

**UMASS  
AMHERST**

# The BRIDGE

*Newsletter of the Department of Civil and Environmental Engineering*



## TRANSPORTATION ENGINEERING

Faculty and students in Dublin, Ireland for the European Transport Conference



## Dear Students, Alumni, and Friends,

Once again, welcome to our CEE Departmental newsletter, the BRIDGE. This is our fifth newsletter after reviving this tradition. As promised, our newsletter will be available from our website, but also a limited number of printed copies will be available to send to our friends.

At the end of the summer of 2019, I will be stepping down as the Head of the Department of Civil and Environmental Engineering after serving in that role since March of 2008. I am not retiring from the university, just returning to the very best job on campus, that being a faculty member. During my time as Department Head, primarily due to the hard work of our faculty, we have had the opportunity to do many great things. I will mention a few here.

We have grown and improved the department in a variety of ways. One area of importance is in the number of undergraduate students, the composition of our graduate students, and the number of faculty. In 2008, the CEE Department graduated 58 seniors, in 2018 CEE graduated 97 students. In 2008, we had 20 Ph.D. students enrolled and 42 Master's students. In 2018, we had 60 Ph.D. students and 60 Master's students. In 2008, we had 20 tenure track faculty and in the Fall of 2019, we will have 28. These are all signs of a growing, vibrant department.

We have been able to attract truly outstanding students to our department. During the past eleven years, our students have been consistently recognized for their excellence. One of the highest honors given to an undergraduate on this campus is to be recognized as a "21st Century Leader." This is an honor given to only 8-10 students from the entire university student body each year at graduation. Since 2009, ten of our graduating seniors have been awarded this recognition.

The University of Massachusetts is a "Research I" Institution. This designation indicates that not only does our university offer a full range of baccalaureate degrees, but we are committed to producing Ph.D. students and give high priority to research. One example of this commitment is the effort our faculty make to generate sponsored research. During the past decade, our sponsored research program has grown from research expenditures of \$5 million a year to over \$12 million a year. These research expenditures primarily support graduate students as they perform the research needed for their advanced degrees.

No list of accomplishments would be complete without mentioning some of our outstanding student organizations, including the Student Chapter of the American Society of Civil Engineers (ASCE), the UMass Chapter of Engineers Without Borders (EWB), and the Institute of Transportation Engineers (ITE). These organizations, and others in our department, provide extremely meaningful professional experiences for our students and the opportunity to serve our local communities and communities throughout the world. These organizations offer a sense of purpose to our students and are extremely important in adding "real-world experiences" to our students that are so valuable in supplementing their academic experiences.

I am very pleased, that following a national search for a new Department Head, that Dr. John Tobiason will be assuming the role of Department Head in the Fall of 2019. John is an outstanding teacher and researcher. I am very sure that he will also be an outstanding Department Head.

My thanks to all of the faculty and staff that have done so much during the past eleven years to make the CEE Department a wonderful place. It has been a true honor to represent the department as its Head and I thank everyone for allowing me that opportunity.

Sincerely,

*Dr. Richard N. Palmer*

Department Head  
Civil and Environmental Engineering

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### 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, Amy Feliciano: [afeliciano@umass.edu](mailto:afeliciano@umass.edu)

University of Massachusetts Amherst  
Department of Civil and Environmental Engineering  
224 Marston Hall  
130 Natural Resources Rd.  
Amherst, MA 01003-9303

# HALEY & ALDRICH DISTINGUISHED LECTURE

## IN GEOTECHNICAL ENGINEERING

### RAILWAY GEOTECHNICS, NDT AND “BIG DATA”

Presented by:  
**Dr. Michael C. Forde**  
 University of Edinburgh, Scotland

On April 1<sup>st</sup>, 2019 Mike Forde’s presentation drew ideas from his earlier career in highway engineering through nondestructive testing (NDT) of structures through to railway geotechnics and “Big data” aspects.

Some of the current “drivers” in railway geotechnics relate to “Train Critical Velocity” for new high speed trains, based upon Rayleigh wave velocity. Mike gave examples of obtaining Rayleigh wave velocity from conventional ground investigations. He portrayed the idea that perhaps of greater relevance is identifying Train Critical Velocity of existing track locations – where the train operator wishes to increase train speeds. This was explored using Spectral Analysis of Surface Waves (SASW) tech-

niques. At the same time, there is increasing pressure on maintenance budgets. Thus, there is growing interest in Ground-penetrating radar (GPR) testing to identify fouled ballast, and applying “Big Data” analysis to railway systems. Work in Europe, the USA and Japan were highlighted.

Mike Forde holds the Chair of Civil Engineering Construction at the University of Edinburgh, Scotland, where he has been on the Faculty since 1973 and has served a number of terms as the Department Chair. Mike is the Technical Chair of the “Railway Engineering” Conference Series, initiated in 1998 and Editor-in-Chief of “Construction & Building Materials,” Elsevier. He is also an elected Fellow of the U.K.’s “Royal



Academy of Engineering” (FREng, 1999) and Scotland’s “Royal Society of Edinburgh” (FRSE, 2006).

Mike received his B.Eng. in Civil Engineering from the University of Liverpool, U.K. in 1966 and his M.Sc. and Ph.D. from the University of Birmingham, U.K. in 1970 and 1975 respectively. He was a visiting professor at MIT in 2005 and is the author of over 300 publications. Mike has received numerous other awards and titles and in the U.K. he is a Chartered Engineer.



Above: Eurostar is the high-speed passenger train linking London with Paris, Lille & Brussels via the Channel Tunnel at up to 186 mph.



Left and right: With an audience of students, alums, consultants, faculty, and staff, Mike Forde captures their attention as he delivers his geotechnical presentation at the University of Massachusetts, Amherst on April 1, 2019.



## CEE Alumna, Michelle Danila, Making Streets Safer for People Throughout the Commonwealth



**Michelle Danila**  
MassDOT

Michelle Danila, who earned her Master's degree from the UMass Civil and Environmental Engineering Department in 2006, is currently the Complete Streets Engineer for the Massachusetts Department of Transportation (MassDOT). Her mission, as she says on her Twitter feed, is that she's just "a girl trying to complete our streets."

In search of that very streetwise goal, Danila has worked on a host of very significant street engineering projects throughout the Commonwealth. At MassDOT, she worked on the Statewide Pedestrian Plan and Statewide Bicycle Plan, which both have visions that all people in Massachusetts should have a safe and comfortable trip regardless of their travel mode.

Danila is a Professional Civil Engineer in the Commonwealth of Massachusetts and



Above: Michelle enjoys the Boston City Hall Bike to Work event.

also a Professional Traffic Operations Engineer, a status earned from the Transportation Professional Certification Board. Before coming to MassDOT, she worked at Toole Design for eight years and previously at Howard Stein Hudson Associates for three.

In the process, Danila has accumulated extensive civil engineering experience that includes transportation planning, traffic analysis, safety analysis, and roadway and intersection design. She says she "strives to improve safety for all roadway users, especially people walking, biking, and taking transit."

In search of that goal, as Danila explains, "I have designed a variety of bicycle, pedestrian, and transit facilities from concept to construction, including separated bike lanes, protected intersections, floating bus stops, curb extensions or other traffic calming elements, and ADA- [American Disabilities Act] compliant sidewalks and curb ramps."



Above: Danila and her son (Lukas) bike the new Connect Historic Boston separated bike lanes.

Looking at just a few of the numerous projects undertaken by Danila before she arrived at MassDOT, she designed some 100 miles of bike facilities, including over ten miles of separated bike lanes, for various Massachusetts communities. She was one of the lead authors for the federal highway administration's *Achieving Multi-Modal Networks: Applying design flexibility and reducing conflicts*, which is a resource that aims to address common myths when designing connected networks for people walk-

ing and biking. She also assisted in the development of MassDOT's *Separated Bike Lane Planning and Design Guide*.

As the MassDOT complete streets engineer, Danila works on complete streets initiatives and ensures that all roadway projects are being designed for people and not just vehicles. She serves as the technical expert for the complete streets funding program, from which municipalities can receive grants to plan and construct complete streets elements on their local roadways. She also develops guidelines and training programs to ensure that all MassDOT employees, municipal representatives, and practitioners understand why we have shifted roadway design from focusing on vehicles to moving people.

Danila is an active member of the Institute of Transportation Engineers (ITE), for which she served as the New England Section president in 2014. She won the New England Section's Young Professionals Group Award in 2006, received the President of the New England Section Award in 2014, and was selected as a Rising Star of the Northeastern District of ITE in 2016. In 2018, she received the UMass ITE Distinguished Alumni Award for her outstanding contribution and service to the transportation profession.

Obviously, it is impossible to go almost anywhere in the Commonwealth and beyond without benefiting from the wise planning, safety features, and expert designs provided by Michelle Danila's distinguished career.



Above: Dr. Michael Knodler presents Danila with UMass ITE Distinguished Alumni Award.

## Alumnus, Robert B. Brack, Making Lasting Contributions of Time, Wisdom, and Funding to the CEE Department

Retired business owner and perennial philanthropist Robert B. Brack, a 1960 graduate of the Civil and Environmental Engineering (CEE) Department, has a long history of supporting UMass Amherst and the CEE with his time, energy, insight, and many key donations. Brack, who spent 50 years working as chairman and owner of the Barker Steel company of Milford, MA, was the lead donor and guiding light for the CEE's Robert B. Brack Structural Testing Facility, dedicated in 2012. He was also the recipient of the 2013 UMass Amherst Distinguished Achievement Award, a 2016 Distinguished Alumni Award, and has made several large donations to the UMass Amherst chapter of Engineers Without Borders.

But those are only a few highlights of his philanthropic impact on CEE. Brack has been involved with the education of engineering students through his establishment of an undergraduate scholarship endowment, graduate student fellowships, the donation of materials for experimental research in the CEE department, and the funding of a post-doctoral fellow in the Structural Engineering and Mechanics Group.

Brack's gifts have provided the stimulus for significant growth in that group, both in research capabilities and overall strength of the program. He also served on CEE's Advisory Board for more than a decade. In that capacity, he gave CEE the benefit of his wisdom, knowledge, and vision, gained through over 50 years of experience at Barker Steel.

After Brack graduated from UMass Amherst in 1960, he started working at Barker Steel and assumed leadership of the company in 1976. Under Brack's leadership, the company grew to 17 locations in 11 states and nearly 600 employees. He sold the business to Harris Rebar in 2007 and retired in 2012. At the time, Barker Steel was the largest independent reinforcing steel company in New England, Pennsylvania, and New Jersey, and even supplied reinforce steel to the new Yankee Stadium.

Brack was also the initial recipient of the Concrete Reinforcing Steel Institute (CRSI) Distinguished Service Award in 2013, a member of the CRSI Hall of Fame, and one of the organization's founding

members. According to the CRSI, the Distinguished Service Award was prompted by "Brack's career-long dedication to both the reinforced concrete industry and the Concrete Reinforcing Steel Institute."

One of Brack's enduring contributions to the CEE department was spearheading the funding for the Brack Structural Testing Facility by making two gifts of \$50,000 apiece, which were coupled with \$150,000 from UMass as a matching challenge grant. Dedicated in October of 2012, the facility contains a "strong floor" and a bridge-crane system to allow on-site experimental testing of large-scale structural elements. The strong floor is a concrete slab with 30- by 60-foot dimensions, which is highly reinforced with steel and has tie-down points every five feet capable of resisting 200,000 pounds of force, offering an almost limitless variety of test setups. The bridge-crane system has a 30-ton capacity, with a 20-foot lifting height, and the enclosed facility is sheltered by a roof. "The Structural Engineering and Mechanics Program cannot test full-size structural elements in its present testing facility," Brack explained at the time of the dedication. "The addition of the Structural Testing Facility offers new and unique opportunities to partner with research organizations such as the Massachusetts Department of Transportation and provides undergraduate, graduate, and Ph.D. students the chance to gain invaluable experience doing research in a full-scale testing environment." Brack added that "This project is a win-win for



**Robert B. Brack**  
Barker Steel, Retired

the students, staff, and department as it continues its growth and development to be one of the finest in the country."

In addition to all of the other invaluable contributions to CEE made by Brack, he has also embraced the UMass Amherst chapter of Engineers Without Borders (EWB) by repeatedly donating considerable funds to the group's annual Corporate Sponsorship Appeal. In 2014, Brack also established the Robert B. Brack Endowment in Civil and Environmental Engineering in honor of the CEE Department Head, Dr. Richard Palmer and in recognition of his outstanding research and advocacy in the field of water resource management.



Above: Brack, center, visits with UMass group in the Robert B. Brack Structural Testing Facility (Brack Lab).

## CEE Alumnus, Brett Towler, Wins Prestigious Award from U.S. Fish and Wildlife Service



**Brett Towler**

U.S. Fish and Wildlife Service

Brett Towler who earned his B.S. from the UMass Amherst Civil and Environmental Engineering Department, recently received one of just three national science awards given out each year by the U.S. Fish & Wildlife Service (USFWS) to employees for their extraordinary contributions to conservation science. During a ceremony at the North American Wildlife and Natural Resources Conference in Denver, CO on March 7<sup>th</sup>, 2019, Towler was presented with the Sam D. Hamilton Award for Transformational Conservation Science. This award was named after a former director of the southeast region of the USFWS who was a champion for collaboration and innovation in leading coastal restoration efforts in the wake of hurricanes Katrina and Rita.

Towler served in the U.S. Army from 1987 to 1991, including a tour in South Korea.

After being honorably discharged, he went on to study engineering at UMass Amherst, receiving a B.S. in Civil and Environmental Engineering in 1996. Towler received his Ph.D. and M.S. degrees in Civil Engineering from Montana State University-Bozeman and continued on as a Research Engineer and then Assistant Professor until 2006. He spent the next few years as a manager for Devine Tarbell & Associates, a Portland, Maine consulting firm, before circling back to the Pioneer Valley in 2010 to join the U.S. Fish and Wildlife Service as a Regional Fish Passage Engineer, and UMass Amherst as an adjunct professor in the CEE department.



**Above: Towler guiding a field trip of UMass students at the Turners Falls Hydropower Project.**

As a Fish Passage Engineer with the USFWS Northeast Region's Fish and Aquatic Conservation program, Towler now applies his two decades of experience as a consultant, educator, researcher and practitioner in support of federal programs and external agencies involved in the planning, design, construction, and operation of fish passage facilities throughout the country. He has played the lead role in organizing and developing a series of USFWS Fish Passage Workshops to enhance the technical skills of engineers, biologists, regulators and program managers working in the field of fish passage. Towler has produced multiple major

reports, and in 2016, served as lead author and editor of the first USFWS engineering manual on anadromous fish passage for the east coast, providing standardized design guidelines that are now being used by states, consultants, and other federal agencies.



**Above: Towler leads UMass students on tour of the Homestead Woolen Mills dam removal and nature-like fishway site in West Swanzey, NH.**

His collaborations with UMass Amherst are manifold. As a co-developer of the USFWS-CEE partnership to enhance the ecological literacy of the next generation of engineers through specialized courses and research opportunities, Towler has taught graduate courses, led research practicums, and advised students under the department's M.S. specialization in fish passage engineering. Recognizing the need to expand collaborations, he championed the development of a broader partnership to include the USGS Conte Anadromous Fish Research Center, a state of the art research lab in Turners Falls, MA.

In 2011, Towler organized the first international Fish Passage conference, a forum which now attracts hundreds of participants each year who discuss advancements in fishway design, fish protection, dam removal, and road-stream crossing techniques. His efforts have resulted in stronger relationships, better conservation outcomes, and provided career opportunities for many UMass students who are now, themselves, positively contributing to this interdisciplinary field.



**Above: US Fish and Wildlife Service photo of Region 5 staff celebrated for migratory fish work.**



**Above: Fran Ryan's photo of Towler giving a demonstration at the USGS Conte Lab's hydraulic lab.**

## Dr. Gerasimidis, Assistant Professor, Structural Engineering and Mechanics

Professor Simos Gerasimidis of the Civil and Environmental Engineering (CEE) Department is a highly accomplished professional engineer who has worked on such larger-than-life structures as the new Yankee Stadium, the Olympic Stadium and Velodrome for the Athens Olympics of 2004, and major interventions associated with the largest Byzantine monuments in Thessaloniki, Greece. This is the kind of rich experience that Gerasimidis brings to the CEE.

His employment background includes working as a post-doctoral research scientist at Columbia University, a teaching assistant at Aristotle University of Thessaloniki, a structural engineer in Greece, a structural engineer for Thornton Tomasetti Engineers in New York, and a structural engineer at Santiago Calatrava. He received his degrees from Aristotle University of Thessaloniki and from MIT.

While serving in these various capacities, Gerasimidis, worked on some of the most recognizable structures on earth. While with Thornton Tomasetti in 2006 and 2007, he was on the team designing the new steel and concrete New York Yankees Stadium. During his time at Thornton Tomasetti, Gerasimidis also calculated and modeled the steel high-rise tower for the Chicago Spire project, a 2,000-foot-high tower in Chicago.



Above: The new Yankee Stadium.

Prior to that high-profile job, he participated in an even more prestigious project, the 2004 Olympics. While on Calatrava's staff in Athens from 2003 to 2004, Gerasimidis helped engineer some of the most identifiable structures throughout the Olympic venue. He calculated and remodeled, in detail, the emblematic arch/dome-like steel

structures for the coverage of the main Olympic Stadium and the Olympic Velodrome; the steel superstructure and foundation of the Agora; the steel Entrance Canopies; the frame-type steel structure for the Nations' Wall; the tubular-steel structure for the Monument; and the cable-stayed steel footbridge at the Katehaki metro station.



Above: Olympic Stadium, Athens, Greece.

Gerasimidis' research interests lie in the areas of structural stability, thin-walled structures, nano- and micromechanics, new architected metamaterials, infrastructure resilience, bridge engineering, new metamaterial designs for engineering biofilm, structural systems, and energy structures. His research activities have aimed at studying the behavior of structures and new cellular truss-lattice metamaterial architectures to localized damage and defects, as well as identifying novel applications for metamaterials.

Gerasimidis has been active in the field of infrastructure resilience, structural response of critical infrastructure systems subjected to



Above: Outside Marston Hall with grad students.



extreme-loading events in urban regions, resilient-oriented structural design approaches, damage propagation, and structural response of damaged or deteriorated structures covering a broad spectrum of structural behavior. He has published more than 80 technical papers in peer-reviewed international journals and conference proceedings. He is the recipient of the Greek Diaspora Fellowship from the Stavros Niarchos Foundation as one of 21 U.S. Greek-born scholars. Gerasimidis is a member of several committees including the American Society of Civil Engineers (ASCE), the Structural Stability Research Council (SSRC), the Engineering Mechanics Institute (EMI) and is a registered (licensed/chartered) professional civil engineer in Greece.

This impressive body of work is yet more indication of the high quality of the faculty members teaching and researching in the CEE department of UMass Amherst.



Above: Program meeting with grad students.

## Dr. Carlton Ho, Professor, Geotechnical



Associate Professor Carlton Ho of the Civil and Environmental Engineering (CEE) Department has been the principal investigator or co-principal investigator on research grants totaling more than \$1,466,500 and has placed more than 65 refereed and non-refereed publications in academic journals and conferences. Since 1987, he has served as a co-chair, panelist, organizer, moderator, or participant for more than 30 professional conferences, meetings, review panels, planning committees, sessions, and workshops. Ho has also edited more than 20 professional reports and proceedings. But that compendium is only the tip of the iceberg of his many accomplishments.

Ho's research deals with railroad geotechnics, the behavior of large, grain-sized materials (ballast, aggregate, gravel), soil dynamics, and in situ testing. He earned his Ph.D. in Civil Engineering and Geotechnical Engineering, his M.S. in Civil Engineering and Geotechnical Engineering, and his B.S. in Civil Engineering from Stanford University.

Ho began his career as a Professional Engineer from 1978 until 1980 by working as a Research Engineer for Okubo Instruments in Colorado Springs, a Junior Civil Engineer for the City of Milpitas in California, and an Associate Engineer for Dames and Moore in San Francisco. From 1987 until 1992, he was an Assistant Professor in the Department of Civil Engineering at the Illinois Institute of Technology in Chicago, and from 1992 until 1996 he was an Assistant Professor and later an Associate Professor

in the Department of Civil and Environmental Engineering at Washington State University in Pullman. He has served in the UMass Amherst CEE Department since 1996.

In addition, Ho has experience as: a visiting researcher and a Research Civil Engineer at the Branch of Geologic Risk Assessment for the United States Geological Survey in Menlo Park, California; a visiting faculty member at the Center of Education and Research of Mechanics of Soil at the National School of Roads and Bridges in Noisy-le-Grand, France; a visiting scholar at the Institute of Infrastructure and Environment, University of Edinburgh, United Kingdom; and a visiting research faculty member at the Department of Transit and Railroad Engineering at Tongji University, Shanghai, China.



Above and above right: High speed train scale model at the Tongji University Rail Transit Outdoor Laboratory.

As a member of the American Society of Engineers, the American Society for Engineering Education, the Earthquake Engineering Research Institute, the Seismological Society of America, the Transportation Research Board, and other professional organizations, Ho has also engaged in a long list of committees as a chairman and member.

Over the course of his teaching career, Ho has taught more than 25 different courses in the civil and environmental engineering field at four major research institutions around the nation and abroad. Ho has also served as an adviser for more than 35 undergraduate and graduate researchers. Even

more impressively, he has volunteered for more than 30 campus committees on behalf of CEE, College of Engineering, and UMass Amherst.

The CEE is fortunate, indeed, to have such an accomplished professional engineer, teacher, and researcher on its faculty.



Above: An afternoon of student advising.



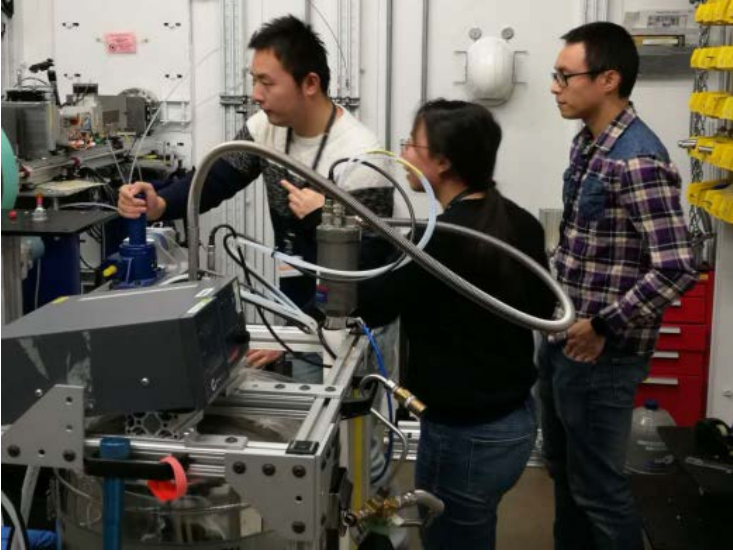
Above and above right: High speed train scale model at the Tongji University Rail Transit Outdoor Laboratory.



Above: Ho's CEE 423 class fieldtrip.



## Geotechnical



Geotechnical Ph.D. students, Jing Peng and Nick Luo, are running 2D synchrotron X-ray diffraction experiments on soft clays at the Argonne National Lab Advanced Photon Source. This is an NSF funded project with an aim to understand why soft clays, after disturbance, increase strength and stiffness without any external input which is called thixotropic hardening.

## Structural Engineering and Mechanics



Ph.D. student Abbas Joorabchian and our Lab Technician Mark Gauthier install specimens in the test frame in Gunness Structural Engineering Laboratory for the American Iron and Steel Institute project on the impact of bearing conditions on the behavior of cold-formed steel wall assemblies. The work shed light on how bearing stress distributions interact with stability modes and alter progression of failure. This motivated a second phase of the work which will begin in the Summer of 2019. This second phase will extend into full-height wall assemblies, and will be conducted in the Brack Structural Engineering Laboratory.

## Environmental and Water Resources



Dr. David Reckhow and his team (Patrick Wittbold shown top left) have a new Mobile Water Innovation Laboratory that, since the start of 2019, takes promising new and affordable technologies to local communities for on-site testing. The van contains a flexible setup of filters, pipes and chemicals (shown top left) that routes incoming water through the same series of steps (purifying, filtering and disinfecting) as a standard drinking water treatment plant. With two sets of everything, scientists can run side-by-side experiments, comparing the performance of a new technology against the standard approach. Researchers can then see whether a new technology works better than existing options, suggests Patrick Wittbold, the UMass Amherst research engineer who headed up the trailer's design.

## Transportation



Four UMass ITE members used a drone and two ground mounted cameras to conduct a traffic pattern study for the parking lot of the Stanley M. Koziol Elementary School in Ware, MA. It was the chapters responsibility to record traffic data for both the morning and the afternoon drop-off and pick-up times. Using the video collected from the ground mounted cameras and the drone, our members came up with suggestions on traffic flow that was more efficient and safer for the students, parents, and staff of the elementary school.

## HISTORY & HERITAGE LECTURE

### HOW STRUCTURAL TESTING INFLUENCED THE DEVELOPMENT OF BUILDING CODES FOR REINFORCED CONCRETE CONSTRUCTION

Presented by:

Dr. Sharon L. Wood

University of Texas at Austin



This year's History and Heritage Lecture was held on February 28<sup>th</sup>, 2019, featuring Sharon L. Wood. Sharon is the Dean of the Cockrell College of Engineering at the University of Texas at Austin. She is holder of the Cockrell Family Chair in Engineering #14, and Jack and Beverly Randall Dean's Chair for Excellence in Engineering. Sharon is a member of the National Academy of Engineering, a past president of the American Concrete Institute, a recipient of the OPAL Award for Education from the American Society of Civil Engineers, and a member of the ACI Building Code Committee.

We were happy to host a standing room only crowd of students, faculty and Amherst

area consultants and engineers for her talk on the history of concrete and its application in the U.S. for buildings and bridges. The History and Heritage Lecture is held annually in honor of a former faculty member Alexander Chajes. The event is intended to honor a high achieving professional or academic that has made significant contributions to the field of Civil Engineering and can reflect on the historical context of those accomplishments within the profession.



Above: Wood (left) at the Engineering Education and Research Center (EERC) construction site with project partners.

Sharon's discussion reflected on how the first multi-story reinforced concrete buildings were constructed in Europe in the 1850s, and by the turn of the 20<sup>th</sup> century, reinforced concrete was being used throughout the U.S. for building construction. The development of design and materials standards lagged behind the construction industry, and contractors used a wide variety of patented technologies, including types of reinforcement and design approaches, in their buildings. Load tests were frequently used to demonstrate the adequacy of an individual building, but many conflicting opinions regarding structural behavior existed. Only through structural testing of reinforced concrete members in the laboratory, did engineers begin to develop the theories that form the foundation of our current building codes. Fundamental observations from early tests were reviewed and the impact on modern construction discussed.



Above: Wood after biking with the Texas 4000 riders, on a mission to cultivate student leaders and engage communities in the fight against cancer.

To celebrate the tremendous contributions of Professor Alexander Chajes, to the University of Massachusetts and the profession of Civil Engineering, an endowment was established on the occasion of his retirement. That endowment, funded through the generosity of many faculty, alumni, and friends of the department, supports the annual Civil and Environmental History and Heritage Lecture. By inviting distinguished professors and practitioners of Civil and Environmental Engineering to campus to speak about the history and heritage of our profession, we remind ourselves of the great

Civil and Environmental engineers who have come before us, and give context to our current research and educational activities. Professor Chajes served for many decades as a professor of Structural Engineering at UMass, Amherst, compiling a remarkable record of scholarly publication and teaching excellence. The History and Heritage Lecture is a reflection of his interest in the topic, and his belief that students of Civil and Environmental Engineering must understand the work of those who laid the foundation for the modern profession.

## FACULTY AWARDS AND ACCOMPLISHMENTS

### SANJAY ARWADE

Panelist at the UMass Museum of Contemporary Art Symposium on Art+Math, April 1<sup>st</sup>, 2019

### CAITLYN BUTLER

2019 Outstanding Teaching in Environmental Engineering and Science Award;  
Chemistry Communications Journal Outstanding Reviewer for April 2019;  
Massachusetts Technology Transfer Center (MTTC) Acorn Innovation Fund Seed Funding for  
“3D Printed Biomimetic Biofilm Supports for Treatment Systems”;  
2019 James L. Tighe Distinguished Teaching Award

### ELENI CHRISTOFA

2019 Barbara H. and Joseph I. Goldstein Outstanding Jr. Faculty Award

### SIMOS GERASIMIDIS

Massachusetts Technology Transfer Center (MTTC) Acorn Innovation Fund Seed Funding for  
“3D Printed Biomimetic Biofilm Supports for Treatment Systems”

### ERIC GONZALES

2019 American Society of Civil Engineers (ASCE) Faculty Award

### MICHAEL KNODLER

2019 UMass Public Engagement Project (PEP) Fellowship;  
2019 Civil and Environmental Engineering (CEE) Research Award

### DAVID RECKHOW

2019 American Water Works Association  
“A.P. Black Research Award”

### JOHN TOBIASON

2019 College of Engineering Outstanding Teaching Award;  
2019 Charles R. O'Melia Association of Environmental Engineering and Science Professors (AEESP)  
Distinguished Educator Award

## FACULTY PROMOTIONS

This year our department held its 2<sup>nd</sup> and 3<sup>rd</sup> Faculty Promotion Lecture Series in the Fall and Spring, respectively. We had a great turn-out at both of the events, filling almost every available chair. Everyone greatly enjoyed the talks given by our faculty. As hiring and promoting are extremely important to our department com-

munity, it is important for us to celebrate our accomplishments and to illustrate that we have a community of scholars that gives us great pride. These events are wonderful opportunities for all of us to both learn about the research being performed by our colleagues and also to honor their accomplishments.



**Caitlyn Butler**  
Associate Professor



**Scott Civjan**  
Professor



**Michael Knodler**  
Professor



**Daiheng Ni**  
Professor

## New Faculty



**Dr. Christian D. Guzman**  
Assistant Professor

Congratulations to Dr. Christian D. Guzman who will be joining the Civil and Environmental Engineering Department in September 2019.

Christian is a graduate of the Agricultural and Biological Engineering Program at the University of Florida, where he received his Bachelor of Science Degree. For his Master's and Doctorate, Christian conducted NSF-funded research in the Soil and Water Lab at Cornell University under the guidance of Professor Tammo Steenhuis. During his time there, he conducted field studies and modeling research on the hydrological and sediment transport patterns of tropical water-sheds including sites in Ethiopia, Honduras, and Colombia.

After Cornell, Christian joined the Watershed Hydrology and Water Quality lab at Washington State University where he has worked on stable isotope hydrology and food-energy-water nexus research as a USDA NIFA Postdoctoral Fellow with Professor Jan Boll.



Soil sampling in a maize field at the Debre Mawi Watershed in Ethiopia with field research assistants.



## New Online Master's Program Targets Working Professional Engineers

In September of 2018, the Civil and Environmental Engineering (CEE) Department brought Professor Nicholas Tooker, P.E., on board to develop an online Master's program for working professional engineers. A Professor of Practice with seven years of experience as a consulting engineer, Tooker will begin to build that program by offering Master's-level online courses in the coming years, all targeted to working engineers.



"We recognize that there are a lot of working professionals right now who need some additional training," says Tooker. "But it's either difficult while they're working to make it to campus and attend class, or it's impossible for them to take time off from work to come here as a full-time student. So we thought this was a good opportunity for us to offer our expertise through the Internet." Regionally, as Tooker knows from departmental surveys, CEE has a stellar reputation in all of the civil and environmental engineering disciplines. "I was brought on to kick-start that program and start organiz-

ing some of our classes so we can offer a Master's degree in a completely online format," says Tooker. "Starting fall 2019, we're going to offer our first graduate courses online, in environmental engineering and transportation engineering."

For starters, Dr. Eleni Christofa will teach an online course in transportation sustainability in an online format. In addition, CEE will also leverage the Newton Campus (the former Mount Ida College Campus), because many employers of CEE alumni have offices within 20 minutes of that campus. "We're going to take advantage of [this proximity] with a combination of beaming courses to that campus from here," says Tooker, "or actually having our faculty travel to give in-person classes on the Newton Campus."

Also, beginning in September, CEE will offer an online environmental bioprocesses class, taught by Dr. Caitlyn Butler. Tooker will help her teach that course in what is called "multi-modal form." "Some students will be taking classes here in person, on the UMass Campus, and then we'll have other students taking it remotely," says Tooker. "All of those students will be able to access any of the coursework or information we have in whatever format they choose." Tooker adds, "What I like about this multi-modal course is that students will have an opportunity to choose how they learn from a

range of modes, so they'll be able to pick what works best for them."

In the spring of 2020, CEE will offer a geographic information systems (GIS) class for engineers in this same multi-modal format, taken either in person or online. It's a software-based skills course that is very high in demand for engineers across a wide range of specialties. "When we talk to people in the profession," explains Tooker, "they often say they need people who know how to do GIS and use the software involved. Students will learn spatial-analysis thinking and how to use the specific software widely employed for it."

Tooker will also offer a graduate-level water and wastewater design class during summer 2020. "We'll roll out these courses over the next few years," he summarizes, "to offer a full Master's degree program online."



Anyone desiring more information on these online courses and how to register for them can contact Tooker directly at [nbtooker@umass.edu](mailto:nbtooker@umass.edu).

## Associated General Contractors

AGC students toured the current construction area of the Worcester Dining Commons to learn more about the main stages of the construction process as well as the important structural aspects of the new building.

Our students also had a ten hour OSHA safety training with guest, Christopher Zigler who taught students about recognition, avoidance, abatement and prevention of safety and health hazards on job sites. Afterwards, the students received a ten hour OSHA certification card which is a requirement for many jobs and internships in the industry.



## Chi Epsilon Honor Society

The UMass Chi Epsilon Honor Society proudly inducted 10 new candidates into their chapter. In addition, the chapter hosted two great guest speakers, Jon Dietrich and Tony Putin, for a seminar regarding “Life as a Consulting Civil Engineer.” The chapter looks forward to future seminars in the hopes of providing beneficial advice for students after graduation, as they enter the field of civil engineering. Chi Epsilon also sponsored FE review sessions for UMass CEE students taking their FE exams. The chapter had plans to go on some construction site visits as well, to see the various facets of the construction process first hand.

## Engineers Without Borders



UMass EWB visited Nguluni, Kenya to implement some projects they designed. This included installation of a solar pump at the secondary school, to distribute water to the two stations, three hand washing stations placed outside the latrines at the primary and secondary schools to improve health and sanitation, two rainwater catchment systems (RWC) at the primary school and Early Development Center (EDC) with a first flush system which eliminates most pollution resulting in safer water, and a water distribution pipeline connecting the borehole to a dispensary with mul-

tiplex service connections that will bring water to households, businesses and farms. The team also visited the University of Nairobi where they met with its EWB chapter and Dr. John Tobiason gave a lecture regarding water quality and quantity, followed by a presentation from project manager Akshay Delity on the Nguluni Project. UMass EWB hopes to design a storage method to use the solar power at the secondary school to generate electricity through it, extend the distribution system, and further collaborate with the University of Nairobi’s EWB chapter.



## Institute of Transportation Engineers



ITE co-hosted our 6th Annual TRB Reception at the Mackey’s Public House in D.C. This year’s reception was another great success. It served as an excellent opportunity for students, alumni, and professionals to interact in a casual environment.

## Women in Transportation Society

WTS members attended the “My STEM Story” event hosted by The Pioneer Valley Women in STEM. This event provided a great opportunity to meet professionals and students and learn about STEM experiences, motivations, challenges and rewards. WTS invited Tighe & Bond’s Andrea Lacasse, P.E.,

who shared her experience in construction management and Jennifer Pinck of Pinck & Company to talk about the value of infrastructure investment. This past winter, WTS members attended the TRB Annual Meeting and also hosted a LinkedIn workshop to help students build up or improve their profiles.



## American Society of Civil Engineers



Our chapter is proud to have sent our Steel Bridge Design and Concrete Canoe Teams to compete at UMaine on April 13<sup>th</sup>.



Our Seismic Design Team competed in Vancouver, Canada and came in 8<sup>th</sup> place during the competition out of 38 teams from several different countries.



ASCE had a great time participating in Habitat for Humanity and are excited for our next build day on April 28<sup>th</sup>.

## STUDENT AWARDS

### SAYEEDA AYAZ

WTS Boston Member Graduate Scholarship;  
Ernest T. and Rae N. Selig Transportation Program Scholarship Endowment  
Third Place Poster Award

### NICHOLAS CAMPBELL

New England ITE Thomas E. Desjardins Memorial Scholarship;  
First Place Poster Award, ITE Northeastern District Annual Meeting;  
UMass ITE Student Chapter Student Service Award

### AIKATERINA DELIALI

2018 WTS Boston Helene M. Overly/Ann Hershfang Memorial Scholarship

### SAMUEL DOWNES

2019 Berger Award Winner;  
2019 New England Graduate Student Water Symposium Best Poster Award

### NICHOLAS FOURNIER

Dwight D. Eisenhower Graduate Student Fellowship - USDOT

### JOSEPH GITAU GIKYONO

2019 Noga Award Winner

### LI HE

2019 Berger Award Winner;  
Charles F. Perrell Scholarship in Environmental Engineering

### MICHAEL KAMLARZ

2019 American Society of Civil Engineers (ASCE) Student Award

### JULIE BLISS MULLEN

2018 New England Water Innovation Network (NEWIN) Water Innovator of the Year;  
2019 Forbes "30 Under 30" All-star List for Science;  
2019 Lemelson Student Prize Award

### MELISSA PACIULLI

Grinspoon Entrepreneur Award for Concept;  
UMass Innovation Challenge Finalist for DrivingmyADHD –  
Virtual Game Based Teen Driving Training Program

### PANAGIOTIS PANTIDIS

UMass Graduate School Dissertation Fieldwork Grant for "3D-Printing in the Nanoscale:  
Exploring the mechanical property space of defected architected metamaterials."

### ALYSSA RYAN

WTS Rhode Island Leadership Legacy Scholarship;  
New England ITS Joseph Sussman Student Award;  
Third Place in Transportation Safety, ARTBA Student Video Contest;  
Dwight D. Eisenhower Graduate Student Fellowship – USDOT;  
Second Place Poster Award, ITE Northeastern District Annual Meeting;  
ITE Upstate New York Section Scholarship Award;  
ITE Connecticut Chapter Scholarship Award

### FRANCIS TAITER

Dwight D. Eisenhower Graduate Student Fellowship – USDOT;  
2018 Volpe Center Award

## Graduate Student Spotlight: Andrew Rohrman, Geotechnical



Andrew Rohrman is a Ph.D. candidate in civil engineering. He received his B.S. from Northeastern University in 2014 and his M.S. from UMass in 2016, both in civil engineering. Andrew is advised by Dr. Carlton Ho, working on research which focuses on railway geotechnics. His early research was funded by the Perrell Fellowship, but the primary source of funding for his doctoral work is the Federal Railroad Administration, whose mission is to “enable the safe, reliable, and efficient movement of people and goods for a strong America.” Andrew is excited to have had the opportunity to work with collaborators in both academia and the rail industry on providing a better understanding of railroad performance.

As the transportation industry grows, trains continue to get heavier and faster, and the materials supporting these loads are of increasing importance. One of these materials is railroad ballast, which is the gravel-size aggregate that is placed below the rails and ties. The majority of Andrew’s work is aimed at better understanding the strength properties and deformation characteristics of railroad ballast in different conditions through laboratory testing. Three main factors are considered: ballast particle angularity, water content, and fouling, which is finer-grained material introduced to the ballast voids. Tests are set up identically so that direct comparisons can be drawn between highly angular versus worn ballast or plastic versus non-plastic fouling materials.

Andrew’s work has shown that reduced particle angularity compromises the performance of ballast, particularly at high fouling contents. While maintenance practices used in industry are usually controlled by the amount of fouling in track, this research provides evidence that the condition of the ballast should also be brought into consideration. Additionally, testing performed with fouling containing plastic fines has

suggested that the current industry standard methods of quantifying fouling may not be adequate in all cases. Along with other research, these findings may help move the industry forward in how it thinks about ballast replacement and the severity of fouling conditions. This work has resulted in papers presented at several conferences including the Joint Rail Conference, GeoShanghai International Conference, and Railway Engineering Conference in Edinburgh, Scotland.



Above: Rohrman and Dr. Ho in Scotland.

**Hometown:** Warren, Rhode Island  
**Hobbies:** Photography, skiing, biking, hiking

## Undergraduate Student Spotlight: Isabella Cobble



### What UMass Amherst student organizations are you involved with?

I am currently President of the UMass Chapter of Engineers Without Borders and Class Representative of the UMass Chapter of American Society of Civil Engineers. I am also involved in Society of Women Engineers and UMass Outing Club, as well as the Chi Epsilon Honor Society.

### What are your plans after graduation?

After graduation, I plan to travel and explore

the west coast of the United States, spending time with family and friends. In the early Fall of 2019 I will begin working full-time as an environmental engineer for Tighe & Bond in Westwood, MA, focusing on a variety of water-related projects.

### Are you involved in research or experiential learning?

I am a member of the Butler Research Group. I am in the process of completing an honors thesis on microbial fuel cells (MFCs), which treat wastewater and generate electricity simultaneously. I’m exploring how MFCs can be utilized to increase the energy efficiency of the wastewater treatment process.

### How has your experience at UMass CEE been?

My experience at UMass CEE has been very positive. I love the variety of the research that professors are involved in. I’ve learned so much from UMass faculty through coursework, hands-on projects, research, and extra-

curricular activities. This knowledge has prepared me for my engineering career and for my life. I appreciate the department’s commitment to diversity and I believe it has a bright future.

### What do you value most from your UMass experience?

I truly value the strong friendships that I’ve made here at UMass. I’ve met so many incredible people who have inspired me to be a better person.

**Hometown:** Quincy, Massachusetts  
**Year:** Senior, 2019 graduate  
**Hobbies:** Dancing, hiking, reading, watching sunsets



Left: With EWB members cleaning a rainwater catchment tank in Kenya.

UMassAmherst

Department of Civil and Environmental Engineering  
224 Marston Hall  
130 Natural Resources Rd.  
Amherst, MA 01003-9303

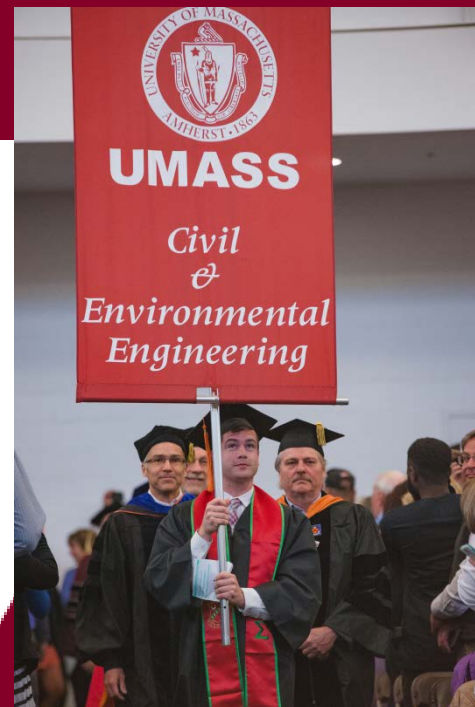
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