

CEE

Department of Civil and Environmental Engineering
The Grainger College of Engineering
University of Illinois Urbana-Champaign
Summer 2023



Department updates
Alumni news and features



CEE ONLINE

Department of Civil and Environmental Engineering
The Grainger College of Engineering
University of Illinois Urbana-Champaign



**Excellence.
Flexibility.
Illinois.**

Earn your master's degree online from the nation's top-ranked CEE program

- Enjoy the flexibility and convenience of an online program
- Work with our top-ranked faculty
- Take the same classes as resident students
- View class recordings on your own schedule
- Complete homework, projects and exams per the class schedule
- Earn the same degree as awarded on campus

With CEE Online, you can earn a master of science degree from the nation's top-ranked online CEE program. Explore our Certificate program, or take a class as a non-degree student. All online students receive access to recorded on-campus lectures and follow the class syllabus, including the same assignments, exams and projects as on-campus students.

Watch course lectures around your busy lifestyle, and apply new principles immediately in your current job. Online students may take up to five years to complete the degree. Visit our website for complete details.

Contact Us

General program questions:
Email: ceeonline@illinois.edu
Phone: (217) 333-3921

Meg C. Griffin, P.E.
Assistant Director for Graduate Programs
mgriffn@illinois.edu

cee.illinois.edu/ceeonline



CEE

The CEE magazine is published twice a year for alumni and friends of the Department of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign.

Ana P. Barros, NAE
Donald Biggar Willett Chair of Engineering and Head

Celeste Bock
Senior Director of Advancement Operations
(217) 333-6955
celeste@illinois.edu

Steven Hall
Interim Associate Dean for Advancement
(217) 300-7830
stevhall@illinois.edu

Kristina Shidlauski
Associate Director of Communications

Keely K. Ashman
Assistant Director of Alumni and Corporate Relations

CEE Magazine
Department of Civil and Environmental Engineering
The Grainger College of Engineering
University of Illinois Urbana-Champaign
1201 Newmark Civil Engineering Laboratory
MC-250
205 North Mathews Avenue
Urbana, Illinois 61801

cee.illinois.edu



CEE

- 5 Plans, Accomplishments and Anticipation/Ana Barros
- 6 Our Incredible CEE Ecosystem/David Byrd
- 7 Upcoming CEE alumni events
- 8 Researchers propose new structure to harvest fresh water
- 9 Researchers turn abandoned oil well into geothermal battery
- 10 CEE professor honored by Girl Scouts
- 11 New transportation infrastructure research center established
- 12 Haiti's humanitarians: alumni put skills to work overseas
- 14 Faculty profile: Marcelo Garcia
- 20 New Chairs and Professorships
 - 20 Imad Al-Qadi
 - 22 Oscar Lopez-Pamies
 - 23 Youssef Hashash
 - 24 Erol Tutumluer
 - 25 Ximing Cai
- 27 Building for a competition and a cause
- 32 CEE geotech students compete in Geowall nationals
- 33 Construction Management students go to Panama
- 34 CEE student scholarships
- 36 Department News
- 38 ACI student chapter places third at nationals
- 40 Alumni news
- 42 In memoriam
- 43 Parting Shot: Knighted!



33



10



25



14

▶ Public transit systems offering broad coverage of stops and routes may still underserve the communities that rely on them the most, according to a new University of Illinois Urbana-Champaign study involving CEE alumni.



Fred Zwicky

Check out these and other stories at
▶ CEE.ILLINOIS.EDU/NEWS

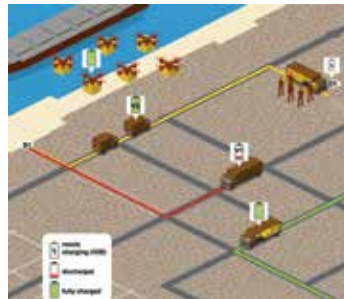


istockphoto.com/lvcandy



▶ Extreme wind events, including tornadoes, hurricanes and Derechos, account for more than 80% of all inflation-adjusted losses caused by natural and human-caused hazards in the U.S. The newly formed Extreme Wind Resilience Center works to mitigate the impact of these extreme wind events and build community resilience to the disasters they cause.

▶ Assistant Professor Eleftheria Kontou will lead research aimed at solving the complex energy supply problem with deployed vehicles in contested environments. This work will be funded by a grant from the Office of Naval Research.



▶ The University of Illinois Urbana-Champaign's Illinois Center for Transportation is one of nine organizations partnering on an effort to enhance and transform our transportation system.



CEEAA Board of Directors

President

David L. Byrd, P.E. (BS 01, MS 06)
Aggregate Construction Consultants
Skokie, Ill.

Vice President

Dana B. Mehlman, P.E. (BS 99, MS 01)
Vedder Price PC
Chicago

Second Vice President and Secretary

Daniel J. Whalen, P.E. (BS 84, MS 85)
Hanson Professional Services Inc.
Springfield, Ill.

Past President

Paula C. Pienton, P.E., S.E. (BS 85)
CN
Homewood, Ill.

Directors

Ama O. Addai, P.E., (BS 04)
Ardmore Roderick
Chicago

Jackie A. Becker, P.E. (BS 07)
Ameren Transmission
St. Louis, Mo.

Kimberly Cummins, P.E. (BS 98)
Cummins Engineering Corporation
Springfield, Ill.

Kevin C. Fuhr, P.E. (BS 96)
Hanson Professional Services
Chicago

Brian S. Heil, P.E., (BS 96, MS 97)
Oates Associates Inc.
Collinsville, Ill.

Matthew A. Johnson, P.E., S.E. (BS 04, MS 08)
Fehr Graham
Champaign

Kurt A. Keifer, P.E. (BS 97, MS 99, PhD 06)
IMS Infrastructure Management Services
Tempe, Ariz.

Justin R. Lewis, P.E. (BS 07, MS 08)
Keller North America
Chicago

Michael J. Mack, P.E. (BS 89)
Burns & McDonnell
Downer's Grove, Ill.

Andrew J. Martin, P.E. (BS 98)
Greeley and Hansen LLC
Chicago

Douglas S. Pelletier (BS 95)
Burns & McDonnell
Chicago

Katherine Pripusich-Sienkiewicz (BS 03, MS 13)
Amazon Web Services
Chicago

Robert Risser (BS 87, MS89)
Precast/Prestressed Concrete Institute
Chicago

Richard Sieracki (BS 74)
The Kenrich Group LLC
Chicago

Michael Vitale, P.E. (BS 82, MS 84)
Mott MacDonald
Cleveland, Ohio

Plans, Accomplishments and Anticipation

By ANA BARROS, NAE
DONALD BIGGAR WILLETTS CHAIR IN ENGINEERING
AND HEAD



Dear CEE Friends,

I hope all our Illini near and far are enjoying a wonderful summer! Here on campus, the quiet summer months will soon give way to the bustling enthusiasm of another new school year. This year, we have much to anticipate.

We are looking forward to closer and stronger connections with our colleagues in industry, thanks to a new corporate partners program currently in development that will make it easier for companies to connect with our world-class faculty and our talented students, as well as utilize the outstanding facilities and equipment that the department has to offer. We will be working to establish cooperative partnerships with industry that will allow us to stay on the leading edge of innovation in a two-way exchange of ideas between academia and engineering practice. Please watch our e-news and upcoming issues of the magazine for more details as this program develops.

In a related initiative, we are beginning to plan for renovations to Newmark Civil Engineering Laboratory (NCEL) to add more hands-on laboratories that will enable our students to benefit from these developing connections with industry. It has been 55 years since the first class was taught in NCEL. The foundations and the walls remain as strong as on that first day. The interior design and the water, energy and air quality infrastructure systems however are in critical need of a major renovation. They are old and inefficient, requiring constant and costly upkeep; maintaining indoor environmental quality to support the work of our staff,

faculty and students is a challenge. This is a great opportunity to re-envision NCEL as a student-centered smart building, itself both a classroom and a convening space to nurture the excitement of engineering innovation and teamwork. Our goal is to leverage our new partnerships with industry for the benefit of our students, bringing technological innovation into the classroom and making our facilities and the intellectual prowess of our world-class faculty available to support industry directly. We want our students to have a second-to-none education in computational and visualization skills, data science, robotics, new materials, and as users and potential developers of digital infrastructure systems from design to construction to operations. We are considering a whole reset of our experimental spaces to promote interdisciplinary research and to facilitate the infusion of the most advanced technologies into civil and environmental engineering research and practice.

Another exciting development is the official launch this fall of our bachelor's degree in environmental engineering (B.S.Env.) program. Current undergraduates may transfer into the program starting this fall, and new incoming students may apply to begin in fall 2024. Students will choose from among five primary concentrations that represent emerging areas of critical importance in the 21st century: Public Health Engineering, One Water, Energy and Environmental Sustainability, Climate and Environmental Sustainability, and Water Systems and Sustainability.

Our enrollment numbers are stronger

than ever. Our undergraduate student population has rebounded to pre-Covid levels; our current undergraduate enrollment is the highest it has been since 2017. This increase is due to large incoming first-year classes in 2022 and 2023 – likely the result of improved efforts to encourage admitted students to accept their offers of admission. During the past two years, we have increased communications with admitted students to make them aware of the many advantages of a degree from CEE at Illinois. This year our CEE Alumni Association Board of Directors assisted in this, along with several faculty members, making phone calls to prospective students to encourage them to accept their offers of admission. One of the many advantages of a CEE degree from Illinois is our vast and accomplished alumni network; the work of the Board this spring in encouraging and welcoming prospective students led to a very strong class of first-year students who will matriculate already having experienced the power of the CEE alumni connection.

Again this year, our number of women students has hit an all-time high. The percentage of women students in this incoming 2023 first-year undergraduate

Continued on the next page

To explore ways to give to the department, please contact:

Ana Barros, barros@illinois.edu
or Steve Hall, Interim Associate Dean for Advancement,
(217) 300-7830, stevhall@illinois.edu

Women students in this incoming 2023 first-year undergraduate class will be 42% – the largest ever in history!


Plans, Accomplishments and Anticipation

Continued from the previous page

class will be 42% – the largest ever in history! The incoming graduate student cohort includes approximately 45% female students, one of the highest ratios in our history. We are delighted to see that more and more women are accepting the challenge of serving society as civil and environmental engineers. The future looks bright!

On the graduate enrollment front, the number of graduate applications and admissions have substantially rebounded from a low in fall 2022, with admissions increasing this year by 22%. The number of incoming graduate students has remained nearly constant since fall 2017, excluding a low enrollment in fall 2020 (a 34% drop), with an incoming class of 197 students in fall 2023. International students make up about 67% of the incoming graduate cohort (fall 2023), with these students originating from 31 countries. The online CEE M.S. program, ranked #1 in the United States, continues to grow with the third largest incoming cohort (30 students) since the inception of the program in fall 2011.

I am delighted to bring you such good news from your home department at Illinois. I have a deep sense of gratitude and excitement for the privilege to serve as department head during this time of great change and so much promise for both the future of CEE at Illinois and the civil and environmental engineering profession.

Go Illini! 

Our Incredible CEE Ecosystem



“If everyone is moving forward together, then success takes care of itself.”

—Henry Ford

By DAVID BYRD (BS 01, MS 06)
PRESIDENT, CEE ALUMNI ASSOCIATION BOARD OF DIRECTORS

I have served as President of our CEE-AA for almost a year, which has been an incredible experience so far! I am the type of person who usually spends 90% of my time focusing on accomplishing the goals that are ahead of me, rather than looking backwards in retrospect, apart from learning from past failures (that last 10%). My message to you this summer bucks this trend, as my experience so far has allowed me to be further immersed in our incredible CEE Ecosystem here at Illinois. By ecosystem, I mean the full reach of CEE at UIUC involving our students, faculty and staff of our department, alumni and the firms we work within throughout the many industries civil and environmental engineering encompasses. It is important for me to highlight here the passion for Illinois that flows throughout this ecosystem by example of the great work our Alumni Board is doing to serve you.

Our annual Alumni Awards Dinner on March 2 in Chicago was once again a great success with over 200 attendees that showed up to network and show support for our awardees. Congratulations again to Mary Lou Kutska, Jack E. Davis, Navneet Garg, and Lt. General Scott A. Spellmon! This dinner (and the rest of the CEEAA) is funded solely through sponsorships from

our alumni, either through their firms or personally. We had 42 sponsors this year – 42! I am personally humbled by the outpouring of support from our alumni and thank Kevin Fuhr and the Alumni Interaction Committee for the hard work they put into the event. To top the evening off post dinner, we packed ourselves into the Union League Club’s bar to watch the Illini basketball team beat Michigan in 2OT!

The Board has built upon our current activities and actively expanded our outreach in many ways. Justin Lewis and the Student Support Committee have created a new Spring Break Shadow program that seeks to match firms that want to offer a one- to five-day “in the life of” experience with current students. We had six firms participate in our first year, offering up a total of 36 slots for students to visit a firm over their spring break. I expect this program to flourish in the coming years as more companies discover and become familiar with it.

The Board continues to strengthen our ties directly with the CEE Department. As May 1 approached this year, a.k.a. “Decision Day” for high school seniors committing to a university, we partnered with John Popovics, Associate Head and Director of Undergraduate Studies, and other

For more information
about the
**CEE Alumni Association
Spring Break Shadow
Program**

please contact
Justin Lewis, chair of the Student
Support Committee,
JRLewis@keller-na.com

department faculty to reach out to over 200 uncommitted seniors to ensure they understood how life-changing coming to CEE at Illinois would be for them. As a Board, we are proud to know the department will welcome 181 new freshman next fall, including 25 last-minute committals! Matt Johnson, Doug Pelletier and the Alumni Faculty Committee will be hosting a reception with the department faculty at our fall board meeting to discuss how the CEEAA Board can further partner with them in their work.

On May 11 we had our first alumni event in St. Louis, a beer tasting at 4 Hands Brewing. This was our first alumni event outside of the Chicagoland area, and we had a great turnout this first year. We will continue to have events in St. Louis and look to continue to expand our geographical reach. We have our annual CEEAA golf outing at Ruffled Feathers Golf Club coming up on July 20. Please join us! Make a foursome with CEE alumni at work and get out for a day of fun. And lastly, we hope to see you at our annual CEE alumni tailgate that takes place on the evening of Friday, October 6, in Lot 31. Getting to Champaign to tailgate and watch the Illini beat Nebraska under the lights will be an epic way to start off a fall weekend.... ILL! **I**



2023 ALUMNI EVENTS

JULY 2023

Golf Outing
July 20, 2023
Ruffled Feathers | Lemont, Illinois

OCTOBER 2023

CEE Tailgate (Game against Nebraska)
Oct. 7, 2023
Memorial Stadium, Lot 31
Champaign

MARCH 2024

CEE Alumni Awards Dinner
Date TBA
Union League Club, Chicago

Keep up-to-date on alumni events and find links to register
on our website:

cee.illinois.edu/events



Researchers propose new structures to harvest untapped source of freshwater

BY LOIS YOKSOULIAN

An almost limitless supply of fresh water exists in the form of water vapor above Earth's oceans, yet it remains untapped, researchers said. A new study is the first to suggest an investment in new infrastructure capable of harvesting oceanic water vapor as a solution to limited supplies of fresh water in the world.

The study, led by civil and environmental engineering professor and Prairie Research Institute executive director Praveen Kumar, evaluated 14 water-stressed locations across the globe for the feasibility of a hypothetical structure capable of capturing water vapor from above the ocean and condensing it into fresh water – and do so in a manner that will remain feasible in the face of continued climate change.

Kumar, graduate student Afeefa Rahman and CEE alumna Francina Dominguez



The researchers' proposed approach for capturing moisture above ocean surfaces and transporting it to land for condensation. Graphic courtesy of Praveen Kumar and Nature Scientific Reports.

quez (MS 03, PhD 07), a professor in UIUC's Department of Atmospheric Sciences, published their findings in the journal *Nature Scientific Reports*.

"Water scarcity is a global problem and hits close to home here in the U.S. regarding the sinking water levels in the Colorado River basin, which affects the whole Western U.S.," said Kumar, Director of UIUC's Prairie Research Institute. "However, in subtropical regions, like the Western U.S., nearby oceans are continuously evaporating water because there is enough solar radiation due to the very little cloud coverage throughout the year."

Previous wastewater recycling, cloud seeding and desalination techniques have met only limited success, the researchers said. Though deployed in some areas across the globe, desalination plants face sustainability issues because of the brine and heavy metal-laden wastewater produced – so much so that California has recently rejected measures to add new desalination plants.

"Eventually, we will need to find a way

to increase the supply of fresh water as conservation and recycled water from existing sources, albeit essential, will not be sufficient to meet human needs. We think our newly proposed method can do that at large scales," Kumar said.

The researchers performed atmospheric and economic analyses of the placement of hypothetical offshore structures 210 meters in width and 100 meters in height.

The researchers concluded that capturing moisture over ocean surfaces is feasible for many water-stressed regions worldwide. The estimated water yield of the proposed structures could provide fresh water for large population centers in the subtropics.

One of the more robust projections of climate change is that dry regions will get drier, and wet areas will get wetter.

"The current regions experiencing water scarcity will likely be even drier in the future, exacerbating the problem," Dominguez said. "And unfortunately, people continue moving to water-limited



Top photo, Praveen Kumar, left, and Afeefa Rahman. Bottom photo, Francina Dominguez.

Researchers turn abandoned oil well into geothermal battery

By LOIS YOKSOULIAN

CEE researchers have successfully demonstrated efficient geothermal heat storage while simultaneously repurposing an abandoned oil and gas well.

A new study, led by CEE Assistant Professor Tugce Baser, is the first field investigation of a geothermal energy storage system within the Illinois Basin – a geologic structure located deep within the subsurface. The findings are published in the journal *Renewable Energy*.

The Illinois Basin is a low-temperature basin, Baser said, meaning it does not naturally produce geothermal energy to generate electricity. Still, the formations in deeper subsurface have the thermal and hydraulic properties needed to establish an artificial geothermal reservoir.

“Many of the same properties that make a subsurface rock formation ideal for oil and gas extraction also make it ideal for geothermal storage,” Baser said. “And because our test site is a former gas well, it already has most of the needed infrastructure in place.”

The basin contains spongelike rock units with open pore space and minerals with optimum thermal conductivity sandwiched between insulating layers – providing the space and insulation needed to establish an artificial heat reservoir capable of retaining fluids hot enough to generate electricity, she said.

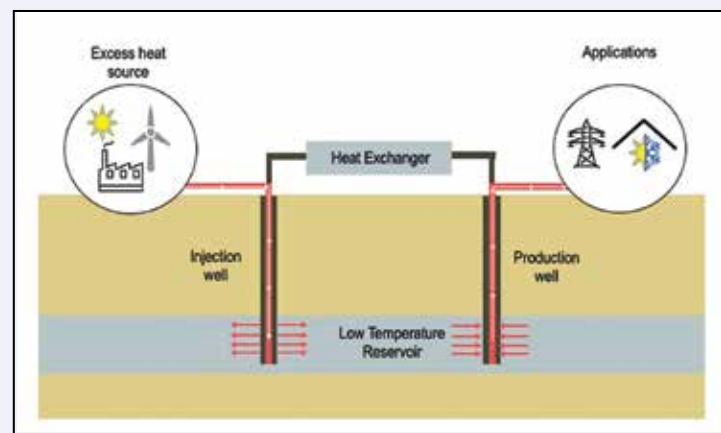
Using data from previous field observations and preliminary numerical modeling studies, the team chose to inject preheated fluid into the Cypress Sandstone, a porous rock unit located about 900 meters under the test site surface.

To test the heat storage capacity of the site, the researchers injected water heated to 50 degrees Celsius into the well for three days of injection in April 2021.

After shutting down the well, the team monitored changes in pressure, thermal conditions and hydraulics for five days.

“Our field results, combined with further numerical modeling, find that the process can sustain a thermal storage efficiency of 82%,” Baser said.

The study further reports an average overall net cost of electricity generation of \$0.138 per kilowatt-hour, making the



A conceptual schematic of the type of advanced geothermal energy storage system demonstrated in this study. Graphic courtesy of Tugce Baser and Renewable Energy

proposed system economically viable and profitable.

“Our findings show that the Illinois Basin can be an effective means to store excess heat energy from industrial sources and eventually more sustainable sources like wind and solar,” Baser said. “The underground reservoir essentially acts as a large underground battery while repurposing abandoned oil and gas wells. It is a win-win situation.”

Researchers from the Illinois State Geological Survey and the Projeo Corporation also contributed to this research. The U.S. Department of Energy supported this study.

The paper “Advanced geothermal energy storage systems by repurposing existing oil and gas wells: A full-scale experimental and numerical investigation” is available online. **I**

areas, like the Southwestern U.S.”

This projection of increasingly arid conditions favors the new ocean vapor-harvesting technology.

“The climate projections show that the oceanic vapor flux will only increase over time, providing even more fresh water supply,” Rahman said. “So, the idea we are proposing will be feasible under climate change. This provides a much-needed and effective approach for adaptation to climate change, particularly to vulnerable populations living in arid and semi-arid regions of the world.”

The researchers said one of the more elegant features of this proposed solution is that it works like the natural water cycle.

“The difference is that we can guide where the evaporated water from the ocean goes,” Dominguez said. “When Praveen approached me with this idea, we both wondered why nobody had thought about it before because it seemed like such an obvious solution. But it hasn’t been done before, and I think it is because researchers are so focused on land-based solutions – but our study shows other options do, in fact, exist.”

The researchers said this study opens the door for novel infrastructure investments that can effectively address the increasing global scarcity of fresh water.

The University of Illinois Urbana-Champaign, the Lovell Professorship in the Department of Civil and Environmental Engineering, the University Scholar Program and the National Science Foundation supported this research. **I**



Girl Power

Local Girl Scouts visit Abbott Power Plant

On a recent Saturday morning, 30 Girl Scouts and their families visited UIUC's Abbott Power Plant to learn about utility systems. The event, called Girl Power, was led by CEE Associate Professor Ashlynn Stillwell. The day started off with a video overview of the plant followed by a tour of the facilities, a series of hands-on demonstrations and games, and the chance to learn about and play on Facilities & Services' heavy equipment. Each girl received a special green hard hat to wear during the event and to keep.

The hands-on demonstrations, which were designed to help the girls understand some of the concepts at work in power generation, were one of the highlights of the day. Several graduate students were on hand to run the demos, which included a sine wave signal generator; a stationary bike that powered light bulbs; and a coin toss game that demonstrated the amount of water and energy required to run common household appliances. Stillwell said that pedaling the stationary bike to turn on light bulbs was particularly popular with the girls.

The event was funded by Stillwell's National Science Foundation CAREER grant, which includes education through Girl Scouts to enable citizen science and



Ashlynn Stillwell helps a Girl Scout put on her hard hat before the tour begins.

increase inclusivity by decreasing stereotypes against women in STEM.

"I hope they learned that girls have a place in STEM fields and energy is a great area to work in," Stillwell said. **I**

The following students helped with the demos: Jenni Nugent, Zahra Heydari and Laura Gray from CEE; Rachel Gaines and Richa Ghosh from Chemical and Biomolecular Engineering (ChBE); Lauren Harris from Chemistry; Raghu Gaddam from Materials Science and Engineering; and Aria Delmar, Arjit Bali and Nicole Stokowski from Electrical and Computer Engineering. ChBE professor Paul Kenis also helped make the demos possible.



Mike Larson, head of Abbott utility operations, leads the Girl Scouts on a tour of the power plant.



Stillwell receives special honor from Girl Scouts

Associate Professor Ashlynn Stillwell has been recognized with the Thanks Badge, one of the highest awards for adults in Girl Scouts. The Thanks Badge honors "a registered adult Girl Scout whose ongoing commitment, leadership and service have had an exceptional, measurable impact on meeting the mission-delivery goals and priorities of the entire council or the entire Girl Scout Movement."

Stillwell was presented with the badge during her last meeting as Past Chair of the Board of Directors for Girl Scouts of Central Illinois. The meeting marked the end of eight years of service on the Board, including as Board Chair (2020-2022).

Stillwell has been a Girl Scout since she was a child and remained active in the organization throughout high school, college and as an adult. She said that when she was younger, being in the Girl Scouts taught her to overcome her fear of public speaking in a safe environment. As an adult she wanted to give back to the organization that has taught her so much.

"I was honestly surprised to receive the Thanks Badge," Stillwell said. "I'm incredibly honored. I'm so grateful to the Girl Scout movement for all that I've learned along the way, including as an adult navigating nonprofit governance." **I**

Precast concrete systems technology the focus of new transportation infrastructure research center



istockphoto.com/Supannee_Hickman

Advancing the technologies used in precast concrete systems will be the focus of a new research center led by CEE Professor Bassem Andrawes. The goal will be to improve the durability and extend the life of transportation infrastructure. A \$2 million grant from the U.S. Department of Transportation will establish this University Transportation Center. The Transportation Infrastructure Precast Innovation Center (TRANS-IPIC) will be a consortium of five universities, including Purdue University, Louisiana State University, SUNY University at Buffalo and the University of Texas San Antonio.

“Deterioration of transportation infrastructure is a pressing national problem,” Andrawes said. “We cannot address this critical problem without adopting transformative technologies that are specifically tailored for transportation infrastructure systems. Many of the emerging technologies such as nano and high-performance materials, robotics and automated manufacturing sound exciting theoretically, but are faced with major practical challenges that hinder or prevent their application.”

A major reason for this, he said, is the difficulty and high cost of incorporating these very delicate technologies into the construction site using conventional construction techniques. Providing a well-controlled manufacturing environment would significantly increase the feasibility of incorporating these new technologies in the delivery, maintenance and management of transportation infrastructure.

Precast concrete (PC) is, by definition, manufactured in a controlled environment, so the path for introducing and

implementing new technologies that can drastically and swiftly impact the durability and service life of infrastructure is much more feasible and straightforward using PC.

“A quite large sector of our transportation infrastructure is built or repaired using PC – for example, bridges, tunnels, railroads, pavement and ports – so deploying new PC technologies will impact the durability of multiple modes of transportation,” Andrawes said.

The new center will focus on the following three key research topic areas: Application of New Materials and Technologies, Construction Methodologies and Management, and Condition Monitoring and Remote Sensing.

TRANS-IPIC’s mission is to leverage research innovation and strong industry support to foster research and education that focus on utilizing PC and its related technologies as an economic approach to provide a quick boost for the durability, safety and climate-adaptability of various modes of transportation networks in the U.S. through infrastructure repair or reconstruction. The consortium will address various aspects of PC technologies including materials, design, modeling, manufacturing, quality control, installation, operations and condition assessment.

The research that will be carried out through the center will focus on a broad range of innovative topics pertinent to the advancement of the durability, resilience and economics of PC transportation infrastructure. TRANS-IPIC researchers will study the use of PC-related solutions that are based on innovative and



Bassem Andrawes

smart materials – for example, smart composites and metals – and novel emerging manufacturing methods that involve robotics and automated manufacturing – for example, 3D printing, Unmanned Aerial Vehicles and Building Information Modeling – guided by big data analytics and Artificial Intelligence.

The center will also provide long-term solutions by replacing our existing infrastructure with more durable components that are built in a controlled environment with advanced durable materials – for example, ultra-high performance concrete, fiber reinforced concrete and fiber reinforced polymers – and built more efficiently to reduce cost and carbon emissions and increase quality and productivity using advanced design optimization techniques like topology optimization, innovative manufacturing methods, quality control technologies and industrial operating processes.

The center will also work on developing a new generation of intelligent transportation infrastructure that has an innovative built-in capability of self-condition assessment using smart materials and remote sensing. **I**

Haiti's Humanitarians

Alumni bring civil engineering, education and self-reliance to the people of Port-au-Prince

BY JAY COPP, UNIVERSITY OF ILLINOIS ALUMNI ASSOCIATION

At Bob O'Brien's retirement party from Western Rock Products in 2004, a colleague gave him a mason's trowel and a hammer. "You'll need these," he cracked. The civil engineer didn't realize the prescience of his friend's parting gift.

The very next day, Robert O'Brien (BS 68) made his first trip to Haiti as a church-based volunteer. Since then, he has visited nearly 60 times to direct construction of schools, health clinics and churches – about 90 projects altogether. His partner in charitable work is his wife, Flo Anne (Fuller) O'Brien (BS 67, Education) who has shepherded progressive teaching methods in the city of Port-au-Prince.

The O'Briens, who met at Illinois and married the day after Bob graduated, volunteer through Haiti Outreach Ministries, which represents a range of Christian denominations. The organization operates five campuses in Port-au-Prince with education and religious facilities.

And although the couple has donated countless hours to the ministries' work, they say they receive much more than they give.

"The people are very friendly," Flo Anne says. "The children want to hold your hand. They want to be right beside you. They can't get enough of you."

The couple's involvement dramatically escalated after January 12, 2010, when a deadly earthquake devastated the city.

"That changed my life," Bob says. He led an intensive rebuilding effort, helping to implement earthquake-resistant standards in new structures. "It took me back



Bob and Flo Anne O'Brien

to my early days and a course on concrete at Illinois," he says.

Over the many years they have been volunteering in Port-au-Prince, the couple is gratified to witness the strides that Haitians have made. Students who once had little or no access to books and other learning materials now do very well on rigorous national exams. Because the spiraling violence in Haiti has made it problematic for the O'Briens to go there now,

Bob continues to manage projects over the phone from the couple's home in St. Augustine, Fla. Nevertheless, the O'Briens are glad to know their service has fostered Haitians' self-reliance.

"Bob worked with them so well and for so long that they can [now] do things on their own," Flo Anne says.

"They teach us a lot," says Bob. "They don't have anything. But they are very religious and feel that they are blessed." **I**



Above, more than 350,000 people perished in a 7.0 earthquake in January 2010. Most deaths were due to shoddy construction, Bob writes.



At right, in Bob's words: "Our first large project in 2010 after the quake, the medical/dental clinic at Citi Soleil campus. The second floor contains a vocational school. The clean water treatment room is on the far left. All the water rooms in our campus serve the community as well as the school and church."



"We build all our buildings using the International Building Code with seismic design criteria," Bob writes. "Mix design is two buckets sand, three buckets gravel, one bucket cement, one-half bucket water to achieve 3,500 psi concrete. We do all concrete pouring using local labor rather than ready mix and concrete pumps. This way each man gets a day wage, even though it's \$10 U.S. plus lunch. Trust me there is a plan for each man. We're using three small concrete mixers and 150 men for this pour."

"In 2013 we started the Secondary School construction at Barye Fe," Bob writes. "These are three-story buildings. These buildings were our most complicated buildings. Note our Haitian construction crew."

THIS ARTICLE ORIGINALLY APPEARED IN ILLINOIS ALUMNI.

Faculty focus:

Marcelo Garcia

From Argentina to Illinois, Marcelo Garcia's journey has led him to become one of the world's foremost experts in water resources engineering and science

Marcelo Garcia was seven years old when he first noticed the power of hydraulic engineering. His family was on vacation in their home country of Argentina, staying in a small house next to a creek. Another family was vacationing nearby, and the children would all play together. To their delight, the grandfather from the neighboring family used stones to build a dam and collect the creek water into a small pool in which the children could play.

"That had an impact on me," Garcia says. "It surprised me that someone could do something so simple like that and create a pool."

Today, Garcia is one of the world's foremost experts in water resources engineering and science. He is the M.T. Geoffrey Yeh Endowed Chair of Civil Engineering and serves as Director of the Ven Te Chow Hydrosystems Laboratory at Illinois. You could say he literally wrote the book on sedimentation engineering, having served as Editor-in-Chief of the Manual of Engineering Practice 110 on the topic, published by the American Society of Civil Engineers. His expertise is sought around the world; in April 2023 he participated in a consulting trip to Ghana, Africa, where he served on a team inspecting the Akosombo and Kpong Dams for the Volta River Authority. Closer to home, his work has helped to vastly improve water management systems in Champaign and Chicago; his contributions to the massive Chicago Tunnel and Reservoir Plan have significantly alleviated the city's problem



Garcia with a model of the Chicago River, which he and his research team built as part of their work with the Metropolitan Water Reclamation District of Greater Chicago.

with flooding and pollution due to overflows of its combined sewer system during heavy storms.

Fittingly, he says that as a child, "I spent a lot of time in the river."

Born in Cordoba, Argentina, in 1959, Garcia grew up comfortable in and around water. His father's career in the auto industry moved the family to Cordoba, Buenos Aires and finally Santa Fe, where Garcia spent many of his formative years. He grew up swimming and canoeing in the waterways around the city. He belonged to a rowing club along the Santa Fe River, where he played volleyball

and water polo. He would go on to excel at volleyball, playing for his high school, his university, and the state and national teams. He was a member of the Argentinian volleyball team when they won the South American Games championship in Santa Cruz de la Sierra, Bolivia, in 1978.

As Garcia finished high school in Santa Fe in 1976, he visited the local university, Universidad Nacional del Litoral. One of the careers they presented was that of Water Resources Engineering, an emerging field at the time. A demonstration of the sort of work done by water resources engineers was held outside in the same

lagoon where the rowing club was located. Garcia didn't know it at the time, but the program was a unique one; it was the only existing undergraduate degree program dedicated to Water Resources Engineering. The program had been created by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to establish a school of hydrology and water resources in Latin America during what UNESCO had designated the International Hydrologic Decade. Furthermore, the person behind this initiative was Professor Ven Te Chow, the world-famous hydrologist who had established the renowned Hydrosystems Laboratory at the University of Illinois Urbana-Champaign. It was the first of a number of coincidences that connected Garcia to the University of Illinois years before he ultimately made his academic home there. At the time, the thing that appealed to Garcia the most was the promise of being able to work outside, in and around water.

Garcia enrolled and began his undergraduate studies, also playing on the university's volleyball team. In time though, the auto industry began suffering in Argentina's tumultuous political and economic climate, and his father lost his job. To help his family and continue his studies, Garcia needed to make some money. One of his professors suggested he apply to work for the national water and power company of Argentina, which was pursuing a large dam project on the Parana River near Santa Fe, aided by about 50 technical experts from the Hydroproject Institute in the Soviet Union. Garcia knew technical drafting, which he had learned from his father, and he was good at math, so he tested into a technical assistant position on the project – in an office downtown, far from campus. It was a challenging period, in which Garcia had to punch in at 7 a.m. for an eight-hour day at work and attend class afterwards, keeping up

his grades and participating on the volleyball team. The schedule was punishing, but the job was lucrative; one of his benefits included a credit of electricity and natural gas to his parents' home. In addition, he was gaining valuable professional experience, working alongside some of his professors, who also were employed on the project.

One of those professors eventually offered him a job on the same water resources project but located in a lab on campus – a hydraulic lab led by one of the Russian scientists: Gertrud F. Onipchenko. The location made for a much easier work/school balance for Garcia. The professional opportunity and mentorship were so profound that Garcia still keeps Onipchenko's business card under glass on his desk.

"Dr. Onipchenko kind of adopted me," Garcia says. "Working with him was special. He saw something in me, and I was able to work on things at that age that most people don't get to work on."

Garcia was put in charge of a study of the erosion of clays from the Parana River and helped to build a highly detailed physical model of the dam project that filled the lab.

"It was a unique experience," Garcia says. "At the age of 20, I was in a hydraulics lab."

"One day during an experiment, Dr. Onipchenko looked into one of his books for a discharge coefficient needed to estimate the flow discharge," Garcia says. "I could recognize one of the figures, and when I asked him about it, he told me that the book was the Russian translation of *Open Channel Hydraulics*, published by Ven Te Chow in 1959 – the year I was born."

He worked in that position from 1979-1983, when he left for the United States to attend graduate school. As Garcia applied to grad schools, the University of Minnesota emerged as an attractive option for



Garcia with his parents during his childhood in Argentina.



Garcia at the 1978 South American Games championship in Bolivia.



Garcia with his wife, Estela Canga, at the University of Minnesota.



Garcia with Dr. Gertrud F. Onipchenko, in whose lab he worked during his undergraduate years.

"It was a unique experience. At the age of 20, I was in a hydraulics lab."

"Since I did not have the means to go back to Argentina to get married, we decided to get married by proxy in a civil court," Garcia says. "They had a whole wedding – our families and friends came, but I wasn't there."

Estela arrived in Minnesota in August 1984, and the two have been together ever since. Today they have two grown children, Emma Garcia-Canga and Blas Garcia-Canga.

During his time in graduate school, Garcia noticed the work of Gary Parker, then an associate professor at Minnesota and now Professor Emeritus of CEE at Illinois. He approached Parker and asked to join his research team. He ended up becoming Parker's teaching assistant for a fluid mechanics course and was assigned to work on what he saw then as an esoteric topic: self-accelerating density currents. When Garcia balked, Parker was direct, he says.

"He told me, 'Whatever it is you wanted to do, we probably did it a long time ago,'" Garcia says.

The topic was unusual, but it allowed Garcia to dive into sediment transport – which he previously had studied in relation to rivers – as well as turbulence, examining the effect of sediments on the structure of the flow. The necessary experiments had never been done before.

"These were very delicate experiments that took a long time to prepare," Garcia says. "It opened a whole new universe to me. As time went by, it became apparent that I was doing something that was at the forefront."

A project at the Scripps Institution of Oceanography near San Diego took his work from the lab to the ocean floor. Researchers were exploring the possibility that storms could cause avalanches of sand deep under the ocean that would self-accelerate, just as an avalanche of snow gets larger and faster as it grows. The project prototype was at Scripps,

a few reasons. He had read about the renowned St. Anthony Falls Hydraulics Laboratory there. In addition, they were able to give him financial aid in the form of a research assistantship. He sold his car and came to the U.S. with \$1,300 cash. But the financial aid did not include a tuition waiver, and Garcia soon found graduate school life far more expensive than he had anticipated.

"I went broke," he says. "I was just too naïve. I got there and didn't have an apartment, didn't have anything. I had not done the math."

He found an efficiency apartment, but the rent was steep on a graduate assistant's pay. Living without his parents for the first time was also a struggle. He was always setting off his smoke alarm just trying to prepare food. The cold climate was a shock; adding to his financial difficulties, he had to buy a winter coat. He was so poor that when the department's Christmas potluck came around, a secretary told him not to worry about preparing a dish; she suggested he just bring a jar of pickles. But even that proved too expensive, and Garcia had to arrive empty-handed. To this day, his former classmates still tease him about the missing pickles.

Relief came in the form of an open room at Nu Sigma Nu, a co-ed medical student fraternity located along the Mis-

issippi River. The agreement included room and board for just \$160 a month.

"That saved me," he says.

A cook named Kay Olson – Garcia still recalls her name – prepared the students' food, including a sack lunch to take to school every day.

"I was the only person who celebrated her food," Garcia says. "The only thing she would make that I couldn't eat was a peanut butter and jelly sandwich. I hadn't grown up with it."

Olson kindly made him an alternative sandwich.

The living arrangement gave Garcia more than just financial relief; it offered him a community and a cultural education. The group ate communal meals, watched MASH and basketball games on TV, played broomball and went to the movies.

Garcia had begun dating another student during his undergraduate years who was a year behind him in the Water Resources Engineering program at Universidad Nacional del Litoral, Estela Canga. In fall of 1983 when Garcia went to Minnesota to begin his graduate studies, Estela stayed behind to finish her undergraduate degree. The following year, she wanted to join Garcia in the U.S. but in order for her to get a visa, the couple had to be married.

where there are very active submarine canyons offshore. It was a phenomenon that could not be easily reproduced in the lab, but the vast submarine canyons allowed this experimentation.

"I was in civil engineering doing hydraulics and fluid mechanics, but I went into this area that had a lot more things – hydraulic engineering, fluid mechanics but also oceanography, geology, geomorphology," Garcia says.

A lucky break came when the CNN Science and Technology show sent a crew from Atlanta, Ga., to film Garcia's turbidity current experiment. This gave Garcia the idea of trying to publish a paper about the work. Parker agreed, and their paper, "Experiments on Hydraulic Jumps in Turbidity Currents Near a Canyon-Fan Transition" was published in the July 28, 1989, issue of *Science*. The publication came at a fortuitous time, just as Garcia was finishing his Ph.D. and interviewing for academic positions.

When Garcia joined the civil engineering faculty at Illinois in 1990, it had been nearly 10 years since the death of Ven Te Chow, the hydrologist who had achieved international notoriety for the water resources program at UIUC. The Hydrosystems Laboratory, which Chow had helped secure through a grant from the National Science Foundation in 1967, was being used for soil mechanics experiments, which were housed in a pyramid structure in the lab. There were only four faculty in the hydrosystems area at the time.

"I knew that the lab had a lot of potential, but I also knew that I was really going to have to apply myself, because the lab had not been active in a while," Garcia said. "There wasn't much hydraulics going on."

With supportive mentoring from the other Illinois hydro faculty, including Ben Chie Yen, Hall Maxwell, Joe Murtha and Al Valocchi, Garcia began building his research program – and with it, the lab fa-



Garcia with Gary Parker at Garcia's 2014 investiture as the Geoffrey M.T. Yeh Endowed Chair in Civil Engineering. Parker was Garcia's Ph.D. adviser at the University of Minnesota.



Garcia stands in one of the massive tunnels that was constructed as part of the Chicago Tunnel and Reservoir Plan.

cilities.

"Funding has always been challenging," he says. "My strategy was to be willing to do whatever project it took to get the lab going. What that meant was to try to do work not just for federal agencies like the National Science Foundation or the Office of Naval Research that tend to give you one project at a time; I also tried to make inroads with state agencies. At the time the Office of Water Resources was under the Illinois Department of

Transportation, and they had some funding."

There was a need to find a solution to the public safety problem of drowning accidents at low-head dams, and Garcia's experience with physical modeling made him a good candidate to lead the initiative. One of the first of these projects was to drown-proof the Glen Palmer Dam on the Fox River in Yorkville, Ill., which had been the site of more than 20 drowning accidents in as many years. To address these problems, Garcia began building physical models that helped him assess the problem and create a solution. Garcia's solution in Yorkville was to modify the shape of the spillway into four steps to dissipate the energy of the water and prevent the formation of the "roller" causing the accidental drownings. Since it was built, there have been no drowning accidents at the dam. For another dam redesign at Wichita, Kan., researchers also included a canoe chute and fish passage to help canoeists safely bypass the dam and allow fish to migrate. As his models began taking up increasing space in the lab, they eventually surrounded the soil mechanics "pyramid."

"It was like the siege of Troy," Garcia says. The soil mechanics research was given a new home, and the Hydrosystems Lab once again became fully dedicated to hydraulic engineering. That year, 1997, they also named the hydrosystems lab after Ven Te Chow.

In the years that followed, Garcia continued to seek out projects that would allow expansion of the lab facilities. The equipment he acquired – like a one-of-a-kind oscillatory flow tunnel and a Kinoshita Meandering Flume – make the Ven Te Chow lab uniquely outfitted to conduct physical experiments that add a critical element to research projects.

"A numerical model gives you some approximation of what is going to happen, but doing physical experiments is



Garcia and Estela in December 2022 at his induction into the American Geophysical Union.

“All this discussion going on about using artificial intelligence – well, you can't use artificial intelligence to recreate an experiment, to recreate real physics.”

paramount,” Garcia says. “All this discussion going on about using artificial intelligence – well, you can't use artificial intelligence to recreate an experiment, to recreate real physics.”

Additionally, Garcia's research program has supported waves of student researchers – more than 40 Ph.D. students and more than 60 M.S. students.

“The work was excellent, and we got excellent students,” he says. “I couldn't have done everything I did without these outstanding students.”

Another significant project beginning in 1994 was a 10-year flood control and water management project on Boneyard Creek, the drainage stream that flows through the UIUC campus. The creek had been a flooding and water quality problem for more than 100 years. The project to improve it was led by local, alumni-owned engineering firm Berns, Clancy and Associates. As part of the project, Garcia constructed physical models of two of the key areas along the channel – Wright Street and Lincoln Avenue. The models served to test, calibrate and improve the mathematical modeling of the proposed hydraulic design and gave the public a chance to see physical representations of how the project would alleviate flood event impacts. Garcia still uses Boneyard Creek as a flood control class project in his hydraulic engineering course.

Despite success downstate in Illinois, Garcia found it difficult to find projects in Chicago. An opportunity came when scientists from the U.S. Geological Survey

identified a strange phenomenon in the Chicago River in January 1998; a bidirectional flow that Chicago engineers were struggling to explain. At the surface, the river was flowing west as expected, but down near the riverbed, water was traveling in the opposite direction, east toward Lake Michigan. The flow was troubling from a water quality standpoint, because it meant water from one of the area's largest wastewater treatment plants could be contaminating the river or even making its way out to Lake Michigan. The odd flow was seen in subsequent years as well, but only in the winter months.

Garcia suspected a density current, the somewhat obscure subject of his Ph.D. work at the University of Minnesota. He theorized that some of the denser water from the Chicago River's North Branch was plunging below the surface and creating a “river under the river.” But Chicago engineers had other theories, including currents caused by wind blowing along the water surface.

“It took me a lot of time to convince them that it was worthwhile to look deeper into it,” Garcia says. “Walking along the Chicago River walk with my children during Saint Patrick's Day when the river is dyed green, gave me the idea that we could do the same in the laboratory to demonstrate the development of density currents. It was a Eureka moment,” he added.

In 2001, thanks in part to support from Illinois CEE alumnus Richard Lanyon (BS 60, MS 61) at the Metropolitan Water Reclamation District of Greater Chicago (MWRD), Garcia and his research team got a chance to test the theory. With funding from the MWRD and data from the U.S. Geological Survey, Garcia and then-grad student Fabian Bombardelli (PhD 04) built a 3D numerical model of the Chicago River system. It was one of the first applications of Computational Fluid Dynamics (CFD) at such a large scale. The

resulting simulations proved the likelihood that density currents were causing the bi-directional flow first observed by scientists from the U.S. Geological Survey. To further validate their work, Garcia and his team constructed a fiberglass physical model of the Chicago River in the Hydro-systems Lab. In subsequent years, they have learned that the cause of the denser water was salt runoff from the winter roadways and have worked to explore ways to prevent such currents.

Once the MWRD had seen what Garcia and his research team could do, Chicago opened up. The city's 40-year, \$4 billion Tunnel and Reservoir Plan (TARP) provided more opportunities for UIUC hydrosystems researchers. TARP was a joint project of the MWRD, the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers with the goal of alleviating flooding in Chicago and pollution in its waterways. The project called for the construction of 109 miles of massive tunnels and huge reservoirs to store the overflow from the city's combined sewer systems until the wastewater plants could handle it. CEE researchers helped optimize the design and operation of the system through computer modeling.

The team developed MetroFlow, which provided a hydrologic/hydraulic modeling framework for the city and surrounding areas. MetroFlow was used to analyze the performance of the Main Stem and Des Plaines Deep Tunnels and the McCook Reservoir. Hydrologic Models were also implemented for the Calumet TARP system. The group also developed the Illinois Urban Hydrology Model (IUHM), which uses a probabilistic approach when there is not enough physical information about the system. As part of the effort, the team developed the Illinois Transient Model (ITM) to analyze the rainfall conditions which can lead to surcharging of the tunnels and result in the geisering phenomenon where air



Former students and colleagues gathered on campus in August 2009 for a workshop and celebration of Garcia's 50th birthday.

trapped inside the tunnels is violently released through manholes and drop-shafts. A set of primary settling tanks for the Calumet wastewater treatment plant was designed using one of the first applications of computational fluid dynamics (CFD) in the water industry. They turned out to be so efficient at removing solids, that although eight were constructed only four are needed. CFD analysis was also applied successfully to reduce turbulence and increase the efficiency of secondary treatment tanks at the O'Brien Water Reclamation Plant on the North Shore Channel.

A later project for the MWRD provided a nexus between MetroFlow and the Chicago Area Waterways, which resulted in the development of the first 3D hydrodynamic and water quality modeling of the Chicago River system, the Chicago Sanitary and Ship Canal and the Cal-Sag Canal on the south side. This model recently has been used to analyze the dynamics of nutrients in the waterways as well as potential harmful algae bloom conditions.

"The MWRD has been an awesome source of support for us, and we have given them our best. We have saved them millions of dollars," Garcia says.

One of Garcia's proudest accomplishments is having revitalized the Hydrosystems Lab since arriving at Illinois in 1990.

"People had written it off," he says. "I'm very proud that we brought the lab that Ven Te Chow so incredibly got for the school back to life. We made it active again and reached a place of prominence both nationally and internationally."

Garcia traces his academic roots back to noted engineer and University of Illinois structural engineering professor Hardy Cross, who in 1936 published the Engineering Experiment Station Bulletin No 286, "Analysis of Flow in Networks of Conduits or Conductors." The bulletin detailed what became known as the Hardy Cross Method for determining the flow in pipe network systems. One of Cross' advisees was Lorenz G. Straub, a native of Kansas City, Mo., who earned all his degrees from Illinois – including his Ph.D. in 1930 – and then joined the faculty at the University of Minnesota, where he established the St. Anthony Falls Hydraulics Laboratory. One of Straub's advisees and research collaborators was Alvin Anderson, who advised Gary Parker, who in turn advised Garcia. Garcia sees it as a "spiritual connection" to Illinois that has

threaded through his career.

"There is this serendipity like a meandering river that kind of brings you all around," he says. "What are the odds that I would start my education in Santa Fe, Argentina, go to school in Minnesota, and then end up coming here to kind of finish what other people started."

In 2020 when half of the old Hydrosystems Lab was being demolished to make way for the new Civil and Environmental Engineering Building and Smart Bridge, Garcia happened to notice a stainless-steel plaque sitting in the rubble. It was from 1967 when the old lab was dedicated, after Ven Te Chow spearheaded the effort in the 1960s to seek funding from the National Science Foundation to build it. Garcia rescued the plaque and made sure it was hung in the new building.

"It's very, very important to know where we came from, where it all started," he says. "Illinois has a history of dealing with water since the earliest days of the University of Illinois, when Arthur Newell Talbot proposed a formula to design drainage channels. So, preserving that – the legacy of Ven Te Chow and all the people who have worked here with water – I think, is very, very important." **I**

What is an investiture?

An investiture is a formal ceremony during which a professor officially receives the honor of a named chair or professorship.

Dignitaries at an investiture ordinarily include campus, college and department leadership. Donors who contributed to make the named positions possible also attend. Because of the significance of the honor, a professor's family, colleagues and students also are invited.

As part of the ceremony, each honoree receives a medallion inscribed with the name of the professorship or chair and their own name. The first time a professorship or chair is bestowed, an inscribed medallion and a shadow box for display are presented to the recipient and to the primary donors. In those cases, the professor is named the inaugural holder of the professorship or chair.

How do named positions for faculty benefit the department?

Named professorships and chairs offer a significant career honor for faculty plus additional discretionary funding to pursue innovative research and enhance their teaching. These honors are very important for the recruitment and retention of top faculty.

A named professorship can be established with a gift of \$500,000. A named chair can be established with a gift of \$2 million.

For information about establishing a professorship or chair, please contact Steve Hall, stevhall@illinois.edu, (217) 300-7830.

Imad Al-Qadi Grainger Distinguished Chair in Engineering



Imad Al-Qadi, second from right, with his family (from left) son-in-law Jaffer, daughter Dana (BS 11, MS 13), wife Muna and daughter, Nora.

Professor Imad Al-Qadi was invested as the Grainger Distinguished Chair in Engineering on April 24, 2023.

Grainger Distinguished Chairs in Engineering are made possible by the Grainger Engineering Breakthroughs Initiative (GEBI), the result of a \$100 million investment in The Grainger College of Engineering by The Grainger Foundation. The GEBI supports multi- and interdisciplinary study and provides a springboard for groundbreaking projects by allowing the college to invest in strategic priorities including faculty chairs and named professorships, undergraduate scholarships, facilities and infrastructure, and research support. Grainger Distinguished Chair appointments have helped the college to recruit and retain world-class faculty and

contribute to UIUC's elite science and engineering program.

Al-Qadi joined the University of Illinois Urbana-Champaign's (UIUC) Department of Civil and Environmental Engineering as a faculty member in 2004. Prior to joining UIUC, Al-Qadi served as the Charles E. Via Jr. Professor at Virginia Tech from 1990 to 2004, as well as an instructor and research engineer at Penn State University from 1988 to 1990. He received his bachelor's degree from Yarmouk University in 1984 and his master's and doctoral degrees from Penn State University in 1986 and 1990, respectively.

At UIUC, Al-Qadi founded the Illinois Center for Transportation, where he serves as director. He established several research initiatives around key topics



Imad Al-Qadi pictured at his investiture with some of his students.

such as decarbonization, sustainability, ground-penetrating radar and connected mobility. He is also leading the initiative to build the Illinois Autonomous and Connected Track – a proposed high-speed, multimodal test track in Rantoul, Ill.

His research interests focus primarily on highway and airfield pavement mechanics, tire pavement interaction, pavement sustainability and economics, autonomous and connected vehicles, ground-penetrating radar, energy harvesting and truck platoons. His work has resulted in the development of numerous standards for the American Association of State Highway and Transportation Of-

ficials. A registered professional engineer, Al-Qadi fulfills many professional leadership roles, including serving as President of the American Society of Civil Engineers (ASCE) Transportation and Development Institute Board of Governors and Chair of the Academy of Pavement Science and Engineering Board of Governors. He is the recipient of numerous awards, including ASCE's James Laurie Prize, Robert Horonjeff Award, and Francis C. Turner Award. He is also the recipient of the French Limoges Medal, quadrennial International Geosynthetics Society Award, the American Road and Transportation Builders Association's S. S. Steinberg Award, National

Academies' D. Grant Mickle Award, and National Science Foundation Young Investigator Award. In 2021 he was listed as the most published and collaborative author in his field in Transportation Research Record. He was elected an ASCE Distinguished Member in 2010.

Special guests at the investiture were Al-Qadi's wife, Muna; his daughters, Dana and Nora; and his son-in-law, Jaffer. Speaking about Al-Qadi's achievements was Dallas Little, University Distinguished Professor, E.B. Snead Chair and Regents Professor in the Zachry Department of Civil and Environmental Engineering at Texas A&M University. **I**

Oscar Lopez-Pamies

Colonel Harry F. and Frankie M. Lovell Endowed Professor in Civil and Environmental Engineering

Professor Oscar Lopez-Pamies was invested as the Colonel Harry F. and Frankie M. Lovell Endowed Professor in Civil and Environmental Engineering on April 24, 2023.

The Colonel Harry F. Lovell and Frankie M. Lovell Endowed Professorship is named after a CEE alumnus, the late Harry F. Lovell (BS 32). He was born on May 20, 1910, in Fulton County, Ill., and earned a bachelor's degree in civil engineering at the University of Illinois in 1932. A member of the Reserve Officer Training Corps at the University of Illinois, he served in the U.S. Army Reserve until

World War II, when he was called to active duty and deployed to the Philippines and Japan. After the war, he joined the Army Corps of Engineers. His many tours of duty included construction of airfields in Morocco. After 31 years in the Army, Colonel Lovell retired in 1961.

Through a series of significant gifts to the Colonel Harry F. Lovell and Frankie M. Lovell Endowment Fund, Lovell generously supported the University of Illinois Department of Civil and Environmental Engineering. Expressing his loyalty to the affairs of the University in 2000, Lovell became a member of the President's Coun-



Oscar Lopez-Pamies, left, with Rashid Bashir, Dean of The Grainger College of Engineering.

cil, a donor recognition society of the University of Illinois Foundation. He became a member of the Pentad Circle of the Presidents Council in 2001. Lovell passed away on Aug. 9, 2005.

Oscar Lopez-Pamies holds a doctorate degree in Mechanical Engineering and Applied Mechanics (2006) from the University of Pennsylvania and the École Polytechnique (France); and Bachelor of Science and Arts degrees in Mathematics (2001) and Mechanical Engineering (2001), as well as a Master of Science degree in Mechanical Engineering (2002) from the University of Maryland Baltimore County. He has been on the Department of Civil and Environmental Engineering at Illinois faculty since 2011, where he teaches graduate and undergraduate courses in methods of structural analysis, mechanics of solids, homogenization, constitutive modeling and numerical methods for partial differential equations.

Lopez-Pamies' research interests are in the mechanics and physics of materials with a particular emphasis on soft-matter systems. He focuses on the development of mathematical theories and their numerical implementation to describe, explain and predict the macroscopic behavior, stability and failure of these materials directly in terms of their microscopic behavior. He has made seminal contributions in the theoretical and computation-



Oscar Lopez-Pamies, third from right, with his family, mother, Antonia Pamies Ortega; father, Manuel Antonio Lopez Vera; son, Dante; daughter, Chloe; and wife, Katya Trubitsyna.

al description of how cracks nucleate and propagate in solids subjected to mechanical loads, as well as in the modeling of large classes of soft solids (including unfilled elastomers, elastomers filled with solid and liquid inclusions, foams, rubber blends, dielectric elastomers, and magnetorheological elastomers) subjected to mechanical loads, electric fields and/or magnetic fields. Among his honors, Lopez-Pamies was the recipient of the Young Scientist Prize from the European Mechanics Society in 2009, National Science Foundation CAREER award in 2011, the Journal of Applied Mechanics award in 2014 and the Young Investigator Medal from the Society of Engineering Science in 2017. Prior to joining the faculty at Illinois, Lopez-Pamies was an assistant professor in the Department of Mechanical Engineering at the State University of New York, Stony Brook.

Special guests at the investiture were Lopez-Pamies' wife, Katya Trubitsyna; their children, Chloe and Dante; and Lopez-Pamies' parents, Manuel Antonio Lopez Vera and Antonia Pamies Ortega. Speaking about Lopez-Pamies' achievements was his colleague Gilles Francfort, from the Flatiron Institute. **I**

Youssef M. A. Hashash Grainger Distinguished Chair in Engineering

Professor Youssef M. A. Hashash was invested as the Grainger Distinguished Chair in Engineering on May 1, 2023.

Grainger Distinguished Chairs in Engineering are made possible by the Grainger Engineering Breakthroughs Initiative (GEBI), the result of a \$100 million investment in The Grainger College of Engineering by The Grainger Foundation. The GEBI supports multi- and interdisciplinary study and provides a springboard for groundbreaking projects by allowing the college to invest in strategic priorities including faculty chairs and named professorships, undergraduate scholarships, facilities and infrastructure, and research support. Grainger Distinguished Chair appointments have helped the college to recruit and retain world-class faculty and contribute to UIUC's elite science and engineering program.

Hashash holds a B.S. (1987), an M.S. (1988) and a Ph.D. (1992) in civil engineering from the Massachusetts Institute of Technology. He began his career with the PB/MK TEAM in Dallas on the Superconducting Super Collider Project. In 1994, he joined Parsons Brinckerhoff in San Francisco and worked on a number of underground construction projects in the U.S. and Canada.

Hashash joined the CEE at Illinois faculty in 1998, where he teaches courses in Geotechnical Engineering, Numerical Modeling in Geomechanics, Geotechnical Earthquake Engineering, Tunneling in Soil and Rock, and Excavation and Support Systems. His research focus includes deep excavations and tunneling in urban areas, earthquake engineering, continuum and discrete element modeling and soil-structure interaction as well as resiliency and sustainability of the built infrastructure. He also works on geotechnical engineering applications of deep learning, artificial intelligence, visualization, augmented reality,



Youssef Hashash, right, with Rashid Bashir, Dean of The Grainger College of Engineering.

imaging and drone technologies. His research group developed the software program DEEP-SOIL that is used worldwide for evaluation of soil response to earthquake shaking. His work on seismic design of underground structures is extensively used in engineering practice. He is the geotechnical co-leader of an investigation by the National Institute of Standards and Technology into the Champlain Towers South Collapse in Surfside, Fla.

Hashash was elected to the National Academy of Engineering in 2022. He is a Fellow of the American Society of Civil Engineers (ASCE), a past president of the Geo-institute of ASCE and has received a number of teaching, university and professional awards including the Presidential Early Career Award for Scientists and Engineers and the ASCE 2014 Ralph B. Peck Award.

Special guests at the investiture included Hashash's wife, So-Young Kim. CEE Professor Imad Al-Qadi spoke about Hashash's accomplishments. **I**

Erol Tutumluer

Abel Bliss Professor in Engineering

Professor Erol Tutumluer was invested as the Abel Bliss Professor in Engineering on May 1, 2023.

The Abel Bliss Professorship in Engineering was established through an estate gift from Helen E. Bliss in memory of her father, Abel Bliss Jr. Ms. Bliss graduated from UIUC in 1911 with a degree in Liberal Arts and Sciences. Early in her career, she taught engineering at a high school in Shreveport, La. She later moved to Washington, D.C., where she was a clerical worker with the Bureau of Aircraft Production and later an executive secretary at the law firm of Ivins, Phillips & Barker until her retirement in 1962. Abel Bliss Jr. entered the university in 1872 to study civil engineering, but unforeseeable circumstances pressed him to leave before completing his degree. In June 1875, the university granted him a partial certificate in civil engineering. His business ventures

included agriculture and real estate, and by 1929, he was a partner in the land development and oil production company of Bliss & Wetherbee.

Erol Tutumluer holds a Bachelor of Science degree (Bogazici University 1989), two Master of Science degrees (Duke University 1991, Georgia Tech 1993), and a doctorate (Georgia Tech 1995), all in civil engineering. He has been on the faculty of the Department of Civil and Environmental Engineering at the University of Illinois since 1996, where he has taught graduate and undergraduate courses in transportation engineering, pavement analysis and design, transportation soils engineering, soil stabilization, airport facilities design, and transportation infrastructure for smart mobility. He



Erol Tutumluer and his wife, Sinem Ertunga-Tutumluer. Tutumluer's students presented him with the framed group picture and flowers. Below, left to right, Youssef Hashash, Tutumluer and Ximing Cai, all of whom celebrated investitures on May 1.

also serves as the Director of International and ZJUI Education Programs.

Tutumluer has research interests and expertise in characterization of pavement and railroad track geomaterials, including subgrade soils and base/ballast aggregates; soil/aggregate stabilization; geosynthetics; advanced imaging and sensing technologies; applications of AI and deep learning techniques to transportation infrastructure; sustainable use of foundation geomaterials and construction practices for transportation infrastructure; dynamic response measurement and modeling of track systems; and mechanistic analysis and design.

Tutumluer has served as an investigator on more than 120 research projects, graduated 23 Ph.D. and 46 M.S. students, and authored more than 350 peer-reviewed publications. He is a Founding Editor-in-Chief of the Transportation Geotechnics Elsevier journal.

Among his honors are the 2020 James Laurie Prize in recognition of his career accomplishments for promoting the Transportation Geotechnics field, and the American Society of Civil Engineers Carl L. Monismith Lecture Award for 2021.

Special guests at the investiture included Tutumluer's wife, Sinem Ertunga-Tutumluer. CEE Professor Imad Al-Qadi spoke about Tutumluer's accomplishments in his field. **I**



Ximing Cai

Ben Chie Yen Professor

Professor Ximing Cai was invested as the Ben Chie Yen Professor on May 1, 2023. He is inaugural recipient of this professorship.

Professor Ben Chie Yen served on the CEE at Illinois faculty for 35 years (1966-2001). He was an internationally recognized leader in hydraulics and hydrology, and made major contributions in open-channel hydraulics, urban drainage, watershed hydrology, and reliability and uncertainty analyses in hydro-engineering. Yen worked with fellow CEE professor Ven Te Chow, pioneering the investigation of hydrologic problems from the perspective of fluid mechanics and the development of computer models in the holistic modeling of watersheds. Yen died in 2001.

Yen's wife, Ruth Chao Yen (PhD Linguistics), established the endowed fund that supports this professorship in 2021 to honor his many contributions to the field of hydrology and support the faculty that continue this important work at the University of Illinois. She spoke at the investiture about her husband and her motivation for funding the professorship.

Ximing Cai has been on the CEE at Illinois faculty since 2002, where he teaches undergraduate and graduate courses in water resources engineering, surface water hydrology and application of geographic information systems, and river basin management. He holds a B.S. in Water Resources Engineering (1990) and an M.S. in Hydrology and Water Resources (1994) from Tsinghua University, China, and a Ph.D. in Environmental and Water Resources Engineering (1999) from the University of Texas at Austin.

Cai's current research areas include coupled human-natural system analysis with an emphasis on human inter-

Continued on page 26



Above, From left, CEE Department Head Ana Barros; Ruth Chao Yen whose gift established the professorship in her late husband's name; Ximing Cai; Cai's son, Jonathan; and Cai's daughter, Carolyn.

At right, Ruth Chao Yen, accepting the professorship medallion from Dean Rashid Bashir. A medallion for display is presented to donors the first time their professorship is awarded.



Continued from page 25

ferences in hydrological processes, water-energy-food system modeling, and sustainable water resources management, particularly in developing countries.

Cai has authored or co-authored more than 210 peer-reviewed journal papers, three books and several monographs. He has been a consultant to several organizations, including the World Bank, the United Nations and other international agencies. Previously, Cai served as associate director of the Institute for Sustainability, Energy and Environment, a campus-wide institute at UIUC. Cai currently serves as Chair of the Task Force bureau, International Water Resources Association on downscaling Sustainable Development Goals to country/region, basin and local scale for sustainable water resources management around the world.

He has received several awards for his work, including the National Science Foundation CAREER award and best paper awards from Water Resources Research, Water International, and the Journal of Water Resources Planning and Management. Cai is an elected 2019 American Geophysical Union Fellow for “forging a new science of hydrologic change accounting the human dimension and using it to advance water resources management.” He was recently selected to receive the 2023 Julian Hinds Award from the American Society of Civil Engineers’ Environmental and Water Resources Institute.

Special guests at the investiture included Cai’s daughter, Carolyn Cai, and his son, Jonathan Cai. CEE Professor Marcelo Garcia spoke about Cai’s accomplishments. **I**

“It is very meaningful to establish this award to encourage scholars and serve human beings.”

An excerpt from Ruth Yen’s address at the investiture on May 1



Ruth Chao Yen

This professorship award was established by our family and friends in memory of the twentieth anniversary of Ben Chie Yen’s departure. Ben passed away in December of 2001.

Ben was born in 1935 in China in a southern small town near the border of Vietnam. Ben was the baby of his family; he had three older siblings. His father was a civil engineering major who graduated from Peking University and earned a master’s degree from a University in Belgium in probably 1927. Ben’s family ancestors moved from Shangdong Province in northern China to Lian-Ping city in Guangdong Province. They are the descendants of Yen Hui, one of Confucius’ favorite students. Ben’s father is probably the 82nd generation of Yen Hui. Yen Hui was commended by Confucius for his simple and humble lifestyle. Confucius said, “A handful of rice to eat, and a gourdful of water to drink, living in a mean street, others would have found it unendurable depressing, but to Hui’s cheerfulness it made no difference at all.”



Ben Chie Yen (1935-2001)

Ben often mentioned he liked to live that kind of life: simple food, simple furniture in the house and wear the same clothes, too. He told me he was one of only two professors in the department that did not use a computer. I do not know how he received and stored all the technical information.

All his friends knew that Ben was a night person. If you want to find him, call his office in midnight, he would definitely be there. His office is his home and his home is a hotel.

Ben had several hobbies. He loved eating good foods; he knew good Chinese restaurants in almost all big cities in the world. He loved friends, always enjoyed talking. He would be the last person to leave a conference room since he was busy talking. Ben loved folk dancing and folk music, especially Scottish folk dances; he was pretty good with it and also ballroom dancing, too. He joined the U of I folk dancing group for over 30 years. He also enjoyed classical music and jazz. Once in the Swiss countryside, in a folk dancing group, he met the English writer Agatha Christie.

Researching on hydrology and hydraulics was always Ben’s passion. He loved his job. The CEE Hydrosystems Lab was his home; he served here for 35 years. If Ben were here, he would want to inspire and train young scholars to continue the study and become world leaders. It is very meaningful to establish this award to encourage scholars and serve human beings. **I**

Building for a competition and a cause

A two-year build project by the Illinois Solar Decathlon student group leads to a new home for a family and a once-in-a-lifetime experience for the students

A house under construction in Rantoul, Ill., is nearing completion. The modest exterior belies the uniqueness of the home, which was designed entirely by University of Illinois Urbana-Champaign (UIUC) students and which features many innovative technologies that make it a model of sustainability, energy efficiency and affordability.

The house is also part of a national competition. Illinois Solar Decathlon (ISD) is a student organization at UIUC that participates in competitions sponsored by the Department of Energy (DOE). The group is divided into three teams, each of which participates in a different challenge or training period. The Design Team creates a new, innovative design of a residential or commercial building each year that addresses real-world issues like affordability and climate change, then presents their design for judging in April. The Concept Team consists of freshmen and sophomores who lack experience in higher-level engineering and architectural concepts, and spends the year receiving training in preparation for future participation on one of the other teams.

The third team – featured in this story – is the Build Team. Students on this team design and build a full-size home powered by renewable energy sources. Solar Decathlon groups at universities across the world participate in the Build Challenge, which takes two years to complete. The first year is spent designing the home and submitting the plans to DOE for review, then the top designs are selected to move forward to the second year, when the building takes place.

A truly interdisciplinary effort, the ISD project includes more than 100 students from across campus, including the School of Architecture, who produce the designs, several departments in The Grainger College of Engineering – including Civil and Environmental Engineering (CEE), Electri-



Future homeowners Elonda Elston and her daughter, Monae Latchison (front row, center) with some of the ISD students and Habitat for Humanity of Champaign County Executive Director Chad Hoffman (back row, second from right).

cal and Computer Engineering (ECE), Mechanical Science and Engineering – and others. Students bring knowledge from their classes to apply to the collaborative effort. This year, ISD is led by Halie Collins, a senior in CEE.

About the Build Challenge

The Solar Decathlon has been around since 2002, though the competition format underwent a change as a result of the COVID-19 pandemic. As it stands now, all qualifying teams are given \$50,000 to start their project, a set of guidelines and criteria on which they will be evaluated, in-person judging by DOE representatives and a period of public exhibition, and a final group presentation in front of a panel of industry experts at the Solar Decathlon Competition Event in Golden, Colo. Solar Decathlon is highly competitive: for the 2023 Build Challenge, 37 teams from around the world originally entered the competition. ISD was one of 15 teams selected to move on to the second year – the build phase – and one of only 11 teams that progressed far enough

with their build to make it all the way through to the final exhibition/presentation rounds.

Many of the participating student groups design their houses as theoretical or model homes, but some teams – including the team at UIUC – take a different approach: they build their houses to be lived in. The team has been working with Habitat for Humanity of Champaign County since the beginning of this project and their design decisions were made with the future residents – a single mother and her young adult daughter – in mind.

CEE graduate student Luke Somerville is leading the build team. He oversees all aspects of the construction process, from meeting with Village of Rantoul officials – Rantoul donated the land for the project – to coordinating with contractors to liaising with the local Habitat for Humanity leader.

While all that was going on, Collins was spearheading an effort to raise funds to supplement the starting budget pro-

continued on page 28

continued from page 27

vided by DOE, going so far as to establish a non-profit foundation for the purpose. Even though the teams are provided with \$50,000 to start, they must seek funding for the remaining costs through grants and other monetary or in-kind donations. Collins said the group's final budget is approximately \$420,000.

The students also deal with cash flow issues, negotiations, contracts and other business-related issues. The business aspect of the project adds an entirely new skill set the students develop as part of their participation in the group.

"Coming to college, I never expected that I would be in this position that I am today. I didn't even know this kind of opportunity existed," Collins said.

About RENU House

The ISD team approached their project with four main themes in mind, which also provided the name: the house should be Renewable, Economical, Nourishing and Universal (RENU).

The home was built using labor and materials sourced and supplied locally, meaning that it should be able to be duplicated in any location. The three-bedroom house is ADA accessible, and a flexible-use room in the center can be open to the rest of the house or closed off and used as an office, home gym, playroom or fourth bedroom. Landscaping plans include a rain garden to help manage stormwater runoff, as well as native plants and a garden bed for vegetables or flowers.

The competition rules say that all the houses must be powered by renewable energy sources. Christine Chung is the team's Design Engineer, responsible for reviewing all the engineering designs and coordinating with Somerville to ensure that all code – and competition – requirements are met. She is a senior in ECE, where her focus is power and energy.

"Our solar system is completely compatible with what our predicted energy consumption is," Chung said. "So along the side of when we design the solar production we have to keep in mind how much the house is going to consume in terms of energy load. A lot of that comes



Above: Halie Collins, in the green jacket, leads a walk-through of the house. At right: Christine Chung



from the other teams, and gathering what design choices they made to make the house most energy efficient."

Chung explains that, for instance, choices that the water team makes about the plumbing – the tankless water heater, the types of piping and pumps – all factor into the energy consumption analysis. The same is true for other design decisions the build team makes. Their solar panel system is grid tied, which means that surplus solar power generated is fed into the electric grid, and on low production days – for example, overcast or stormy days – the house can pull power from the grid. The goal is to produce enough power from the solar panels over the course of a year to offset its energy consumption; that is what makes the house "net zero." A battery back-up will provide electricity during power outages.

There are many features incorporated into the design of RENU House that make it both cutting edge and sustainable. The exterior is made from bamboo, a highly sustainable resource due to its quick growth and regeneration. The ductless HVAC system utilizes a noiseless filtration system and will require less maintenance over time. Indoor units control the temperature in each room, all of which are operated by individual thermostats with smart load control that automatically adjust operation requirements by sensing both indoor and outdoor conditions. The plumbing utilizes a very efficient tankless water heater that uses energy only when hot water is being delivered. Students

in ECE and Computer Science designed an app using open source software that can be used to control and monitor the home's electrical systems.

One major factor that makes the house net zero is the exterior insulation finishing system (EIFS). Their EIFS uses blown-in cellulose between exterior ZIP panels and interior drywall, which means that very little energy will be required to heat or cool the house because it will be so airtight and able to store heat and cool air effectively.

"People don't think it's very sexy in terms of talking about net zero homes, but more than 50% of building a net zero home is the exterior envelope finishing system," Somerville said.

Somerville said that for every engineering choice they made, they also had to consider the embodied environmental impact: everything from how much carbon dioxide is produced to evaluating the metals used in equipment and the impact of mining those metals out of the ground. All of that is balanced against economic considerations, sustainability and the human experience.

These design decisions are an important part of the competition because the team needs to explain their choices to the judges and justify them. The team's decisions are judged in 10 categories that

make up the “decathlon.”

“You’re taking all of these 10 categories into account, and they’re all weighted equally,” Somerville said. “Each of them is worth 100 points, for a grand total of 1,000. Designing the home becomes a very, very in-depth, thought-out process.”

An additional factor the team is dealing with is the reality of designing a home with a resale value appropriate for Rantoul. That means innovations also have to be low-budget, which is not always easy, and the overall upfront costs for a sustainable house are high. Regardless, the students believe their house could be replicated in similar small towns across America.

“It’s been a very big challenge for us to balance our budget with sustainable technology, just because more sustainable technology does tend to be more expensive,” Collins said. “However, just trusting the fact that it does pay back over time with energy savings has been a very important reminder throughout this process. All of our systems combined and the construction of the home – it does come out to be around the average price of a home in 2023. So it’s not technically ‘affordable,’ but it is very affordable in the long run because a family will save tens of thousands of dollars in energy or utility bills.”

But as Chung notes, they have another outcome they are working for that has nothing to do with the competition.

“We are designing with a purpose for an actual family to live there, not just for the sake of producing a really cool energy efficient house to just win this contest,” she said. “We have a long-term purpose for it. So there’s a lot of considerations that are taken into our design, where – sure, we want to win this contest – but we also want to make sure it’s a reasonably priced house in the long term.”

Building for a cause – and an education

For Somerville, who grew up in the Beverly neighborhood of Chicago, being involved in construction is practically in his blood: his father was a bricklayer and all of his uncles worked in trades around the city.



“I’ve been around construction my entire life,” he said. “I always really enjoyed that process of a bunch of people coming together and working together to create something new that benefited the people, places, around them. I just think that directly being able to see the rewards of your work, was something that I found hugely inspiring.”

That feeling carried over into this project, which is the first Habitat for Humanity house on the block but which will eventually be joined by three more. The neighborhood they are building in is a mix of single-family homes and multi-family residences, of young adults and seniors, of lower income and middle income. Somerville is enthusiastic about being part of a larger effort that is helping to build up a community.

“I think that being fortunate enough at this age to be able to use the engineering knowledge that I’ve learned from the University of Illinois, and being able to directly impact something as large and influential – and life changing, honestly – as this for people in the local community is really an opportunity you could not find anywhere else,” Somerville said. “It really motivates me on a day-to-day basis.”

The impact of the build project also goes beyond the future homeowners and the neighborhood: it affects the students and their education. Each of them is able to apply classroom knowledge to the real world, and vice versa.

Somerville notes that his coursework in construction management and de-



Above: RENU House nears completion in May 2023.

At left: Luke Somerville

sign have directly translated into the work he has done on this project. In turn, the hands-on work has expanded his knowledge and understanding of concepts he has learned in

class. Additionally, the industry connections he made in this process taught him a lot about sustainable construction concepts. In fact, his participation in ISD and interactions with Arup – an engineering design firm that consulted with the team early in the process – led directly to a job offer. He is moving to San Francisco this summer to join the firm.

“I strongly believe that Illinois Solar Decathlon makes the biggest real-world impact on the local community as well as the student body that participates in it, compared to any other club in the University,” he said. “The projects that we work on are in the hundreds of thousands of dollars, and every two years we have direct industry connections with the Department of Energy as well as a multitude of other national and renewable energy leaders. The people in the organization get hands-on experience that you cannot find anywhere else – internship or otherwise. And at the end of the day the thing that I like the most about it is that you get to donate a home to a local family in need.” **I**

See more photos, hear from Halie Collins, and find out how the team did at finals on our website:

go.cee.illinois.edu/isd



Alumni Awards Dinner

Alumni, faculty, students and friends of the department gathered on March 2, 2023 at the Union League Club in Chicago for the 2023 CEE at Illinois Alumni Awards Dinner. The event included a cocktail reception, dinner, remarks by Department Head Ana P. Barros, and presentation of the CEE Alumni Association alumni awards.

See More Photos Online

Scan this QR code to see more photos from the event on our website, or visit cee.illinois.edu/alumni/events/photos:



2023 DINNER SPONSORS:

CEE at Illinois thanks the following companies for their generous support of the Alumni Awards Dinner, student programming and alumni events throughout the year.

DIAMOND SPONSORS

- Burns & McDonnell
- HNTB Corporation
- Trotter and Associates

PLATINUM SPONSORS

- Blinderman Construction
- Carollo Engineers
- Fehr Graham
- Greeley and Hansen
- H.W. Lochner
- Hanson Professional Services
- HDR
- Keller North America
- Milhouse Engineering and Construction
- Mott MacDonald
- TranSystems
- Vedder Price
- Wiss Janney Elstner Associates

GOLD SPONSORS

- Christopher B. Burke Engineering
- Cummins Engineering Corp.
- Donohue & Associates
- Envista Forensics
- Granite Construction
- Michael Baker International

SILVER SPONSORS

- Andrew Richardson
- Ardmore Roderick
- Burns & McDonnell
- Ciorba Group
- Crawford, Murphy & Tilly
- Gannett Fleming
- INGENII
- Magnusson Klemencic Assoc.
- Oates Associates
- Patrick Engineering
- W.E. O'Neil Construction

BRONZE SPONSORS

- AECOM
- Engineering Enterprises
- EXP
- Farnsworth Group
- Lin Engineering
- Michael Neal
- RME
- Strata Earth Services
- TGRWA

Above (top to bottom): CEEAA President David Byrd makes remarks. Alumnus Andy Nelson accepts the Distinguished Alumni Award on behalf of Scott Spellmon, who was unable to attend. CEEAA Board Member Doug Pelletier, center, with fellow alumni Nicholas Pansic Pelletier (left) and Alan Hollenbeck. CEE students (l-r) Lauren Smith, Isabella Zardini and Josie Hoppenworth. Next page: more scenes from the evening.

2023 ALUMNI AWARD WINNERS

DISTINGUISHED ALUMNI AWARDS

Jack E. Davis (BS 84)

Navneet Garg (phD 97)

Scott A. Spellmon (MS 97)

YOUNG ALUMNI ACHIEVEMENT AWARD

Mary Lou Kutska (BS 11)

Learn more about the winners at cee.illinois.edu/alumni/awards

At right, top: Navneet Garg and Mary Lou Kutska received their awards at the Alumni Dinner in Chicago. At right, bottom: Jack Davis (left) and Scott Spellmon were unable to attend the dinner, but shared pre-recorded remarks by video.



CEE team competes in National Geowall Competition

"Geotechnical engineers love to preface just about every word with the prefix 'geo,' so you are about to see that prefix a lot."

By JACK LAWRENCE (BS22)
GESO PRESIDENT

On its face, the task of building a miniature retaining wall using only paper seems relatively straightforward. In reality, however, one must evaluate numerous factors including, but not limited to, the strength of the paper, the composition of the backfill material and techniques for soil compaction.

This was the task at hand for the UIUC GeoWall Team which is a subgroup of the Geotechnical Engineering Student Organization (GESO). Geotechnical engineers love to preface just about every word with the prefix "geo," so you are about to see that prefix a lot.

The National GeoWall Competition is one of several competitions hosted within a program known as the GeoChallenges. The GeoChallenges are a series of student competitions held at GeoCongress which is one of the largest conferences for geotechnical engineers within the United States. GeoCongress is organized annually by the American Society of Civil Engineers' Geo-Institute division.

Every year, the UIUC GeoWall team submits a robust design report to the competition. Each of the designs is then reviewed, and approximately 20 institutions are invited to construct their design in-person during the national finals at the conference. The process of creating this year's design started with performing various geotechnical engineering tests on the backfill material. This year's competition mandated the use of a highly uniform sand for the backfill material. Luckily, the team received several bags of a similar geological material last year in the form of a very generous donation from a Chicago-based drilling company, so they began testing immediately.

Once testing was complete, it was time to assemble the design itself. The type of retaining wall that the GeoWall competition requires is known as a me-

chanically-stabilized earth retaining wall. Essentially, this terminology means that several layers of reinforcement strips are installed within the backfill material to maintain the wall's stability. To optimize the layout of these reinforcement strips, the team created a finite element analysis (FEA) model in a specialized software. This software essentially simulated the behavior of the wall under various loading conditions. The software also allowed the team to reduce the amount of material being used since conservative designs are penalized during the assessment of the design reports.

Following the submittal of reports, the UIUC design was ranked in the top four nationally. Once it was clear that the team would need to travel to GeoCongress 2023, the team worked tirelessly to practice their construction techniques. While it was clear that, in theory, the team's design would successfully resist all loads applied to the wall, the construction of the wall would need to be of a satisfactory quality so that it could resist these loads in reality. It was also critical to minimize the total construction time in order to score the maximum number of points.

The team also simultaneously commenced fundraising efforts. The goal was to send 16 students to the conference in Los Angeles at an estimated cost of \$28,000. After applying for countless grants and writing an immense number of emails to companies, the team successfully acquired just over \$31,000 from seven sponsors and three grant applications.

Eventually, the time came to travel to Los Angeles. Three team members traveled by car across the United States with all of the equipment necessary to compete while the remaining members flew.

When the big day arrived, the competition was intense. The team's wall flawlessly resisted the static load component of the competition but unfortunately failed during dynamic loading. This unfor-



Moments after the wall collapsed during the dynamic loading component of the competition.

tunately meant disqualification, but the team obtained a substantial amount of data which will be used in the design of next year's wall.

While the team was disappointed when the wall failed, it did not come as a complete surprise. This year's design used a factor of safety that was extremely close to 1 which meant that the design was quite risky. It was necessary to use a factor of safety of this magnitude since the highest placing team normally uses a very streamlined design. While the Illinois team could have easily settled for second or third through the use of a more conservative design, they were eager to secure the top placement. After all, the CEE department has a long history of pursuing innovative solutions to the world's most complex problems and the UIUC GeoWall team could not be more proud of the fact.

The GeoWall team would like to thank their faculty adviser, Professor Scott Olson, for his invaluable support and technical advice. Companies who are interested in donating equipment, geological material or sponsorship funds to the UIUC GeoWall team can reach out to uiuc.cee.geso@gmail.com for more information. **I**



Global Leaders in Construction Management students at the Panama Canal. Their teacher and chaperon E.J. Ignacio is in the center.

GLCM visits Panama

In January 2023, 14 CEE students traveled to Panama City, Panama for nine days as part of the Global Leaders in Construction Management (GLCM) Program to learn about the Panama Canal and other Panamanian megaprojects.

The students spent the first few days touring Casco Viejo, the historic district of Panama City; the Panama Canal Museum, that details the history and significance of the canal; and Cinta Costera, a 26-hectare land reclamation project that includes four miles of Pacific coastline. The group then toured the Panama Canal Miraflores Locks (Pacific side), learning about the origins of the canal, the canal expansion from 2007-2016, and were able to witness first-hand the operation of multiple ships travelling through the canal. Next the GLCM program toured the Panama Ports, that support all the ships that travel through the canal including the roughly 8

million shipping containers per year. The students were also able to tour the Panama Canal Agua Clara Locks (Atlantic side) providing the unique experience of visiting two different oceans in the same day.

The GLCM students also received an in-depth tour from engineers at the Metro de Panama, the rapid transit system of metropolitan Panama City that started in 2014. The tour started with the Central Control Office which has 12 administrators monitoring Lines 1 and 2, which boast a daily ridership of 450,000. The students also visited the current construction of Line 3, a \$3 billion monorail extension into Western Panama, where they learned about the Metro master plan to develop six more transit lines in an existing metropolitan city.

“These international trips provide a tremendous opportunity for the students to understand how construction is per-

formed in different countries, climates, and cultures,” said E.J. Ignacio, Director of the GLCM program. “They’ve never had to consider how a seven-month rainy season might affect a construction project, or how they might coordinate building a new nine-line metro system into a fully developed city.”

During the weekend the GLCM students learned more about Panamanian culture and were able to visit the Gamboa Rainforest, a tropical forest on the Chagres River; Portobelo, an historic port on the Atlantic/Caribbean side; and Isla Grande, a peaceful island in the Caribbean. The last few days of the trip were spent touring several of Panama’s recent and ongoing infrastructure projects including Tocumen International Airport Expansion, Panama Bay Sanitation Plant, AES Panama, Amador Convention Center, and a new Cruise Ship terminal capable of unloading two cruise ships simultaneously. On the final night, the students were able to watch – and join – in an authentic Panamanian dinner/dance show.

“As an educator, I’d love it if the students learn something on one of these trips that they can apply in their future engineering careers,” Ignacio said. “As their mentor, I’ll settle for the students learning about a new culture, or even themselves.” **I**

At left: The GLCM group on the dock at the Cruise Ship Terminal in Amador, and touring the Panama Metro monorail construction site.



2023 CEE Student Awards

A. Epstein Award in Civil Engineering

Michael Molloy, Jack Reicherts

Alan Zimmer Scholarship

Luca Franceschina

Albert J. Reinschmidt Memorial Scholarship

Tommy Stogin

Anna Lee and James T. P. Yao Scholarship

Zeyu Li

Barry J. and Pauline G. Dempsey Transportation Scholarship

Brandon White

Bates and Rogers Scholarship

Gabriel Dubowski

Bernard Delbert Murphy Scholarship in Civil Engineering

Abby Culloton, Vincent Roszkowiak, Lucia Venegas

C.S. and Ruth Monnier Scholarship

Daphne Eng, Siari Rodriguez-Ayala, Marcela Velazco, Kayla Wilson

CEE Visionary Scholarships

Lillie Amador-Rojas, Saliyah As-Salaam, Cesar Blas, Tiana Bojic, Thomas Burke, Juan Campa, Claire Corrigan, Gabriel Dubowski, Allison Dunn, Sean Eddings, Liliana Hinojosa, Samantha Ho, Matthew Hyman, Yuna Kim, Juliette Kim, Tessa Kleiner, Santiago Leyva, Karen Madrigal, Camila Marden, Desiree Oliveros, Katrina Padilla, Jessica Palmer, Savanna Palmer, Grace Perea, Cambria Richards, Duska Richert, Danielle Rohe, Aimee Rounds, Allie Soukup, Ella Spera, Aiman Zainab

CEEA Undergraduate Service Leadership Scholarship

Samantha Linares, Alice Teixeira

Charles E. Deleuw Scholarship

Jesse Ekanya, Brandon Mah

Chicago Outer Belt Contractors Association Scholarship

Joseph Fraterrigo

Class of 1943 Civil Engineering Award

Emily Shao

Clement C. Lee Outstanding Scholar Award in Honor of Houssam Mahmoud Karara

Trygve Hansen

Crawford, Murphy & Tilly Inc. Scholarship

Isabelle Newsom, Joshua Zavala

CRSI Education and Research Foundation Scholarship

Virginia LoPresti

Dan and Mary Guill Engineering Scholarship

Patrick Alonso

Delores Wade Huber Scholarship

Rishi Patil, Eddie Vercruysse

DFI Educational Trust Charles J. Berkel Memorial Scholarship

Eduardo Mancera

Donohue & Associates Scholarship

Cadyn Grafton

Doris I. and James L. Willmer Endowed Scholarship

Julie Ferrer

Duane Edward and Phyllis Ann Erickson Memorial Scholarship

Natalie Carlisle, Nina Trousdale

Earle J. Wheeler Scholarship

Abbey Van Brunt

Edward R. Healy Memorial Scholarship

Katrina Padilla

Eric J. Kerestes Memorial Scholarship

Nathan Finkelshteyn

ESCA Consultants Scholarship

Chloe Fess

Foster Research Scholarship

Nicholas Novak

Fred L. Gau Memorial Civil Engineering Scholarship

Juliette Kim, Yeongbok Lee, Desiree Oliveros, Aden Weiss

George C. Eisenmayer and Ida Eisenmayer Scheve Scholarship

Jeanette Guerrero

George L. Farnsworth Jr. Scholarship

Kassandra Estrella, Abbey Fields

Glenn E. Hodges Civil Engineering Scholarship

Henry Bahrs, Izabela Dimevska

Grant W. Shaw Memorial Scholarship

Louis Cho, Sophia Donnellan

Harold R. Sandberg Scholarship

Aaron Marszewski, Yatri Sutaria

Harry K. and Carol A. Windland Scholarship in Memory of David A. Windland

Jackson Moore, Dominick Tadewald

Henry T. Heald Scholarship

Will Salzmann

Illinois Association of County Engineers Award

Amritha Bellary, Emma Conroy, Eric Houston, Ethan Light, Charlotte Poole

Industry Advancement Foundation of Central Illinois Builders of the AGC Scholarship

Danny Blidy



Above, left to right: Rachel Chen, winner of the Klein and Hoffman Inc. Scholarship in Honor of Frank Klein, with professor Scott Olson; professor Erol Tutumluer, right, presented the Barry J. and Pauline G. Dempsey Transportation Scholarship to Brandon White; Clay Patterson of Langan Engineering and Environmental Services Inc., right, presented the Rudolph Frizzi Geotechnical Scholarship to John Sadek; CRSI Education and Research Foundation Scholarship winner Virginia LoPresti, right, with Parisha Chanodia of CRSI.

Ira O. Baker Award in Civil Engineering

Jack Reicherts (first), Yuhui Zhai (second)

Ira O. Baker Memorial Scholarship

Mayank Aggarwal, Alexander Gordan

Jacobs Transportation Scholarship

Yilei Ge

Jean D. and Michael W. Franke

Scholarship

Jake Wagoner

Jim Donnelly Memorial Scholarship

Konstantin Kotelnikov

John B. Felmley Civil Engineering

Scholarship

Benidel Ntumba

John Carollo Scholarship

Cadyn Grafton

John O. Fooks and William D. Fooks

Scholarship

Sahil Patel

Joseph C. and Marianne J. Geagea

Civil and Environmental Engineering

Scholarship

James Delaney, Sarah Dzieza, Riley Kelch

Julian Rueda Geotechnical Engineering

Scholarship

Marcella Yates

Kay and John Briscoe Scholarship

Alejandro Fernandez, Max Lanham

Klein and Hoffman Inc. Scholarship in

Honor of Frank Klein

Rachel Chen

Koch Scholarship in Civil and

Environmental Engineering

John Devine

Langan/Dennis J. Leary Memorial

Scholarship

Coleman Froehlke

Leonard C. and Ruth E. Lindblom

Undergraduate Scholarship

Dominika Dynak

Loreta and Silvio Corsetti Memorial

Scholarship

Jack Marion, Matthew Ross

Louis A. Bacon Scholarship

Yuna Kim

Maren Somers Memorial Engineering

Scholarship

Ella Spera

Maude E. Eide Memorial Scholarship

Steve Bae, Anthony Dirico, Matt Wingen

Max Whitman Memorial Scholarship

Calvin Piemonte

Moreland Herrin Scholarship

Cayden Schroeder, Caden Tieszen



Douglas County Engineer James Crane, center, presented the Illinois Association of County Engineers Award to (l-r) Charlotte Poole, Ethan Light, Eric Houston and Emma Conroy.

Norman Carlson Scholarship

David Wasilewski

Ralph C. Hahn Civil and Environmental Engineering Scholarship

Trygve Hansen

Richard Jaccoud Scholarship

Philip Budzyna, Claire Corrigan, Emmanuel Darkwa, Sheikh Faysal, Faith Kasper, Julia Miazek

RJN Foundation Civil Engineering Scholarship

Dominika Szal

Rudolph Frizzi Geotechnical Scholarship

John Sadek

Shelby K. Willis Engineering Education Scholarship

Qiqi Li

Susan Douds Goertz and Jack L. Goertz Scholarship

Santiago Leyva

Walter E. Hanson Graduate Study Award

Nicholas Marchak

Walter L. and Carole A. Crowley Scholarship

Nicholas Marchak

Wayne C. Teng Scholarship

Michael Cano, Collin Sorge Young, Gavin Ursetta

William A. Oliver Endowed Scholarship

Arannya Roy

William C. Ackermann Sr. Civil Engineering Scholarship

Aaron Leshuk-Morita

William E. Stallman Scholarship in Civil and Environmental Engineering

Meredith Innes

William John MacKay Award

Kevin Danner, George Anthony Goce

William T. and Karen E. Arnold Scholarship

Brandon Daniels

Wilson H. Tang CEE International Scholarship

Hongjie Luo, Jiayi Shi

Wilson H. Tang CEE Risk, Reliability & Decision Analysis Scholarship

Kent Lullo

Winfred D. Gerber Memorial Scholarship

Izzatul Hamizah Shahairul Izam

YED Scholarship

Megan Otto

Zerbe Scholarship

Dev Desai



Professor John Popovics, center, with the Ira O. Baker Award winners. Jack Reicherts, right, was the first place winner, Yuhui Zhai was the second place winner.



Faculty Promotions

Effective August 16, 2023



**Professor
Nora El-Gohary**



**Associate Professor
R.D. Cusick**



**Associate Professor
Franklin Lombardo**



**Associate Professor
Rafael Tinoco**



**Associate Professor
Vishal Verma**

Professor and Department Head **Ana P. Barros** received Diplomate, Water Resources Engineer (D.WRE) Board Certification by the American Academy of Water Resources Engineers. It is the highest level of advanced post-license certification offered in the water resources engineering profession for professional engineers.

Professor and Department Head **Ana P. Barros** was appointed to the National Academies of Sciences, Engineering and Medicine's Committee on Earth Sciences and Applications from Space. The committee provides an independent, authoritative forum for identifying and discussing Earth system science research requiring data from space with the research community, the federal government and the interested public.

CEE at Illinois Ph.D. student **Bayezid Baten** has been awarded the ACI Presidents' Fellowship from the American Concrete Institute (ACI) Foundation. Baten's research centers on developing low-cost and sustainable Ultra-High Performance Concrete. He is advised by assistant professor **Nishant Garg**.

CEE railroad engineering students **Michael J. Copley, Shashank Muddana, Daniel Mueller, Matthew M. Parkes,** and **Geordie Roscoe** received Educational Foundation Scholarships from the American Railway Engineering and Maintenance-of-Way Association. CEE railroad engineering student **Thomas J. Stogin** received the Union Pacific William E. Wimmer Scholarship.

Professor **Marcelo H. Garcia** was recognized by the Illinois Science & Technology Coalition (ISTC) as one of this year's Researchers to Know from universities across Illinois. The ISTC's annual list highlights faculty conducting groundbreaking research on campuses throughout Illinois. ISTC recognized Garcia for dedication to his field of study and outstanding achievement in research.

Professor **Marcelo H. Garcia** has been awarded Honorary Membership in the International Association for Hydro-Environment Engineering and Research (IAHR). The award will be presented at the Opening Ceremony of the 40th IAHR World Congress to be held in Vienna, Austria, in August 2023. It is the highest honor bestowed by the association on an individual. It is given in recognition of outstanding career contributions to the field of hydro-environment engineering and for exemplary service to IAHR.

Assistant Professor **Nishant Garg** was featured in Illinois Public Media's latest episode of "State of Change" on carbon. Garg studies low-carbon alternatives for making concrete, including a project analyzing ash from incinerated waste.

Professor **Mani Golparvar-Fard** was appointed to the International Scientific Committee of the Technical University of Munich's Georg Nemetschek Institute of AI for the Built World. Golparvar-Fard is also leading an initiative to establish the first institute of AI in Construction in the U.S., with funding from the National Science Foundation and the Discovery Partners Institute.

Former CEE at Illinois head **Nicholas P. Jones** was appointed Executive Vice President and Vice President for Academic Affairs of the University of Illinois System.

Professor **Erol Tutumluer's** Ph.D. student **Mingu Kang** was awarded first prize at the Geosynthetics Conference 2023 student research showcase for his research on the mechanical stabilization of airport pavement.

Assistant Professor **Eleftheria Kontou** won a National Science Foundation CAREER award to advance the science of bidirectional electric vehicle (EV) and infrastructure technologies management, which enable EVs to serve as mobile energy storage resources, providing services

to buildings and enhancing the resilience of urban energy systems during power outages.

Assistant Professor **Eleftheria Kontou** was named Researcher of the Year, one of the annual Sustainable Transportation Awards presented by the Illinois Alliance for Clean Transportation, formerly known as Chicago Area Clean Cities. The awards are given to organizations and individuals who take actions to locally reduce vehicle emissions and improve air quality.

Assistant Professor **Eleftheria Kontou** was awarded the CUTC-Cambridge Systematics New Faculty Award by the U.S. Department of Transportation Council of University Transportation Centers (CUTC).

Ph.D. student **Hannah Lohman** was selected as a 2023 John A. Knauss Marine Policy Fellow. This prestigious fellowship provides a unique experience to chosen graduate students interested in ocean, coastal and Great Lakes resources and related policy decisions.

Professor Emeritus **Gary Parker** was recognized with Research.com's Earth Science Leader Award for 2023. The website also ranked him among the best researchers in the discipline of Earth Science – number 40 in the United States and number 73 in the world.

CEE graduate student **Vedang Patil** won the Structural Engineers Foundation Max Zar Scholarship.

Professor **Murugesu Sivapalan** was ranked number 52 in the U.S. and number 93 in the world in Research.com's 2023 Ranking of Best Scientists in the field of Earth Science.

Professor **Billie F. Spencer Jr.** was named a 2023 American Society of Civil Engineers Distinguished Member for pioneering new approaches to improve the performance of structures through mod-

eling, monitoring, control and optimization, and for his unwavering commitment to education/mentoring of students and to professional service.

Professor **Timothy D. Stark** received the 2022 Jennings Award from the Geotechnical Division of the South African Institution of Civil Engineering for his paper entitled, "Liquefied Strength Ratio with Stress Densification and Low Stresses."

Assistant Professor **Rafael Tinoco** received a 2023 Campus Distinguished Promotion Award. He will be promoted to Associate Professor with tenure as of August 2023. The award recognizes promotion cases that are exceptionally strong based on the scope, quality and impact of scholarship, teaching, service and engagement efforts.

Professor **Erol Tutumluer's** Ph.D. student **Hang Wang** won second prize at the Geosynthetics Conference 2023 student research showcase for her research on the evaluation of geosynthetics in aggregate stabilization using Bender Element Sensor Technology.

Assistant Professor **Jinhui Yan** has won the 2023 Gallagher Young Investigator Medal from the U.S. Association for Computational Mechanics. This award is given once every two years to junior faculty under 40 and is the highest award for young scholars in the field.

Assistant Professor **X. Shelly Zhang** was awarded a David C. Crawford Faculty Scholar Award. The award targets faculty members who excel in scholarly and service contributions to the CEE department. Zhang was cited for her teaching and for building a strong, independent research program as a junior faculty member.

Assistant Professor **X. Shelly Zhang** received the 2023 Young Investigator Research Program award through the Air Force Office of Scientific Research.



Watch faculty research webinars on YouTube



Geotechnical Problems Caused by the 2023 Kahramanmaraş - Türkiye Earthquakes

CEE Professor Tugce Baser with CEE alumni Ozgun Alp Numanoglu (MS 14, PhD 19) and Okan Ilhan (PhD 20)

Presented March 31, 2023



Research for an Electrified Transportation Future

Eleftheria Kontou
CEE Assistant Professor

Presented April 20, 2023



ACI student chapter wins third in nationals

Members of the American Concrete Institute's (ACI) student chapter in CEE at Illinois returned from ACI's spring national convention with a third-place overall win in the student competition. The ACI holds two national conventions a year which draw top universities and companies from around the world.

A particular highlight was the student research presentation competition, in which CEE at Illinois students won first and third prizes. First prize winner was Sangmin Lee, with the presentation "Concrete Characterization Using Ultrasound and Physics-Informed Neural Networks," co-authored by CEE Professor John Popovics. Third place winner was Krishna Polavaram, with the presentation "Understanding Radiation Damage in Concrete via Multi-Modal Characterization," co-authored by CEE Assistant Professor Nishant Garg.

Presentations are chosen based on

abstracts submitted prior to the conference; only 30% of submitted abstracts are accepted. A panel of judges assesses presentations in the sessions, and scores are based on technical merit and presentation quality. There were 14 total student presentations at this conference.

A particularly interesting competi-

tion requires students to construct a bowling ball using fiber-reinforced concrete. The construction quality is assessed through bowling the ball to knock down pins. The concrete mix design must meet weight limitations, and students must predict the strength performance.



Left to right: Representative from award sponsor, Giatec; Krishna C. Polavaram, Sangmin Lee; Mohammed Albahtiti; Assistant Professor Nishant Garg.



Winner dinner

The two winning teams from Professor Jeffery Roesler's CEE495 end-of-semester Request for Qualifications (RFQ) Presentation competition enjoyed dinner out in May. CEE alumnus Mickey Kupperman (BS 57), Chief Operating Officer of Silverstein Properties, helped with the competition. Left to right: Michael Molloy, CEE senior; Ben Kossack, CEE senior; Kupperman; his wife, Janice Kupperman; Jose Anaya, CEE senior; Noemi Carrasco, CEE junior; Isaac Acosta, CEE junior; Roberto Romero, CEE junior; Roesler's wife, Sandra Roesler (MS 95); Roesler (BS 92, MS 94, PhD 98); Anthony Dirico, CEE junior; and Will Wisniewski, CEE senior.

ERDC visitors tour CEE Building, Newmark Lab facilities

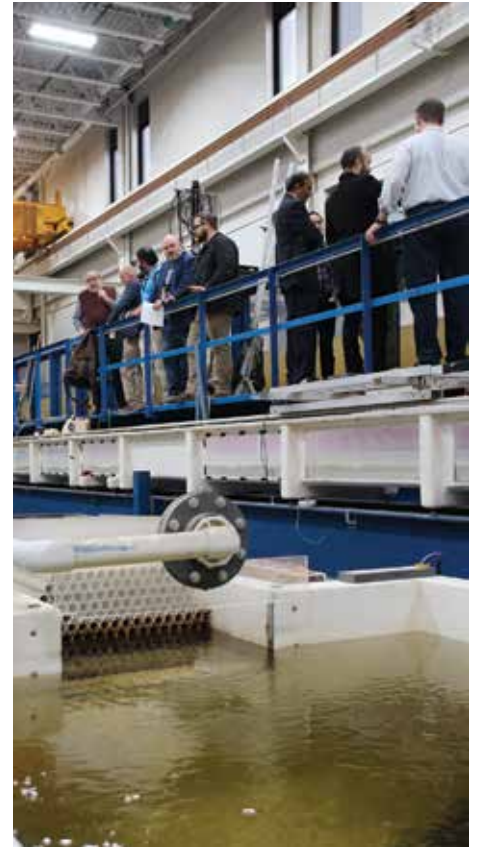
A group of visitors from the U.S. Army Corps of Engineers Engineer Research and Development Center (ERDC) toured several labs in the CEE Building and Newmark Civil Engineering Laboratory in February. Attendees included Andrew Nelson (MS 11, PhD 18), Director of the Construction Engineering Research Laboratory (CERL); Justin Berman, Associate Technical Director at ERDC's Cold Regions Research and Engineering Laboratory; James Allen, ERDC Technical Director; Timothy Shelton, ERDC Division Chief; and George Calfas, Supervisory Anthropologist at CERL.

The tour began with a visit to the Ven Te Chow Hydrosystems Laboratory, where the visitors learned about the Large Oscillating Water-Sediment Tunnel, the Kinoshita Meandering Flume, the large wave tank and more. Professors Marcelo Garcia and Rafael Tinoco were on hand to explain the capabilities of the equipment and talk about some of the re-

search the Water Resources Engineering and Science group is conducting.

Additional stops included geotechnical laboratories run by Scott Olson and Tugce Baser, Vishal Verma's environmental engineering lab, where he explained his ongoing research into air particle toxicity, and the Newmark Structural Engineering Laboratory under the direction of Larry Fahnstock. The tour concluded with a visit to the Concrete Materials Laboratory, where Nishant Garg and Jacob Henschen discussed 3D printing of concrete and characterization of low-carbon and sustainable construction materials.

"The relationship that CEE has with ERDC and CERL is a long-standing and important one," said Ana P. Barros, department head and Donald Biggar Willett Chair of Engineering. "We were thrilled to provide their delegation with an up-close look at our facilities and tell them about some of the exciting research currently happening in our department."



Professor Marcelo Garcia, far left, shows the visitors around the Ven Te Chow Hydrosystems Laboratory.



Steel Bridge team's success at regionals takes them to nationals

In April, the Steel Bridge student organization competed at the Western Great Lakes Conference, held at the University of Minnesota, Duluth. The Illinois team earned four awards:

- Construction Speed: 2nd place
- Cost Estimation: 2nd place
- Construction Economy: 3rd place
- Overall: 3rd place

Their performance at the regional conference earned them a spot at the Student Steel Bridge Competition National Finals, held June 2-3, 2023, at the

University of California, San Diego. At that competition, the Steel Bridge team came in 20th overall, out of 43 teams.

According to the students, they passed lateral deflection comfortably and their construction speed clocked in at just over 13 minutes. The team received penalties for bolt drops and stepping into the river.

Perhaps most importantly, the team feels that they gained valuable experience and knowledge that they will bring to their project next year.

Front row, left to right: Calvin Piemonte, Dan Zhuravel, Ryan Hammond. Back row, left to right: Konstantin Kotelnikov, Livia Bezati, Matt Ross and Joshua Zavala at nationals.

CORPORATE PARTNERS

PRINCIPAL PARTNERS

BNSF
RAILWAY

CN **GIC**

HANSON

Manhard
CONSULTING

Terracon

UNION PACIFIC
BUILDING AMERICA®

WJE ENGINEERS ARCHITECTS MATERIALS SCIENTISTS
Wiss, Janney, Elstner Associates, Inc.

LEGACY PARTNERS

benesch
engineers · scientists · planners

ExxonMobil

FULLERTON
ENGINEERING · DESIGN

LANGAN

SUMMIT
DESIGN + BUILD
CHICAGO · TAMPA

TROTTER
ASSOCIATES, INC.
ENGINEERS AND SURVEYORS
Experienced Professionals - Better Solutions
Serving the Community Since 1999

Turner

WE O'NEIL



Stephen M. Durian



Ali Omar



Gerald Voigt

2020s

Yen-Chu Wu (MS 22) received the U.S. Department of Transportation Council of University Transportation Centers Charley V. Wootan Memorial Award for her Master's thesis "Designing Electric Vehicle Incentives to Meet Emission Reduction Targets."

1990s

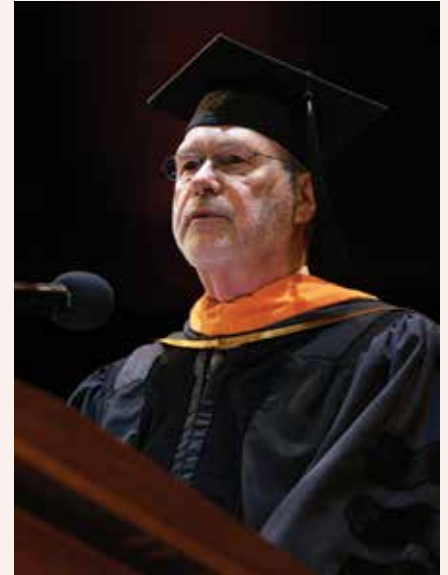
Stephen M. Durian (BS 94, MS 96) is the new Deputy Public Works Director for the city of Aurora, Co., leading the development review division. He was formerly the Transportation and Engineering Director for Jefferson County, Co.

Ali Omar (PhD 1997) was elected a 2023 Fellow of the American Meteorological Society.

1980s

Anthony M. Baratta, P.E., (BS 89) IDOT District 2 Local Roads & Streets Engineer, has retired after 42 years of service with the State of Illinois.

Gerald (Jerry) Voigt (BS 85, MS 87). P.E., M.ASCE, received the 2023 Wilbur S. Smith Award of the American Society of Civil Engineers Transportation and Development Institute. The award was established to honor contributions to the enhancement of the role of the civil engineer in highway engineering. Voigt is



CEE alumnus William F. Baker Jr. (MS 80) speaks at The Grainger College of Engineering Commencement on May 13, 2023. Baker is the Structural Engineering Consulting Partner at Skidmore, Owings & Merrill in Chicago.

President of Square One Pavement Consulting LLC.

1970s

Michael D. Engelhardt, P.E. (BS 79, MS 81) has been presented the Geerhard Haaijer Award for Excellence in Education by the American Institute of Steel Construction to recognize his profound impact on the structural steel design and construction industries. He is a professor at the University of Texas at Austin.

Plat H. Gulkan (PhD 71), a professor of civil engineering at Baskent University, Ankara, Turkey, was elected to the National Academy of Engineering for improving earthquake safety of buildings and seismic resilience worldwide.

Governor appoints Milhouse to UI Board of Trustees

Illinois Governor J.B. Pritzker has named CEE alumnus Wilbur C. Milhouse III (BS 94, MS 95) to the University of Illinois Board of Trustees.

Milhouse is the Chairman and CEO of Milhouse Engineering & Construction Inc., the fifth largest design firm in Chicago. The firm has branch offices throughout the United States, Africa and Bermuda. Milhouse also co-founded Milhouse Charities, a nonprofit organization dedicated to advancing academic achievements and opportunities for minorities and other underrepresented youth by sup-

porting STEM-focused organizations. Milhouse has served on The Grainger College of Engineering's Board of Visitors, the CEE Alumni Association Board of Directors and the board of University of Illinois Research Park LLC. He also served as convocation speaker for The Grainger College of Engineering in 2017.

His honors include the Chicago Area Entrepreneurship Hall of Fame Award



Wilbur C. Milhouse III

(2015), the Project SYNCERE Engineering Excellence Award (2019), the National Society of Black Engineers Dynamic Engineers Innovating Change Award (2019), The Grainger College of Engineering Alumni Award for Distinguished Service (2020) and the Civil and Environmental Engineering Alumni Association Distinguished Alumni Award (2018).

Milhouse holds nine professional engineering licenses in the United States. **I**

Hanson CEO named Grainger Distinguished Alumnus

Sergio "Satch" Pecori (BS 73, MS 74) has been named a Distinguished Alumnus of The Grainger College of Engineering. Pecori is chairman and chief executive officer of Hanson Professional Services Inc., a national, employee-owned engineering, planning and allied services company. With nearly 50 years of experience in the engineering industry, he has led Hanson's efforts to provide sustainable and resilient design services on complex projects worldwide. He is also highly regarded in the technical field, serving as an ambassador for the engineering profession in numerous leadership roles.

Pecori is a member of the American Council of Engineering Companies and served as chairman from 2017-18. He is also a member of the American Society of Civil Engineers (ASCE), serving on its Industry Leaders Council. He serves on

the Design Professionals Coalition's Executive Committee and is a member of the Illinois Society of Professional Engineers and the Institute for Sustainable Infrastructure's board of directors.

He has served on The Grainger College of Engineering Advisory Board and the University of Illinois Springfield's (UIS) Business Advisory Council for the College of Business and Management. He is a member of the University of Illinois Foundation President's Council.

Pecori has received numerous awards, including the U.S. Secretary of Defense Medal for Exceptional Public Service in 2015, the Ellis Island Medal of Honor in 2019 and ASCE's Outstanding Projects



Sergio "Satch" Pecori

and Leaders (OPAL) award in management. He also received the Distinguished Alumni Award from CEE at Illinois in 1999 and is a distinguished chapter honor member of UIUC's Chi Epsilon.

Pecori champions Hanson's support of The Grainger College of Engineering, CEE at Illinois, and the UIS College of Business and Management. As part of

Hanson's involvement in the Springfield Rail Improvements Project in Springfield, Ill., Pecori has led the development and implementation of the Grow Our Own Minority Participation Program, fostering minority students' interest in science, technology, engineering, the arts and mathematics (STEAM) careers. **I**

IN MEMORIAM



David Michael Waterman (MS 11, PhD 17), 49, of Charlestown, Ind., died on April 25, 2023, at the University of Louisville Hospital after a courageous battle with cancer.

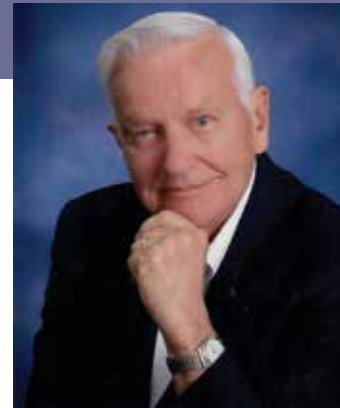
He was born on September 3, 1973, to Robert C. Waterman and Kathleen A. (Powell) Waterman of Charlestown.

He graduated from Charlestown High School (1991) and continued his education at Purdue University, earning a Bachelor of Science in Engineering (1996). Waterman began his career in the Portland, Ore., area in environmental engineering. He returned to the Midwest to attend graduate school in the Department of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign.

Waterman continued his career as a professor at the South Dakota School of Mines, where he was posthumously awarded Honorary Tenure. His field of study and research were in the area of sedimentation studies in rivers and streams.

In lieu of flowers, the family respectfully asks that you make a donation in David's honor to the laboratory where he spent many hours during his master's and Ph.D. work, the Ven Te Chow Hydrosystems Lab. Gifts may be made online at cee.illinois.edu/give. Please specify that you would like to direct your gift to the David M. Waterman Fellowship Fund. If you would prefer to make your gift in another way, please contact Steve Hall, stehall@illinois.edu, (217) 300-7830.

Robert M. Koscielny (BS 54) died Jan. 4, 2023, at age 90. He was the recipient of the Ira O. Baker prize at the time of his graduation from UIUC. He served in the U.S. Army and was honorably discharged in 1956. His career began at Bates and Rogers Construction Co., and he went on to establish his own company, Koscielny Property Management.



Robert M. Koscielny

L. Dow Nichol III (BS 53), died Nov. 5, 2021, in Winfield, Ill. He was 90. He graduated from Glenbard (now West) High School in 1949 and from UIUC. He served in the Navy Civil Engineers Corps. In Washington, D.C., he worked as a consulting engineer and earned a Bachelor of Law degree from George Washington University. He worked on a paper mill construction project in Hadera, Israel. He then had a 32-year career with Harza Engineering Company, where he specialized in planning, preliminary design and evaluation of hydroelectric projects. He worked in 16 countries.



Stanley T. Rolfe

Frances Doyne Proudfit, 98, long-time secretary to Nathan Newmark, passed away May 14, 2023 at the Windsor of Savoy. Born January 31, 1925, in St. Joseph, Ill., to Oscar and Hazel (Fisher) Hissong, she graduated from St. Joseph High School (1942) and from UIUC with degrees in English and Music (1946). She taught for a short time before joining the University of Illinois, where she served many years as secretary to Nathan M. Newmark, Head of the Department of Civil Engineering.



Raymond R. Tomasko

Stanley T. Rolfe (BS 56, MS 58, PhD 62), retired civil engineering professor at the University of Kansas, died Jan. 23, 2023, in Valley, Neb. He was 88. After earning three degrees in Civil Engineering at UIUC, Rolfe began his career at U.S. Steel. In 1969, he and his family moved to Lawrence, Kansas. At The University of Kansas, he served as a professor of civil engineering and in a variety of other roles for more than four decades. His professional legacy includes several editions of a co-

authored textbook, numerous awards and recognitions, and induction into the National Academy of Engineering.

Raymond R. Tomasko (BS 60) of Verdigris, Okla., died March 17, 2023, in Catoosa, Okla. He was 86. Born December 7, 1936, in Streator, Ill., he attended UIUC to study Civil Engineering. After graduation with his bachelor's degree, Tomasko moved to Oklahoma and started a more than 40-year career with the U.S. Army Corps of Engineers.



KNIGHTED!

CEE seniors Leah Courtney (left) and Abby Culloton (right) were inducted into the Knights of St. Patrick on April 29, 2023. Initiation into the Knights of St. Patrick is one of the highest honors an engineering student can achieve. It is presented annually by The Grainger College of Engineering to 8-15 students who represent leadership, excellence in character, and exceptional contributions to the College of Engineering and its students. In the middle is Christina Garcia, a fourth-year CEE student who served as this year's Knights Director.



Department of Civil and Environmental Engineering

The Grainger College of Engineering
University of Illinois Urbana-Champaign
Newmark Civil Engineering Laboratory MC-250
205 North Mathews Avenue
Urbana, Illinois 61801

NONPROFIT
ORGANIZATION
U.S. POSTAGE PAID
CHAMPAIGN, IL
PERMIT NO. 453

