FALL/WINTER 2017

CIVIL AND ENVIRONMENTAL ENGINEERING

UNIVERSITY OF WISCONSIN-MADISON

WE'RE EXPANDING OUR STRUCTURES LAB!

Photo: Todd Brown

CHAIR'S MESSAGE

David Noyce

Greetings, alumni and friends,

I am so proud to be chair of the Department of Civil and Environmental Engineering at a time when we are enjoying unprecedented growth—not only in our student body, but also in our faculty!

I'm pleased to report that CEE now has 30 tenured or tenured-track professors. It's been nearly two decades since we have had that many faculty members—and we are continuing to hire: In the 2017-2018 academic year, we are seeking up to four faculty members and I will be excited to introduce our new colleagues to you. (You also can "meet" Greeshma Gadikota, our amazing new assistant professor in environmental engineering, in this newsletter.) Supported by our 28 adjunct professors and many more affiliated professors and research professionals, our faculty were excited to welcome more than 600 undergraduate students to campus this fall. Approximately 130 of these undergraduate students joined our degree program in geological engineering (GLE). GLE is an outstanding instructional and research program offering BS, MS, and PhD degrees as part of the CEE family. CEE is also the home of another outstanding program offering MS and PhD degrees—the Environmental Chemistry and Technology Program (EC&T). The synergy created with each program makes every day a great day in CEE.

It's impressive to note that we are one of only a handful of CEE programs across the country that are experiencing increases in enrollment. And along with the growth of our student body, we also are pioneering innovative ways to educate these young engineers—including developing an outstanding new curriculum that prepares them to succeed as professionals. In tandem, we are significantly enhancing our research and teaching laboratories; you can read about one of those endeavors—construction of a major addition to our structural engineering research laboratory—in this newsletter. Gifts from our alumni and friends played a critical role in this project; when we asked, they responded generously!

I'm also excited to tell you about developments in our autonomous vehicle research. Not only are we leading research in the Wisconsin Automated Vehicle Proving Grounds—a university, industry, government partnership that is researching, testing and advancing development and deployment of self-driving vehicles—but we recently established a collaboration with Southeast University in Nanjing, China. The Southeast University transportation engineering program is ranked first in China and researchers there are building a significant international autonomous vehicle proving grounds. Our formal partnership and leadership in the development of the organization will enable us to collaborate on and lead research in autonomous vehicles on an international scale. Finally, in mid-November, we sponsored a multi-day event during which we showcased a driverless Navya shuttle in Madison and on our engineering campus. The event marked the first time a driverless vehicle has "visited" Wisconsin!

The news we've included here is only a small snapshot of the many great things happening in our department. I invite you to visit our website, www.cee.wisc.edu, to learn why CEE at the University of Wisconsin-Madison is bigger, stronger and better than ever before!

ON, WISCONSIN!

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STRUCTURES LAB EXPANSION IS UNDERWAY

On Sept. 18, 2017, CEE hosted a groundbreaking ceremony for the Jun and Sandra Lee Wisconsin Structures and Materials Testing Laboratory. The new facility will allow structural engineering faculty, students, collaborators and industry partners to forge new ground in the full-scale testing and evaluation of structural elements and building materials.

The 2,500 square foot addition to the laboratory will include a high-strength floor and multi-story post-tensioned reaction wall with grid high-strength anchors, an overhead crane, and access to the exterior, making it possible to test structural components up to 40 feet long. The addition was made possible by a $1 million lead donation from Jun (BSCE '68, MSCE '69, PhDCE '73) and Sandy Lee (BA '69) and many other contributions from the department's friends and alumni.

"For our students, the new lab provides the kind of hands-on experience that is invaluable to their education and among my own top priorities for their time at UW-Madison," said College of Engineering Dean Ian Robertson at the ceremony.

"The lab will help attract top faculty and students to our program so that we can continue to build upon CEE's long history of outstanding structural engineering education and research," added C.K. Wang Professor Gustavo Parra-Montesinos.

ADJUNCT PROFESSORS HELP STUDENTS BRIDGE ACADEMIC TRAINING AND PROFESSIONAL WORLD

In the spring semester's first lecture of the senior capstone design class, instructor Mark Oleinik (BSCE '76, MSCEE '78) likes to show the CEE students a picture of a random pile of bricks. "That's your brain," he says.

Then comes a picture of a brick wall. "That's your brain on capstone, after you've organized all of its pieces so that you end up with something," he says. "Because ending up with something is what engineering is all about."

The class challenges the seniors to put on the hat of a professional engineer for one semester and take a real-world project all the way from design to implementation. But they're not in it alone.

Each team of four to five students typically works with two mentors, and many of these (including Oleinik) are adjunct professors at UW-Madison. CEE is proud—and perhaps unique in the country—to have not just a handful, but nearly 30 of them.

Rahel Desalegne, whose appointment began in fall 2015, has a simple summary for the value this group of practitioners brings to the department: priceless. "I think they are CEE's hidden gem," she says. "If you add the combined professional experience of these 28 people, you have almost 1,000 years of knowledge that's being passed on to the next generation of engineers."

Department chair David Noyce agrees wholeheartedly. "This group essentially doubles the size of our department," he says. "Our adjunct professors love what they do, and their dedication shows in the quality and breadth of their contributions."

The Accreditation Board for Engineering and Technology Inc. (ABET) agreed as well, noting during its most recent department review that the level of involvement by practitioners was unique and contributed significant value to the training program.

The adjunct group has officially existed for about a decade, starting with former department chair Jeffrey Russell asking Michael Doran (BSME '72, MSCEE '74) in 2008 to become its first chair and Professor Greg Harrington to serve as its academic liaison. Russell's goal was to formalize the connection between the department and the practitioners who were helping with its teaching mission.

Most adjunct professors are CEE graduates and have had (or still have) successful careers in the public or private sector in different specialties, such as transportation, construction, architecture, water, environmental or geological engineering. To better support its diverse goals, the group recently formed three committees: governance, integration of practice, and education.

The governance committee provides a framework for sharing and archiving information and practices for the benefit of future adjunct professors. The integration of practice committee, which Desalegne co-chairs with John Corbin, focuses on enhancing the students' experience outside the classroom.

This fall, for example, the committee hosted an inaugural CEE Discovery Series workshop called "World of Water," where short presentations by a mixed panel of academics and professionals were followed by a Q&A session with an audience of more than 100. As a native of Ethiopia who received her academic training in Germany, Desalegne also brings a wealth of international connections to the adjunct faculty group.

The education committee, which Oleinik co-chairs with Kathryn Huibregtse, focuses on curriculum development and classroom teaching and mentoring. While the adjunct faculty are involved in a wide range of instructional activities, two classes rely especially heavily on their support: the senior capstone design course (Civ Engr 578), which has been held every semester since fall 2001; and the freshman design practicum (Inter Engr 170), which the adjunct faculty helped develop and teach for the first time in fall 2016.

"Most students in the College of Engineering are now required to take this freshman course, which provides an introduction to the process of team-based design," Doran says. It helps students decide on their major, and often their specialty within that major, as they are exposed to the whole breadth of the engineering profession.

The senior capstone design course typically requires at least 10 additional mentors and judges for the students' final presentations. Their projects range from the design of parks and buildings, including Taliesin, the estate of American architect Frank Lloyd Wright, and Lake Monona's waterfront in Madison; to wastewater, stormwater and drinking water infrastructure; to wind farms and historic landmarks.

Some capstone teams have won national accolades, such as a first prize at the industry-sponsored North American Design Competition and a "Rising Star" award from a competition sponsored by the American Society of Heating, Refrigeration, and Air Conditioning Engineers.

According to Jo Tucker (BSCE '77; MSCE '85, University of Louisville), who is the adjunct group's current chair, all members enjoy their interactions with the students, whether they involve formal teaching or informal mentoring. "It's really fun to see a young person learn, grow and take charge of their work world," she says. "Helping to educate the future of the civil and environmental engineering profession allows us to give back to the department that has shaped our own careers."

CLOSING ELEMENTAL LOOPS WITH GREEN CHEMISTRY TOOLS

As a toddler, Greeshma Gadikota was drawn to chemistry by the smell of acidic fumes from her father's company. While they may not have been the healthiest exposure, those fumes became some of her earliest and most powerful childhood memories. She also found it fascinating to watch the mixing of massive amounts of material in boilers and reactors and the transfer of fluids from one tank to another.

"Chemical engineering was something we talked about at the dinner table," remembers Gadikota, who joined CEE in June 2017 as an assistant professor and Grainger faculty fellow. "Between smells, sights and evening discussions, I knew at a pretty young age that my own career would also revolve around chemical reactions."

Gadikota spent the first 17 years of her life in Hyderabad, India's fourth-largest city. Along with her love of all things chemical came an early appreciation for financial accountability as she was expected to help with billing and administrative tasks for the family business from time to time.

Outside of school, Gadikota enjoyed creating art and writing prose. Having excelled in high school math and chemistry, she set her eyes on American colleges and left India at age 17 to study chemical engineering (with a minor in economics) at Michigan State University.

With a bachelor's degree in hand at age 21, Gadikota wasn't ready to commit to an academic career just yet. She moved to New York City for a master's degree in operations research and spent a few years working on Wall Street. The maturity she gained from this experience served her well in graduate school. "I brought the same work ethic I learned at my Wall Street job to pursuing my degrees at Columbia University," she says.

That work ethic helped her juggle a full plate of research and teaching duties, as well as mentoring undergraduate and master's students, while completing a master's and PhD in chemical engineering. Like her graduate advisor Ah-Hyung (Alissa) Park, Gadikota chose to apply her chemical engineering skills to energy and environmental topics.

For the next 18 months, she stayed at Columbia as a postdoctoral researcher with a joint appointment in chemical engineering, earth and environmental engineering, and the National Institute for Standards and Technology. Next, she moved to New Jersey for a second postdoctoral fellowship at Princeton University. Her goal was to understand the chemical nature of global environmental problems with tools ranging from the nano- to the macroscale.

"At Columbia, I concentrated on experimental chemistry, and at Princeton, I did more computational work," Gadikota explains. "Those different angles, and some valuable time for soul-searching, helped me articulate the research questions I now want to tackle as a junior faculty member."

> "For me, UW-Madison was in many ways a one-stop shop."

In a nutshell, she studies the materials we use to produce energy and consumer goods in order to close elemental loops with more sustainable chemical reactions. A prime example is the carbon loop: It starts with extracting carbon-containing fossil fuels (coal, oil and natural gas) and burning them to generate energy, and ends with releasing carbon dioxide and other gaseous forms of carbon into the atmosphere.

To reduce the detrimental impact of the resulting carbon imbalance, Gadikota is pursuing two distinct strategies for closing the loop: integrating carbon dioxide into construction and pavement materials, or putting it back underground with carbon capture, utilization and storage technology. The latter is a long-term strategy that removes the majority of carbon dioxide from industrial and power plants to either inject it back into geologic formations or use it for other commercial purposes.

Gadikota also studies hydraulic fracturing (fracking) technology for natural gas extraction, which relies on high-pressure water injection into drilled boreholes to create fractures and fissures in gas-bearing shale formations. Replacing some of this water with other fracturing fluids would reduce fracking's environmental impact. Last but not least, she researches how to close elemental loops for rare earth metals in consumer goods with new urban waste recycling pathways.

All of these interests also are a great fit for Environmental Chemistry and Technology graduate training program, which Gadikota joined in summer 2017, and for the class on sustainable energy and resource recovery she is teaching in fall 2017. Knowing that it takes a lot of people power to bring her ideas to life, she had already recruited her first PhD student before she even moved to Madison with her husband, an engineer at Exact Sciences with experience in strategic marketing, and their three-year-old son.

The decision to come here was an easy one. "For me, UW-Madison was in many ways a one-stop shop," she says. "I think a large public Big Ten school provides more program stability than many smaller private schools, along with a wealth of other resources, regardless of whether I decide to focus on research, teaching or commercialization of my research findings—or all of the above."

DEEPENING OUR UNDERSTANDING OF ROCK STRESS FOR UNDER-EARTH EXPLORATION

Photo by NASA Landsat, via Wikimedia Commons

Aerial image of Tarim Basin in northwest China, where rock samples for the study were obtained.

Measuring unobservable forces of nature is not an easy feat, but it can make the difference between life and death in the context of an earthquake, or the collapse of a coal mine or tunnel. To manage the risk of such events, researchers often rely on estimating a quantity called rock stress.

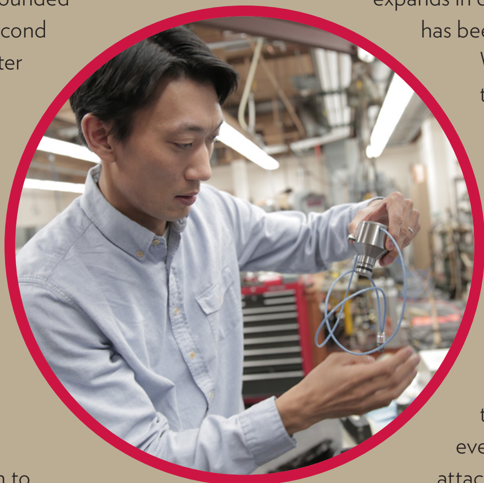
"Rock stress—the amount of pressure experienced by underground layers of rock—can only be measured indirectly because you can't see the forces that cause it," explains Assistant Professor Hiroki Sone. "But instruments for estimating rock stress are difficult to use at great depths, where the temperature and pressure increase tremendously."

Addressing this challenge, Sone and his colleagues in China and Japan have now pushed the limits of rock stress measurements that don't require temperature-sensitive instruments to new depths, from a previous maximum of 4.5 kilometers (2.8 miles) to a whopping 7 kilometers (4.3 miles).

In a study published in July 2017 in *Scientific Reports*, the researchers used rocks sampled from a well bore of that depth to show that stress estimates obtained by the so-called anelastic strain recovery method were consistent with a visual analysis of borehole wall images, a reliable but often infeasible approach that requires a specialized scanner.

"These new results give us confidence that we can use the anelastic strain recovery method at greater depths than we thought possible."

The scientists conducted their proof-of-principle study in the Tarim Basin in northwest China, an area almost two-thirds the size of Alaska that is surrounded by K2, the world's second highest mountain after Mount Everest, and several other mountain ranges. The region is well known to historians because of its association with the Silk Road, an ancient trade route between China and the Mediterranean.



Hiroki Sone prepares a rock sample for deformation measurements under stress conditions in a triaxial rock mechanics apparatus. *Photo by Stephanie Precourt.*

Today, in addition to historians and mountain climbers, petroleum companies have taken an interest in Tarim Basin, as it contains some of the largest oil and gas resources in Central Asia. These companies want to understand the region's geology to assess whether drilling may trigger seismic activity since many smaller earthquakes have occurred in the surrounding mountains.

For Sone and his colleagues, this presented a unique opportunity to advance the methodology for measuring rock stress. "We wanted to test the reliability of the anelastic strain recovery method at up to 7 kilometers depth because its main advantage is that you only need to sample and analyze the rock itself," Sone says. "It estimates stress indirectly by measuring how much the rock sample expands in different directions after it has been recovered."

With that kind of depth, the recovery process—pulling a large enough rock sample out of a borehole—can take a few days, which is why the researchers were excited to prove that the method still worked.

For the first time, they measured rock stress even when sensors weren't attached to the sample until 65 hours after coring and found that the results matched a conventional image analysis of the borehole wall, obtained with a resistivity scanner.

"These new results give us confidence that we can use the anelastic strain recovery method at greater depths than we thought possible," Sone says. "As long as the rock deforms the same amount in vertical and horizontal directions, this method is much easier to apply when very high temperatures and pressures in the Earth's crust challenge the other options in our toolbox."

MAKING SENSE OF BRIDGES LOADED WITH SENSORS

Brock Hedegaard

UW-Madison has a few iconic landmarks: the statue of Abraham Lincoln in front of Bascom Hall, the Carillon Tower, and the colorful Union Terrace chairs on the shore of Lake Mendota.

But one of its most heavily traveled structures is the Park Street bridge between Library Mall and Bascom Hill that hundreds of students and staff cross every day. Since spring 2017, some of these pedestrians may have wondered why students regularly unload and attach a jumble of wires and sensors to the bridge.

"People sometimes ask if my students are going to blow it up," says Assistant Professor Brock Hedegaard—tongue in cheek, of course.

He supervises three master's students as part of a project whose goal is to collect one year's worth of vibration data from sensors, or accelerometers, that are attached to the pedestrian bridge. Since Hedegaard plans to develop novel "sub-structuring" analysis methods, the students use several sets of "boundary sensors"—similar to the frets on a guitar—to collect vibration data from sub-sections of the bridge, as well as its entirety.

"Let's say we have some corrosion on a guitar string, but plucking the entire string doesn't help us pinpoint its location because it only affects a small fraction of the string," Hedegaard explains. "If we hold down two adjacent frets and pluck only the section of string between them, we will likely notice a much bigger difference in sound because the percent of damage is greater."

These sub-structuring analysis methods may help monitor those parts of a building or bridge that have incurred the most visual damage from an earthquake while also providing information on how that damage affects the entire structure, all while taking into account the data's natural long-term variation.

The Park Street Bridge project is part of Hedegaard's larger research focus on evaluating how structural fingerprinting methods work in the real world. This interest started with his dissertation project at the University of Minnesota, where he began to analyze a gigantic new set of structural monitoring data in 2008.

In that case, the data came from sensors attached to the rebuilt I-35W bridge in downtown Minneapolis after its startling 2007 collapse, which killed 13 people. That disaster created the research impetus to improve structural monitoring methods and transformed the mindset of Minnesota's Department of Transportation—as well as its data storage needs, as the new sensors filled up the server in less than a year.

Hedegaard has continued to analyze the I-35W bridge data since his move to UW-Madison in fall 2014, with a focus on identifying structural degradation on a background of normal variation in traffic patterns and outside temperatures observed over several years.

Graduate students attach sensors to the Park Street bridge to collect vibration data.

"In order to monitor a structure's long-term health, we first need to understand the data's normal fluctuations that fall within the safety range," Hedegaard says. "When we discovered just how large that normal variation is, it was certainly an eye-opener for me and many other engineers."

He notes that analysis methods for long-term monitoring data continue to be developed today, especially since structures like the I-35W bridge—with 500 channels of data collected at least once every hour for an expected lifespan of 75 years—aren't yet common in the United States.

"An important goal of modern design philosophy is to incorporate monitoring plans into the design," Hedegaard says. "That means small problems can be fixed before they accumulate and the kind of sudden and large-scale collapse we saw with the I-35W bridge will be less likely to occur."

The Park Street Bridge connects Library Mall and Bascom Hill.

Photos: Stephanie Precourt

RESEARCHERS TRACK GROUNDWATER USE BY TREES IN KEY WISCONSIN REGIONS

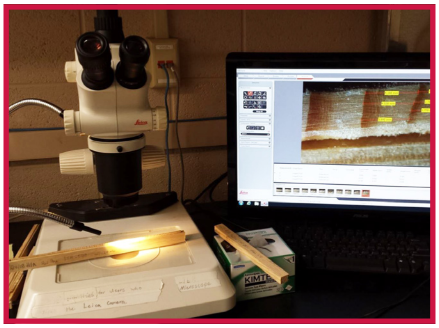
Steve Loheide

Let's say you're putting together your monthly budget and account for all existing resources, deposits and expenses. But there's one problem: You've forgotten to include your electric bill.

Just as that household budget would be inaccurate, so too is the groundwater budget in certain areas of Wisconsin, where a potentially significant user of the state's groundwater resources—its copious forests—is often left out.

"For groundwater management, it's critical to account for all users, but we currently don't have any good estimates of direct groundwater use by forests," says Associate Professor Steve Loheide.

With support from the UW Water Resources Institute, Loheide and graduate student Dominick Ciruzzi are examining exactly how much groundwater is being used by trees, and how the changing levels of available groundwater may have affected the trees' growth over time.



Studying the tree cores can give researchers a clear idea of whether the levels of groundwater were high or low in a given year.

The project is focused on two areas: The temperate highland forests of Wisconsin's Northwoods near Minocqua and forests in the Central Sands region, both of which feature sandy soil that can't retain water as effectively as other soil types. The Northwoods forest serves as the baseline that will help researchers better understand the Central Sands region, which has experienced an increase in groundwater use by high-capacity wells.

Like most plants, trees survive on shallow soil moisture, only resorting to groundwater in years with low precipitation. To gauge how much groundwater trees are using, Ciruzzi plans to monitor wells—10 in the Central Sands region, 15 near Trout Lake—for daily fluctuations in the water table. The bigger they are, the more groundwater is being used by the trees.

This covers the present, but the researchers also want to learn about the trees' past groundwater use. To that end, Ciruzzi collects tree core samples (small enough to be stored in a drinking straw) to measure their growth rings. A low growth rate indicates a dry year and deep groundwater use.

"We want to use the growth rings, the chronology held within the trees themselves, to tell us how productive those trees were in the past and how much water they were using," says Loheide. "By comparing this to current conditions, we can reconstruct a record of what was happening in the past."

His hypothesis is straightforward: In areas where the groundwater is shallow and close to the surface (3 to 8 feet), trees will be able to access it and grow consistently and productively. But in areas where the water table depth has changed—due to a changing climate or well pumping activity, for example—Loheide expects more variability in the growth rings. Ultimately, the research could have an impact on both forest and groundwater management strategies.

"The forests have an effect on the groundwater system by using it and changing water levels on their own, and conversely, changing water levels have an effect on the health of the forest," Loheide says.

Navya's passenger shuttle is one of many autonomous vehicles worldwide in various stages of development. Its display on the engineering campus in November 2017 underscored UW-Madison's leadership role in the federally funded Wisconsin Automated Vehicle Proving Grounds project, a collaboration among industry, government and academia that will advance the state of the art in this revolutionary form of transportation.

Photo: Renee Meiller

Photo: Barry Staver for ASCE

STUDENTS CEMENT THEIR WINNING STREAK

The American Society of Civil Engineers has held the National Concrete Canoe Competition for the last 30 years and UW-Madison students have been no stranger to the challenge. In June 2017, they competed against 19 other teams, including three from Canada and one from China, to win sixth place overall, fourth for oral presentation and fifth for design paper.

"It's one of those unique challenges to show the ability of engineering students across the nation to be creative," says this year's project co-manager Addison Pierskalla, who oversaw the canoe's design and construction with Allissa Munden. "You have to create a concrete mix that's less dense than water, so when you completely submerge the canoe, it floats back up on its own. Not only do you get to create a work of art out of concrete, but you also get to physically race and paddle in it."

Pierskalla says this has been one of the biggest years for team membership, with about 30 students helping to build the canoe. Typically, civil engineers make up half the group and the rest represents mechanical, industrial and chemical engineering. Many students participate for several years. "The team has a family feel," Pierskalla says. "You become best friends over the years and through that, you take on more responsibility on the technical aspects, too."

The rules for the competition are distributed each September, followed by regionals in March and nationals in June. The UW-Madison team has a history of success, having won regionals several years in a row and nationals a total of seven times. Many alumni continue to be involved at some level. "I remember getting about 10 text messages from alumni the morning that the rules were released saying they're up now," Pierskalla says.

Faculty advisor Chin Wu provides assistance when needed, but the project is driven by the students' own motivation. This year's design was inspired by the Wisconsin-born architect Frank Lloyd Wright, with concrete inlays paying homage to the chevron design of Prairie Style stained glass windows.

In addition to the race, the students—ranging from freshman to senior, plus an occasional graduate student or two—compete for the best canoe display and oral presentation, for which an entire day is dedicated.

With such a tight-knit group, initiative—such as plenty of note-taking at the displays and presentations—doesn't go unnoticed. "The thing I was most pleased with was the maturity of the team, especially in the younger members," Pierskalla says. "They took careful notes because they were so interested in driving the team next year, not because we told them to do it."

For Pierskalla, the benefits of getting involved go well beyond resume building and winning a race. "This is an opportunity to learn the skills you want to use for full-time employment," he says. "Your goal should be to better yourself and your team by focusing on something positive, other than just winning the competition."

ASCE held its 30th National Concrete Canoe Competition in Golden, Colorado in June 2017. *Photo courtesy of Colorado School of Mines.*

CEE STUDENTS PURSUE JOHN NOLEN'S VISION OF A SIGNATURE PARK FOR MADISON

Photo: Jeff Miller

When you're in the business of designing parks or buildings, a frequent piece of advice is this: Start small, but dream big. That's because you're usually in it for the long haul—even when you eventually become as famous as Wisconsin-born architect Frank Lloyd Wright.

Case in point: The Monona Terrace Community and Convention Center in Madison opened its doors in 1997, almost 60 years after Wright first sketched its design on paper.

Yet, shorter turnaround times are possible, as UW-Madison's Witte Hall dormitory illustrates: It took less than five years for design ideas hatched by CEE undergraduates to materialize in the ongoing dorm renovation. And CEE adjunct professor Fred Klancnik, who has been a regular mentor for the senior capstone design class since 2014, is cautiously optimistic that Witte Hall won't be the last example.

In fact, the next one may have an intimate connection to Frank Lloyd Wright as it involves Law Park, located close to Monona Terrace along John Nolen Drive, and the Lake Monona boathouse that was one of Wright's first designs at UW-Madison in 1893, when he was a civil engineering student himself.

"Law Park's revitalization is a project I worked on with two capstone teams in spring 2017 as part of our larger vision for the Nolen Waterfront, which includes building Wright's boathouse," Klancnik says. "We started small, but the idea has gained traction with key stakeholders at the city, county and state level. While it's too early to say when exactly it may be executed, the momentum is definitely there."

Today's vision is inspired by a stunning master plan for Madison that landscape architect John Nolen prepared in 1909. Since he believed the city had one of the greatest waterfronts in the world, he proposed a signature park connecting the downtown area to Lake Monona. However, his design was never realized and today's Law Park is a small sliver of land dominated by a six-lane roadway and rail corridor.

Signature parks that started with big dreams similar to Nolen's and eventually came to fruition include Chicago's Millennium Park and The Presidio's Crissy Field in San Francisco, both widely considered a perfect embodiment of each city's character and brand.

In Madison, key partners in ongoing conversations about the Nolen Waterfront are the Madison Design Professionals Workgroup, a group of architects, engineers (including Klancnik) and other experts who have worked pro bono on the project since 2012; Downtown Madison Inc., a nonprofit organization devoted to broader downtown revitalization efforts; the Clean Lakes Alliance, an environmental nonprofit organization for the Madison area's Yahara Lakes; and the Madison Community Foundation, a charitable organization that has managed endowed funds for 75 years.

Also participating in these conversations are three May 2017 civil engineering graduates—Rodey Batiza, Helen John and Miles Tryon-Petith—who have been continuing their capstone projects as members of conceptual planning teams convened by the Madison Design Professionals Workgroup.

Beyond conversations, evidence of momentum toward realizing Nolen's vision includes a recently approved $500,000 City of Madison budget for continued Law Park design efforts and a supportive audience of more than 200 (including several potential private and public sponsors) at a September 2017 event hosted by Downtown Madison Inc. that included explicit kudos for the capstone students' contributions.

"I cannot over-emphasize the help we received from UW-Madison's Department of Civil and Environmental Engineering," said Dave Mollenhoff, a local historian, book author and member of the Madison Design Professionals Workgroup. "I wish I had the time to tell you how they drilled down to the details of this project to produce reports that would cost thousands of dollars from consultants. This, friends, is a brilliant example of what we call the Wisconsin Idea."

To see two of the Nolen Waterfront conceptual plans that were started by CEE undergraduates, visit:
www.engr.wisc.edu/cee-students-pursue-john-nolens-vision-signature-park-madison/

ENGINEERS' DAY 2017
DISTINGUISHED ACHIEVEMENT AWARD RECIPIENTS

Alain Peyrot

Retired President, Power Line Systems • MSCEE '66, PhDCEE '68

> **We honored Alain for his exemplary achievements as a structural engineer, faculty member, entrepreneur, philanthropist and UW-Madison alumnus.**

Structural engineer Alain Peyrot, a native of France who grew up in Madagascar, was a CEE faculty member from 1970 to 1997. In his research, he specialized on the structural design and behavior of high-voltage electric power lines, which eventually led him to establish the start-up company Power Line Systems. Under his leadership, it became a global pioneer for software to design, construct and manage high-voltage electric power lines. Today, the software is used by more than 1,600 companies in more than 125 countries.

Read more about Alain:
https://www.engr.wisc.edu/alain-peyrot-2017-distinguished-achievement-award-recipient/

Daniel Piette

Board member, Petroleum Geo-Services • BSMineE '80

> **We honored Dan for his career-long leadership in mining engineering and big data, which has helped introduce new technologies to the energy industry.**

Mining engineer Dan Piette, who grew up in Appleton, Wisconsin, has held executive roles in eight start-up companies for energy-related technology. For the past 10 years, he has served as the vice chair of the Board of Directors for Petroleum Geo-Services, which assists oil companies in identifying new oil and gas reserves. He was attracted to mining because it combines many different facets of engineering—chemical, civil, mechanical and industrial—with business economics.

Read more about Dan:
www.engr.wisc.edu/daniel-piette-2017-distinguished-achievement-award-recipient/

Dennis K. Henning (BSCE '77) was named a distinguished engineer of the Texas Engineering Foundation at the annual meeting of the Texas Society of Professional Engineers in Austin, Texas. The award recognizes the service of a licensed professional engineer in the technical advancement or the professional development of engineering, or both. Henning is a Madison native who has worked in Texas for more than 35 years.

Anthony Heddlesten (BSCE '07) received the Public Education Award from the Illinois Association for Floodplain and Stormwater Management, which recognized his efforts on increasing public awareness of the association's mission. For his interactions with the public, he also received an employee of the year award from the Rock Island (Illinois) district of the U.S. Army Corps of Engineers. Heddlesten is the district's lead flood area engineer.

Mark Ray (BSCE '06), a Madison native and director of public works for the city of Crystal, Minnesota, received the American Public Works Association's Myron Calkins Young Leader award at the PWX conference in Orlando, Florida. The award recognizes young members who have demonstrated a significant commitment to the profession and show potential for future growth within the association.

Professor Emeritus **Kenneth Potter** received the Ray K. Linsley award from the American Institute of Hydrology for his outstanding research contributions to surface water hydrology at the annual conference of the American Water Resources Association in Portland, Oregon. The award was established in 1986 and honors Linsley's impact on hydrology, including the Stanford watershed model that is used by researchers around the world.

Professor Emeritus **Tuncer Edil** received the Woodland G. Shockley Memorial award from the committee on soil and rock of ASTM International, an international standards organization, for his exceptional service to the committee's activities. An ASTM International member since 1984, he has also received the committee's awards for special service (2001, 2013), technical editing (2013) and standards development (1992, 1996, 2013, 2017).

ALUM'S CAREER PATH FROM SUMMER INTERN TO MODERN CONSTRUCTION EXECUTIVE

David Thomack

As an accomplished alum of the construction and engineering management (CEM) program, David Thomack (BSCE '94, MSCE '95) has combined field work and higher education in his profession and maintained strong connections to the department that made his career possible.

Born and raised in Madison, Thomack didn't have to venture far from home for college and graduate school. As an undergraduate student in CEM, he spent each summer interning with the Hoffman construction company, working his way up from laborer to superintendent. After completing his bachelor's and master's degrees in 1995, he became a field engineer and project manager with the M.A. Mortenson company.

Next came the Boldt Company, where he began as a senior project manager and is now the executive vice president and general manager for the company's western operations in San Francisco, California. During his 12 years with Boldt, he has overseen the construction of several large hospitals and research centers, including the Wisconsin Institutes for Medical Research at UW-Madison. He specializes in green building design and lean construction, with credentials from the U.S. Green Building Council's Leadership in Energy and Environmental Design and the Lean Construction Institute.

Thomack has also participated in academic research efforts with CEM chair and Boldt Company Professor Awad Hanna. He has mentored many students and participated in the UW Construction Club, a student organization that provides professional experience and networking opportunities.

"I think the greatest strength of the CEM program is its tradition of industry collaborations," Thomack says. "I'm proud to continue this tradition as part of the Boldt Company's long record of supporting CEM and the College of Engineering."

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GOLF OUTING SCORES BIG

CEE held its 21st annual golf outing on September 29th at Pleasant View Golf Course in Middleton, Wisconsin. Seventy-five companies sponsored the event, the course was full of 216 golfers, and more than $75,000 was raised to support our students and the department. Thanks to the hard work and continued dedication of our golf committee and the support of our sponsors and golfers, the event was a great success!

Save the date for next year's outing: September 14, 2018