GEOTECHNICAL GRADUATE STUDENTS
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Dear Students, Alumni, and Friends,

Once again, welcome to our new CEE Departmental newsletter, The BRIDGE. This is our third consecutive newsletter after a long hiatus. As promised, our newsletter will be available from our website, but also a limited number of printed copies will also be available to share with our friends.

As I noted in my last “Letter from the Department Head,” our department been in a transition over the last ten years, with growth in the number of undergraduates we are educating, the number of Ph.D. students we are producing and the level of our sponsored research. A transition that I did not mention is the change in our faculty. Of our 27 tenure track faculty, 12 were hired in the last ten years, and two new faculty (in addition to our 27) were hired this semester and will be starting soon. Ten of those 12 new hires arrived directly after receiving their Ph.D. or during a relatively short post-doc appointment. This hiring during the past ten years has introduced to the department exciting new ideas related to education, new research strengths, and opportunities for professional service.

Although the department has grown in number of tenure track positions, several of the faculty hires are a direct result of retirements. Some of the faculty most beloved by our students and with the longest tenure, have either recently retired or will soon. In that category are Drs. Tom Lardner, John Collura, David Ostendorf, and David Ahlfeld. You will find in our newsletter an article concerning Dr. Ostendorf. Dave O. has been at UMass more than 30 years and was a fixture of our junior level hydraulics course. Noted as “the most demanding faculty members” in our curriculum, Dave O. also was the principal investigator on research projects totaling over $30 million during his career. You can expect to see an article on David Ahlfeld in the next newsletter as he will be retiring in December.

Other topics covered in the newsletter include our Annual History and Heritage Lecture provided by Dr. Chris Hendrickson of Carnegie Mellon University. Dr. Hendrickson spoke on the “Past and Future of our U.S. Interstate Highway System.” In our faculty spotlight, you will read about three of our outstanding faculty, Drs. Sanjay Arwade, Caitlyn Butler, and Michael Knodler, and some of the outstanding research they are performing with their graduate students at UMass Amherst. You will also read about on-going research in each of our four programmatic areas. As always, our students have been extremely busy and the newsletter brings you up to date on some of the more notable student organization activities as well as some of the individual achievements and awards that our students have garnered this semester.

We thank all of your for your interests in the Civil and Environmental Engineering Department at UMass Amherst and welcome your comments and suggestions for our newsletter.

Sincerely,

Dr. Richard N. Palmer
Department Head
Civil and Environmental Engineering

IN THIS ISSUE

History & Heritage Lecture Series …… 3
CEE Statistics ........................................ 4
CEE Career Fair ................................... 5
Faculty Retirement: Dr. David Ostendorf 6
Alumni News .................................... 7
Faculty News .................................. 8
Faculty Spotlight: Dr. Sanjay Arwade … 9
Faculty Spotlight: Dr. Caitlyn Butler … 10
Faculty Spotlight: Dr. Michael Knodler… 11
Faculty News .................................. 12
Student Activities ...........................13-15

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The Bridge

The BRIDGE

The Bridge will be published in the Fall and Spring semesters by the Civil and Environmental Engineering Department at the University of Massachusetts Amherst.

Email your news, contributions, and suggestions to Editor, Brooke Stebbins: bstebbin@umass.edu

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PAST AND FUTURE OF THE U.S. INTERSTATE HIGHWAY SYSTEM

Presented by Dr. Chris Hendrickson, Ph.D.
Director, Traffic 21 Institute
Carnegie Mellon University
April 30, 2018

Authorized in 1956, the U.S. Interstate Highway System has had profound impacts on the transportation of both freight and individuals as well as on the form of rural and urban communities and economies in North America. While only a small fraction of roadway mileage, the Interstate System carries a fifth of all vehicle miles of travel. It is a connected system to enable efficient travel throughout the United States. Numerous counties have invested in similar roadway systems. However, the system has been expensive, has severed many urban neighborhoods, has had negative environment effects, and is growing increasingly congested.

This talk looked back at the impacts on urban form and economic activity and innovations on standards of the Interstate Highway System, including engineering, financing and planning challenges. Financing, engineering and management issues facing future operation of the system were also discussed.

Dr. Chris Hendrickson is the Hamerschlag University Professor Emeritus, Director of the Traffic 21 Institute at Carnegie Mellon University, member of the National Academy of Engineering and Editor-in-Chief of the ASCE Journal of Transportation Engineering. His research, teaching and consulting are in the general area of engineering planning and management, including design for the environment, system performance, construction project management, finance and computer applications.
**Current Statistics for the CEE Department**

84% of the 2017 CEE undergraduate students had jobs after graduation with an average salary of $56,900 or went onto graduate school.

![Pie chart showing CEE, ECE, MIE, and ChE research expenditures from FY 2010 to FY 2015.]

- **UMass College of Engineering Research Expenditures FY 2010 - FY 2015**
  - **CEE** (42%)
  - **ECE** (29%)
  - **MIE** (17%)
  - **ChE** (12%)

![Line graph showing graduate students enrolled by year.]

- **Graduate Students Enrolled**
  - Master's
  - Ph.D.
  - Total

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The CEE Career Fair is a biannual event in the Civil and Environmental Engineering Department. Our first CEE Career was organized in Spring 2003 by then Department Head Alan Lutenegger and Associate Department Head Michael Switzenbaum. The first fair had 12 companies participating and has grown to include 32 companies participating. A Fall Career Fair was added in 2006 due to the popularity of our Spring Career Fairs.

Many companies participate in both the Spring and Fall Career Fair where they have access to all the CEE students to discuss summer positions, co-ops and permanent positions and can make competitive offers or schedule interviews with CEE students.

Over the years the CEE Career Fair has turned out to be an event where a majority of the companies participating in the fair have alumni from our program representing them. It's a great opportunity for the CEE students to network with perspective employers and alumni of the program.

Participating Companies:
Arcadis
BETA Group
BL Companies
Bohler Engineering
CDM Smith
Consigeli Construction
Criterium Dudka Engineering
Dimeo
Fuss & O'Neill
Garg Consulting Services
GeoDesign
Gill Engineering
GZA Engineering
Haley & Aldrich
Hayward Baker
Kleinfelder
MassDOT
Milone & MacBroom
Roux Associates
Sanborn Head & Associates
Schnabel Engineering
Simpson Gumpertz & Heger
Tata & Howard
Tighe & Bond
Turner Construction
VHB
Walsh Brothers
Weston & Sampson
Engineering
Woodard & Curran
Wright - Pierce
WSP

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Weston & Sampson
Engineering
Woodard & Curran
Wright - Pierce
WSP
Dr. David Ostendorf, Environmental and Water Resources

Anyone who is reviewing the impressive record of soon-to-retire Professor David Ostendorf will quickly come across one very startling fact: he has been the principal or co-principal investigator on more than 20 grants, totaling over $30,000,000, a staggering amount for any researcher. Ostendorf, who has been a faculty member in the Civil and Environmental Engineering (CEE) Department since 1980, is a prolific researcher in the areas of groundwater hydraulics and pollution, environmental fluid mechanics, and hazardous waste disposal. As CEE Department Head Richard Palmer says, “For more than 35 years, Dr. Ostendorf has been one of the department's most outstanding teachers. His classes are noted for their rigor and challenge, and he has taught a generation of undergraduate civil and environmental engineers the academic discipline necessary for success. As his teaching awards indicate, students greatly appreciate his efforts in the classroom.”

Born on February 6, 1950, in Stamford, Connecticut, Dr. Ostendorf is married with three children and two grandchildren. In addition to his academic experience, he is also a Commonwealth of Massachusetts Registered Professional Engineer in Civil Engineering. Before coming to UMass Amherst, Ostendorf worked from 1973 to 1975 for Stone & Webster Engineering Corporation, Boston, as an engineer in the Environmental Division, where, among other duties, he coordinated a hydrographic survey and originated the Hydrology and Heat Dissipation System Sections of the Environmental Report of a proposed nuclear power station. He later served in the Hydraulic Division providing hydraulic input to a full-scale model study of fish diversion facilities. Then, from 1977 to 1979, Ostendorf was a teaching assistant at the Massachusetts Institute of Technology.

From 1994 to 1999, Ostendorf was also the director of the Environmental Technology Program Consortium, a group of academic, private, and public sector institutions offering fellowships and training in environmental restoration through a $1.3 million grant from the U.S. Department of Defense. Over the years, Ostendorf has published more than 60 papers in peer-reviewed academic journals, completed more than 33 proceedings, book chapters, and communications, finished more than 33 abstracts and presentations, and compiled more than 12 professional reports. Among the numerous awards and honors obtained by Ostendorf was the James L. Tighe Civil Engineering Distinguished Teaching Award in both 1994 and 2005, the Outstanding Advisor Service Award from the College of Engineering in 1992 and 1994, the position of Chapter Advisor for the Chi Epsilon Undergraduate Honor Society from 1986-1996, and the Civil and Environmental Engineering Department Research Award in 2010.

Ostendorf earned his B.S.E. degree in Civil Engineering from the University of Michigan in 1972 and his S.M. degree in Civil Engineering (1978) and Sc.D. degree in Civil Engineering (1980) from the Massachusetts Institute of Technology.
Alumnus Jon Dietrich Awarded Senior Alumni Award

Because of his consummate career, Civil and Environmental Engineering (CEE) alumnus Jon W. Dietrich (B.S. 1969, M.S. 1974) of Northampton, Massachusetts, was a 2017 recipient of the College of Engineering Outstanding Senior Alumni Award. Recipients of the Outstanding Senior Alumni Award have brought recognition and honor to the College of Engineering through their professional achievements, leadership, and service to the profession, university, and society. In service to UMass Amherst, Dietrich has taught transportation engineering courses in CEE as an adjunct faculty member and has volunteered for many years as a member of the CEE Advisory Council.

As an associate/senior transportation engineer for Fuss & O’Neill, Inc., Dietrich has been responsible for conducting transportation planning and traffic-engineering studies and design projects for over 40 years. Dietrich has worked as a staff engineer, project manager, and client manager on a wide range of civil engineering projects. These have included local and regional transportation planning studies, traffic-impact studies for a variety of land-development projects, and intersection and roadway designs, including traffic-signal design and traffic-safety studies. He has also managed the design of transportation and roadway construction projects, bikeway rail-trail projects, parking studies, and master plans. Before moving to Fuss & O’Neill in 1995, Dietrich spent 16 years in a similar position at Champagne Associates in Troy, New York, and Northampton, Massachusetts. He also worked from 1972 to 1979 at Curran Associates, Inc., in the Northampton office as a civil/transportation engineer. Dietrich is a life member of the American Society of Civil Engineers (ASCE), Boston Society of Civil Engineers Section/ASCE, and a life member of the Institute of Transportation Engineers (ITE) and a member of the New England section of ITE. He is a registered Professional Engineer (PE) in the Commonwealth of Massachusetts and Vermont.

An army veteran, Dietrich lives in Northampton with his wife, Deb. They have two sons, Seth and Andrew, and three grandchildren.

Alumnus Heather Rothenberg Awarded Junior Alumni Award

Civil and Environmental Engineering alumna Dr. Heather Rothenberg – who won a coveted Outstanding Junior Alumni Award from the College of Engineering in October of 2017 – is the director of Trust and Safety Research at Uber Technologies in San Francisco. Her team is responsible for global safety research that supports Uber’s product development. While specializing in transportation engineering, Rothenberg earned her M.S. from the CEE department in 2003 and her Ph.D. in 2009. Since then, her career path has been steep, scintillating, and fast!

“I build the bridge between transportation science and policy,” Rothenberg explains about the various Uber positions she has held. “I understand why safe and efficient transportation is critically important to policy makers and communities. And I understand why engineers and data scientists have to make decisions they feel compelled to make. I’ve done this work in government, industry, and academia...and I’ve built strong teams to deliver success in all of these environments.”

Prior to joining Uber, Rothenberg was the director of Policy and Federal Projects at Sam Schwartz Engineering in Washington, D.C. While there, she was responsible for guiding companywide business development strategies for federal projects.

Rothenberg began her post-UMass career with the U.S. Department of Transportation when she served in the National Highway Traffic Safety Administration’s (NHTSA) Office of Government Affairs, Policy, and Strategic Planning. She provided leadership for agency strategic planning efforts and representation of NHTSA on cross-department teams. She subsequently served in the Federal Highway Administration’s Office of Safety, where she developed guidance and rulemaking for implementation of MAP-21 programs, including performance management, safety data, and strategic highway safety plans.

As Rothenberg sums up her experience, “I’m a big thinker who sees the beauty in details and I think the best follow-up to a great idea is an actionable plan for implementing it.”
It was a productive year for the CEE faculty, Drs. Eleni Christofa, Song Gao, Eric Gonzales and Daiheng Ni attending the 97th Transportation Research Board Annual Meeting in Washington, D.C. where they each presented six papers.

Dr. Casey Brown traveled to Tanzania for meetings with high-level government officials on the Ministries of Finance, Energy, Water, and Agriculture, and with partners from the World Bank to begin a dialog on the management of their water resources. Dr. Brown also presented his research findings at the Department of Defense Strategic Environmental Research and Development Program (SERDP) Symposium where he leads a major research effort funded by SERDP on the effects of climate change on hydrologic extreme events.

Dr. John Tobiason was invited to present his work on lead in school drinking water at Tufts University. He and Dr. David Reckhow had lead a voluntary program where water samples from 818 schools in 153 communities between April 2016 and February 2017 and issued its final report in early May. Statewide, 72% of school buildings had at least one fixture that tested high for lead or copper.

Dr. Colin Gleason traveled north of the Arctic Circle this past summer to conduct research on rivers in support of an upcoming NASA satellite launch (SWOT-the Surface Water and Ocean Topography mission). The UMass-led team is developing and testing new river measurement techniques for efficient validation of the satellite post-launch (pictured below).

Dr. Guoping Zhang was invited to visit a construction site in Djibouti, Africa, where the red clay weathered from igneous and volcanic rocks presents challenges in construction, such as difficult for compaction, and tendency for collapse upon wetting. Geological samples were subsequently delivered for lab analysis. Upon the visit, he was thinking of the possibility of developing a potential Engineers Without Borders (EWB) site in Djibouti.

Dr. Emily Kumpel gave a technical talk at a Symposium in Mysore, India, co-hosted by the Indian Water Works Association Mysore chapter and the Department of Environmental Engineering at IISc Science and Technological University in Mysore. In Mysore, Dr. Kumpel also toured the water system’s new storage tank construction and distribution as part of their project to convert from intermittent to continuous water supply with the Karnataka Urban Water Supply and Drainage Board. In Bangalore, she gave a seminar at the Ashoka Trust for Research in Ecology and the Environment (ATREE), and visited the laboratories at the Department of Civil Engineering at the Indian Institute of Science, Bangalore.

Above: Dr. Kumpel visiting households with newly-installed water meters in Mysore with engineers from the Karnataka Urban Water Supply and Drainage Board. Left: Dr. Emily Kumpel with Dr. Mohan Kumar and graduate students and researchers in his group at the Department of Civil Engineers at the Indian Institute of Science, Bangalore.

Above: The LiDAR is creatively elevated to capture more of the Sagavininktok River in Alaska’s North Slope, with the Alyeska Pipeline in the background. The Dalton Highway runs almost 500 miles north from Fairbanks to the Arctic Ocean to serve the oilfields at Deadhorse, but also provides a vital ground transportation link to Arctic research. Left: Merritt Harlan, UMass CEE Ph.D. student, and Ted Langhorst of the University of North Carolina prepare a ground-based LiDAR for a scan of North Saskatchewan River. This technology allows researchers to map the earth’s surface with incredible precision (5mm) within 2km of the sensor.
Dr. Sanjay Arwade, Professor, Structural Engineering

The summary of his accomplishments says it all. Professor Dr. Sanjay Raja Arwade of our Civil and Environmental Engineering Department has amassed more than 20 research grants totaling more than $4,000,000 as a principal and co-principal investigator, he has published 61 refereed journal articles in research publications, he has presented at 47 conference proceedings, he has given 29 invited lectures and department seminars, and he has delivered 55 presentations, posters, and abstracts at national and international conferences. You might say that Arwade’s research expertise focuses on “uncertainty,” and specifically on uncertainty quantification in structural and solid mechanics. As Arwade explains, he studies “Numerous sources of system uncertainty such as material property variability and problems related to how loading randomness generates response uncertainty in structural and solid mechanics.”

Accordingly, Arwade’s interests in this area lie in developing: (1) enhanced design approaches for offshore wind energy generation; (2) new methods for representing the input uncertainties as random fields and generating samples of those random fields; (3) efficient methods for quantifying uncertainty in systems with large numbers of random input parameters and performing dimension reduction on such systems; (4) system reliability effects in the structural systems. How does Arwade apply these uncertainty principles? Take wind turbines. Wind turbine research, he says, has concentrated largely on the energy producing turbine itself, yet construction of the support structure can contribute up to 25 percent of the total life-cycle cost of an offshore turbine.

Therefore, as Arwade explains, “I am working with collaborators on new methods for multi-physics, probabilistic simulation of offshore wind turbine support structures to allow designers to use quantitative risk-based approaches to design such structures.” Beyond wind turbines, Arwade notes that deterministic approaches to modeling material strength in many structures neglects the inherent random heterogeneity present in materials ranging from the very new (as in steel foam) to the very old (as in wrought iron). “Through computational simulations, validated by experiments,” Arwade says, “I am characterizing the way in which material heterogeneity manifests as uncertainty in material response that then influences structural reliabilities.”

As part of his research, Arwade has participated in multiple academic committees for the American Society of Civil Engineers (ASCE), the International Association for Structural Safety and Reliability, and the International Network for Structural Art. He has also helped organize key sessions for the U.S. National Congress on Computational Mechanics, the International Conference on Structural Safety and Reliability, and the ASCE Engineering Mechanics Conference. In addition, Arwade has served as the Associate Editor of the ASCE Journal of Engineering Mechanics since 2014. He has also worked as a reviewer for the American Association for the Advancement of Science, NASA, the NSF, and ASCE Press, as well as such academic publications as the International Journal of Architectural Heritage, Wind Engineering and Industrial Aerodynamics, Construction & Building Materials, Journal of Materials in Civil Engineering, International Journal for Uncertainty Quantification, Journal of Engineering Mechanics, Probabilistic Engineering Mechanics, and many others.

Beyond all these considerable academic achievements, Arwade is also an accomplished distance and trail runner and has completed the historic New York City Marathon three times and the fabled Great Range Traverse in New York’s Adirondack Mountains and the Pemigewasset Wilderness Loop in the White Mountains of New Hampshire.

Above: Illustration of a wind turbine multiline anchor.

Above: Prof. Arwade, in collaboration with Prof. Peggi Clouston (BCT) and Ph.D. student Fiona O’Donnell, is investigating the mechanics of cross laminated timber, an important new building material used in the Olver Design Building.
Soon after arriving at UMass Amherst in 2011, Environmental Engineering Professor Caitlyn Butler burst upon the scene by designing and developing a very green pit latrine that could purify domestic waste for a small village of subsistence farmers in Africa, while also converting it into healthy compost for their fields and turning it into enough carbon-neutral electricity to provide some lighting in the village. This multipurpose new invention was called a Microbial Fuel Cell Latrine, and Dr. Butler soon installed a pilot latrine at a technical high school in rural Ghana.

Since then, Butler hasn’t lost a beat. She has served as the principal investigator on $731,600 worth of funded research projects and the co-principal investigator on an enormous $7,677,000 in research grants. She’s also placed 19 papers in peer-reviewed journals, written two book chapters, authored 17 conference papers, totaled 44 conference abstracts, and participated in 21 invited panels, presentations, and seminars.

Butler came to the Civil and Environmental Engineering Department after serving as an assistant professor from 2010 to 2011 in the Department of Engineering in the College of Technology and Innovation at Arizona State University.

Since then, Butler has garnered many honors and awards, including: a 2015 National Science Foundation (NSF) CAREER Award to support her research into the improved understanding of cross-kingdom biofilms; a 2015 Africasan Research and Technological Innovation Award from the African Ministers’ Council on Water for her development and deployment of the Microbial Fuel Cell Pit Latrine mentioned above; and an American Society of Civil Engineers (ASCE) ExCEEd Fellowship to attend the ASCE Excellence in Civil Engineering Education Teaching Workshop in 2012. In addition to the 2017-18 Lilly Fellowship for Teaching Excellence Butler recently received from the UMass Amherst Institute for Teaching Excellence & Faculty Development (TEFD), she had previously received a Student Centered Teaching and Learning Fellowship from the TEFD in 2015.

The prestigious and influential NSF CAREER award gave Butler $500,000 to pursue her pioneering research on special “oxygenic photogranules,” which can produce their own oxygen during wastewater treatment, thus cutting electricity consumption in half, while also cleansing wastewater.

Butler’s CAREER project also dovetailed with additional research she has been conducting with CEE Associate Professor Chul Park. Their collaborative research promises a three-way fix for wastewater treatment. Their process will provide a groundbreaking new way to eliminate harmful organic compounds and nitrogen from wastewater, slash the huge energy bill for wastewater treatment, and even make green biofuels as a byproduct.

These projects also accurately characterize the collective work of the Butler Research Group that she directs in the CEE department. As Butler explains, “My research objectives focus on developing energy-efficient treatment strategies for wastewater treatment. I examine biofilm systems where microorganisms use counter-diffusional chemical gradients to accomplish treatment goals. I am interested in developing scalable process designs that could be easily integrated into existing treatment infrastructure, but am also interested in the ecology and function of the microorganisms that facilitate treatment.”
Dr. Michael Knodler, Associate Professor, Transportation

Associate Professor Michael A. Knodler, the director of the University of Massachusetts Transportation Center (UMTC), is one of the most productive researchers in the Civil and Environmental Engineering Department and the entire College of Engineering. See UMTC at http://www.umasstransportationcenter.org/umtc/default.asp.

A partial list of Dr. Knodler’s accomplishments includes 74 grants for sponsored research as a principal investigator totaling over $14 million, including extramural funding from more than 20 different sponsoring agencies, as well as 19 additional grants totaling $3.1 million as co-principal investigator. He has also authored or co-authored 39 journal articles and an additional 60 papers in international or national conference proceedings.

Knodler’s main areas of research and teaching are related to transportation safety, operations, design, and education.

Among his many honors, Knodler has been awarded the James L. Tighe teaching award, and he was selected as the College of Engineering Outstanding Teacher in 2013 and the Outstanding Researcher in 2015. He has also been a Team-Based Learning Fellow at UMass Amherst, has received the Harvey B. Boutwell Award from the Northeastern District of the Institute of Transportation Engineers (ITE), and the William P. McNamara Distinguished Service Award from the New England Section of ITE, which in the past has also given him the New England ITE Service Award and the Young Engineer of the Year Award.

Knodler’s impact is both profound and widespread. Under his guidance, the UMTC is responsible for promoting transportation research, education, and training throughout the Commonwealth of Massachusetts and improving transportation mobility and safety with innovative technologies and strategies.

The current focus of the UMTC’s research, education, and training efforts encompasses the following major programs: Baystate Roads (Local Technical Assistance Program); the Research Section; the UMTC Transportation Training Institute; the UMass Traffic Research Safety Program (UMassSafe); and the U.S. Department of Transportation University Transportation Centers.

Knodler also presided over the recent addition of UMassAir to the UMTC. UMassAir has been established collaboratively with these two goals: to serve as an incubator to develop new basic and applied research through access to unmanned aerial system (UAS) technology; and initiate an educational program to train the next generation of UAS research scientists and the civilian workforce seeking to gain knowledge in UAS piloting, sensor use, data processing, and analytics.

Recently the UMTC collaborated with the Massachusetts Department of Transportation (MassDOT) to consolidate several of these programs into the more streamlined “One Center” (http://www.umasstransportationcenter.org/umtc/One_Center.asp) and provide a practical framework to launch new initiatives. Under the One Center, the UMTC provides research and support for MassDOT by making the resources of the UMass system easily accessible for transportation-related issues.

Knodler is also active with the Transportation Research Board and the ITE. Knodler is the past chair of ITE’s Northeastern District and the past chair of the ITE Education Council. He is also a member of both the Traffic Control Devices Committee and the Highway Safety Workforce Development Subcommittee. Dr. Knodler recently served as a panel member on NCHRP Project 20-5 (Permanent Signs Mounted on Median Barriers).
Dr. Richard Palmer, CEE Department Head, Inducted into the ASCE Distinguished Member Class of 2017

Professor Richard N. Palmer, head of the Civil and Environmental Engineering Department and university director of the Northeast Climate Adaptation Science Center, was formally inducted as a Distinguished Member of the American Society of Civil Engineers (ASCE) at its Celebration of Leaders Luncheon during the ASCE 2017 Convention, October 8-11, in New Orleans. He was one of only seven members inducted this year.

Palmer was inducted “for his conceptual and practical contributions to applying structured decision analysis and participatory methods in managing conflict in water resources, including Shared Vision Planning, and for methods addressing potential impacts of climate change in natural resource management.”
Research

Geotechnical

Dr. Guoping Zhang’s Geotechnical student, Jing Peng (Ph.D. candidate) and Dr. Don DeGroot and Dr. Guoping Zhang’s student Nick Luo (Ph.D. candidate), are working on a FemtoTools microrobot and micromechanical testing system to study the nanomechanical genes of shales taken from a geological rock formation at a depth of ~10,000 ft. The mechanical system has a load resolution of 5 nN and displacement resolution of about 2 nm. The students are hoping to develop a rapid, viable, micromechanics-based technology for screening and assessing different chemical additives used in hydraulic fracturing of oil/gas shales.

Transportation

Dr. Eleni Christofa’s graduate students, Ph.D. student Farnoush Khalighi (driving) and Ph.D. student Katerina Deliali (passenger) testing driving simulation scenarios under the guidance of Ph.D. student Nicholas Fournier. The students are pictured testing driving simulator scenarios that Nicholas developed to study the impact of bicycle infrastructure treatments (e.g., bike boxes, through bike lanes, etc.) on driver behavior. This study was funded by the U.S. Department of Transportation through the SaferSIM University Transportation Center.

Environmental and Water Resources

Dr. Caitlyn Butler’s Environmental and Water Resources students, Cynthia Castro (postdoc) and Salimar Cordero (first year Ph.D.). Cynthia is describing her experiments on microbial fuel cells to Salimar. Cynthia is trying to understand how anode-respiring microbial communities break down waste organic matter when competing electron acceptors are present in the anode compartments.

Structural and Mechanics

Dr. Sergio Brena (middle) and his structural students, Gercelino Ramos (right) and Jorge Rivera (left), assisting with moving steel elements to assemble a test-scale specimen to failure as part of Jorge’s Ph.D. dissertation. The research project objective is to evaluate reinforcement details prescribed in the American Concrete Institute Code (ACI 318) for beams in perimeter frames to ensure structural integrity. The intent of these provisions is to prevent progressive collapse after the unanticipated loss of a supporting member of the frame (column). The project involves laboratory testing of full-scale components and analytical studies to evaluate the load redistribution capacity of beams detailed according to code.

Congratulations to Dr. Colin Gleason who was awarded the prestigious National Science Foundation CAREER Award this year. Dr. Gleason was also featured in the New York Times for his research groups exploration of Greenland. During his Ph.D. at UCLA, they researched the role that rivers play in the global water budget, particularly as climate change alters our hydrologic cycle.

Congratulations to Dr. Daiheng Ni who was awarded a $406,348 research grant by Toyota Motor Engineering & Manufacturing to explore connected vehicle technology. Dr. Ni’s objective is to develop a mathematical model to predict a driver’s operational control in terms of anticipated speed and acceleration on a short horizon of between 0 and 10 seconds of reaction time.

Congratulations to Dr. Michael Knodler for being named Transportation Engineer of the Year for New England Institute of Transportation Engineers (ITE) this past December. This recognition selects individuals who have displayed exceptional technical accomplishments in the form of written articles or reports, or development of new concepts and/or theory related to transportation engineering.
STUDENT ACTIVITIES

Engineers Without Borders Student Chapter

After arriving home from Ghana in August where two rainwater catchment systems were constructed and in conjunction to the post-trip reports, the members began researching and preparing alternative analysis reports for a water treatment system and water source development. After comparing all alternatives, it was decided that household biosand filters and hydrofracturing boreholes were the best options. The team is currently working on pre-implementation reports and design phase with the goal of implementation in the summer of 2018.

The Kenya Project focused their efforts on expanding existing water infrastructure in Nguluni. This included a new rainwater catchment system at the Ndumani Primary School, repairs to RWCs at Nguluni Primary School, and monitoring the borehole and pumphouse installed in January 2017. Moving forward, the Kenya Project will continue to upgrade RWCs when possible, expand the distribution network issuing from the highly productive borehole, and introduce handwashing initiatives in joint cooperation with the Nguluni Star Women Group to the Nguluni Primary School.

Institute of Transportation Engineers Student Chapter

Fall 2017 was another busy semester for our ITE Student Chapter. Starting off on an exciting note in September, a new E-Board was elected, two student members were awarded the NEITE Desjardins Awards, and a planning team was formed for the ITE Northeastern/Mid-Colonial Student Leadership Summit our chapter hosted this April. This Summit is originated in the ITE Western District and has since then traversed throughout the rest of the country. The Summits are entirely planned by students, for students. Approximately 100 students, both undergraduate and graduate, attended the three-day event. This fall, our planning team spent time creating sponsorship packets, advertising, scheduling, and more. Three students attended a Student Leadership Summit at Purdue University in September to gain more insight. Also during this time, our chapter continued to complete yearly events, including attending regional ITE meetings, volunteering at the Moving Together Conference in Boston in October, completing an Adopt-A-Highway cleanup, attending the Hot Chocolate Run to Benefit Safe Passage, and hosting a Holiday Party in December.

Associated General Contractors Student Chapter

This past semester, AGC was able to take students on a tour of two very unique project sites on campus. The first of these two tours was of the new Physical Science Building, which will be opening soon. This building will house many new physics and chemistry labs, and it has complex mechanical, electrical and plumbing (MEP) systems. The construction management team provided an overview of the extensive BIM coordination that was performed to properly install these systems. The tour also allowed the group to see the exposed MEP systems that had upper one-third of the junior and senior civil engineering class at UMass. We organized a Chi Epsilon information session for all eligible candidates and discussed the activities that we were planning to organize during the Spring semester. Those candidates who chose to become members of Chi Epsilon were officially initiated on December 7, 2017. During the initiation, as per the Chi Epsilon ritual, the candidates were blindfolded and were asked to pledge their service to the civil engineering profession and the Chi Epsilon Honor Society.

Chi Epsilon Honor Society

Chi Epsilon is the only National Civil Engineering Honor Society and the membership is by invitation only. During the Fall of 2017, eligible candidates were selected from the entire upper one-third of the junior and senior civil engineering class at UMass. We organized a Chi Epsilon information session for all eligible candidates and discussed the activities that we were planning to organize during the Spring semester. Those candidates who chose to become members of Chi Epsilon were officially initiated on December 7, 2017. During the initiation, as per the Chi Epsilon ritual, the candidates were blindfolded and were asked to pledge their service to the civil engineering profession and the Chi Epsilon Honor Society.

Women in Transportation

UMass WTS had its first meeting of Fall semester in early October 2017 during which the election of new officers was held welcoming the newly elected President Sayeda Ayaz, Vice President Katerina Deliali, Treasurer Alyssa Ryan and Secretary Elizabeth Casola. UMass WTS invited Patty Leavenworth, Chief Engineer for MassDOT at UMass Amherst as part of its speaker series. She spoke on “Leadership and Project Management in Transportation” during the transportation seminar on October 19. She was accompanied by several different indivi-
Graduate Student Spotlight: Aikaterini Deliali, Transportation

Aikaterini or Katerina is a second year Ph.D. student in Transportation Engineering and advised by Dr. Eleni Christofa. Her Ph.D. dissertation is focused on bicycle safety, more specifically she is working on quantifying the safety of different bicycle-specific infrastructures, e.g. how much safer is cycling on bike lanes versus protected bike lanes. Katerina is currently working with an Intersector, a microwaved-based device that captures XY coordinates and speed from the moving objects that are approaching. Katerina received a degree in Civil Engineering from the National Technical University of Athens, Greece with specialization in Transportation. She became interested in Transportation Engineering after attending a workshop about green cities and how care-dependency can be reduced. Katerina was a daily commuter in Athens, she explained, “I was facing the unsuccessful transit system in Athens and also extreme congestion in rush hours, that created delay and polluted the air. I wanted to provide feasible solutions to these problems.”

After finishing her thesis, Katerina chose UMass Amherst for her Ph.D. because Dr. Christofa’s research in bike-related topics and the campus is famous for being progressive in social and environmental topics. She also noted that from her interview, “I perceived that UMass Transportation group has a great and friendly environment.” Katerina has recently presented her work on the Transportation Research Board Annual Meeting and she has future plans to attend the SaferSim Symposium where she will be presenting her poster.

Undergraduate Student Spotlight: Saleh Aqleh

What UMass Amherst student organization are you involved with?
I am currently the treasurer of the Arab Cultural Association and a very active member for the Muslim Student Association and the Students for Justice in Palestine.

What are your plans after graduation in 2019?
Working on structures has long been a dream of mine and for that reason I plan on pursuing a Masters and Ph.D. in Structural Engineering.

Are you involved in research or experiential learning?
I’ve just started working with Dr. Gerasimidis in the Structural Engineering Department. We are working on developing microlattice architected metamaterials for structural engineering purposes.

How has been your experience at UMass CEE been?
My experience at UMass has been a great one. Coming here I wouldn’t have imagined myself in my current position, I actually had no idea what to expect from college. But all I can say that it was good and I hope it keeps getting better.

What do you value the most from your UMass experience?
The connections that I have made with people, inside and outside of the Civil and Environmental Engineering Department. I have met people from so many different places, that all think in different ways. It still amazes me how if we all just put our minds to do the same thing, we could cause some serious change.
The College of Engineering relies upon the philanthropic support of alumni, friends, and corporate partners to maintain the excellence of our educational and research programs.

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