and Education Foundation (EREF), an organization that funds teaching and research in solid waste.
- **Dr. Paul Khosla** gave the keynote speech at the First International Conference of Transportation Research Group of India in Bangalore in December 2011. His talk was on “Advancements in Pavement Technology.”
- **Jim Levis**, a PhD student working with Drs. **Ranji Ranjithan, Morton Barlaz and Joe DeCarolus**, was recently awarded a scholarship from the American Society of Mechanical Engineers (ASME) Materials and Energy Recovery Division for his research in solid waste management.
- **Zachary Bugg**, a PhD student working with Dr. **Nagui Rouphail** on safety research, is the 2011 Southeastern Transportation Center Outstanding Student. Zach competed with transportation students at seven other southeastern universities - Tennessee, Kentucky, Vanderbilt, UNC Chapel Hill, NCAT, South Florida, and Florida. Zach received a scholarship, a certificate, and a trip to the January 2012 Transportation Research Board Annual Meeting. He and other US regional winners will be honored at a banquet sponsored by USDOT.
- **Wan Jiao**, a PhD student working with Dr. **H. Christopher Frey** on modeling of human exposure to fine particles, received three awards related to her paper on “Assessment of Inter-individual, Geographic, and Seasonal Variability in Estimated Human Exposure to PM_{2.5}” that she presented on December 7, 2011 at the Annual Meeting of the Society for Risk Analysis in Charleston, SC. Prior to the meeting, she received Student Travel Awards from SRA and from the Research Triangle Chapter of SRA. At the meeting, she received the Student Merit Award.
- Three Water Resources and Environmental Engineering graduate students won all of the poster awards at the North Carolina American Water Works Association and Water Environment Association (NC AWWA-WEA) Annual Conference this past November in Concord, NC. **Xia He, Ling Wang, and Mohammad Arafin** won 1st, 2nd, and 3rd place, respectively.

IN THE SPOTLIGHT: Transportation Systems and Materials

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 fifth in a series of articles that profile each of these groups.



FROM THE ROMAN ROADS to railroads to superhighways to modern urban transit systems, transportation networks spur and sustain economic prosperity and quality of life. As we move into the 21st century, the lessons of 20th century successes and failures motivate a central focus on sustainability of future transportation networks. The Transportation Systems and Materials (TSM) group, consisting of eight full time faculty members, prepares future leaders and innovators and delivers high impact research across the full range of planning, design, construction, operation, and maintenance of integrated, multimodal transportation systems.

Preparation of Students for Professional Practice: The TSM group offers a broad range of courses providing both sound theoretical foundations and practical application knowledge and skills. Students are afforded hands-on learning experiences including laboratory testing and exploration, field study, exposure to software currently used in practice, and graduate and undergraduate research. Many students participate in the Transportation Research Board (TRB) annual meeting in January (See TRB article on page 6) under the auspices of the NCSU student chapter of the Institute of Transportation Engineers (ITE). Student involvement in ITE provides an important avenue for networking with practicing professionals and potential employers.

Extension and Public Service: TSM faculty members are actively involved in numerous technical committees of the American Society of Civil Engineers (ASCE), the TRB, the American Society for Testing and Materials (ASTM), and the Association of Asphalt Paving Technologists (AAPT). Several

faculty members serve on editorial boards of national and international research journals. The faculty offer many seminars and short courses providing vital continuing education for practicing professionals and expediting the application of TSM group research findings.

Highly Distinguished Faculty: TSM faculty hold and have held many leadership positions in technical committees and high profile working groups. TSM faculty members have been awarded many state, national, and international honors for their research, teaching, and professional service. Research and teaching examples include five National Academies of Sciences best paper awards (Dr. **Nagui Rouphail**), the Distinguished Research Fellowship from the Korean Science and Engineering Foundation (Dr. **Richard Kim**), College of Engineering Outstanding Teacher Award (Drs. **Paul Khosla** and **Akhtar Tayebali**), College of Engineering Outstanding Faculty Engaged in Extension (Drs. Khosla and **Joe Hummer**), the ASCE Frank M. Masters Transportation Engineering Award (Dr. **John Stone**), and the National Science Foundation Faculty Early Career Development (CAREER) Award (Dr. **Billy Williams**). Current professional leadership examples include chair of the Advanced Technologies Committee of ACSE's Transportation and Development Institute (Williams) and chair of the Transportation Research Board Joint Simulation Subcommittee (Dr. **George List**).

Research Activities: Current research activities, though broad in scope, all contribute to the goal of sustainability.

In the realm of planning, Dr. **George List** is leading an effort to develop an environmentally responsible plan to accommodate



freight flows in North Carolina through a statewide study being prepared for the 2010 Governor's Logistics Task Force. Dr. **John Stone** is working to provide vital information to the North Carolina Department of Transportation (NCDOT) on heavy vehicle loadings on the state's roadways. The timeliness and importance of this research is highlighted by recent headlines on pending legislation in Congress concerning federal truck weight restrictions.

Dr. **Joe Hummer** is leading research to assess the operational and safety characteristics of a novel interchange design known as the *double crossover diamond*. This work is one example from Hummer's broader research program aimed at sustainably enhancing safety and mobility in the face of increasing traffic demand.

Dr. **Richard Kim** is performing research focused on developing performance-related specifications (PRS) for asphalt concrete as well as for asphalt binder used in preservation surface treatments. Kim is recognized as an international leader in modeling the behavior and performance of asphalt materials and pavement systems and his PRS research is founded on advanced material and structural models that he has developed over the last 25 years.

Dr. **Paul Khosla** has investigated the use of waste materials such as ground tire rubber and recycled asphalt pavement (RAP). This research provided the basis for formulation of standard specifications for use of RAP in North Carolina. Dr. **Akhtar Tayebali** and Khosla are jointly investigating use of recycled roofing shingles and incorporation of warm mix technology into

asphaltic concrete mixtures. Warm mix technology reduces the energy needed to produce such mixtures.

Drs. **Nagui Rouphail**, **Billy Williams**, and **George List** are involved in several state and federal level projects aimed at enabling system operators, managers, and policy makers to monitor the performance of the transportation network. The primary focus is on measuring transportation network reliability, which refers to the predictability and repeatability of travel times. The research also aims to develop new methods for improving travel time reliability.

In the areas of transportation, health, and the environment, there are several collaborative projects underway. Rouphail and Institute for Transportation Research and Education senior research scientist Dr. **Bastian Schroeder** are researching safety for visually impaired pedestrians at roundabouts. Rouphail and Dr. **H. Christopher Frey** of CCEE's environmental engineering program have collaborated for a dozen years on measurement and modeling of vehicle emissions.

TSM research activities are funded by numerous sponsors including the **Federal Highway Administration**, **National Academies of Science**, **National Cooperative Highway Research Program**, **National Institutes of Health**, **National Science Foundation**, **North Carolina Department of Transportation**, **Southeastern Transportation Center**, and **U.S. Environmental Protection Agency**. • Photos: Sea Container Operations at CSX Chicago Intermodal Yard Double Crossover Diamond. > Field Pavement Testing for Model Calibration. > Double Crossover Diamond Interchange in Springfield, Missouri.

CCEE FACULTY: How May We Be of Service?



Engagement with people and organizations outside the university is a principal means by which NC State University, a land-grant university, fulfills its unique mission. Engagement represents an ongoing two-way interchange of knowledge, information, understanding, and services between the university and the state, nation, and world. CCEE faculty are widely sought by external stakeholders for their expertise and experience. Moreover, these interchanges enable faculty to bring best practices and state-of-the-art technical approaches to the classroom and to mentoring of students in research. Faculty engagement in professional communities sets an example for students of the value of being a member of a professional society and of using expert knowledge to inform public policy. One of the key reasons that the United States is the world's leader in science and engineering education is because university faculty are actively engaged in their professional communities.

THERE ARE MANY FORMS of engagement. Some of the most frequent are service: (a) in science and technology advisory roles with state, national, or international organizations; (b) as editors or on editorial boards of technical journals; (c) in leadership roles in professional societies; and (d) in developing and delivering professional training and education to practicing professionals. However, there are many other forms of engagement. Here, we give just a sample of the many ways our faculty are engaged beyond the bounds of Mann Hall.

ENGINEERING AND PUBLIC POLICY

CCEE faculty are engaged in advising governmental and nongovernmental organizations on issues that are at the interface of engineering, science, and public policy. At the state

level, Dr. **Margery Overton** chairs the Science Panel on Coastal Hazards, which advises the North Carolina Coastal Resources Commission on scientific issues relate to coastal policy. Dr. **Joel Ducoste** was appointed by the NC House of Representatives to serve on the Offshore Energy Exploratory Study Committee, which advises the NC General Assembly on the environmental impact of proposed offshore energy options. Dr. **E. Downey Brill** serves on the State Water Infrastructure Commission to identify water infrastructure needs, develop a plan to meet the needs, and monitor implementation of the plan. Dr. **H. Christopher Frey** is serving on the Health Impacts Assessment (HIA) Working Group to advise the State Health Director on how to incorporate HIA into decision making regarding public works projects. Dr. **George List** is leading a project for the Governor's Logistics



“Leadership roles in professional societies are a key way for CCEE Faculty to share their knowledge, guide development of their fields, mentor young professionals, and learn new things to bring back to the classroom and to research.”



Task Force, which is studying how transportation infrastructure investments can create jobs in the state. **Roberto Nunez** is serving on the North Carolina Code Officials Qualifications Board.

At the national level, CCEE Faculty serve in advisory roles for Federal agencies such as the Federal Highway Administration (FHWA), Nuclear Regulatory Commission (NRC), and U.S. Environmental Protection Agency (EPA). Dr. **Richard Kim** serves on FHWA’s Asphalt Mixture and Construction Expert Task Group and on the Pavement Preservation Expert Task Group. Dr. **Abhinav Gupta** has interacted with the NRC to evaluate the seismic risk associated with nuclear power plants. Dr. **Morton Barlaz** is serving on an EPA Science Advisory Board (SAB) panel that is reviewing EPA’s accounting framework for biogenic carbon dioxide emissions from stationary sources. Ducoste is a member of the EPA SAB Drinking Water Committee, which provides advice on national drinking water standards. Frey is serving a second three-year term under appointment by the EPA Administrator to the Clean Air Scientific Advisory Committee (CASAC), which reviews the scientific basis for exposure, risk, and policy analysis of the National Ambient Air Quality Stan-

dards (NAAQS). He is chairing CASAC’s Lead Review Panel. Frey is also serving on the National Research Council’s Board of Environmental Studies and Toxicology, which conducts national assessments of policy-related environmental issues.

CCEE faculty are engaged internationally in advisory capacities. Dr. **Mervyn Kowalsky** is an active member of several national and international committees on performance-based seismic design. Frey recently served on a World Health Organization working group on methods for quantifying uncertainty in assessment of human exposure to chemicals in the environment, and was a lead author of an Intergovernmental Panel on Climate Change guidance document regarding greenhouse gas emission inventories.

CARETAKERS OF THE PROFESSIONAL LITERATURE

CCEE faculty serve in leadership and reviewer roles for top journals and conferences. Dr. **Sankar Arumugam** is editor of the *Journal of Water and Climate Change* and an associate editor of *Water Resources Research*. Dr. **Mo Gabr** is editor of the American Society for Civil Engineering (ASCE) *Journal of Geotechnical*

and *Geoenvironmental Engineering*. Dr. **William Rasdorf** is the longest serving (from 1989 to 2008) editor of the *ASCE Journal of Computing in Civil Engineering*. For 25 years, Dr. **Billy Edge** has been editor of the proceedings of the world's most prestigious international coastal-engineering conference, the International Conference on Coastal Engineering. Drs. **Richard Kim**, **Joel Ducoste**, **Detlef Knappe** and **Nagui Roupail** serve as associate editors of the *International Journal of Pavement Engineering*, *Water Science and Technology*, *ASCE Journal of Environmental Engineering*, and *Intelligent Transportation Systems Journal*, respectively. Many faculty have served on editorial boards of journals, including Drs. Kim, **Morton Barlaz**, **H. Christopher Frey**, **Roy Borden**, **Francis de los Reyes**, **Sami Rizkalla** and **Rudi Seracino**. Via roles such as editor, associate editor, editorial board member, and reviewer, faculty are providing leadership regarding the technical direction of their fields.

LEADING THE PROFESSION

Leadership roles in professional societies are a key way for CCEE Faculty to share their knowledge, guide development of their fields, mentor young professionals, and learn new things to bring back to the classroom and to research.

Dr. **Billy Edge** is currently a Technical Region Director of ASCE, which includes review of the activities of ASCE's Institutes and dissemination of best practices among them. Furthermore, Edge is President of the Academy of Coastal, Ocean, Port, and Navigation Engineers. Dr. **H. Christopher Frey** is a past president of the Society for Risk Analysis, and currently serves as chair of the Air & Waste Management Association's technical committee on transportation and air quality. Dr. **Richard Kim** serves on the board of directors of the International Society for Asphalt Pavements (ISAP) and is the conference chair for the ISAP's next International Conference on Asphalt Pavements, to be held in 2014. Kim is also the founder and first president of the Asian-American Pavement Engineers Association.

Dr. **Sami Rizkalla** is a Council Member of the International Institute for Fiber Reinforced Concrete in Construction (IIFC). Dr. **Rudi Seracino** is on the executive committee of IIFC, and is co-chair of the American Concrete Institute subcommittee on FRP Strengthening and Repair of Unreinforced Masonry Structures. For ten years, Dr. **Nagui Roupail** has been the N.C. State University representative to the Transportation Research Board (TRB). Dr. **Ed Jaselskis** chairs TRB's Construction Information Technology Joint Subcommittee (AFH10/ABJ50) to identify workshop themes and research needs.

Dr. **Roy Borden** is a past chair of the ASCE Grouting Committee. Dr. **Emily Zechman** is a "control group" member of the ASCE Water Resources and Environmental Systems Committee. Faculty such as Drs. **Chris Bobko**, **Joel Ducoste**, **Mervyn Kowalsky**, **Detlef Knappe**, and many others serve as active members on professional society committees. Many faculty also serve as session chairs and program committee for professional society meetings.

EDUCATION BEYOND THE CLASSROOM

Faculty are active in developing and delivering workshops and courses to professional communities worldwide, and in promoting the quality of academic programs nationally. Dr. **Francis de los Reyes** has conducted workshops for wastewater treatment plant operators and professionals in the US and the Philippines. Dr. **Mervyn Kowalsky** teaches and maintains research collaborations with the ROSE School in Pavia, Italy. **Roberto Nunez** and **Matt Poisel** conduct numerous workshops for practitioners on topics such as concrete field testing certification, occupational safety, and construction project management training. Drs. **Paul Khosla** and **Akhtar Tayebali** have delivered workshops on "Superpave Mixture Design and Analysis" for the North Carolina Department of Transportation. Dr. **H. Christopher Frey** has delivered one day workshops on uncertainty and sensitivity analysis at annual meetings of the Society for Risk Analysis.

Dr. **John Stone** has been the lead organizer for a number of years of a summer practicum held in Raleigh that hosts students from Central and South America, including Venezuela, Ecuador, Guatemala, and Costa Rica. A dozen CCEE faculty contribute to delivering seminars on a wide range of topics for the visiting students. Dr. **Joe Hummer** is the lead organizer of summer study abroad programs that enable approximately 20 CCEE students to take NCSU courses for academic credit in locations such as China and Australia, while benefitting from local culture and observing how engineering is practiced abroad. The third study abroad program is planned for Hong Kong this summer.

Dr. **Jim Nau** is extensively engaged in assuring the quality of civil engineering programs nationally. He is active in accreditation reviews with ASCE and the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). He is a past chair of the ASCE Committee on Curricula and Accreditation (CC&A). Dr. **David Johnston** also serves as an ABET reviewer and is a member of ASCE CC&A. The experiences gained by Nau and Johnston help our department prepare for the 6-year accreditation review cycles for

each of the undergraduate degree programs in civil, construction, and environmental engineering.

OTHER CONTRIBUTIONS

Faculty contribute to professional practice in a variety of other ways, including peer review of proposals for funding agencies, consulting on specific projects, peer review of government technical reports, serving as expert witnesses in cases that involve infrastructure failure, and international collaborations. Faculty-led research also occasionally makes the news, leading to communication of key research findings to the general public via the media.

Dr. **Roy Borden** has consulted on the grouting of major dams in Mexico, Canada and South Korea and numerous major excavations and tunnels in the United States, and has served as an expert witness in cases involving infrastructure failures. Technologies developed by Dr. **Bob Borden** have been used to remediate thousands of waste sites in the US, Canada, Mexico, South America, Europe, Africa, Australia, and Japan. Many faculty are engaged in international collaborations that provide the opportunity to apply or refine techniques developed at NC State. These collaborations also provide benefits to a large segment of the global population that suffers from inadequate drinking water, air quality, and infrastructure. For example, Dr. **Francis de los Reyes** has many collaborations in the Philippines, India, China, and Montenegro related to the need for safe drinking water. Dr. **Min Liu** collaborates extensively with colleagues in Asia on construction methods. Drs. **H. Christopher Frey** and **Nagui Roupail** collaborate with colleagues in Portugal, China, and India on transportation and air quality.

These are just examples of the many things that CCEE faculty are doing on a regular basis to transfer information and knowledge into practice to the benefit of individuals, organizations, and society at the state, national, and international levels. These interactions enrich the content of courses and mentoring experiences for students. •





From left to right: Jeff Morrison, Matt Modlin, Cameron Bryant, Banning Reed, Joel Ducoste, Mitch Fluhrer, Robert Macia, Mohammed Mullah, Rob Stevenson, Michael Wang, Kari Neville, Ed Jaselskis, Anna Lynch

Professionals Contribute to Teaching

*Students Benefit from Interactions with
Practitioners in Class and Beyond*

OUR DEPARTMENT has a long history of engaging practicing engineers in the education and evaluation process, particularly in the senior capstone design courses, with the goal of broadening and deepening the learning experience for the students. Such active engagement by professionals helps to ensure that students are ready for professional practice.

In addition to guest-speakers, professionals have been engaged in lecturing, evaluating student projects, and in facilitating visits to their offices and construction sites. This past fall semester we have been fortunate to continue and enhance this process, with quite a few practicing engineers volunteering their time to actively engage students in the classroom.

STRUCTURAL ENGINEERING

In our capstone design course in structural engineering (CE 420) taught by **Irving Nazario**, P.E., we have been privileged with the active participation of **Mitch Fluhrer**, P.E. (BSCEC, 1993) and **Banning Reed**, P.E. (BSCEC, 1993) of Fluhrer Reed Structural Engineers. Since 2005, they have been unvarying in their support of this course. They have regularly provided drawings of their office-building projects, which form the basis for semester-long projects to design steel frames for these buildings. In addition, they have made presentations on how they acquire projects, how they design them, the technology on which they rely, and how they run their day-to-day operations. Fluhrer Reed has also participated in the panel that judges the oral presentations and drawings of each student team's design effort.

Additionally, this past fall, the building project made available by Fluhrer Reed formed the basis for collaboration between students in the CE 420 structural engineering and CE 440 geotechnical engineering capstone courses. The latter was taught by **Dr. Roy Borden**. Basing their analysis on actual site data obtained from Mosher Engineering (the original geotechnical consultant for the project) and design data obtained from the structures students, the geotechnical students developed site-specific data on soil characteristics and strengths, which was then used by the structures students to complete their designs.

Tom Caldwell, P.E. (MCE, 1993), Chief Engineer of Atlas Engineering, continued his active participation in CE 420 with an informative talk on ethical conduct for professional engineers.

Rob Stevenson, P.E., of LHC Structural Engineers, and the president of the Triangle Chapter of Structural Engineers Association (SEA), along with several SEA members, came to nine student-team design sessions, during which they spent considerable time discussing each team's plans and progress. Each professional brought structural drawings for some of their current projects. As the students clustered around the drawings and asked questions, they learned from the professionals, and each other, about how to implement their own design projects. The participating SEA members include: **Cameron Bryant**, P.E., Black & Veatch; **Kari Neville**, P.E. (BSCE, 2004; MCE, 2007), Stroud Pence & Associates; **David McCarty**, P.E., Stewart Engineering; **Jamie Brueggeman**, P.E., Stewart Engineering; **Matt Modlin**, P.E. (BSCEC, 2000), LHC Structural Engineers;

Tim Hilton, P.E. (BSCE, 2006; MCE, 2008), LHC Structural Engineers; and **Heath Drye**, P.E., Collins Structural Consulting.

Additional SEA members hosted activities off campus. **Robert Macia**, P.E., Treasurer of the Triangle Chapter of SEA and Senior Vice President and Chief Operating Officer of Stewart Engineering, led a tour of his firm's Raleigh offices. At Fluhrer Reed's offices in Raleigh, **Banning Reed** was our host. **Anna Lynch**, P.E. (MCE, 2009) of Stroud Pence and Associates, and the Vice President of the Triangle Chapter of SEA, led the class on a tour of the construction site of a steel-framed structure in Raleigh. She also participated in the panel of judges at the end of the semester, along with **Jeff Morrison** (MSCE, 2000) of Stroud Pence & Associates and **Tim Hilton**.

GEOTECHNICAL ENGINEERING

In the CE 440 geotechnical engineering capstone design course, **Bill Mosher**, P.E., the head of Mosher Engineering, provided the class with subsurface exploration data and topographic maps of the project site. In addition, **Adam Browning**, P.E. (BSCE 2004; MSCE 2006), of S&ME, Inc., supplied the students with additional subsurface information that his company had obtained in an earlier exploration of the same site. Later in the semester, Bill Mosher came to class and evaluated the presentations made by each of the geotechnical student teams on their interpretation of the geologic and subsurface conditions at the site, as well as on the engineering properties they proposed for use in their foundation designs. Bill also provided insights into professional practice and his expectations for young engineers in his office. At the end of the course, Mr. Mosher and Mr. Browning assisted in the evaluation of each team's final foundation recommendations. In CE 342, **Mohammed Mulla** (MCE, 2011), a senior geotechnical engineering with the North Carolina Department of Transportation, gave an invited presentation on site investigation.

CONSTRUCTION ENGINEERING AND MANAGEMENT

The CE 469 capstone design course in construction engineering taught by Dr. **Mike Leming** in the fall and **Roberto Nunez**, P.E., in the spring, focuses on two group projects: heavy or highway construction, and commercial-building construction. At least one practicing engineer is invited to participate in each project to lecture on key aspects of the design of the construction process. These professionals also help to evaluate the student presentations later in the semester.

This fall, **Randall Gattis**, P.E. (BSCEC, 1977), Vice President, Bridge Design, at Sanford Contractors, helped with the highway project. **Marcus Tuttle** (BSCCEM, 2005), a project manager with Lend Lease (previously Bovis Lend Lease) and **Leslie Smith**, P.E., a project manager with Bayer CropScience, helped with the building construction project.

CE 464/564, Legal Aspects of Contracting, is taught by Dr. Ed Jaselskis. **Perry Safran**, with Safran Law Offices, and **Gerald Jeutter**, spoke to the class on the topic of bankruptcy law. **Riana Smith**, also with Safran Law Offices, gave a lecture on employment law.

TRANSPORTATION ENGINEERING

The CE 400 transportation engineering capstone design course taught in the spring by Dr. **John Stone**, encompasses a multidisciplinary approach involving actual projects. The course emphasizes important interactions among transportation projects, the community, economic development, land use and the environment.

This past spring featured a potential economic development site in Lee County, NC. **Bob Heuts**, Director of the Lee County Economic Development Corporation, and **Robert Bridwell**, Director of Sandford/Lee County Community Development, presented two projects to the students, a pharmaceutical plant and an aircraft assembly factory, and hosted them on several field trips. These projects involved site location options, utility issues, and a variety of highway, rail and air access design problems that the student teams had to resolve. Mr. Heuts and Mr. Bridwell participated in a workshop review of the students' preliminary designs and in evaluating the final presentations. **Michael Surasky** (BSCE 1996; MCE 2000), Senior Transportation Engineer with HDR Inc., and **Eric Lamb** (BSCE 1993; MCE 2001), Manager of Raleigh Transportation Planning, have worked with the over the past few years.

WATER RESOURCES AND ENVIRONMENTAL ENGINEERING

For our combined CE 480/481 capstone design courses in water resources engineering and environmental engineering, Dr. **Michael Wang** (PhD 2007), a vice president of the environmental engineering firm of Hazen and Sawyer, provided valuable assistance to the instructor, Dr. **Joel Ducoste**. Wang lectured on the practical operations of water treatment plants and discussed standard design protocol and submission procedures performed

DEPARTMENT NEWS

by consulting firms. He also facilitated the on-site tour of the water treatment plant that the student teams in these courses used as the basis for their semester project.

Dr. **Francis de los Reyes III** developed and taught a new course in Fall 2011 on water and sanitation for developing countries. Dr. **Hal House** of Integrated Water Systems arranged for field trips to two decentralized wastewater treatment systems and lectured on the operating principles of these systems. In addition, Wang presented a lecture on costing water and wastewater treatment plants.

CE 497/596, Coastal Structures is taught by Dr. **Margery Overton**, and this fall featured a two-day field trip to North Carolina's Outer Banks. During the trip, presentations were made by: Dr. **Tim Kana**, President of Coastal Science & Engineering, who talked about the Nag's Head beach nourishment project design; **Mike Muglia**, a field research coordinator for the Coastal Studies Institute of UNC, who discussed wave monitoring projects; **Pablo Hernandez**, Assistant Resident Engineer at the Manteo Office, NC Department of Transportation, who discussed NCDOT's response to Hurricane Irene and the Pea Island breach temporary bridge; and **Dennis Stewart**, a biologist at the Pea Island National Wildlife Refuge, who talked about the work at the refuge. During the semester, **Johnny Martin** (BSCE,

1993; MSCE, 1997) of Moffat & Nichol gave a presentation on the Rudee Inlet, Virginia, North Jetty Stabilization project.

PRACTICING PROFESSIONALS ENRICH CCEE

Nearly 30 practicing professionals participated in the 8 courses summarized above. Practicing professionals routinely interact with CCEE students in many other ways, such as through student chapters of professional societies including the American Society of Civil Engineers, National Homebuilders Association, Association of General Contractors, American Concrete Institute, Institute of Transportation Engineers, Engineers Without Borders, Air & Waste Management Association, American Water Works Association, and Professional Engineers of North Carolina. Many students are engaged in research projects that involve interactions with professionals. Faculty and students are grateful to the many practicing professionals who have taken the time and made the effort to instruct and mentor students. •

Drought Management Project Wins Award



Dr. Sankar Arumugam, an associate professor in the Department of Civil, Construction, and Environmental Engineering, recently completed a project entitled "Improved Drought Management Strategies for the Triangle Area Utilizing Climate Information Based Probabilistic Streamflow Forecasts." This research,

which was supported by the North Carolina Water Resources Research Institute, was selected as the best project in the South Atlantic-Gulf region and has been nominated for a national award given by the National Institute for Water Resources. Dr. Arumugam is working to use climate forecasts for improving reservoir management, particularly in times of drought. "We are very confident that improvements in water supply will actually occur through this research," says **Dr. Michael Voiland**, Director of the NC Water resources Research Institute. •



The CCEE Department has established its own Facebook page. Like us on Facebook at **www.facebook.com/ccee.ncsu** to receive department news, follow updates, and connect with other CCEE alumni and students.

John Brantley – A Class Act

“John offers his students a glimpse of the history of aviation, as well as current practice and future trends.”



FOR 30 YEARS John Brantley (BSCEC 1964) has been a “class act” for CE504 – Airport Planning and Design - and its predecessor airport courses CE510 and CE603. During that time he taught NCSU CCEE students who built U.S. and international careers on the principles that he and others have presented in the course. As Director of the expanding

Raleigh-Durham International Airport (RDU), he brought special perspectives to the class including commentary on Federal policies, management and funding issues, and his satisfaction of being involved in aviation. Relying on his education as a civil engineer and his professional experience as an airport engineer and director, he posed challenging semester projects for student teams and accompanied them on airport visits throughout NC. Although John retired as RDU Director in 2011, we are grateful that he has agreed to continue teaching and the CCEE Department looks forward to John’s next offering of the course in the fall of 2012.

John offers his students a glimpse of the history of aviation, as well as current practice and future trends, so it is appropriate to review the history of the airport course.

Professor **Paul Cribbins** originated the airport course in 1978. Over the years, a number of practitioners have been involved including **Tom McDowell** (NCSU BSCE 1969, MCE 1971), who was

John’s predecessor as RDU Director, John Brantley, who started to participate in the course in 1984, **Bruce Matthews** (MSCE 1973), who was then the Manager of Airport Development for the North Carolina Department of Transportation (NCDOT) Division of Aviation, Rick Barkes, Manager NCDOT Aviation System Development, and **Bobby Walston** (BSCE 1990), NCDOT Airport Development Engineer. This course includes complete coverage of Federal Aviation Administration (FAA) Airport Design Circulars airport visits, guests from the aviation industry, and a semester long project to design a general aviation airport.

“As I look back over the nearly 30 years,” John says, “I’m reminded each of us brought something to the party that complimented the others. We weren’t there for any reason other than a love of aviation, air transportation and airports, and the desire to see students exposed to that mode of transportation. The course really took off when seniors were allowed into the course...The time and energy all of us invested truly changed the lives of some of the students who have gone on to careers in aviation, which most likely never would have occurred had they gotten no exposure through the course. I’m proud to have been part of the team that enabled that to happen, and in a very small way maybe I’ve paid Paul Cribbins back for the guidance he gave me back in the spring of 1964 when I thought I knew where I wanted to go but not how to get there. I hope so anyway.” • Photo:

John Brantley ▶ Terminal 2 of RDU International Airport (Courtesy Raleigh-Durham Airport Authority)

CCEE Department History—Buildings: Mann Hall 1963 to the Present

CCEE Doubles in Size During 48 Years in Mann Hall

OLD MANN HALL had been the home of the department since 1928. Nationwide expansion of facility and infrastructure construction in the 1950's had boosted student enrollment and created cramped conditions. Initiation of the Interstate highway program in the late '50s further fueled the need for a modern facility for education and research.

About 1960, initial planning for a site focused on the much surveyed hill bounded by Page Hall, Winston Hall and 1911 Building. A preliminary design had been developed, but by the time the building was funded for design and construction, the site was changed to the site occupied until 1956 by the 1912 vintage Zoology Building.

Designers for the new Mann Hall were Sloan & Wheatley Architects of Charlotte, Gardner, Elsevier & Kline Construction Engineers of Durham for the structure, and Cofer and Assoc., mechanical & electrical engineers of Greensboro. Contractors included King-Hunter general contractors of Greensboro, Bryant-Durham Electric of Durham, and Dick & Kirkman mechanical contractors of Greensboro. Construction started April 24, 1962 with final acceptance on December 19, 1963. Designed and built with careful attention to cost, the 78,266 gross sf facility cost \$990,223, including design fees and furnishings, or \$12.50/sf in 1962 dollars or \$93.60/sf. in 2012 dollars. Classes were first offered in the new Mann Hall for the Spring 1964 semester.

Occupied exclusively by the CE Department, the Fall 1964, student enrollment was 547 undergraduates and 54 graduate students with a faculty of 23. The functional design spread offices, classrooms and computation, and design labs on the upper three floors with a ground level main entrance on the front of the building. Experimental labs were located on the basement floor with ground level access at the rear of the building. Although the exact use of spaces has evolved to meet ever changing needs, the general plan has served the department extremely well.

Some features of the building, including air conditioning, were almost unique on the campus at the time. The front steps and porch are gathering places in comfortable weather for general discussion. The lobby is a well used gathering and study space. Both have allowed CCEE students greater social and supportive interaction than seen in many campus buildings.

As buildings are being renovated on the North Campus and built on the Centennial Campus, this *hearth* concept facilitating student interaction has become popular. Other spaces, such as the Shelco student lounge and the Computing lab, add opportunity for student and project team interaction.

Today with a Fall 2011 undergraduate enrollment of 813, graduate enrollment of 359 and a faculty of 46, Mann Hall is well beyond its original occupancy level. To meet space needs over the years since the mid 1970s, there have been a series of moves in and out of temporary spaces in adjacent buildings plus the relocation of some research activities to the Constructed Facilities Laboratory. Once again the CCEE Department looks forward to a new facility, this time to be located on the Centennial Campus when funding becomes available. • Photos: Zoology Building ca. 1920

(Archives image 14) > Mann Hall in 1964 (Archives image 4114) > Construction Begins 1962 (Archives image 4172) > Construction Rear View 1963 (Archives image 4174) > Mann Hall in 2011 > Shelco Student Lounge

This article is one of a series intended to describe the department's history. The first few will focus the buildings that have served as our homes followed by other articles on faculty, students, development of programs, and educational and research facilities. In parallel, a history section will be developed on our website. We are indebted to the NC State Libraries Special Collections Research Center for permission to use the images included. If you have photo images of the current Mann Hall under construction or in use that you could share, please contact the author, David Johnston (johnston@ncsu.edu), with a description.





An Elegant Solution to a Messy Problem

Solving a real-world problem – that's what engineering is all about.



IN MANY DEVELOPING COUNTRIES, disposing of human waste is difficult and hazardous. While conventional pit latrines can be safe and effective, they must be emptied on a regular basis. That's the problem – large waste disposal trucks just can't fit through the narrow alleyways of crowded cities. That's where the Wolfpack comes in.

In Spring 2010, the students in the Water Resources and Environmental Engineering Senior Design Project (CE480 and CE481) were challenged by the class instructor, Dr. **Robert Borden**, to respond to a Request for Proposals (RFP) issued by the Bill and Melinda Gates Foundation. The objective was to develop an effective, low cost, easy to reproduce approach to quickly and hygienically empty latrines and cesspits in crowded urban areas. The prize - \$100,000.

Tate Rogers, a senior in Environmental Engineering, took the challenge and developed a simple, yet elegant method to pump sludge, using a gasoline-powered earth auger inserted in a PVC pipe. The turning motion of the corkscrew-shaped auger operates similar to an Archimedes' screw, discharging the sludge through a hose to a waiting truck or 55-gallon drum. How did Tate come up with the idea? -- a solid engineering education and many hours on his parents farm north of Winston-Salem, cleaning out the horse stalls.

This fall, Tate learned that his proposal to the Gates Foundation was selected for funding. The Grand Challenges in Global Health Program is an international competition, focused on developing practical, but ground-breaking solutions to basic problems. Competition for the \$100,000 grants is fierce, with only 110 proposals funded out of nearly 2,100 submissions. Tate will use the money to develop his idea and demonstrate its effectiveness as the topic of his Masters of Science (MS) thesis in Environmental Engineering at NCSU. Initial prototypes should be ready by the end of 2012, with field-testing in the Philippines in spring 2013. Once he finishes his MS, Tate wants to work on engineering projects to help people in developing countries.



"It's really, really cool because not many graduate students get to work on something they came up with," said Tate. "If it's successful, we want to make the technology and the training available globally. Solving a real-world problem – that's what engineering is all about."

• Photo: Dr. Robert Borden ▶ Tate Rogers developed the handheld device, which functions like an Archimedes' screw, lifting waste and funneling it into containers for transport.

Tackling Water and Sanitation Issues in Developing Countries

Promoting Safe and Sustainable Water Supply in the Philippines, India and China

CCEE STUDENTS AND FACULTY are working to address one of society's most pressing challenges— how to improve water supply and sanitation in developing countries. Poor water, sanitation, and hygiene has historically been the direct and indirect cause of 2.4 million deaths per year (6500 deaths per day), with most of the fatalities being children under age 5 in the poorest developing countries. To develop effective and sustainable approaches for improving water supply and sanitation, students must consider cultural factors in addition to cost and technical performance. Typical water and wastewater treatment classes focus on large-scale technologies used in developed countries. A new class, developed by Dr. **Francis de los Reyes**, “Water and Sanitation for Developing Countries” was offered in Fall 2011 to address this gap. The initial class of 7 undergraduate and 14 graduate students examined the current worldwide situation in water, sanitation, and hygiene (WASH), analyzed the characteristics of successful and failed WASH projects, and analyzed the design of known technologies such as the VIP latrine. The class visited two decentralized wastewater systems in Apex and Pittsboro. The field trips were coordinated with Dr. **Hal House** of Integrated Water Systems, which designs onsite, plant- and soil-based technologies.

In addition to teaching at NCSU, de los Reyes has been working with non-governmental organizations in the Philippines, India and China on water, sanitation, and development issues. In 2009, one of de los Reyes’ graduate students, Lauren Wellborn, spent 6 months in the Philippines to analyze the water quality and wastewater systems in 40 small communities that had treatment systems developed by Gawad Kalinga (www.gk1world.com) or GK, a non-profit organization that transforms slums to sustainable, livable village communities. de los Reyes also helps GK with improving the siting, design, and construction of septic tanks for these new villages, educating GK workers on environmental technologies including anaerobic systems, rainwater collection, and green walls (urban agriculture). At home, de los Reyes serves as head of the Triangle area chapter of GK. In the last few years, the group has raised funds to build 3 villages (90 homes) and support other GK villages in the Philippines. •

Photos: CCEE students visit a decentralized wastewater treatment system in Apex, NC. Dr. Hal House of Integrated Water Systems explains how the system works.
➤ Dr. Francis de los Reyes giving a talk in a low income area in the Philippines.



Students Test Innovative Steel Building Connection

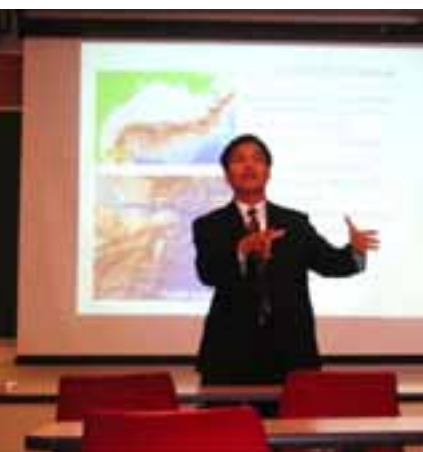
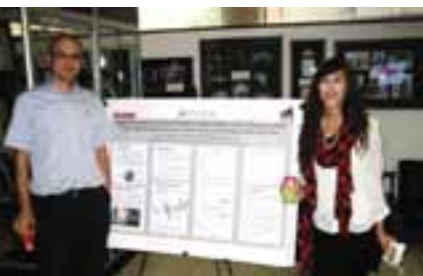


A large number of steel building failures during the 1994 Northridge earthquake in California came as a shock to the structural engineering community. Most of the steel building failures were caused by cracks at welds between the beam and column connections. Since 1994, researchers have been making efforts to enhance seismic performance of building connections. CCEE department researchers under the supervision of Dr. **Tasnim Hassan** developed a novel technique to enhance seismic performance of building connections by heat treating specified beam flange areas. The research team secured a grant from the National Science Foundation through the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) Program to experimentally validate the heat treating technique and to develop a design methodology. Graduate students **Machel Morrison** (PhD) and **Doug Schweizer** (MSCE) traveled to Minneapolis, Minnesota to conduct

seismic experiments on steel building connections at the University of Minnesota's Multi-Axial Sub-assembly Testing (MAST) Laboratory. Machel and Doug tested four unreinforced flange-welded web building frame connections between August and November of 2011. Experiments performed so far have successfully validated the heat treating technique. Currently, the researchers are analyzing data collected from the first round of experiments and are planning a second set of experiments in 2012. Using the experimental and analytical results, the NCSU research team will apply to the American Institute of Steel Construction Inc. for prequalification of heat treated modified connections. Once prequalified, the modified connection can be implemented into steel construction for improved seismic design and safety. •

Photo: A connection after the test and the NCSU graduate students at the Minnesota Laboratory (Left to Right: Machel Morrison, Rick Snyder (Lab staff) and Doug Schweizer)

Eleventh Structural Engineering and Mechanics Symposium



Each semester the Structural Engineering and Mechanics (SEM) Group in the CCEE department holds a symposium as a forum for graduate students to present their research. The eleventh SEM symposium was held on Oct 28, 2011 and included eight oral and eight poster presentations. The presentations were evaluated by a group of judges and the best oral presentation award was given to Mr. **Raasheduddin Ahmed** for his presentation on "Constitutive model development for high temperature lifing simulations." Raashed is pursuing a PhD under the supervision of Dr. **Tasnim Hassan**. The best poster presentation award was given to Mr. **Adel Elsaid** and Mrs. **Anna Harris Clark** for their poster on "Rapid assessment of critical bridges in coastal regions under extreme loading." Adel is pursuing a PhD and Anna is pursuing an MS under the supervision of Dr. **Rudolf Seracino**.

The keynote presentation was delivered by Dr. **Gwo-Tarng Ju** from Shell on "Development and implementation of novel ultra-deepwater technology." Since receiving his PhD from the University

of Texas at Austin in 1985, Ju has been involved with various subsea development projects at Shell. From 2003 through early 2010, Ju led the development of key technologies that were used for the first time in the Perdido Project, which is the world's deepest offshore drilling and production facility. In recognition of his contributions to the Perdido Project, Ju received the ASME International Petroleum Technology Institute's Geomechanical Engineering Achievement Award in 2010. In his presentation, Ju described challenges and technology development for the Perdido Project, and shared his views on what it takes to transition from student to a practicing engineer. Ju is currently the engineering manager for subsea equipment in North America and South America for Shell.

FDH Engineering sponsored the eleventh SEM symposium. **Shell** sponsored Ju's travel to NCSU. The next SEM symposium will be held on Fri, Mar 2, 2012. • Photos: Adel Elsaid and Anna Harris Clark jointly won the best poster presentation. > Dr. G.T. Ju delivering the keynote presentation.



Fall 2011 Baccalaureate Ceremony

Alumni Joined by 134 December Degree Recipients

THE FALL 2011 departmental baccalaureate ceremony was held on Friday, December 16, 2011. A total of 80 students were awarded their undergraduate degrees, with 63 in civil engineering, 12 in construction engineering and management, and 5 in environmental engineering. A total of 48 masters degrees were awarded, with 47 in civil engineering and 1 in environmental engineering. Six doctor of philosophy degrees were conferred. Doctoral candidates were recognized and hooded by their advisors. The doctoral hood is lined with the colors of the university granting the degree (red and white of course), and trimmed with royal blue.

The audience, numbering about one thousand, was greeted by a few opening remarks from Dr. **Mort Barlaz**. Dr. **Jim Nau**, Associate Head for Undergraduate Programs, then recognized the members of Chi Epsilon, the national civil engineering honor society, and introduced the five undergraduate valedictorians, each with a perfect 4.0 cumulative grade point average. The five valedictorians were **Cory Matthew High**, **Thomas Alexander Petersen**, **Patrick Graham Pritchard**, **John Nicholas Smith**, and **Michael Steven Wojnarowski**. Cory is from Dobson, NC and has returned to NC State this spring to pursue his master's degree, concentrating in structural engineering. Thomas is from Langenfeld, Germany but attended high school in Yuma, Arizona. He will attend graduate school and will focus on water resource management and hydrology. Patrick (Graham) is from

Greensboro, and is pursuing his master's degree in structural engineering here at NC State. John (Nick) is from Richmond, VA and will either attend graduate school at NC State or will engage in professional practice. Finally, Michael was a double major in civil engineering and construction engineering and management. He is working for Progress Energy as a project manager.

The commencement speaker was Dr. **John S. Fisher**, P.E., Professor Emeritus of Civil Engineering at NC State and Chairman of FDH Companies. In addition to challenging the graduates to develop their careers as engineers, Dr. Fisher urged the graduates to work to maintain personal relationships with friends and fellow students. Citing several of his own key experiences, Dr. Fisher emphasized the significant role these people have had on his life, both personally and professionally. Dr. Fisher is one of three founding partners of FDH which began by applying nondestructive wave propagation techniques for assessing the size and condition of foundations for bridges, towers, and similar structures. Dr. **Darrin Holt** (the H in FDH) earned his Ph.D. degree from NC State in 1994, and was a student of the third founding partner, Dr. **Robert Douglas**, former Professor of Civil Engineering, now deceased. Since its founding in 1995, FDH, now a full-service civil engineering firm, has grown to 140 employees with offices in Raleigh, St. Louis, and Baton Rouge. • Photos: Valedictorian Cory Matthew High and Dr. Jim

Nau > Dr. John Fisher



Four CCEE Graduates Commissioned as Army Officers

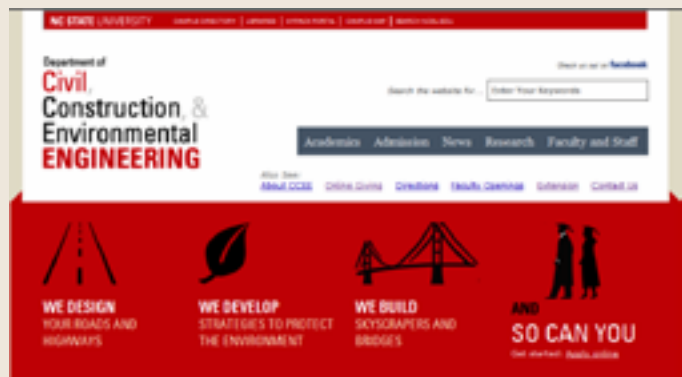
Teamwork, tact & effective communication

ON FRIDAY, DECEMBER 16, 2011, seven NCSU U.S. Army Reserve Officer Training Corps (ROTC) Cadets were commissioned as 2nd Lieutenants in the US Army. Among those, four were graduating seniors in Civil, Construction and Environmental Engineering. **Bryan C. Underwood** is a BSCE graduate who will join the US Army Corps of Engineers. **Justin T. Wilcox** is a BSCE graduate who will join the Quartermaster Corps, US Army. **Willis G. Daniel, Jr.** is a BS Construction Engineering and Management (CEM) graduate who will join the US Army Reserves and U.S. Army Corps of Engineers. **Thomas A. Borden**, a BSCE graduate, will join the US Army

Corps of Engineers. The NCSU U.S. Army ROTC program consists of a voluntary two-year basic course (Freshman and Sophomore) and a two-year advanced course (Junior and Senior), which includes a five-week summer camp prior to the final year. ROTC training goes beyond the typical college classroom in that students learn leadership skills including how to motivate co-workers, cope with the unexpected and organize large, complex tasks. The training also emphasizes teamwork, tact, and effective communication. Such skills are valuable in both military and business settings. • CCEE Graduates and Commissioned U.S. Army Second Lieutenants Bryan C. Underwood, Justin T. Wilcox, Willis G. Daniel, and Thomas A. Borden

AN ALL NEW DEPARTMENT WEBSITE: WWW.CE.NCSU.EDU

A newly designed website (www.ce.ncsu.edu) has been in operation for the CCEE department since Fall 2011. Designed and developed by College of Engineering web staff in Information Technology and Engineering Computer Services (ITECS) under the guidance of Drs. **Kumar Mahinthakumar**, **Joe DeCarolis**, and **John Baugh**, the new site boasts a completely new look and easy navigation features. Dynamic content such as faculty publications, projects, courses, and contact information are automatically pulled from university databases, minimizing error and eliminating the need for constant maintenance and updates. News and announcements are fed to the website through the Towncrier system, developed by web staff in the Department of Electrical and Computer Engineering. Additional enhancements are underway for graduate and undergraduate academic and admission pages.





Engineers Without Borders in Bolivia

Does where you live make a difference?

Do you ever stop to think about where your water comes from? How do you know you have enough? Does where you live make a difference? During the Engineers Without Borders -North Carolina State University (EWB-NCSU) chapter's trip to Bolivia this summer, these questions arose daily as students evaluated the functioning of a water catchment system installed at a local school by their chapter back in 2009. The travel team consisted of Bolivia Water Sanitation Committee leader Andrew Santos, **Benjamin Lord** (B.S. ENE student) Sara Monti, and professional mentor **Sara Allen** (MSENE 2011), an engineer with GHD. They spent two weeks in Bolivia, gathering data and forging personal and professional ties with the local community as part of the chapter's ongoing commitment to sustainable engineering in the region.

The EWB-NCSU chapter has been involved with the agricultural training school Centro de Capacitación Técnica y Formación Integral Asanquiri (CECTFIA) in Asanquiri, Bolivia, since 2007. This most recent trip was the culmination of over a year's worth of background work and research done by the entire committee, including water quality analysis with the advice of NCSU faculty, including Dr. **Detlef Knappe**, a professor of civil

and environmental engineering and the project's sponsor.

The travel team spent most of their time in Asanquiri on-site at CECTFIA, documenting the condition of the water catchment system and its components, noting areas of damage, and testing water quality in various water storage locations. The trip also included outreach to the school's students, with basic engineering and water testing principles taught alongside impromptu English lessons. The NCSU team and students bonded over shared meals, conversations, and pick-up soccer games. The school's teachers and director, **Luc Mattheij**, were important contributors to the evaluation of the system and the success of the trip.

Following the farewells to CECTFIA and returning to the metropolitan city of Cochabamba, the team met with non-profit organizations such as Rotary International and Save the Children to strengthen ties with the local community and find new ways to involve them in the work at CECTFIA. Although the trip ended four months ago, communication between EWB-NCSU and CECTFIA continues. The trip was an unforgettable experience that continues to drive the chapter with a sense of purpose. •

Photo: Eugenio, Sara Allen, Claudina, Justina, Eulogia, and Sara Monti

News from CCEE Student Groups

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



INSTITUTE FOR TRANSPORTATION ENGINEERS

During the Fall 2011 semester, the Institute for Transportation Engineers (ITE) student chapter at NCSU organized an Adopt-A-Highway service project and football tailgating event. The chapter volunteered and participated in the 2011 North Carolina Section Institute of Transportation Engineers (NCSITE) annual meeting, held in Raleigh in November, where ITE president **Katy Salamati** and vice-president **Zachary Bugg** received NCSITE scholarships. The ITE student chapter won the traffic bowl competition for the state of North Carolina at the NCSITE annual meeting and will compete against nine other teams at the Southern District meeting in April, 2012. ITE sponsored travel for thirty-two undergraduate and graduate students to attend the 91st Annual Meeting of the Transportation Research Board in Washington DC from January 22-25, 2012. Salamati received the Center for Transportation and Environment student of the year scholarship, and Bugg won the Southeastern Transportation Center student of the year scholarship.

ITE is looking forward to organizing a student-led seminar at NCSU on March 30, 2012. Students from Civil Engineering Departments at universities across North Carolina will attend the meeting and present their research. • Photos: ASCE and AGC student chapter members stand on the partially constructed 9th floor of Valentine Commons, a student housing community near NCSU.

AMERICAN SOCIETY OF CIVIL ENGINEERS

In Spring 2012, the American Society of Civil Engineers student chapter is sponsoring several seminars by alumni and professional organizations, including speakers from Huntington

Ingalls Industries (Feb 1), Kimley Horn & Associates (Feb 26), and Fluor Corporation (April 4). The students are building and casting a concrete canoe and designing and fabricating a steel bridge for upcoming competitions. The chapter is looking forward to a number of events including a Habitat for Humanity building event, construction site visits, a cookout, and the ASCE student competitions at the annual Carolinas Conference, which was hosted last year at NC State and will be hosted this year at Clemson University.

ASSOCIATION OF GENERAL CONTRACTORS

The Association of General Contractors (AGC) student chapter will meet four times this semester and will host speakers from local corporations. The students are looking forward to a number of events, including site visits to local construction projects such as the Valentines Commons student housing community and the new Talley Student Center, a joint AGC and National Association of Home Builders (NAHB) bowling night, and an end-of-the year cookout.

PROFESSIONAL ENGINEERS OF NORTH CAROLINA

The Professional Engineers of North Carolina (PENC) student chapter is conducting several activities this semester. Students from PENC will run the engineering portion of Boy Scout day at NC State, where Boy Scouts can earn engineering merit badges. PENC will also have monthly meetings throughout the Spring 2012 semester and a pig pickin' later in the spring.

NC SAFEWATER

NC Safewater participated in several activities during the Fall 2011 semester. The group hosted the City of Raleigh Reuse Coordinator, along with speakers from Dewberry, Integrated Water Strategies, and Highfill Infrastructure, who spoke at lunch meetings. The NC Safewater chapter sponsored travel for 15 students to attend the NC American Water Works Association and Water Environment Association (AWWA-WEA) Annual Conference in Charlotte in November. Nine graduate students participated in the student poster competition, and first, second, and third place prizes were awarded to NC State students. The chapter received its charter plaque from the national Water Environment Federation at the conference. NC Safewater sent eight students to the NC AWWA-WEA Reuse Committee meeting to discuss decentralized water treatment systems with professionals.

During the Fall 2011 semester, NC Safewater members volunteered at the NC AWWA-WEA Model Water Tower Competition, where elementary school students competed to design the best water tower. Chapter members also volunteered at the Walnut Creek Wetland Festival and adopted a stream. The group toured the Wake County Landfill, the new Dempsey E. Benton Water Treatment Plant, and the Lake Johnson Dam with engineers from Hazen and Sawyer who designed recent modifications to that dam.

In the Spring 2012 semester, NC Safewater will host engineers from Hazen and Sawyer, who will speak at a group meeting, and the chapter will tour the Neuse River wastewater treatment plant.

NATIONAL ASSOCIATION OF HOME BUILDERS

In the Spring 2012 Semester, the National Association of Home Builders student chapter has several events scheduled. In addition to joint events with the Association of General Contractors (AGC) student chapter, NAHB students will participate in a Habitat for Humanity construction project. The chapter will attend a Durham Bulls game and host a go kart social, a cook-out, and meetings with invited speakers.

Undergraduate Student Engages in Research with CCEE Faculty



As an environmental engineering major, **Dylan Cawthorne** '14 knows he would like to work with an engineering consulting firm after graduation. However, he has yet to decide if he wants that job to be on the technical or policy side of environmental engineering. Cawthorne is also uncertain if he wants to focus on promoting sustainability in water consumption, waste flow, or renewable energy sources.

Fortunately, Cawthorne has assembled a group of faculty to provide support during the next few years at NC State and assist him in navigating postgraduate opportunities and career options.

Dr. Detlef Knappe in the Department of Civil, Construction, and Environmental Engineering is Cawthorne's Park Faculty Mentor. Knappe has been a member of the NC State faculty since 1996.

"Dr. Knappe has been my guide through my major thus far," said Cawthorne. "He has been a great resource for navigating the environmental engineering program and has given me valuable advice concerning my academics."

Cawthorne is currently involved in an undergraduate research project focusing on energy systems modeling with **Dr. Joe DeCarolis**, also a faculty member in the Department of Civil, Construction, and Environmental Engineering. DeCarolis's research program incorporates addressing energy and environmental challenges at the intersection of engineering, economics, and public policy. In addition, he is involved with projects that include the economics of off-shore electricity storage and solid waste management.

CCEE Advisory Board 2012

The Department of Civil, Construction, and Environmental Engineering 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, and 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 broader University and the community. Board members are also typically engaged in other ways, such as advising students in design courses (see related article), helping to connect faculty with industry stakeholders, and development. The advisory board meets each semester, with the next meeting scheduled for April 2012. Members serve for a four year term.

The following distinguished alumni and friends of the department are currently serving on the Board:

Sepi Asefnia, BSCE 1993
SEPI Engineering & Construction

Barry W. Gardner, BSCEC 1975
Shelco Construction Co.

Pam Townsend, BSCE 1984, MSCE 1987
AECOM

Suzanne M. Beckstoffer, BSCE 1982
Newport News Shipbuilding

Michael B. Gwyn, BSCEC 1980, MSE 1994
(Past Chairman)
SAIC Constructors, LLC

Tony Warner, BSCEC 1966
Warner Construction

Thomas W. Bradshaw, Jr.
*North Carolina's interim
Statewide Logistics Coordinator*

John T. Jenkins II, BSCE 1990
Stewart Engineering

Hans Warren, BSCEC 1984
Warco Construction Inc.

Thomas C. Church, Jr., BSCEC 1964
Ashland Construction Company

Richard Rohrbaugh, BSCE 1981
Kimley-Horn Associates

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

Michael W. Creed, BSCE 1973
(Chairman)
McKim & Creed

Elizabeth A. Sall, BSCE 2003
*San Francisco County
Transportation Authority*

Heather Denny, BSCEC 1995
McDonald-York Building Co.

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

Late Alumnus Ed Vick Wins Watauga Medal for Distinguished Service to NC State

Transportation Founders Fund Graduate Scholarship Named in Vick's Honor



CCEE alumnus C.E. "Ed" Vick will posthumously receive the prestigious Watauga Medal for distinguished service to NC State. The Watauga Medal is NC State's highest nonacademic honor. Winners were recognized at the university's Founders' Day Dinner on Monday, March 5. Vick passed away on May 13, 2011.

Vick's ties to the university extend back to his college years when he received both his bachelor's and master's degrees in civil engineering from NCSU in 1956 and 1960, respectively. His service to NC State included membership on the Board of Visitors, the Alumni Association Board of Directors and the Engineering Foundation Board. Vick was also a founding member of the Departmental Fellows program of the Department of Civil, Construction and Environmental Engineering (CCEE). He was a key figure in the development of the Caldwell Scholarship program, and in 1990 he created an endowment for the C.E. Vick Engineering Scholarship. He was the College of Engineering Alumnus of the Year in 1991 and that same year, he received the Distinguished Engineering Alumni Award. In 2006, he was the recipient of the Alumni Association Meritorious Service Award.

Vick was one of the founders of **Kimley-Horn and Associates Inc.**, a Raleigh-based engineering, planning, and environment

consulting firm with over 1600 employees in more than 60 offices across the US. He served as president from 1972 to 1992 and then chairman before his retirement in 2001. In addition to numerous professional memberships, honors, and awards, he was inducted into the NC Transportation Hall of Fame in 2007. A month prior to the announcement that Vick would be honored with the Watauga Medal, a graduate scholarship was named in his honor. The Transportation Founders Fund (TFF), an outreach activity of the Institute for Transportation Research and Education (ITRE) at NCSU and CCEE, has named the TFF Graduate Scholarship in memory of Vick. Vick was an original member of TFF, one of the first members of the TFF Executive Committee, and a long-time member of the ITRE Advisory Council, serving until 2008.

The C.E. "Ed" Vick Jr. Transportation Founders Fund Graduate Scholarship is awarded annually at the TFF Speaker Series held in the spring. The scholarship, offered through CCEE for students working toward a graduate degree in a transportation-related field, is funded through membership fees and contributions and managed through the NC State Engineering Foundation.

"Recognizing Ed's contribution through the renaming of the scholarship is the least we can do to honor his memory," said ITRE Director Nagui Roupail. "Ed was not only a strong supporter of ITRE and TFF, but also an advocate for excellence in the transportation program at NC State. He would be pleased to have his name associated with the excellent cadre of incoming graduate students to our program." •

CCEE Alumnus Jimmy D. Clark Appointed to NCSU Board of Trustees



Jimmy D. Clark has been appointed by Gov. Bev Perdue to the North Carolina State University Board of Trustees. He replaces Gayle Lanier, whose term has expired. He joins fellow department alum **Barbara Mulkey** (BSCE '77 MSCE '84), who is Chair of the Board of Trustees.

Clark is owner and president of Guy M. Turner Inc. a Greensboro-based company founded in 1924. The company specializes in heavy rigging, specialized transportation and crane services, and has 10 offices in seven U.S. states.

Clark received his Bachelor of Science degree in civil engineering from NC State in 1974 and is a registered professional

engineer. He served as chair of the NC State Board of Visitors, and is a member of the NC State Engineering Foundation Board, Dean's Circle, Student Aid Association, Alumni Association and The Walter Hines Page Society. He has also served on the Park Scholarship Selection Committee and has established the Jimmy D. Clark Distinguished Professorship for NC State's Department of Civil, Construction, and Environmental Engineering. Dr. **Ed Jaselskis** currently holds the Jimmy D. Clark Distinguished Professorship.

NC State's Board of Trustees is composed of 13 members; eight are elected by the UNC Board of Governors, four are appointed by the governor, and the remaining member is the president of the student government. •

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



Newport News Shipbuilding
A Division of Huntington Ingalls Industries

NEWPORT NEWS Shipbuilding - a Division of Huntington Ingalls Industries, was pleased to be the CCEE Firm of the

Month for January 2012, which provided the opportunity to introduce NC State students to our company. As the largest industrial employer in Virginia, NNS designs, builds, and maintains the U.S. Navy's most complex warships. The shipyard employs all disciplines of engineers, as well as summer interns, and has also hosted student tours of their facilities. It is important for industry and universities to build strong relationships. Firm of the Month is a simple method for introducing students to potential career opportunities and to enable employers to demonstrate to faculty and students the breadth of their engineering operations. We look forward to continuing our connections with NC State. •

Photo: Newport News Shipbuilding Company in Newport News, VA



S&ME, Inc. was honored to be Firm of the Month for November 2011. Our ties to NC State are significant, with our

company founder and three of four past Presidents being NC State graduates. Headquartered in Raleigh, S&ME employs 1,100 engineers, scientists, technicians and support staff in 24 locations ranging from Cleveland, Ohio to Tampa, Florida.

Staying connected to NC State has always been a priority for us. We established the **Sean McGrath Geotechnical Fellowship** in memory of Sean, an NC State graduate and S&ME geotechnical engineer. Members of our staff serve as guest speakers, as judges for senior projects, and we've donated field exploration services in support of research activities carried out by NC State faculty.

The relationship we've enjoyed with NC State has helped make our company successful, and we appreciate the opportunity to enrich the students' experience in small ways. We look forward to many more years of a mutually beneficial relationship, and the continued success of both organizations. •

Dr. Edward D. Gurley, Associate Professor Emeritus



Dr. Edward D. Gurley, Associate Professor Emeritus, died on January 14, 2012 at the age of 81. Dr. Gurley earned his BS in 1957 and his MS in 1960, both in mechanical engineering, and both from NC State. He earned his PhD degree from the University of Illinois at Urbana-Champaign in theoretical and applied mechanics in 1963, and joined the Engineering

Mechanics Department at NC State as an Assistant Professor on January 1, 1964. He was promoted to Associate Professor in

1969. The Engineering Mechanics Department was dissolved in 1976, at which time Dr. Gurley became an Associate Professor of Civil Engineering. He retired on December 31, 1997 after a total of 39 years of service to NC State. Dr. Gurley taught a variety of undergraduate engineering mechanics courses in both the Engineering Mechanics and Civil Engineering Departments including statics, dynamics, and solid mechanics. In civil engineering, he regularly taught theory of elastic stability at the graduate level. He served the College of Engineering on the Faculty Senate from 1985-87. He was inducted into the NC State Academy of Outstanding Teachers in 1983. •

Alumni Updates

➤ **Heather Denny** (BSCE 1995), President, McDonald York Building Co., Raleigh, N.C., has been named to the second annual Engineering News Record (ENR) Southeast Top 20 Under 40 list. The list recognizes leadership, diligence and integrity in construction and people who have the potential to play an important role in the industry for years to come. Ms. Denny was the CCEE Department graduation speaker in May 2011.

➤ **Wes Lowder**, P.E. (BSCE 1984; MSCE 1986) joined S&ME full time in 1986 as a staff engineer after working as a field technician for three summers while attending NCSU. He is currently a Regional Manager/Vice President, with responsibility for offices in eastern North Carolina (Greensboro, Raleigh, Wilmington), Richmond, VA, Lexington, KY, and Columbus, OH.

➤ **Yuki Puram** (BSENE 2009) is working for NC Department of Environment and Natural Resources as a compliance engineer in the Division of Air Quality. She is also a proud mother of a two-year old and a committee member of Step Up for Down Syndrome.

➤ **Dennis Rorie**, P.E. (MSCE 2006) spent his first year following graduation working with geotechnical consulting firm S&ME, Inc. in Raleigh, NC. He then accepted a position with the city of Charlotte, NC Engineering & Property Management

Department where he provided plan review services for private development projects. Currently, Dennis serves as an engineering project manager for the city of Charlotte Department of Transportation. Dennis received his Masters of Public Administration from the University of North Carolina – Charlotte in 2011, where he concentrated in Urban Management & Policy. He is an active member of the Institute of Transportation Engineers (ITE), Conference of Minority Transportation Officials (COMTO), and the American Society of Civil Engineers (ASCE).

➤ **Justin Rowell** (BSENE 2007) conducted research for a year with the environment and biology departments of a UK university, got married, traveled to South Sudan to visit a missions organization and worked with an international engineering firm in Leeds, UK. He returned to the US in the summer of 2008 and subsequently founded Greenmodeling, an energy efficiency and environmental services company based in Charlotte, NC.

➤ **Ahmad Sadri** (MSCE 2007) is working for the City and County of Honolulu as the Energy Recovery Engineer at the H-POWER waste-to-energy facility, which converts municipal waste to 80 MW of renewable energy.

➤ **Lisheng Shao**, P.E., G.E. (Ph.D. 1995) serves as the chief engineer of Hayward Baker Inc. Western Region, in charge of ground improvement design, analysis, quality control, and technology development. He joined Hayward Baker, Inc. in 1997. He has published over 30 technical papers in geotechnical engineering.

➤ **Stacey A. Smith**, P.E. (BSCE 1992; MCE 2004) is President and Senior Engineer of Richardson Smith Gardner & Associates, Inc. in Raleigh, North Carolina. He provides solid waste consulting for public and private clients throughout the U.S. with experience at over 50 solid waste facilities. He and his wife, Jennifer, live in Fuquay-Varina with their two children, Zoe and Dylan. They enjoy local sports and outdoor activities, the YMCA Guides program, and family history.

➤ **Bryan Staley** (Ph.D. 2009) was appointed Vice President of Environmental Research at the Environmental Research and Education Foundation (EREF) upon completion of his PhD. In 2011, he was promoted to President. EREF is a non-profit foundation that provides grants and graduate level scholarships that relate to solid waste management. Staley resides in north Raleigh with his wife, Ann-Margaret, and two children, Isaac (4) and Isabelle (1).

➤ **Willy Stewart** (BSCEC 1981, MCE 1984), CEO of Stewart Engineering, Inc., and Project Manager Mike Hoeft received the 2012 Henry A. Stikes Grand Conceptor Award on behalf of the

company from the North Carolina American Council of Engineering Companies (ACEC/NC). The award is in recognition of the company's work on the Buckner Companies' Home Office, located in Graham, NC. Stewart was the structural engineer-of-record for the 12,000 square foot, two-story building which houses 34 employees and receives hundreds of visitors each year. The building uniquely exposes steel framework, glass, electrical, HVAC, plumbing and mechanical systems from both the inside and out.

➤ **Junyu "Allen" Zheng** (Ph.D. 2002) is a professor of environmental engineering at South China University of Technology in Guangzhou, China. He is active in regional air quality research with a focus on emission inventories for the Pearl River Delta (PRD) Region. He was a key initiator and organizer of the International Workshop on Regional Air Quality Improvement in Rapidly Developing Economic Regions, and the 3rd workshop was held in Guangzhou in November 2011. He is a guest editor of *Atmospheric Environment* for a special issue on "Improving regional air quality in PRD and Hong Kong: From science to policy."

➤ **Ted Ziegler** (BSCE 2005, MSCE 2007) worked for J.S. Thompson Engineering, Inc. for 11 years before founding Spectra Engineering & Design, PLLC in May 2011. The 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:

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

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 an international 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 140 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. Printing of this issue of *CCEE News* is sponsored by FDH Engineering, Inc.

CCEE Department Logo Store

DepartmentLogoStore.com features apparel with the name and logo of the Department of Civil, Construction, and Environmental Engineering. Available items include polo and twill shirts, t-shirts, hooded sweatshirts, jackets and windbreakers. Items are available in a variety of sizes and colors. All apparel items are embroidered with "NC State University," the Department's Achievement of Arms, and "Civil, Construction, and Environmental Engineering." Items can be shipped within the United States or can be picked up, free of shipping, in Cary, NC. To view the available selection and to place an order, visit: <http://www.departmentlogostore.com/>



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.
Visit <http://www.engr.ncsu.edu/foundation/>

To talk to someone or for additional information, contact: **Lora Bremer**, CCEE, Director of Development
Phone: 919.513.0983,
Email: lora_bremer@ncsu.edu

North Carolina State University
Department of Civil, Construction, and Environmental Engineering
Campus Box 7908
Raleigh, NC 27695-7908

