



The University of Texas at Austin  
Civil, Architectural and  
Environmental Engineering  
*Cockrell School of Engineering*

# CITIES · WATER · ENERGY

Fall 2015

[caee.utexas.edu](http://caee.utexas.edu)



Architectural engineering graduate Jaime Garza (BSArE 2002) developed parameters for the structural support of Nancy Rubins' *Monochrome* for Austin, installed on UT Austin campus earlier this year.

*Photo: Landmarks UT Austin*

## A message from the Chair



Richard L. Corsi

**What starts here changes the world.** That simple sentence is rich with truth. It is highly relevant to the students who start their educations in the Department of Civil, Architectural and Environmental Engineering (CAEE) at the University of Texas at Austin, and then become alumni who change the world for the better every day. Stand on any street corner in Texas. Look around. Chances are that you will see something that a CAEE graduate had a hand in. Whether it is designing and constructing structurally sound buildings, safe roadways and bridges, healthy and efficient interior environments, treatment systems that provide clean water and air, or levees and dams that keep people from drowning in floods, or maintaining the structural integrity of power plants, and more, our alumni are not just changing the world, they are saving lives in the process. And what I love about our alumni is that despite the importance of their work they tend to be humble. It's just what they do. That's why I am so proud to be a part of the CAEE community. I hope that you are, too.

In this newsletter you will be introduced to four new assistant professors, each of whom bring exciting new expertise and tools to our community. Collectively, these new members of our community of scholars add to our strategic vision to be thought leaders in the connections between the growth of cities, water and energy demands, and innovations in critical infrastructure that weaves these themes together.

You will also read about some very impressive alumni. You will "meet" Jessica Baker, our Outstanding Young Alumna who is developing innovative solutions to solving complex flood problems in Texas, and 11 inspiring 2014-15 inductees into our Academy of Distinguished Alumni. They hail from all around the world, and are recognized engineering leaders in their communities and at large. They show our students how they can change the world. One member of our Academy of Distinguished Alumni, Thomas Taylor, and his wife Dane, have made a generous personal pledge to build a new suite for our architectural engineering design studio on the 3rd floor of ECJ Hall. Why is their gift so important? Our architectural engineering students are top notch, highly sought after (effective 100% job placement rate at graduation) and deserving of the best educational facilities possible. They will now have these by spring break of 2016. More information about this great new facility is found in this newsletter. The changes that are occurring on the first and second floor of ECJ Hall, coupled with the changes now possible on the 3rd floor, have allowed our department to build an effective "building within a building" for undergraduate education.

Through the generosity of alumni we have been able to grow funds through our Legacy Campaign. Those funds are being used entirely to provide scholarships for undergraduate students and fellowships for graduate students. This year we will fund six students and provide them with research experience in the process. You will read about some of the students funded in the past year.

If you received this newsletter, there is a pretty good chance that you have experienced the splendors of Barton Creek Pool in Austin. We have included information about the efforts of one of our faculty members, Ben Hodges, to help sustain that gem. And we have also included information about an exciting new \$13.7 million NSF grant to create a Natural Hazard Engineering Center at UT. The Center will be directed by Professor Ellen Rathje of CAEE. Through these efforts we will change the world locally, regionally, nationally, and globally.

There are so many other exciting things happening in our community. One newsletter cannot capture it all. But we do our best to reach our students, staff, faculty and alumni with relatively frequent updates on our website which is dynamic and filled with interesting information. I hope that you will visit it on a regular basis. And we also #tweet. On a daily basis you can view tweets about all aspects of the accomplishment of our wonderful community. We will soon approach 1,000 followers on Twitter, from current students to alumni, employers of our students to media outlets and even our peer institutions across the world. You can follow our daily tweets at @UT\_CAEE.

It is a privilege and an honor to serve as Chair of the Department of Civil, Architectural and Environmental Engineering and our greater CAEE community. We tend to be humble, but we are changing the world.

*Richard L. Corsi*

Richard L. Corsi  
Chair and ECH Bantel Professor for Professional Practice

## Welcome, New Faculty



### **Joshua Apte**

Assistant Professor  
Building Energy and Environments

Josh Apte joined the CAEE faculty in January 2015 from UC Berkeley, where he received his PhD and worked with the Energy and Resources Group. His research interests include sustainability in the built environment; methods for air pollution exposure assessment; atmospheric aerosols; environmental issues in low income countries (air pollution and climate change mitigation). He received a Fulbright-Nehru fellowship to the Indian Institute of Technology to characterize in-vehicle exposure to particulate matter.



### **Christian Claudel**

Assistant Professor  
Transportation Engineering

Christian Claudel joined the CAEE faculty in January 2015. He received his PhD from UC Berkeley and has served as an assistant professor at King Abdullah University of Science & Technology (KAUST) for the past four years. His research interests focus on solutions to traffic flow models and optimization-based traffic state estimation and control. He will add new dimensions to our transportation engineering program with his expertise in wireless technologies and the use of unmanned aerial vehicles for real-time traffic flow sensing.



### **Kasey Faust**

Assistant Professor  
Construction Engineering and Project Management

Kasey joined the CAEE faculty in August 2015. She received her PhD from Purdue University, where she was also a NSF Graduate Fellow and also received a Master of Science in Industrial Engineering. Her research interests focus on the management of critical civil infrastructure systems, interdependencies and vulnerabilities in various categories of cities at the interface of engineering and policy. Here, she will explore different avenues of infrastructure management, human-infrastructure interdependencies, and public perceptions towards critical infrastructure systems.



### **Salvatore Salamone**

Assistant Professor  
Structural Engineering

Salvatore Salamone joined the CAEE faculty in August 2015. He received his PhD from University of Palermo and has served as an assistant professor at the State University of New York at Buffalo for the past five years. He is also former director of the university's Smart Structures Research Laboratory. Salamone's research interests are structural health monitoring, non-destructive evaluation, resilience of structural systems subject to earthquakes, ultrasonic sensing methods for smart structures, wave propagation in solids, digital signal processing and pattern recognition, dynamics and vibrations of structural systems, and piezoelectric energy harvesting

## Outstanding Young Alumna



### Jessica D. Baker, BSCE 2004

*Established in 2003, the Outstanding Young Alumnus/Alumna Award recognizes a graduate of the Department of Civil, Architectural and Environmental Engineering under the age of 40 who has distinguished himself or herself with outstanding service and contributions to the engineering profession. Jessica is the 2014-15 award recipient.*

Jessica Baker serves as the Water Resources Department Manager at Half Associates in Richardson, TX, where she is involved in hydrologic and hydraulic studies, and focuses on floodplain and stormwater management projects. Her team develops innovative solutions to complex flood problems for communities throughout Texas. Jessica has extensive experience with the Federal Emergency Management Agency's (FEMA's) mapping programs, including the nationwide update of Digital Flood Insurance Rate Maps (DFIRMs) and FEMA's Risk Mapping Assessment and Planning (Risk MAP) program focused on delivering quality data that increases public awareness and leads to mitigation actions to reduce flood risks.



*Jessica is responsible for flood risk identification and awareness, public outreach and education.*

She serves as the Association of State Floodplain Managers (ASFPM) Region VI Director on the national Board of Directors representing Texas, New Mexico, Oklahoma, Arkansas, and Louisiana. She also serves as the Texas Floodplain Management Association (TFMA) Vice President. Through this role she teaches flood safety courses throughout Texas. She is passionate about the education of community officials, media, and citizens, and works to provide outreach and training to ensure that all communities understand the risks associated with flooding.

## ONE word.

Our undergraduate and graduate programs are routinely ranked among the top ten in the U.S. In the most recent *U.S. News & World Report*, our programs were ranked:

**#6 Undergraduate Civil Engineering**

**#6 Undergraduate Environmental Engineering**

**#3 Graduate Civil Engineering**

**#6 Graduate Environmental Engineering**

Students, alumni and faculty were recently asked to provide one word to summarize their experiences at CAEE.

Check it out:

[www.caee.utexas.edu/about/one](http://www.caee.utexas.edu/about/one)

If you wish to participate, please send your one word to [klopfenstein@mail.utexas.edu](mailto:klopfenstein@mail.utexas.edu) along with a brief explanation of why you chose that word.

## Announcements & Briefs



Award recipients Valerie Sorge and Dr. Patrica Clayton are recognized by Department Chair Richard Corsi.

## 2015 Department Awards

### ARE Leadership Award

**Reese Hatridge**

*Awarded to an architectural engineering student who demonstrated outstanding leadership in campus and community activities.*

### CE Leadership Award

**David Vargas**

*Awarded to a civil engineering student who demonstrated outstanding leadership in campus and community activities.*

### Werner W. Dornberger Academic Excellence Award

**Kaitlin Renee Dietz**

*Awarded to an architectural engineering student who started at UT Austin as a freshman, has the highest GPA in class, and is completing a degree in four years.*

### John A. Focht Academic Excellence Award

**Valerie Ann Sorge**

*Awarded to a civil engineering student who started at UT Austin as a freshman, has the highest GPA in class, and is completing a degree in four years.*

### Outstanding Teaching Assistant Award

**Celina Dozier**

*Presented to a TA who has shown exemplary dedication and motivation in their teaching.*

### Department Teaching Award

**Lance Manuel**

*Presented to a faculty member who has excelled in teaching and has demonstrated exceptional motivation of students in the classroom.*

### Ervin S. Perry Student Appreciation Award

**Patricia Clayton**

*Presented to a faculty member who best meets the ideals of "an excellent teacher and a good friend."*

### CAEE Staff Excellence Awards

**Sharon Bernard and Laura Klopfenstein**

*Presented to staff members who have distinguished themselves and who have contributed significantly to the CAEE Department's teaching, advising, mentoring, and/or research efforts.*

## Academy of Distinguished Alumni Inductees 2014 - 2015



**Sandra Akmansoy BS 1996, MS 1997** is a Director and the Group Leader for Arup in Denmark. She is also a member of Arup's Europe Region Board, and its youngest member. Since being appointed Group Leader in 2012, she has doubled the Danish business, adding many prestigious projects and client's to Arup's portfolio. These projects include the Nordhaven metro extension to Cityringen Metro line in Copenhagen, the Roskilde Fjord Bridge, terminal development plans at the Copenhagen Kastrup Aiport, and a laboratory building at the Bispebjerg Hospital. In her former position at Proctor & Gamble's Civil, Structural and Architectural Engineering Department in Brussels, Belgium, Sandra also developed project management skills as well as technical skills working on sites in France, UK, Egypt, and Morocco, as well as conducting post-earthquake seismic surveys in Turkey.



**Ronald A. Cook PhD 1989**, expert in the areas of connections to concrete and wind engineering, is Professor Emeritus of Civil Engineering at the University of Florida. His fields of specialization are structural behavior, structural systems, connections to concrete structures, and the performance of structures under wind loading. His introduction to the area of connections to concrete began while he was an undergraduate researcher. Ronald later acquired design experience involving large scale connections to concrete while at the Tennessee Valley Authority. After consulting and teaching as an adjunct professor, he returned to school at UT Austin to complete a PhD. He later developed consensus standard provisions for adhesive bonded anchors that are now implemented by ACI 318, ACI 355, and the International Federation of Structural Concrete Design Guideline.



**Hernán de Solminihac MS 1986, PhD 1992** is the former minister of mining for the government of Chile, his native country. Previously he was minister of public works of Chile. He began demonstrating his engineering expertise only two weeks after the fifth most powerful earthquake on record occurred and led the country's reconstruction efforts. Since then, he has participated in diverse urban and interurban projects in the public and private sector. Before his political appointments, he served as Pontificia Universidad Católica de Chile's dean of the School of Engineering and was an engineering professor who taught undergraduate and graduate courses in infrastructure management and civil engineering. Minister de Solminihac also created IncubaUC, a business incubator focused on entrepreneurship and a private company, APSA, a pioneering knowledge transfer company focused on engineering and road management.



**Joseph F. Malina, Jr. (Honorary)** leaves a lasting legacy as an educational and industry leader, and a respected professional engineer after more than half a century at UT Austin as an environmental and water resources engineering professor. He helped thousands of students understand the real-world importance and applications of civil and environmental engineering. Joe also served as department chair from 1976 to 1988, attracting national visibility for the program. His research focuses on biological treatment of municipal and industrial wastewaters; handling, treatment, and disposal of municipal sludges; industrial residuals and hazardous wastes; solid waste engineering; computer-aided-engineering of waste treatment systems; environmental impact of highway construction and highway runoff. He has served as a consultant to industry, local, municipal, state and federal governments and agencies, and international organizations.

The Academy of Distinguished Alumni in the Department of Civil, Architectural and Environmental Engineering was established in 2003 to recognize the professional achievements and contributions of our graduates. Academy members are leaders within their professional communities and serve as role models for our students. Each active member holds at least one degree in civil, architectural, or environmental engineering from the University of Texas at Austin.



**Patricia S. Metcalf BS 1985** has worked at ExxonMobil nearly 30 years and has demonstrated a commitment to her profession, company, peers and university. Now a Project Services Area Manager for the ExxonMobil Development Company, she began her career as a construction and maintenance engineer after graduation. She later held negotiating, planning, technical and managerial roles in Exxon's Gas & Power Marketing Company and also obtained an MBA from Rice University. In 2007, she moved to the development company as a Construction Supervisor, Business Manager for Odoptu and Chayvo Expansion Projects and served as Area Manager and a Project Control Manager for Nabiye. Her dedication to increasing the number of women and minorities in the engineering workplace has also been significant. She has helped many UT Austin students go on to become successful professionals and has served on ExxonMobil's recruiting team in various capacities to find, recruit, hire and integrate students into the company.



**Erik L. Nelson BS 1981, MS 1983, PhD 1986** is president and CEO of Nelson Forensics, one of the fastest growing forensics firms in the nation. He began his career as a design engineer providing structural design and project management for commercial buildings. Multi-disciplined in nature, his firm's specialties include forensic engineering and architecture, fire investigation, chemistry and environmental science, accident reconstruction, cost estimating and appraisal, and roofing materials testing. Nelson Forensics has been involved in several high visibility projects including explosion damage assessment in West, Texas; hurricanes Sandy, Rita and Katrina storm surge and wind damage assessments; and cause/origin of windstorm failure to the Dallas Cowboys Practice Facility. Erik regularly shares his knowledge with the profession through journal articles as well as university continuing education courses and at technical society meetings.



**Nabil Hani Quaddumi BS 1976** Nabil Qaddumi has combined academics and business acumen throughout his career. He is Chairman of Projacs International, the largest Pan-Arab project management firm with 20 major offices in the Middle East, North Africa, Asia, Europe and North America, and more than 600 professional staff. Nabil came to UT Austin when the Lebanese Civil War erupted and received a bachelor's degree. After completing a graduate education at Stanford University and MIT focused in construction management, he joined the civil engineering faculty at Kuwait University. In 1984, he founded Projacs, managing projects whose total construction value exceeds \$10B. Additionally, he and his family founded the Hani Qaddumi Scholarship Foundation offering grants to more than 1,000 students to date in Palestine and Lebanon. He is also Deputy Chairman of the Arab Fund for Arts and Culture.



**Julio A. Ramirez MS 1976** often felt the rumble of the earthquakes during his childhood in Mexico. This instilled a lifelong curiosity as to how people and buildings survive the earth's tremors. Now a civil engineering professor at Purdue University, he is an established leader in the structural engineering profession. He also serves as the Chief Officer of the \$105M National Science Foundation funded George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES), and is Director of the NEEScomm Center. In this role, he is responsible for management and oversight of these facilities, the cyberinfrastructure necessary for operations, and the associated community outreach programs. Throughout his career, Julio has focused on the shear response of reinforced and prestressed concrete structures. Between 2004 and 2007, he chaired the subcommittee on shear and torsion for ACI Committee 318, which develops the building code provisions for concrete structures.

## Academy of Distinguished Alumni Inductees 2014 - 2015



**Edward E. Reed BS 1957** has built everything from an astronaut training facility, to sophisticated high rise offices and residential towers, to a veteran's memorial. As founder and CEO of E.E. Reed Construction Company in Sugar Land, TX, he has become a dynamic force in the construction industry with annual revenues averaging over \$225M and a position on the *ENR* Top 400 Contractors list. He earned a dual-degree in civil engineering and business administration at UT Austin. After serving in the Air Force and a 17-year career with Harvey Construction Company, he founded his company in 1977. He has also served as an officer of the Sugar Land Economic Development Corporation; president of the Architectural Review Board for the City of Sugar Land; director and chair for Associated Catholic Charities; director of the Associated Builders and Contractors, Inc. of Houston; and is active in various civic and charitable endeavors.



**Egidio Torre Cantú MS 1981** was sworn in as Governor of Tamaulipas, Mexico in January 2011 for a single six-year term. A life-long Tamaulipeco, Governor Torre built and grew a successful engineering and construction business before entering politics. His academic background laid the foundation for a successful professional career. After earning a bachelor's degree in civil engineering from the Instituto Tecnológico de Monterrey and a master's in civil engineering from the University of Texas at Austin, he managed the construction of government edifices, large hydraulic projects, tourism infrastructure, and urban and industrial development projects. He also taught architecture courses at Universidad La Salle, in Ciudad Victoria. Since entering public service in 1982, he has been active in state and local politics and is deeply committed to transforming Tamaulipas by raising the standard of living for its citizens.



**Waheed Uddin PhD 1984** has over 35 years of professional and research experience in highways, airports, air quality, traffic management, infrastructure, and environmental sustainability. He is a pioneer in evaluating laser remote sensing terrain scanning technology and geospatial analysis for infrastructure development and environmental applications. A professor of civil engineering at the University of Mississippi, he is also the founding director of the Center for Advanced Infrastructure Technology. Waheed's innovative transportation and flood inundation mapping products were implemented for 2005 Hurricane Katrina impact assessment on Mississippi Gulf Coast, post 2010 floods in Pakistan, and 2011 floods in Thailand. He also developed several new engineering labs at his university which focus on asphalt testing, remote sensing/geospatial data analysis, and modeling/visualization.



## Faculty News



Oguzhan Bayrak

Chandra Bhat

Stephen Boyles

Richard Corsi

Michael Engelhardt

Robert Gilbert

Maria Juenger

Kara Kockelman

**Oguzhan Bayrak** received the ACI *Chester Paul Siess Award for Excellence in Structural Research*, which honors a paper that describes a notable achievement in experimental or analytical research.

**Chandra Bhat** received the 2015 Hind Rattan, an award given by the Government of India, for his outstanding services and scholarly achievements in the transportation and econometrics field. He also received the ASCE's 2015 *Frank M. Masters Transportation Engineering Award* for pioneering efforts in transportation systems analysis.

**Stephen Boyles** received the Council of University Transportation Centers CUTC-ARTBA New Faculty Award for outstanding contributions in the transportation field.

**Richard Corsi** was elected to the University of Texas at Austin Academy of Distinguished Teachers. He was one of only three faculty members on the UT campus to be elected this spring.

**Michael Engelhardt** received the American Institute of Steel Construction (AISC) Lifetime Achievement Award for making a difference in the structural steel industry's success and for his outstanding service to AISC and the structural steel design/construction/academic community.

**Robert B. Gilbert** received a 2015 Regents' Outstanding Teaching Award, the highest teaching honor bestowed by the University of Texas System Board of Regents. The award honors outstanding performance in the classroom and dedication to innovation in undergraduate instruction.

**Maria Juenger** was elevated to the grade of Fellow of the American Ceramic Society (ACerS) and will be recognized in October 2015. She was also elected to be a Fellow of the American Concrete Institute (ACI).

**Kara Kockelman** received a Google Research Award in the category of Robotics for her work on Anticipating & Mitigating the Latent Demand Effects of Self-Driving Vehicles: A Role for Data-Driven Modeling & Credit-Based Congestion Pricing.

**Fernanda Leite** was named as one of *The Engineering News-Records (ENR)* 'Top 20 Under 40'.

**David Maidment** received a Geospatial World Leadership Award in the category of Geospatial Scientist of the Year based on his contributions to geospatial science as a specialist in surface water hydrology, and in particular for applications of geographic information systems (GIS) to hydrology.

**Lance Manuel** received the ASCE *Stephen D. Bechtel, Jr. Energy Award* which recognizes outstanding achievements in the energy field by a civil engineer.

**Daene McKinney** will serve as Principal Investigator of a 3-year \$1.5 million National Science Foundation (NSF) grant to study community-based approaches to reducing glacial lake outburst flood risks in Nepal.

**William O'Brien** was awarded a Fiatech Superior Technical Achievement Recognition (STAR) Award for outstanding contributions to the capital construction industry.

**Paola Passalacqua** received the Cockrell School of Engineering 2014-15 Dean's Award for Outstanding Teaching by an Assistant Professor.

**Kenneth Stokoe** was named the 2015 Texas Society of Professional Engineers Travis Chapter Engineer of the Year.



Fernanda Leite

David Maidment

Lance Manuel

Daene McKinney

William O'Brien

Paola Passalacqua

Kenneth Stokoe

## Research

# Engineering an Endangered Species' Habitat

Dr. Ben Hodges is collaborating with the City of Austin to develop models that will improve the sustainability of Barton Springs Pool, the city's most beloved swimming hole and a three-acre federally protected salamander habitat.



Most locals know that one of the most important citizens in our environmentally conscious city is the salamander. The Barton Springs salamander and Austin Blind Salamander are US endangered species that only live in the habitat of Barton Springs, Zilker Park in Austin, Texas. The city goes to great lengths to protect the water quality of this amphibian's habitat as well as many other environmentally sensitive watersheds.

The Barton Springs salamander was given the taxonomic name, *Eurycea sosorum*, in honor of the citizens of Austin, who initiated and passed the SOS (Save Our Springs) Ordinance in 1992 to protect the Edwards Aquifer. The salamanders are rare and tiny (average length is 6.35 cm), and require clean and consistent water flow in order to survive. As stream salamanders they are ecological indicators – they provide readily quantifiable metrics of ecosystem health and integrity.

This is where water resources engineer and Associate Professor Ben Hodges enters the picture. In collaboration with the City of Austin, he is developing models that will improve the sustainability of Barton Springs Pool and salamander habitat, which are hampered by gravel washed in during floods that can build up over years. Hodges' expertise on hydrology, hydraulics and fluid mechanics prompted the city to ask for help with hydrodynamic studies for the Barton Springs Pool Master Plan.

The project was also the thesis topic for former master's student Abby Tomasek (MS 2013). Tomasek spent two years working alongside Hodges, collecting data and developing a model of Barton Springs Pool. This work is continuing with Ph.D. student Yuxiang Lin.

## Research

As part of the city's master plan, a detailed bathymetry survey, hydrodynamic modeling, and flow analysis of possible new gates in the pool's dams are three components of a larger effort to improve the pool. The city is looking at ways to modify the lower dam with new gates to improve water flow for the salamander habitat and reduce gravel accumulations.

Hodges and his team produced a detailed bathymetric study of the pool. For this study, a cost-effective, custom survey instrument was constructed using an off-the-shelf a "fish finder" sonar with GPS, which was mounted inside a 5-gallon bucket and supported with an inflatable swim tube.

"In the past, a similar survey would have required instruments costing tens of thousands of dollars," says Hodges.

The team has created a three-dimensional hydrodynamic model of the pool under different discharge conditions in order to better understand the flow conditions for the salamander's habitat. The model simulates flow speed and direction and the influence of wind on water circulation in the pool.

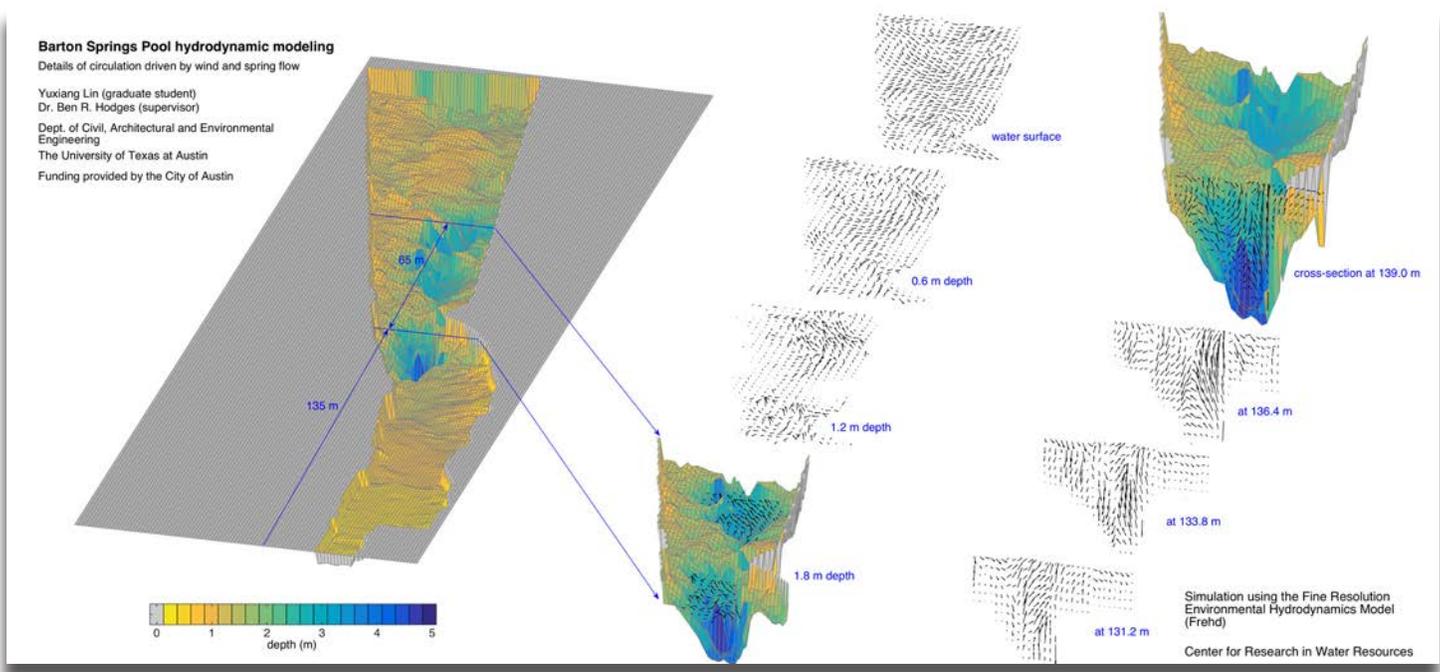
To calibrate the model, the team measured the water velocity using an acoustic Doppler current profiler (ADCP), which was mounted on the pool bottom with the help of a diver from the City of Austin. The ADCP uses high-frequency sound wave to measure the water velocity, a concept that is similar to the way Navy submarines use sonar.

In 2013, this instrument was placed close to the springs in two different deployments. Data collection in 2014 focused on areas further away from the springs in order to get a better understanding of the mean flow through the pool.

The ADCP data collection continued around the clock for several weeks, including when occupied by swimmers. The speed of a swimmer gliding over the top of the instrument appears as "noise" in the data that can be removed by filtering.

Over the summer, the team will be using the model to provide the city with flow analyses for existing and possible new gates in both the downstream and upstream dams, which will allow the city to determine how to improve sustainability of the system. The overall goal is to ensure the flow habitat for the salamanders is maintained or improved while reducing gravel accumulation behind the dam during floods.

"In the long run, improved flow conditions will make the pool a better place for endangered species, and reduce the periodic costs of closing the pool to remove gravel accumulations," says Hodges. More details on the research can be found at <http://www.crrw.utexas.edu/hodges/BartonSpringsPool>



## Community of Scholars



# THE LEGACY CAMPAIGN

Honoring Tradition | Sustaining Excellence | Celebrating Students

## STUDENTS SUPPORTED BY THE LEGACY CAMPAIGN



**Ethan Howley** is an undergraduate civil engineering student with a passion for researching sustainable solutions to water purification and a deep interest in reconciling design and environmental necessity. “I am fascinated by the ways in which humans interact with the environment, and I want to find ways to improve the relationship.”

As an undergraduate researcher, Ethan currently assists on an EPA-funded project called the Water Innovation Network for Sustainable Small Systems (WINSSS) under the guidance of Dr. Mary Jo Kirisits and Dr. Michal Ziv-El. Ethan’s role in the collaboration is to monitor biological nitrification reactors and the micro-organisms that make them work. “Traditionally, nitrification has been done chemically. Biological nitrification could offer an advantage in reduced chemical costs,” says Ethan.

Nitrification is an important stage in purification of wastewater. As sources of new water grow scarce, more cities will consider recycling treated wastewater to meet increased demand. Ethan is hopeful that additional research on the effectiveness of biological treatments to rid wastewater of contaminants like ammonia will ultimately provide more efficient drinking water solutions and contribute to the growth of sustainable cities.

Second year civil engineering undergraduate **Lauryn Altena** is working with Dr. Lance Manuel to study strategies for mitigating urban heat island problems. The Urban Heat Island (UHI) involves the creation of elevated temperatures in urban spaces, sometimes up to 12 degrees °C higher than nearby rural areas. Such increased temperatures have implications for peak energy demand, air pollution, greenhouse gas emissions, heat-related illnesses, and water quality. The UHI grows as cities and their associated infrastructure grow, and it is a problem that affects most of the world’s population daily.

Lauryn’s study will help to identify the variables that most significantly contribute to increased UHI while considering mitigations to address those effects in specific cities. “Specific variables that affect UHI include building design, building location, (close buildings can trap hot air) amount of impervious cover, and wind flow around structures.”

While it is generally agreed that surface modification is the cause of increased temperatures in urban areas, the particular ways in which factors like albedo, evapotranspiration, and canopy layer work together to produce a heat generating system requires still more study. Such research seeks to improve the performance and efficiency of infrastructure within cities.



If you would like to create your own Legacy Fund to support student research, please contact Henna Tayyeb at [hennat@austin.utexas.edu](mailto:hennat@austin.utexas.edu) or 512-471-0469.

## Community of Scholars

**Matthew Reiter** is a civil engineering student skilled at uncovering the environmental impacts of transportation. Under the guidance of Dr. Kara Kockelman, Matthew will pursue a study of plug-in electrical vehicles (PEVs) to determine the degree to which they represent an environmentally friendly alternative to conventional passenger cars in Texas. His study will assess not only emissions, but also the energy impacts of battery provision and other manufacturing processes required to produce PEVs.

Prior to initiating this project, Matthew worked for Dr. Kockelman as an Undergraduate Research Assistant, investigating the air quality implications of electric vehicle adoption. Over the course of the study, they were surprised to discover, despite Texas' relatively "clean" power grid, emissions associated with electricity generation appear to be worse than those from conventional vehicles.

Sustainable transportation is at the heart of sustainable cities, and Matthew is keen to determine whether or not the future adoption of PEVs will fundamentally change energy consumption in cities. Matthew has also co-authored a paper with Dr. Kockelman about reducing "cold starts" (when the engine of a conventional vehicle is cold, and therefore requires more energy to start) and will present it at the Transportation Research Board's Annual Meeting in January 2016.



**Melvin Goh** is a PhD candidate in the Department of Civil, Architectural and Environmental Engineering. His research is dedicated toward the development of a practical computational tool that can be used to assess the performance of existing reinforced concrete slabs and shell structures that have been deemed deficient according to evolving structural design philosophies, or are exhibiting signs of distress as a result of degradation associated with ageing and deterioration. Melvin's goal is to create a reinforced concrete modeling procedure that combines high-fidelity and low-cost modeling approaches to perform adequately detailed analyses for full structural systems with limited computational effort.

This type of system-level modeling procedure can be used to more efficiently model the performance of reinforced concrete slabs and shell structures under critical loading scenarios that cannot be realistically examined at the single-element or subassembly level. Examples of such applications include the progressive collapse resistance of reinforced concrete slab systems and the seismic performance of flat plate systems under earthquake ground motions. Practical computational tools that can provide reliable structural performance estimates will be invaluable in the coming years as the inventory of ageing and distressed concrete infrastructure continues to grow.

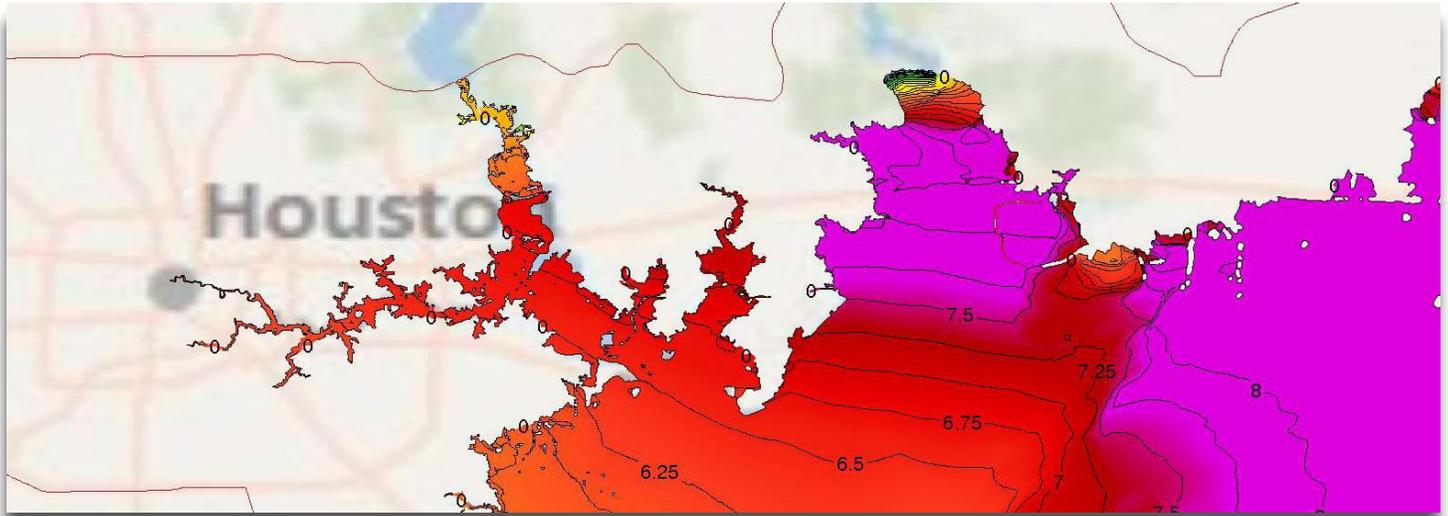
Melvin's research is being carried out under the supervision of Dr. Trevor Hrynyk.

**Nash Mock** has been passionate about improving global environmental conditions since joining CISV International at age 11. Working with graduate student Aureore Mercelat and under the direction of Drs. Lynn Katz, Kerry Kinney and Frank Seibert, Nash is currently assisting with a research project involving the use of hollow fiber hydrophobic membranes to separate water/oil emulsions. Nash first became interested in undergraduate research in an Environmental Sampling and Analysis course taught by Dr. Katz.

The novel membrane process has been patented by UT researchers, and the group's current research builds on previous studies examining its application to oil/water separation in biofuel production. Specifically, the focus of current work seeks to gain a more fundamental understanding of the process and to assess the potential of this process for separating oil/water mixtures for other applications including oil and gas industries and cleanup of oil spills.

Nash is also optimistic that the development of a suitable membrane might also allow for the recovery of oil and its reuse in energy production (an attractive possibility, given its diminishing, non-renewable status).

## Community of Scholars



### \$13.7M NSF Grant Creates Natural Hazards Engineering Center at UT Austin

A new cyberinfrastructure effort funded by a \$13.7 million grant from the National Science Foundation will help engineers build safer structures that can better withstand natural hazards such as earthquakes and windstorms. The Cockrell School of Engineering at The University of Texas at Austin is leading the effort to build a software platform, data repository and tools that will help the United States design more resilient buildings, levees and other public infrastructure that could protect lives, property and communities.

Geotechnical professor Ellen Rathje, an expert in earthquake engineering, will lead the UT Austin team, which will include aerospace engineering professor Clint Dawson, who brings hurricane modeling expertise, and TACC director Dan Stanzione, a leader in high-performance computing. The team is partnering with Jamie Padgett of Rice University, Jean-Paul Pinelli of the Florida Institute of Technology and researchers from other universities across the country.

The Cockrell School team will use analytics, storage, visualization and cloud technologies at the university's Texas Advanced Computing Center (TACC) to develop DesignSafe, a resource-sharing Web platform that will enable computer models and simulations of natural hazards that can be validated against real-world data, creating an easily accessible resource for natural hazards researchers across the United States.

"We are bringing together our expertise in engineering and information technology to develop the best tools to help engineers better understand the impact of natural hazards on our cities and infrastructure," said Rathje, principal investigator on the project. "There is tremendous potential to save lives and property through better engineering, design and planning. The platform we develop here will help engineers use data and simulation to improve the design and planning processes."

The cyberinfrastructure grant is part of the NSF's new Natural Hazards Engineering Research Infrastructure (NHERI) program. NHERI was created to enable research and educational advancements aimed at preventing natural hazard events from becoming societal disasters.

Collaborative engineering research is critical to making our buildings and lifelines resistant to earthquakes, tornadoes and hurricanes," said Joy Pauschke, NSF program director for NHERI. "The NHERI cyberinfrastructure will help spur engineering advances and bring together the natural hazards research community with an accessible platform for sharing data, computational (or simulation) tools and other resources."

A primary goal of DesignSafe is to enable engineers to inexpensively and efficiently run hazard simulations and create models to compare and evaluate different alternatives for a building, levee or other structure before selecting a design. Running large-scale simulations requires efficient, open source computer codes. To meet this need, the DesignSafe team will incorporate open source software systems into the platform, including the NSF-supported OpenSees program for earthquake engineering simulations, originally developed by UT Austin President Gregory L. Fenves.

# Renovated Suite Gives Architectural Engineering Students New Space to Design and Build

Alumnus Thomas W. Taylor (BS ArE '59) and his wife, Dane (BBA '75), have made a personal pledge of \$400,000 to renovate the CAEE Architectural Engineering Suite. This gift will provide funding for a state-of-the-art design studio which teaches students the integration of architecture and engineering systems.

Defining the identity of the third floor, the new space will include glass wall views into the seminar room and student spaces. This will create a vibrant learning community where students can study, collaborate, and engage with faculty and classmates.

The construction of the new Engineering Education and Research Center (EERC) has triggered several significant renovations within Ernest Cockrell Jr. Hall (ECJ). Once complete, the EERC will operate as a connected neighborhood on the three lower levels of ECJ, which will include the architectural engineering design studio.

Department Chair Richard Corsi summarizes what this gift means to the department. "Americans spend 70 of their 79 years of average lifetime inside buildings," he said. "It is critical that building environments are safe from structural or enclosure failures and designed to promote human health, productivity, and learning. These conditions are the responsibilities of architectural engineers. This wonderful gift from Thomas and Dane Taylor will benefit and inspire countless generations of architectural engineering students who will continue to define where we live our lives. Their generosity will have immediate and long-lasting impacts that benefit CAEE students and those who occupy the buildings they design and build."

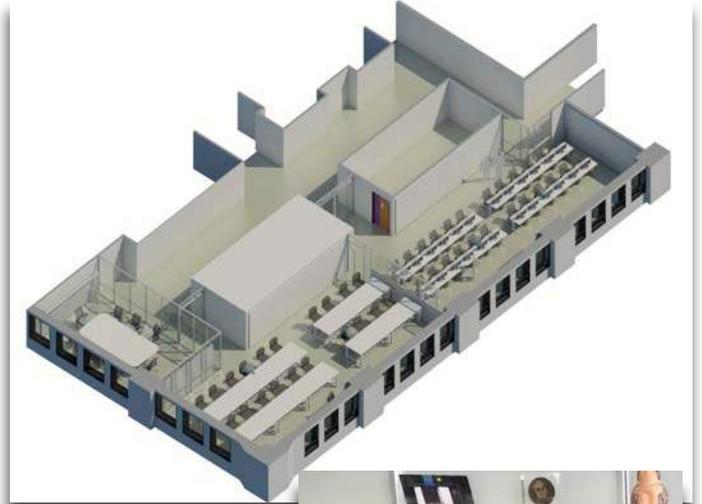
A longtime supporter of the Department of Civil, Architectural and Environmental Engineering, Taylor received his bachelor's degree in architectural engineering in 1959. He has been a leader and innovator in the building industry throughout his 50+ year career as a structural engineer. Now a Principal Design Engineer at structural engineering firm Datum Engineers, he took over operations in 1963 and helped Datum grow into a nationally recognized firm.

Passion for design and architecture – the "Art of Structural Engineering" – has been Taylor's signature. Projects such as Thanksgiving Square, the Ballpark at Arlington, the Chapel of St. Ignatius, EDS Headquarters, Parkland Memorial Hospital, Perot Museum of Nature and Science, Irving Convention Center, Dallas Convention Center and the Dallas Federal Reserve Bank have become Datum's signature works.

"I have had many blessings in my life and have so much enjoyed my career as an architectural engineer," Thomas said. "The two blessings that have made such an impact on my life, is my loving family and a public education at the University of Texas at Austin."

The new studio will be named after Datum Engineers. The expected date of completion is March 2016.

If you are interested in supporting the ECJ Renovation, please contact Henna Tayyeb at [hennat@austin.utexas.edu](mailto:hennat@austin.utexas.edu) or 512-471-4046.



*Dane and Thomas Taylor*

## Alumni

# Intersection of Art and Engineering



A fascinating large-scale sculpture was recently installed near the engineering complex, assembled from vintage aluminum canoes and small boats. A sight to behold, it clearly requires innovative structural support. This is where the skills and talents of engineer and UT Austin alumnus **Jaime Garza** (BS ARE 2002) help carry out the artist's vision.

**“My education prepared me  
and to communicate my so**

**- Jaime Garza (BS ARE '02)**

Garza, Vice President at Nabih Youssef Structural Engineers, served as the managing structural engineer for the sculpture, Monochrome for Austin. He worked closely with artist Nancy Rubins and her team to develop the parameters for the sculpture's support based on the concept of the completed sculpture.

The installed work consists of a pedestal made out of stainless steel plates that supports an angled tube steel box truss that then supports a horn shaped triangular truss that cantilevers out laterally. The pedestal sits on a three foot diameter concrete pier while the trusses carry up to 70 aluminum canoes and row boats tied together and anchored by a multitude of stainless steel cables. The aluminum boats transfer their own weight, live loads, and wind loading to the structural support through direct connection to the truss, T-shaped steel frames that jut out from the truss, adjacent boats, and through the stainless steel cables.

The entire sculpture, including the boats' capacity, has been analyzed for the safe transfer of its own weight and applied loading from its environment.

When Garza's team developed the structural design of the sculpture, the artist requested that it be able to be placed anywhere in the world, prior to knowing that it was going to The University of Texas at Austin. As a result, the sculpture was designed to be safely installed almost anywhere.

“My team and I developed worst case load conditions for the sculpture; a large earthquake, a hurricane, or heavy snow,” says Garza. “After evaluating significant environmental loading, we found that fatigue is often a governing load case, since the sculpture moves constantly in the wind. Although the constant movements of the sculpture will be imperceptible to people walking by, the movement will stress the joints significantly over the life of the sculpture.”

## Alumni



For the development of this sculpture, Garza managed a team of engineers and CAD designers to implement this project. The project was also peer reviewed by another UT CAEE graduate, **Jeremy Klahorst** (BSARE 2002, MSCE 2004), Associate Principal at Datum Engineers.

Garza, who also received an MS in Structural Engineering Mechanics and Materials from UC Berkeley in 2013, has been involved with seismic evaluations, retrofits of existing buildings, exhibition designs for Los Angeles County Museum of Art (LACMA), and designs for new buildings. He led the design on the retrofit of the LAX Theme Building using a tuned mass damper at the top of the building to counteract earthquake loading, a first in the US.

He is currently the lead engineer for the new Waldorf Astoria Hotel that has begun construction this year in Los Angeles. He has also worked with Rubins on several of her large scale sculptures, including the Big Edge sculpture in front of the Vdara Hotel & Spa in Las Vegas.

Garza is proud to be a part of this project, a visually compelling example of the intersection of art and engineering, located on the campus where he received his undergraduate degree.

e to tackle any problem  
olutions and ideas.”



“The architectural engineering program at The University of Texas at Austin was the perfect foundation for my current career in structural engineering,” he says. “My education prepared me to tackle any problem and to communicate my solutions and ideas.”

Located at the corner of 24th Street and Speedway in front of the Norman Hackerman Building, Monochrome for Austin was unveiled by UT’s Landmarks public art program in March 2015.

*photo credit: Landmarks UT Austin*

# CAEE Donors

We wish to express our sincere gratitude to the individuals and organizations who donated to the Department of Civil, Architectural and Environmental Engineering in 2014.

YOU ARE PART OF A  
**TRADITION OF  
EXCELLENCE**

Your gifts enhance our students' educational experiences, and help them become the next generation of international leaders.

# 13

**Kolodzey Travel Grant Award Recipients**



# 52

**Friends of Alec donations of \$250+**

The award provides an opportunity for PhD students to attend technical conferences, make oral and poster presentations about their dissertation research, and to develop a network of colleagues at other universities.

FOA Gifts enrich educational experiences of our students. These funds helped us hire three new faculty, renovate one lab and assist student organizations.

# \$280,664

**Total of endowment gifts**

Endowments provide permanent support. These gifts are invested - never spent - and each year a distribution is made to the designated program or area.

**Corporate Gifts**

# 55

**Association/Foundation Gifts**

# 5 + 2

**Legacy scholars/fellows and new Legacy Funds**

Legacy Funds are housed together to create an overall pool of support for CAEE undergraduate and graduate education. The return on the endowed Legacy Funds gives the department the highest flexibility to address critical areas of research and recruitment.



# 15

# 302 = \$2,139,911

**Total # of department gifts**



# Alumni Updates

CAEE alumni have varied professions and interesting careers. Faculty, current students, and fellow graduates are always interested in learning about the lives alumni lead after they leave UT.

If you have an update you'd like to share - a career change, promotion, retirement, marriage or birth, please e-mail Laura Klopfenstein at [klopfenstein@mail.utexas.edu](mailto:klopfenstein@mail.utexas.edu) or visit our website at [www.caee.utexas.edu/alumni](http://www.caee.utexas.edu/alumni)



*Gisela Consuelo Guzman, daughter of Denise Guzman (BS 09) and Marco Guzman (BS 08). Denise and Marco both work at ExxonMobil.*

Let us know about your future engineer and we'll send you a free t-shirt, compliments of the

**Friends of Alec Annual Giving Program.**

## 70's

**Walter Chiang** (MS 75) was recognized as 2014 Hall of Achievement honoree at UT Arlington for significant contributions to the engineering profession. It is an honor given to a distinguished few in recognition of exceptional achievements.



*A former adjunct faculty member at UTA, Walter Chiang taught courses from 1976-1991.*

**Candice Koederitz** (BS 78) was honored with a 2015 Cockrell School Distinguished Engineering Graduate Award.



*Dean Sharon Wood and Candice Koederitz Hook 'Em before the spring commencement ceremony.*

**Jim Wiethorn** (BS 73, MS 75) was recognized as *The Engineering News-Records (ENR)* Top 25 Newsmakers which recognizes outstanding achievements of top industry professionals. Over the past three decades, Jim has investigated hundreds of crane accidents and generated data on what causes lifting machines to fail, which he has provided to industry to help jobsites become safer.

## 80's

**Doug Dayton** (BS 87) was promoted to president of Professional Services

Industries, Inc., a nationally recognized consulting engineering and testing firm providing integrated services in several disciplines.

**Randall Poston** (BS 78, MS 80, PhD 84) was recognized as *ENR's* Top 25 Newsmakers which recognizes outstanding achievements of top industry professionals. He led a six-year-long, designer-friendly remake of the ACI Concrete Code and recently launched Pivot Engineers to focus on investigation and repairs of existing structures.

## 90's

**Sergio M. Alcocer** (PhD 91) was honored with a 2015 Cockrell School Distinguished Engineering Graduate Award. He also delivered the keynote address at the Cockrell School's Spring 2015 Commencement Ceremony.

**Sanjeev Malhorta** (MS 91) received the Diplomate in Geotechnical Engineering from the Academy of Geo-Professionals of ASCE's Geo-Institute. He is employed with Ove Arup & Partners as an Associate Principal in the firm's New York office.

**David Pittman** (PhD 93) was recently named director of the Geotechnical and Structures Laboratory (GSL) at the U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, MS. ERDC research and development supports the Department of Defense and other agencies in military and civilian projects.

**Jeff West** (PhD 99) is one of four recipients of the 2015 Distinguished Teacher Award at the University of Waterloo. The award is given in recognition of a record of teaching excellence.

## 00's

**Ben Matthews** (MS 03), Senior Project Manager/Division Manager at Atkins, was named as one of the *ENR's* 'Top 20 Under 40'. He is a former officer who manages nationwide Air Force programs and is actively involved in the Society of American Military Engineers.

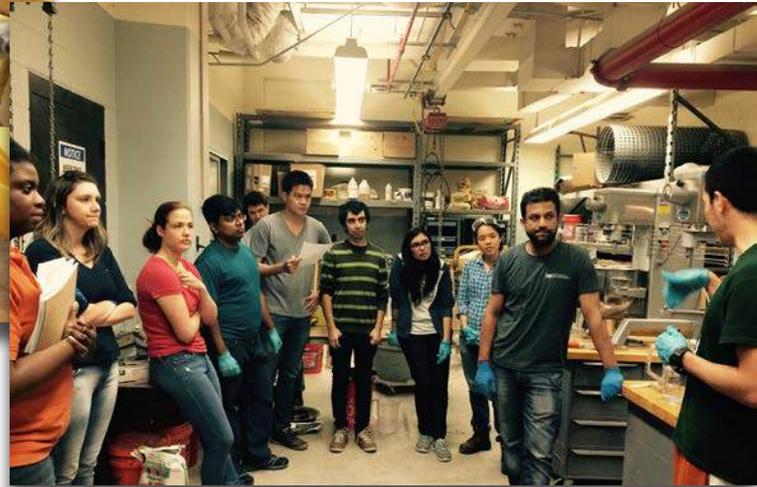
THE UNIVERSITY OF TEXAS AT AUSTIN  
301 E. Dean Keeton St., STOP C1700  
Austin, Texas 78712-1056  
512/471-4921  
Fax 512/471-0592  
caee@engr.utexas.edu  
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Student teams from Dr. Raissa Ferron's CE 397 course design self-consolidating concrete mix and fill into Longhorn forms as part of a classwide competition.

Hook 'em!



The University of Texas at Austin  
Civil, Architectural and Environmental Engineering  
Cockrell School of Engineering

For more on the Department of Civil, Architectural & Environmental Engineering, or for information on ways to get involved with UT CAEE, please contact Laura Klopfenstein at 512-471-1279, or by e-mail at: [klopfenstein@mail.utexas.edu](mailto:klopfenstein@mail.utexas.edu)

