

# CEE

Department of Civil and Environmental Engineering  
University of Illinois at Urbana-Champaign  
*Winter 2012*



## Renewal

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# CEE

CEE is published twice a year for alumni and friends of the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. Those alumni who donate annually to CEE at Illinois receive every issue.

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# CEE

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## Leading the world

BY AMR S. ELNASHAI, PROFESSOR AND HEAD

WILLIAM J. AND ELAINE F. HALL ENDOWED PROFESSOR IN CIVIL AND ENVIRONMENTAL ENGINEERING

Our department has reached a milestone of great significance. We have just been reviewed by a distinguished external panel of six members of the National Academy of Engineering, including two university presidents, a recent past president of the American Society of Civil Engineers, the chair of the CEE department viewed as our top competitor, a past vice president and provost of one of the most distinguished universities in the world, and the senior vice president of a major global company.

Ours was no simple external review. We engaged with the panel about eight months before their site visit by sharing and jointly developing contents of the information that would facilitate their review. We talked, debated, agreed and disagreed. We opened our records and provided new statistics never compiled before. The “we” in the preceding sentences is not the royal “we” referring to the department leadership, or the “we” referring to the front office. The “we” is for the overwhelming majority of the faculty and the overwhelming majority of the staff. Counting, our Overview Report was developed, reviewed, edited and formatted by 53 individuals who are employees of CEE. By the time we were ready to host the distinguished group, our understanding of the operation of the department, the gaps that exist in some aspects and the pressing issues that we need to address were clear, and the benefit from being assessed by an external team was at least in part already realized.

We hosted the review panel for two days, with the chair of the panel arriving one day earlier. We delivered 17 coordinated presentations comprising 199 slides, after handing over a comprehen-

sive report of 72 pages, and a supplementary electronic compilation of all departmental documentation and statistics, in more than 400 pages. I characterize the outcome of the review in three components: a strong acknowledgement of the top quality and leadership of the CEE department; an unequivocal endorsement of integrative and interdisciplinary initiatives already under way; and a set of insightful recommendations to address perceived threats and to galvanize the leadership position of the department in both the medium and long terms.

One of the significant recommendations from the panel was that three themes that we have developed to guide our research and education to address global challenges require more focus. Our themes of Infrastructure Renewal, the Water-Energy-Environment Nexus, and Societal Risk Management were considered too broad to be operational. The implications of the recommendation from the panel for more focus urges us to draw more detailed implementation plans to turn the vision into reality and to provide metrics for measuring progress toward achieving our goals. We have taken the review panel’s recommendations to heart, and

we have pledged to articulate our plans by spring 2012. From their side, they expressed willingness to provide additional review and comments. We will report in due course on our progress toward hav-

ing a final implementation plan for the next five years.

Perhaps one of the earliest steps the department took toward integrating its excellent specialty sub-groups within the department and with other related disciplines on campus was changing the model for hiring faculty from area-based management to a department-wide approach. The effort has thus far delivered five exceptional new faculty members who represent the vision of more integrated and forward looking educational and research programs. For example, one of our new professors had an adviser from CEE and another from Industrial Engineering, works clearly between two of our department’s seven areas, namely Environmental Engi-

neering and Science, and Environmental Hydrology and Hydraulic Engineering, and provides a critical link between the department and the campus communities working on bioenergy and biotech-

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nology. Another new faculty member is working with Electrical and Computer Engineering professors in the interdisciplinary Coordinated Science Lab, as well as Environmental Engineering and Science and structural engineering colleagues from CEE, while his main contribution is in transportation engineering. Another of our new professors is applying for grants under mathematics programs, while working on theoretical modeling of novel soft solids, and teaching structural engineering courses. Another new professor in our department is traditionally trained in one sub-discipline, geotechnical engineering, but planning to apply her tools in emerging topics such as energy exploration and tsunami hazards. Our newest professor is a structural engineer leading the application of robust quantitative tools to address problems in many other disciplines within and beyond CEE and exploring the interface of engineering and ethics.

We have added these five tenured or

*The external review team poses with CEE faculty (left to right): CEE Professor Imad Al-Qadi; CEE Professor Praveen Kumar; CEE Professor and Associate Head for Graduate Affairs Al Valocchi; CEE Professor Benito Mariñas; CEE Professor Charlie Werth; Henry T. Yang, Chancellor, University of California at Santa Barbara; CEE Professor Bill Spencer; David E. Daniel, President, University of Texas at Dallas; CEE Professor and Head Amr S. Elnashai; Lisa Alvarez-Cohen, Fred and Claire Sauer Professor of Environmental Engineering and Chair, Department of Civil and Environmental Engineering, University of California, Berkeley; CEE Professor and Associate Head for Undergraduate Affairs Liang Liu, Glen T. Daigger, Senior Vice President and Chief Technology Officer, CH2M Hill, Denver, Colo.; Robert L. Street, Campbell Professor Emeritus, Department of Civil and Environmental Engineering, Stanford University; and William F. Marcuson III, Chair, President of W. F. Marcuson III and Associates Inc., Vicksburg, Miss.*

tenure-track professors within the past year and we are currently interviewing for up to four more faculty positions, which will result in approximately 20 percent new faculty by spring 2012. These professors will be the role models for those students who aspire to work on the peripheries of traditional sub-disciplines and indeed on the peripheries of disciplines, and to address system-level societal problems. Our rigorous core competencies are also protected and enhanced, by virtue of the strong background of all new professors in fundamentals of en-

gineering, and their undisputed ability to train our students in areas other than their own research domains. We are by no means avoiding hiring faculty with more traditional training, but we will continue to focus on excellence and not on replacement, while being mindful of the requirements of educating a combined total of 1,300 undergraduate and graduate students at the highest level.

A defining moment in our strategy was when we established the first multi-

*Continued on page 6*

Continued from page 5

disciplinary construct, which we refer to as a program, with the charge of developing comprehensive features of education, research and outreach in Sustainable and Resilient Infrastructure Systems (SRIS). This cross-cutting group draws members from our traditional sub-disciplines; there will be no hiring of professors in programs since such a step would lead to more fragmentation, not integration, of the department. The SRIS program was charged with launching a minimum of three specific activities, namely:

- New undergraduate program content
- Graduate (M.S. and Ph.D.) program content
- A department-wide seminar series

It is gratifying to note that the SRIS program is now in full flight, with all three activities fully implemented after an elaborate process of development, scrutiny, revision and approval. Our students are very appreciative of the effort of the department and are embracing the new primary and secondary fields of study that the Sustainable and Resilient Infrastructure Systems program has launched. The new interdisciplinary seminar series have been a great success, with audiences comprising students and faculty from many different areas. The M.S. program has been approved recently and is accepting applications for a first cohort of students to start in fall 2012. This program is complemented by exciting training opportunities with overseas experience under the departmental initiative of Global Leaders in Civil and Environmental Engineering.

We are also engaged in solidifying the financial future of our CEE department to benefit our students. Taking advantage of our success in developing new revenue streams that have led to the strongest finances that our department has enjoyed in the past 10-15 years, we are taking steps to improve the educational experience of our students and expand even

further our research program. Two specific actions soon to be implemented are major investments in the CEE Research Experience for Undergraduates (REU) and the Discovery and Innovation Grants. The former is a program whereby the CEE department will entertain proposals from students and faculty mentors to fund research assignments with durations of eight weeks. The application process and the reporting requirements are simplified with the goal of attracting participation by many of our students and faculty. The Discovery and Innovation Grants is a new program in CEE in which faculty apply for research funding for time-sensitive, fast turn-around ideas where an injection of resources has the potential of leading to significant outcomes, avoiding the inevitable delays and uncertainties associated with seeking funding from external sources.

Finally, we are modernizing our physical infrastructure to underpin the implementation of our strategic plan. Departmental facilities have gone through a major transformation. We recently inaugurated the Yeh Student Center, with six state-of-the-art lecture rooms and space for interdisciplinary collaboration and meetings. We have coupled the opening of the Yeh Student Center with upgrades, underway and planned, for our buildings on campus, Newmark and Hydrosystems, including renovation of entrance halls and installation of interactive displays, and addition of design studio facilities that enable the enhancement of project-based learning experiences for our students.

With a sharpened and widely-shared vision, a comprehensive implementation plan, exceptional students, reinvigorated curricula, expanded and interdisciplinary faculty, cross-cutting programs and management structures, and state-of-the-art laboratory and education infrastructure, our department is as strong as it has ever been and is in a position to lead the civil and environmental engineering field in learning, discovery and serving its varied stakeholders.



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# Now what?

By LAWRENCE P. JAWORSKI, P.E., (BS 72, MS 73)  
PRESIDENT, CEE ALUMNI ASSOCIATION BOARD OF DIRECTORS

By now you have read the articles, viewed the pictures, and maybe even watched the video (available on the CEE website) of the ceremony surrounding the dedication of the Yeh Student Center adjacent to Newmark Civil Engineering Laboratory. It was a beautiful fall day on campus with the sun shining and mild temperatures. It was indeed a pleasure and—after almost 40 years—a huge relief to finally have the Yeh Center open and in use.

During my visit to campus for the CEEAA board meeting, dedication, and football game, I got to see first-hand how heavily the students are using the center. Once again, a huge “thank you” to Geoffrey Yeh for his very generous matching gift and to all of you who stepped up and accepted Geoffrey’s challenge to pledge funds and finally see the completion of this \$7 million, 20,500-square-foot addition to the CEE campus.

So, now what?

We’ve been talking about the Yeh Student Center for so long that with the center now completed, the question has to be, “Now what?” Well, I can tell you that there are a wide range of activities going on within our department. During my last visit to campus for the dedication and CEEAA board meeting, I was able to sit down with Amr Elnashai, department head, and catch up on developments in CEE. Our discussion was wide-ranging and covered topics such as the department’s having the largest undergraduate and graduate enrollment ever, to topics like the fact that the average ACT entrance score to the department is now almost 31—the highest in six years. (Makes me glad I’m not competing for a slot now.) Amr reports the department is doing well, even though the University as a whole is still struggling.

Here are a few additional items of interest:

- A six-person panel of engineering educators, academic leaders and practitioners—all National Academy of Engineering members—conducted an external review of the department in October. Their report praised the department’s faculty, research, academic programs, and students and offered recommendations for continued excellence.
- The CEE at Illinois online master’s program continues to be a huge success and—did I mention? —a solid revenue stream. Currently online degrees can be obtained in construction management; transportation engineering; or infrastructure. Check it out on the department website.
- Professor Elnashai also reports that the department’s “Take Your Advisee to Lunch” initiative is a success. This is an effort directed toward strengthening ties between the academic staff and the students. It is great to hear that, as always, our department continues to adapt and change to meet the needs of today’s students and thereby retain our national excellence!

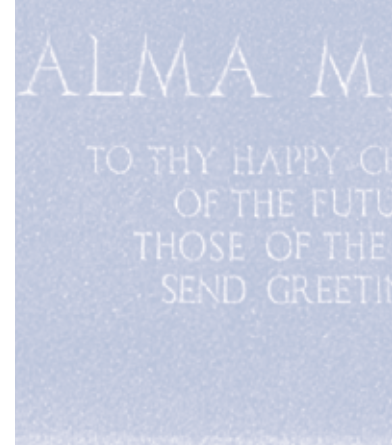
As a preview of coming attractions, mark your calendars now for our annual CEE Alumni Dinner and Awards Presentation scheduled for Wednesday, March 14, 2012, in Chicago. In addition, given the impressive success of our first-ever CEE Golf Outing, watch for details of our second annual golf outing that will be held in the Chicagoland area on July 12.

Finally, don’t forget to do your after-holiday shopping for all your CEE-logo items at the CEE Store. There’s a link on the department website <https://my.cee.illinois.edu/buy/>.

Go Illini!



We’ve been talking  
about the Yeh  
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## Upcoming alumni events



### CEE Golf Outing

July 12, 2012

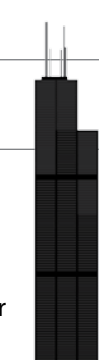
<https://my.cee.illinois.edu/golf>

### Alumni Dinner in Chicago

March 14, 2012

<https://my.cee.illinois.edu/ad>

Details and registration available at the websites listed. Please contact Breanne Ertmer for more information. Email: [ertmer@illinois.edu](mailto:ertmer@illinois.edu); phone: (217) 265-5426.







# Yeh Center is dedicated

The department's new Yeh Student Center was formally dedicated September 23. Hundreds of alumni and donors gathered on campus for the event, for which speakers included University of Illinois President Michael J. Hogan and lead donor M.T. Geoffrey Yeh (BS 53).

The \$7 million M.T. Geoffrey Yeh Student Center is a 20,500-square-foot addition to Newmark Civil Engineering Laboratory. Completed in July, the Yeh Center provides state-of-the-art classrooms, meeting rooms and gathering space for the department's 1,300 students.

The project was funded entirely through private gifts, a particular accomplishment given the economic challenges of recent years, said Professor Amr S. Elnashai, CEE department head.

"Our success in raising the required funds and providing our students a state-of-the-art facility is a testament to our vision and drive, and to the faith our alumni and friends have in us," Elnashai said. "Through economic peaks and troughs, CEE at Illinois has remained the top-ranked department. When many departments were contracting, we were building a new student structure that was

donated entirely by our alumni, faculty and friends."

In addition to Hogan and Yeh, other speakers at the event included Interim Vice President and Chancellor Robert Easter, College of Engineering Dean Ilesanmi Adesida, and Vice Chancellor for Institutional Advancement James Schroeder. Also speaking was current department head Professor Amr S. Elnashai and former department head Professor Robert H. Dodds Jr. (MS 75, PhD 78), who spearheaded the Yeh Center project.

The \$4 million naming gift for the student center was given by Illinois alumnus M.T. Geoffrey Yeh, a real estate developer and philanthropist from Hong Kong.

The construction of the Yeh Student Center fulfilled the original vision for Newmark Laboratory, built in the 1960s, which included plans for an additional structure for classrooms. At that time, budget constraints prevented its realization. Before this year, civil and environmental engineering students have attended class in various buildings across the campus. In addition to state-of-the-art classrooms, the Yeh Student Center provides CEE students with a designated home on cam-

## Watch the video




Scan this code with your smart phone or view the video on the department's website, [cee.illinois.edu](http://cee.illinois.edu).

For more pictures of the Yeh Center, visit [cee.illinois.edu/yehcenter](http://cee.illinois.edu/yehcenter)



pus where they can hold student group meetings, study, collaborate on projects, and meet informally. It features sustainable design, including a green roof.

The dedication festivities included a formal ceremony and reception September 23 and a CEE pre-game party before the football game September 24. 





“Through economic peaks and troughs, CEE at Illinois has remained the top-ranked department. When many departments were contracting, we were building a new student structure that was donated entirely by our alumni, faculty and friends.”

—Amr S. Elnashai



#### Photos

Top left (l to r): CEE student Sam Ball, Professor Robert H. Dodds, Vice Chancellor for Institutional Advancement James Schroeder, College of Engineering Dean Ilesanmi Adesida, Interim Vice President and Chancellor Bob Easter, University of Illinois President Mike Hogan, M.T. Geoffrey Yeh, Professor and Head Amr S. Elnashai, CEE student Jill McClary. Above, top: Yeh poses with the donor recognition wall in the lobby of the Yeh Center. Above, bottom (l to r): Yeh; his wife, Helen; daughter Yvette Yeh Fung; son-in-law Carl Fung; and son V-Nee Yeh. At right: Yeh with Professor and Head Amr S. Elnashai.



## W.E. O'Neil Classroom



*L to r: Paul Roundy, Dean Arnold, Rich Erickson, Bill O'Neil, Janet O'Neil, Bob Dodds, John Hackett, Amr Elnashai, Pat McGowan, Rich Davey.*

## Olson Classroom



*L to r: CEE student Jill McClary, Nathan Martin, John Valleau Sr., Cindy Valleau, Meghan Valleau, John Valleau Jr., Katie Valleau, CEE student Sam Ball.*

## Khachaturian Hall



*L to r: Jon Khachaturian, Bobbi Khachaturian, CEE students Evgueni Filipov and Dan Borello, Margaret Khachaturian.*

## Hay Classroom



◀ *L to r: CEE student Carrie Desmond, Alan Butler, Peter Nicholson, Mike Franke, Jean Franke, Ronald Drucker, Rapik Saat, Libby Barkan, Chris Barkan, CEE student Ryan Kernes.*

▼ *L to r: CEE student Thomas Frankie, Richard Newmark, CEE student Brian Schertz.*

## CEE Alumni Board Conference Room



▲ *L to r: CEE student Brian Schertz, Wilbur Milhouse, Stan Herrin, Dave Byrd, Katie Zimmerman, John Kos, Ken Floody, Al Staron, Larry Jaworski, Colleen Quinn, Lynne Chicoine, Dan Burke, Frank Powers, Paula Pienton, Greg Cargill, John Carrato, CEE student Thomas Frankie.*

► *L to r: CEE student Kathryn Born, Don Manhard, Trish Manhard, Donnie Manhard, CEE student David Nauheimer.*

## Newmark Classroom



## Manhard Consulting Classroom







#### **College of Engineering Dean Ilesanmi Adesida**

"The Yeh Center represents the kind of first rate classroom and collaborative space that students who choose a premiere engineering college at a world-class university want and expect. In Engineering at Illinois, we are continually working to make the curriculum and the environment better support the exceptional students that we attract. ... And no question about it, the civil and environmental engineering students are exceptional. This is a consistently top- ranked department by any and every measure. We have the world's best and brightest students and faculty here; we can prove it.



#### **University of Illinois President Mike Hogan**

"This new state of the art building is a testament to what can be achieved, even in the midst of the worst economic downturn since the Great Depression, and it's a model for the donor support that is now so critical and will continue to be so critical going forward to assure that the greatness that so many of us have worked so hard to build at the University of Illinois over the last century and a half continues unabated into the future. Your gifts have advanced our excellence at a time when we never could have done it on our own. You've added yet another jewel to the department that is the pride of our campus and the envy of peers around the world."



#### **Professor Robert H. Dodds Jr.**

"I can't believe this day is here. About 25 years ago, Prof. Bill Hall, then head of the CEE department, initiated the earliest planning for this wonderful new building we dedicate today. Each dept head since Bill moved the concept along, but during my first year as head in the fall of 2004 I decided we really needed to get this project done. ... Thinking back, it was probably when I was walking to teach a class somewhere down on the quad during one of those -10 degree December mornings that we often have right before finals. ... It was well past time to revive modern classrooms, meeting and study space for students in one of the world's best civil and environmental engineering programs."



#### **Professor and Head Amr S. Elnashai**

"It is my immense pleasure to welcome you here today. It is a glorious day. ... It is a real milestone in the history of our department and in the lives of our students—an event that will be remembered for many years to come as a time when we at last realized the original plan and aspirations of having a comprehensively equipped home for the top-ranked civil engineering department. ... This is our thank-you day to those who have made this day a reality."

# Renewal

**I**ncreasingly, CEE at Illinois is focusing its research and instruction on multidisciplinary, global research projects and instructional programs that address three of society's most pressing civil engineering challenges: renewal of the infrastructure; the nexus of water, energy and the environment; and the management of risk to society from natural and human-made disasters. This is in response to an emerging awareness of society's most pressing needs, in both developed and developing countries.

Researchers in the department are conducting innovative research with the power to address these challenges and, through instructional innovations, are preparing students to be leaders with the knowledge and vision to meet them.

On the next few pages, we focus on just a sampling of the work being done in the area of infrastructure renewal.

In 2009, the American Society of Civil Engineers gave the U.S. infrastructure systems a grade of D and estimated that \$2.2 trillion is needed to repair, maintain or upgrade the systems that support economic progress and societal safety. Recognizing this need, CEE researchers are developing breakthrough technologies for structural health monitoring, extending the life of recycled pavements, improving the seismic design of above- and below-ground structures, and much more. The department's new program in Sustainable and Resilient Infrastructure Systems will ensure that today's students will graduate armed with the knowledge and tools to rebuild society to be better than before.

The result will be renewed infrastructure that is stronger, safer, greener, and more cost-effective. Sustainability is a key focus, ensuring that the innovations of today will lead to better infrastructure tomorrow.

**In 2009,  
the American Society  
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U.S. infrastructure systems  
a grade of D.  
Research and instruction  
by CEE at Illinois faculty  
is focused  
on raising its grade.**





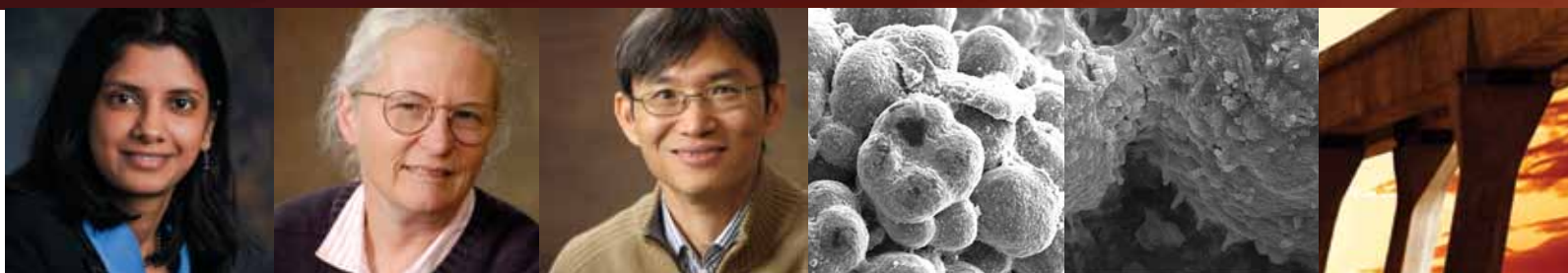
istockphoto.com/Agnieszka szymczak

## New program: Sustainable and Resilient Infrastructure Systems

The department's new program in Sustainable and Resilient Infrastructure Systems will address emerging approaches to infrastructure systems, focusing on resiliency and sustainability of interconnected infrastructure—for example, structural, geotechnical, and water interactions in urban environments. The program aims to prepare new generations of civil engineers who are ready to address pressing societal issues while developing needed infrastructure. For example, students will be able to use system-level approaches and thinking to achieve sustainable use of material and resources in the construction of engineered systems. Students will learn to balance short-term costs of facility development and the need for integrating the facility within an infrastructure system that is resilient to natural and human-made disasters.

The SRIS program offers an undergraduate primary area and enables graduate students with an interest in integrated research, education and practice to obtain cross-disciplinary M.S. and Ph.D. (pending) Civil Engineering degrees. The program also seeks to stimulate work among researchers from the department's traditional areas, working in multi-disciplinary groups, leading to cross-disciplinary projects that address critical societal problems. **I**

[cee.illinois.edu/SRIS](http://cee.illinois.edu/SRIS)



# Biomining: The key to self-healing concrete

By LEANNE LUCAS

A crack in the sidewalk outside your front door is not that big a deal when you first notice it. But before long the crack has grown, and you know if you don't deal with it soon, you could be looking at a major repair. Now fast-forward a few years. You notice a crack on Monday, but you're not worried. By Friday it will have 'healed' itself. Sound impossible?

Maybe not, according to a team of CEE researchers. Assistant Professor Paramita Mondal, graduate students Bin Zhang and Ashna Chopra, Professor Leslie Struble and Professor Wen-Tso Liu are studying biomining, the process by which living organisms produce minerals as a possible method to promote concrete crack remediation. In other words, self-healing concrete.

"Concrete is basically weak in tension and strong in compression," Mondal said. "People have tried to deal with the problem over the years in a variety of ways. The most common solution has been to use steel rebar to reinforce concrete. Reinforced concrete is stronger, but it still cracks," she said. "And you might find this crack when it happens, one month later, or six months later. As this delay increases, the repair cost increases. Or the area might be so damaged you need to replace the structure partially."

Another method suggests that some of the cement powder that was initially used to make the concrete still resides in the structure; contact with water (rain water or ground water) could cause the remaining powder to react and fill up the space. Of course, there is a limit to how big a crack could be filled, so researchers at Michigan have tried putting fibers in concrete to minimize crack width and control the damage. Yet another method puts glass spheres or tubes filled with

glue in the concrete. If the concrete cracks, the glue cracks and releases the glue to fill up the space. This method has been effective, but limited. If there is another crack in the same location later, the glue is gone.

"The work we are doing puts bacteria in concrete, to mimic the way limestone forms in nature," said Mondal. "In nature, bacteria that form calcium carbonate are known to influence the rock formation process of carbonate rocks and sediments such as limestone. The list of bacteria capable of forming calcium carbonate is extensive, but the challenge was finding one that would be active in concrete's environment of high alkalinity and low oxygen."

The family *Bacillus* suits all the conditions, said Mondal. *B. pasteurii* is a non-pathogenic microorganism commonly found in soil and is not known to have any effect on human health.

The first step was to test the bacteria's growth in the laboratory. "We provided the bacteria, the food and the right environment," said Mondal. "We could see that it was depositing the minerals, which are the basic building block of limestone. This has been achieved in a test tube.

"Then we made a cement specimen and applied the bacteria with food," Mondal continued. "We saw the same kind of deposition. We did a chemical analysis of it, and it is the same calcium carbonate that's forming."

Eventually, the team hopes to prove that after introducing these microorganisms into concrete during mixing, they

**"It's an innovative concept—definitely outside the box."**

will form spores, or hibernate, in the highly alkaline condition inside the concrete. Once a crack occurs, the pH level at the cracked surface will drop due to the exposure of surface to air. The combination of the pH drop and a flow of oxygen and carbon dioxide at the crack face will activate the microorganisms and will provide the conditions favorable for growth. The microorganisms will deposit calcium carbonate, and as the crack fill up, the supply of oxygen and carbon dioxide will be interrupted, causing the microorganisms to hibernate again, ensuring the continual effectiveness of the microorganisms in filling up cracks at the same location.

Mondal said there are a few ongoing research projects in several parts of the world on the use of microorganisms in developing self-healing construction materials, and researchers are reporting that the biomining technique is promising based on its effect on compressive strength due to filling up pores inside concrete. However, Mondal said that an increase in compressive strength is not sufficient proof that the bond between the newly developed deposit and the cracked material is sufficient to regain part of the strength lost due to cracking.

"That is the specific goal of our project," she said. "We are testing the specimen to see whether the crack is going through the filling material, through the original material, or through the interface. That will tell us which part is the weakest."

"Conceptually, all of this should work," Mondal concluded, "but there is lots more research to be done. It's an innovative concept—definitely outside the box."

*Photos (l to r): Paramita Mondal; Leslie Struble; Wen-Tso Liu; a bacteria-induced mineral deposit; a higher magnification of the same sample, showing bacteria cells on the surface.*





## Wireless structural health monitoring advances with a second system deployment

By LEANNE LUCAS

CEE researchers continue to make advancements in the field of structural health monitoring for civil infrastructure. The research team is part of the Illinois Structural Health Monitoring Project (ISHMP) led by Professor Bill Spencer of CEE and Professor Gul Agha of the CS department.

Structural health monitoring (SHM) of civil infrastructure in real time offers the potential to reduce inspection and repair costs while providing increased public safety. In the summer of 2009, researchers at Illinois developed an inexpensive, wireless means for continuous and reliable SHM. That system is currently in use by 75 research groups in 15 countries. Later that year, a joint project between Illinois, KAIST in Korea, and the University of Tokyo resulted in the successful deployment of these sensors on the Jindo Bridge in South Korea to achieve the world's largest wireless SHM system.

At that time, the team deployed 71 state-of-the-art, wireless smart sensor nodes designed to record and transmit more than 427 channels of complex, high-fidelity data. Each node was com-

prised of the Imote2 (including on-board CPU, radio, and power management integrated circuit), the ISM400 sensor board, and a battery. Eight of the 71 nodes were self-powered using solar panels and rechargeable batteries. The nodes measure 3-axes acceleration, temperature, humidity and light.

"Based on the success of the 2009 deployment, in 2010 the network size was increased to a total of 659 channels on 113 sensor nodes," said Spencer. "One hundred of the nodes use our ISM400 sensor board, but we've developed a new high-sensitivity accelerometer board that's used for 10 of the nodes. It allows us to measure lower levels of acceleration and vibration. The remaining three nodes are connected to 3D ultrasonic anemometers to measure and collect the speed and direction of the wind on the bridge."

All the nodes are now solar powered, and a mini wind turbine was installed on one node to assess the potential for wind energy harvesting. In addition, the research team is working with MEMSIC Inc.

*Continued on page 20*



shm.cs.illinois.edu



*Photos (top to bottom): The Government Bridge, located over the Mississippi River between Rock Island, Ill., and Davenport, Iowa, on which a wireless monitoring system is deployed. CEE Technical Service Supervisor Tim Prunkard is installing sensors on the top chord of the bridge. Bill Spencer. Point your smart phone's QR code reader at this code to watch a video of the Government Bridge's draw span opening to allow boat traffic to pass. You can also watch the video here: [http://www.youtube.com/watch?v=IGq7ZQAzM\\_0](http://www.youtube.com/watch?v=IGq7ZQAzM_0).*



# New materials, designs help create bridges that can take the shake

By LEANNE LUCAS

Bridges are a critical component of infrastructure, ensuring the transportation of goods as well as people. Two research projects underway in the Department of Civil and Environmental Engineering address the design for safety and functionality of bridges in the aftermath of an earthquake.

Associate Professor James LaFave and Assistant Professor Larry Fahnstock have worked with the Illinois Department of Transportation (IDOT) on a three-year project, funded through the Illinois Center for Transportation, to evaluate IDOT's earthquake resisting system (ERS) strategy for the design and construction of new bridges in Illinois.

"The nature of the earthquake hazard is more highly variable than almost any other type of loading," said LaFave, "and at its upper limits, it's quite severe. It's not practical to design structures that sustain no damage at all, but rather one should try and have a 'hierarchy' of damage. We're evaluating IDOT's ERS strategy to determine how favorable their idea of the hierarchy of damage is to what would actually happen in an earthquake. One aspect of that is to understand experimentally how the bearing assemblies behave [the components between the main bridge superstructure and the concrete piers/abutments], and to then evaluate that analytically in the context of the whole bridge as a system."

"On the west coast of the U.S., they use specialized isolation bearings that have unique shapes and material properties to allow movement and to dissipate the earthquake-induced energy," Fahnstock said. "They're expensive and wouldn't necessarily be viewed as an acceptable approach here. We would like to achieve a response in bridges here in Illinois that is similar to what is achieved in higher seismic regions, but we'd like to achieve it with more typical kinds of bearings and components."

They are investigating the use of elastomeric bearings, which in their simplest forms are just a steel plate attached to the girder above with

a thick rubber pad that sits on the concrete. The basic function of elastomeric bearings is to allow thermal movement, or expansion and contraction due to ambient temperature, of the bridge. The rubber pads deform and allow the bridge to move and not build up stress during normal service life.

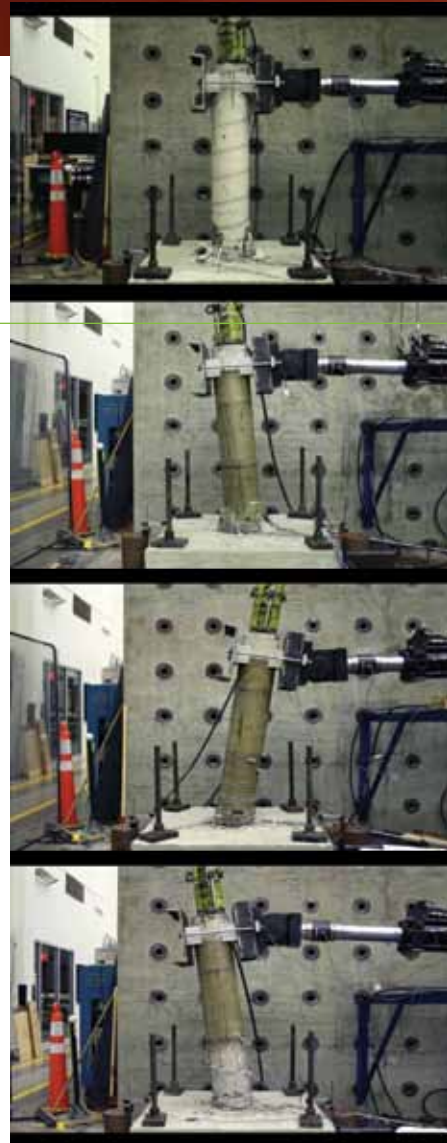
"We're studying the idea that these 'ordinary' components can potentially function as isolation bearings," Fahnstock said. "They're not very expensive, and they have the potential to allow the bridge to move a good deal during an earthquake and dissipate energy."

"We're developing a greater base of fundamental understanding as to how the key components of these bridges behave, based on sound research testing and analysis," said LaFave. "We're then using that knowledge in conjunction with our IDOT partners to ensure that there can be a predictable, favorable hierarchy of damage that develops so that a bridge remains serviceable after a large seismic event."

A second project that will advance research in the area of retrofitting and repairing current structures, is one being undertaken by Assistant Professor Bassem Andrawes, who received the 2011 National Science Foundation Faculty Early Career Development (CAREER) Award to develop and study a new technology that uses smart materials to reinforce lifeline concrete structures with the aim of mitigating damage from strong earthquakes.

"When an earthquake hits, a bridge needs to deform in a ductile manner. Bridges that were built 40 or more years ago lack this ductility," said Andrawes.

Current technology used to improve the



*Photos above: Screen captures from video of Andrawes' tests comparing the damage to a bridge pier with seismic loading for a traditionally built pier compared with alternative methods. Top to bottom: the as-built column was non-ductile, so it sustained severe damage at low drift levels; a traditional retrofit method using passive confinement resulted in severe damage to the column at moderate drift levels; a hybrid method using a shape memory alloy spiral as a supplementary retrofit measure proved to be very effective; no signs of significant damage were observed in the column retrofitted with shape memory alloys (active confinement) even at extremely large drift levels. Code: Point your smart phone at this QR code to watch a video about Bassem Andrawes' work with smart materials. Photos at top (l to r): James LaFave, Larry Fahnstock, Bassem Andrawes.*

*Continued on page 20*





## Project increases safety of building deep

BY BRIAN KORNEILL

As U.S. cities continue to expand, the sustainability of urban environments is a pressing concern. Cities are faced with providing more space for people to live and work. Often, the most efficient option in crowded urban areas is to build vertically, resulting not only in taller structures, but also in ones that take advantage of the more cost-effective underground space.

This necessity in areas that are seismically active brings particular challenges, says CEE Professor Youssef Hashash.

"With urban renewal, we are building very tall structures next to extensive underground structures in many U.S. cities, and we do not know how they will perform during large seismic events," he said.

This question is the central focus of a study, funded by the Network for Earthquake Engineering Simulation (NEES), on which Professor Hashash is collaborating with colleagues from Colorado University (CU) Boulder and the San Francisco-based engineering firm, Arup. Since this is not only a U.S. concern, there is also a parallel

study happening in Japan. Both arms of the project are focusing on how the need for more living space above-ground—for example taller buildings—and more underground transportation solutions—for example, subways—can be balanced with safe, sustainable design methods.

The biggest challenge of the project is that the issue of how underground structures will interact with taller structures during seismic events is simply not currently understood, Hashash says. In order to get a better sense of what happens to these structures during an earthquake, researchers at CU Boulder are carrying out physical experiments on models that simulate seismic events. Hashash and his team will use the information gathered in these tests to perform complementary computational modeling. The result will be a greater understanding of how buildings and underground structures interact when under stress from an earthquake.

Given how complex underground structures are becoming, the study will not only be looking at stand-alone struc-

tures such as parking garages, but also other subterranean structures, including tunnels that run under buildings and/or criss-cross one another. Having a clearer picture of these interactions will lead to better design tools and information for engineering and design firms—"a product that is of immediate practical use to the profession," Hashash says.

The inclusion of Arup, which focuses, in part, on innovative, sustainable infrastructure designs, as a project collaborator is key to ensuring the tools developed from the study are of effective use to the practitioner, Hashash says.

These new tools will make it safer and more sustainable to build up and down in close proximity—a growing necessity for urban environments, Hashash says.

"The use of the underground is part of the objective to have more sustainable, more livable cities," Hashash says. **I**

*Photos: The Transbay Transit Center in San Francisco, where extensive underground structures will exist in close proximity to tall buildings (BusinessWire); Youssef Hashash.*



# Recycling promises greener future for transportation

By BRIAN KORNEILL

The aging of the nation's transportation infrastructure necessitates countless projects to repair, maintain and replace crumbling pavement. The recycling of road materials yields clear benefits to the environment and is more cost-effective, but it is not often put into practice due to uncertainties about the behavior of recycled materials and their effect on pavement durability, says CEE Professor Jeffery Roesler (BS 92, MS 94, PhD 98).

"Not all recycled material will be useful for every application," he says. "We must test and characterize its properties and develop mixtures and applications for this material to ensure it can be constructed properly and last the intended service life."

Two current research projects by transportation faculty promise to increase the viability of recycling road materials. Ultimately, the goal is to make the concrete/asphalt products containing recycled materials last as long, about twenty years, as those made with all new materials, Roesler says.

A good quantity of asphalt harvested from road projects is still in useable shape. Reclaimed asphalt pavement (RAP) can be mixed in with new materials for road surfaces, which makes it both more cost-effective and better for the environment. Concrete can also be recycled and used as an aggregate (it is known as RCA when used in this manner) in new

concrete mixes.

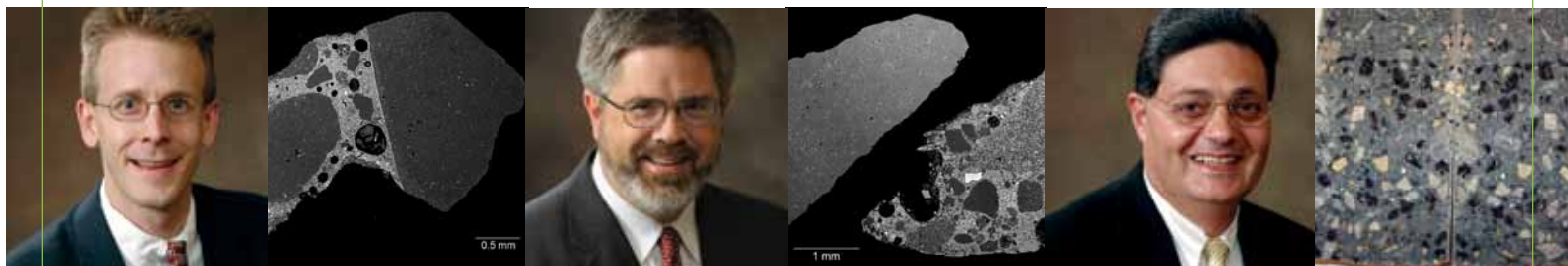
RCA is the focus of a project by researchers led by Roesler and Professor David Lange for the O'Hare Modernization Project at O'Hare International Airport, which is funded by the O'Hare Modernization Program and the City of Chicago through the University of Illinois Center of Excellence for Airport Technology. Roesler and Lange were initially brought on to find a use for the crushed concrete that resulted from O'Hare's updating of runways, taxiways, and apron areas. The RCA was used to replace virgin aggregate in new concrete slab replacement for the existing apron areas. Researchers developed the concrete mixtures, then tested them to determine if the materials created would meet the service life requirements for the O'Hare airfields. The ongoing project, which started in 2006, has evolved to include finding ways to use the large amount of fine RCA that has also been generated from the airport's projects. Heavy plane traffic at O'Hare means a lot of wear on the runways, which will require a lot of maintenance to keep traffic moving smoothly and safely. Developing sustainable methods for these projects is an important goal for all involved.

Another project—led by Roesler, Professor Imad Al-Qadi and graduate research assistant Alexander Brand (BS 10) and funded by the Illinois State Toll Highway Authority—uses proportions of

fractionated reclaimed asphalt pavement (FRAP) as a coarse aggregate in concrete for pavement applications, as well as available by-product materials such as fly ash and blast furnace slag as a replacement for the high carbon footprint of cement. The overall goal, Roesler says, is to "rehabilitate 40 miles of the I-90 Tollway in the Chicago area in the next couple of years with concrete containing FRAP as one of the main roadway materials." To prepare for this, Roesler has been examining the properties of both fresh and hardened concrete samples which were mixed with FRAP to determine such issues as the strength, fracture, and freeze/thaw durability of the product. The project's next stage will look at, among other things, ways to determine effective treatment methods to improve bonding between the cementitious matrix and FRAP aggregate so that a higher percentage of coarse FRAP may be used.

As renewal of our paved environments continues, research into recycled road materials promises a greener future for the transportation industry. I

*Top photo: concrete crushing operation at O'Hare Airport. Bottom photos (l to r): Jeffery Roesler; ternary concrete mixture containing 50 percent fractionated reclaimed asphalt pavement aggregate; David Lange; backscatter electron micrograph of fine recycled concrete aggregate particle; Imad Al-Qadi; backscatter electron micrograph comparing natural and recycled concrete aggregates.*







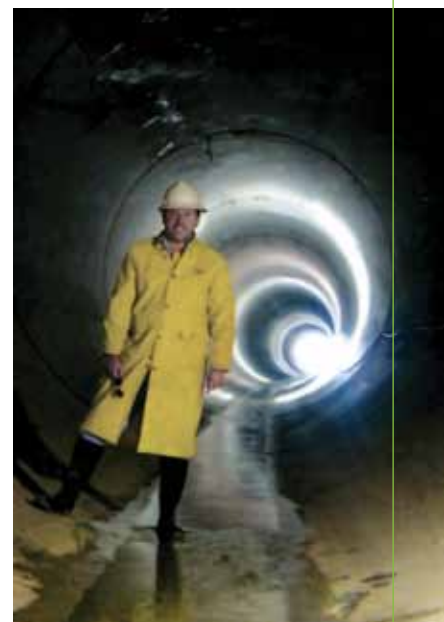
## Hydro models optimize a massive water control plan

Residents of the Chicago area are enjoying progressively cleaner waterways and greater protection from flooding thanks to ongoing research by department researchers to optimize one of the largest civil engineering projects ever undertaken, Chicago's Tunnel and Reservoir Plan (TARP).

In 1972 the Metropolitan Water Reclamation District of Greater Chicago adopted TARP with the goals of protecting Lake Michigan from sewage pollution, improving the water quality of area streams and rivers, and providing protection from flooding. The TARP system consists of more than 100 miles of deep, rock-bored tunnels that receive a combination of storm water and wastewater from more than 600 near-surface connecting and regulating structures throughout the 375-square-mile service area.

CEE researchers are developing a system of models to allow simulation of the hydrologic and hydraulic response of the TARP system with precision and complexity. They have developed new modeling codes to simulate the hydrologic response of large, heterogeneous urban catchments; identify bottlenecks in the tunnels and connecting structures; optimize the operation of regulating structures; simulate the formation and propagation of hydraulic transients in the deep tunnels; and combine the various models into a system of models to address questions pertinent to the operation and improvement of the system.

The models will also assist the U.S. Army Corps of Engineers in their current project to examine the impact of ecological and hydrologic separation of the Illinois Waterway from the Great Lakes. Accurate simulations of the TARP system are critical to evaluating the effect of different separation approaches on the water quality of Lake Michigan, the Illinois and Des Plaines rivers, and flooding in the Chicago area.



## As water systems face renewal, research seeks best methods

The nation's drinking water and wastewater treatment supply and collection systems are facing major rehabilitation in the coming years as a result of a combination of factors, including aging infrastructure; population growth, shifts and greater longevity; and the increasing practice of water reuse.

Department faculty are doing pioneering research toward developing innovative approaches for rehabilitating the various components of water conveyance and water quality control systems. Emerging alternatives for rehabilitating drinking water distribution systems will likely lead to differences in the toxicity of tap water, depending on the approach. Researchers led by CEE Professor Benito Mariñas and Professor Michael Plewa of the University of Illinois Department of Crop Sciences are investigating the potential impact on public health brought about by these various systems in a project funded by the Environmental Protection Agency. The project will test four distribution system rehabilitation scenarios, using different source waters and treatment approaches, with the goal of assessing the impact on mammalian cells. The first study of its kind, it will offer a comprehensive look at proposed rehabilitation alternatives and their relative potential health effects. The work will lead to better strategies for drinking water infrastructure rehabilitation and safer drinking water.

*Photos: 1. Membrane technologies such as those in this Barcelona, Spain, desalination plant, are key elements for sustainable renewal of the urban water infrastructure. 2. Benito Mariñas.*

*Photo: Marcelo García stands in one of the large tunnels constructed as part of Chicago's Tunnel and Reservoir Plan.*

## Structural Health Monitoring

*Continued from page 15*


to develop the next-generation wireless smart sensing nodes.

A second SHM wireless system has been installed on the Government Bridge, located over the Mississippi River between Rock Island, Ill., and Davenport, Iowa. Built in 1896, the Government Bridge is an eight-span, double-decker, steel truss bridge, where the upper deck carries rail traffic for the Iowa Interstate Railroad and the lower deck carries vehicular traffic. The second span of the bridge is a draw span that can swing 360 degrees in either direction to allow boats to pass. The Government Bridge has been in near continual operation since its construction.

"The Army Corps of Engineers inspects and maintains the bridge," said Spencer. "To supplement the traditional visual inspections, they installed a fiber optic SHM system with 34 strain sensors on the draw span of the bridge. In addition, we worked with them to install a wireless SHM system in July of this year."

Initial observations of the strain data showed that the swinging bridge span had different strain levels based on which direction the bridge closed in. To confirm the orientation of the bridge, a wired digital compass was added to the SHM system.

"These three systems—fiber optic, wireless and wired—together make up the integrated SHM system for the draw span and generate rich data on the structure," said Spencer. "The integration of the measurements from all three systems is providing a robust and complete view of the bridge condition."

"The success of these full-scale deployments on new and historic bridges demonstrates the tremendous potential of wireless smart sensor technology for SHM," Spencer concluded. "This technology has reached a level of maturity that makes it an important tool for management of civil infrastructure." 

## Bridges

*Continued from page 16*

ductility in old bridges is to wrap the bridge columns in steel or fiber reinforced polymer (FRP) jackets, a technique called passive confinement.

"With passive confinement, an earthquake must hit the bridge," said Andrawes, "in order for the column to start deforming or dilating laterally. That's when these jackets start confining the concrete and improving the ductility. But this dilation process causes damage to the bridge columns, so for this technology to work, the concrete has to sustain some kind of damage first."


Andrawes' research applies active confinement, but not with traditional materials. Andrawes' approach uses shape memory alloys (SMA), a class of metallic alloys that remembers its original shape after being deformed and returns to the pre-deformed shape through heating.

"The idea is to stretch the wires made of SMAs and wrap them around the bridge column in the plastic hinge zone, which is the most critical region in the column," said Andrawes. "Once that's in place, we apply heat until it starts to shrink to its original length. But because of the column, it cannot do that, so it squeezes the column and confines the concrete, causing the column to behave in a more ductile manner."

This method was so effective that Andrawes tested it as a quick emergency repair to damaged bridge columns.

"Right now, the technologies that are in place for repair take days or even weeks to restore functionality of the columns," Andrawes said. "In our lab, we caused excessive damage to some of our columns, then repaired them with the shape memory alloy spirals. We were able to do it in less than 15 hours."

To date, all of Andrawes' work has been done in the lab, but, in cooperation with IDOT, the next phase of the project will be to implement this technology in one or more IDOT bridges.

"We will monitor these bridges over the next few years to see how the SMA spirals perform in real service conditions," he said. 

# CEE state of mind

Josh Brickman, structures senior and avid rapper, has released his first album and given props to U of I's home town in a popular YouTube video

By Dan Malsom



Scan this code with your smart phone to view Brickman's video, "Champaign State of Mind," or visit his channel at [youtube.com/thebrickmanmusic](https://youtube.com/thebrickmanmusic).



Came here for school,  
graduated to the high life  
Imma mad baller,  
rapper in the limelight  
Mortar for construction,  
I make the words stick, and  
reppin' U of I,  
you can call me the Brickman

Josh Brickman, Champaign State of Mind

Josh Brickman, CEE senior, has one full semester left before he completes his undergraduate degree with a primary focus in structures. Already he has set his sights on graduate school, distributing his applications to several top-tier schools including Illinois.

Applications, however, are not the only thing that Brickman has been distributing as of late. On October 14, Brickman released *The Music Man*, his debut solo rap album. The album, available for free download at <http://www.mediafire.com/?efqnagzmzcqamtp>, features 13 tracks that he wrote and recorded over his past few semesters on campus.

Brickman's interest in rap began during a high school English class, where he would compose raps instead of formal papers on literary works like Shakespeare's "Hamlet" and Charles Dickens' "Great Expectations." Now instead of rapping for a grade in class, Brickman finds his own influences and motivations.

"I can do it on my own time, and I can do it when I want," Brickman said. "It's my own passionate hobby."

Throughout his life, Brickman has been heavily involved in band and music. His parents encouraged him to begin playing the piano when he was 5 years old. In school, he learned to play the alto saxophone. At Illinois, Brickman became involved in music through the Krannert Center Student Association. The student-run organization recruits volunteers who serve as ushers and tour guides for the performing arts center. Brickman embraced this opportunity and worked with others to begin a new ambassadors program within the organization this year.

The time required for Brickman's hobby, along with his coursework and other commitments, require him to keep many aspects of his life organized. Brickman will often print out daily schedules outlining



CEE senior Josh Brickman poses in front of the Yeh Student Center.

what he needs to do and when he needs to do it. He dedicates a few hours each week to his rap projects, either all in one chunk or over the course of a few homework breaks. When he comes up with new material for a song, he will save the lyrics in a file within a group of folders on his computer. All of his ideas end up there.

This fall, however, Brickman devoted a good portion of his rap project time to planning his CD release. With help from a friend in his fraternity, Brickman began promoting his music over social media outlets like Twitter and Tumblr. Brickman took on the remaining work alone.

"I had to do everything else, like printing my own CD labels and getting everything ready for the (release) party," he said.

One song on the CD, titled *Champaign State of Mind*, had an accompanying music video that Brickman and his friends filmed over the course of six months in 2011. Three weeks after the CD release, the video had accumulated 16,000 views on YouTube and had gained the attention of WCIA, Champaign's local TV station.

Brickman described the filming as a very spontaneous process.

"(Sometimes) it would be a Saturday afternoon, and I would call my friends and say, 'Guys, wake up, we need to work on this,'" Brickman said.

The video features scenes from different locations on campus and along Green Street, with Brickman frequently paying homage to his engineering roots: rapping in front of Engineering Hall and Newmark Lab, sitting outside of the Grainger Library,

and posing in front of the Beckman Institute.

"I do see another U of I music video on the horizon," he said. "I've gotten so much out of the school. I have had such a good time here, so I just want to give back."

Brickman's diverse interests often help create new material for his rap CDs, and he already has begun work on a new album. One song he recently wrote reflects on the decision to end the Space Shuttle. While the space program isn't typical rap material, Brickman grew up with space exploration as a key interest in his life, and such influences commonly show up in his music.

Within his engineering degree, Brickman said that his creative side has helped shape a better vision of what he wants to do beyond college. While he came to the school knowing that he had an interest in structures, he now has a more refined idea of what his goals are within that field.

"I like to see that these structures have a grander purpose," Brickman said. "Beyond just saying, 'Hey, I built that,' I want to say, 'Hey, I built that, and this worldclass orchestra comes and plays here once a year.'"

When looking for internships and job opportunities as an undergraduate, Brickman always searched for companies that showed more of a creative or "grander purpose" side. Before he begins to work full-time though, he will work towards a master's in structural engineering, likely at Illinois. Brickman will also continue to rap.

"The fun and success that I've had with this album—I would like to see it continue," he said.

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# Student Organizations

Some of the many student organizations for civil and environmental engineers at Illinois tell what they're up to and how alumni can get involved. A more extensive list of CEE student organizations and links to their websites appear here: [cee.illinois.edu/student\\_organizations](http://cee.illinois.edu/student_organizations).

## **American Railway Engineering and Maintenance-of-Way Association**

The Illinois chapter of the American Railway Engineering and Maintenance-of-Way Association (AREMA) was founded in the fall of 2008 and has since grown to 70 members. The 2011 AREMA Annual Conference was held in Minneapolis in mid-September, and 33 chapter members attended, providing them valuable networking opportunities. This year, chapter members will participate in their fourth Engineering Open House as well as go on field trips to gain insight into the field of railway engineering. The chapter is seeking guest speakers, hosts for field trips, and donations to help fund travel to the 2012 AREMA Conference in Chicago. For more information, contact Samantha Chadwick at [aremauiuc@gmail.com](mailto:aremauiuc@gmail.com).

## **American Society of Civil Engineers**

The American Society of Civil Engineers (ASCE) Student Chapter is planning on yet another event-filled year. Some of the premier events that ASCE has lined up for the 2012 year include general meetings with interesting and distinguished speakers, social events such as cookouts and team recreation games, participating in Relay for Life, and much more. The chapter is also continuing to work with and hold joint events with the local and national ASCE Chapters. The organization hopes to attend the national conference which will be held in Montreal, Canada, in the fall of 2012. For more information, contact Jacob Thede, [thede1@illinois.edu](mailto:thede1@illinois.edu).

## **Chi Epsilon**

The Chi Epsilon Alpha Chapter is having a great start to the semester. Exxon Mobil and Teng & Associates gave presentations at our general meetings on projects they worked on. The tradition of our wine and cheese mixer continued this year with Professor Jon Leibman hosting the event. Chi Epsilon is always looking for professionals to present at meetings, as well as corporate sponsorship of a scholarship for the most outstanding member of each semester. Contact President Tim Veldman at [veldman1@illinois.edu](mailto:veldman1@illinois.edu) for more information.

## **Concrete Canoe Team**

The University of Illinois Concrete Canoe Team is returning after a successful 2010-2011 season where we placed second at the Great Lakes Regional Competition qualifying us for the national competition. We placed 11th of 23 universities at the national competition in Evansville, Ind. In 2012, the team

hopes to return to the national competition, this year hosted in Reno, Nevada! We are seeking alumni and company sponsorship to support our efforts. Please contact canoe team captain Arielle Malinowski, [malinow7@illinois.edu](mailto:malinow7@illinois.edu), with any questions. For more information, visit our website: <https://netfiles.uiuc.edu/ro/www/BoneyardYachtClub/> —Arielle Malinowski, Captain

## **Construction Management Association of America**

The Construction Management Association of America (CMAA) is a professional organization with the mission of promoting and enhancing leadership, professionalism and excellence in managing the development and construction of projects and programs. We are the only organization on campus that has a specific focus on construction management and project management and offer quality exposure and interface to the construction industry. We offer lectures and workshops on the latest news, projects, and technologies being introduced to the industry such as BIM 3D modeling. We hold networking events with colleagues and practitioners, and plan field trips to local projects. National chapter members also have the opportunity to become certified Construction Managers in Training (CMIT) by passing an extensive exam that covers the fundamentals of being a construction manager. If any students or alumni are interested in becoming a part of CMAA through membership, sponsorship, seminars, networking, etc., please contact Kristopher Gustafson at [gustafs4@illinois.edu](mailto:gustafs4@illinois.edu).

## **Earthquake Engineering Research Institute**

The student chapter of the Earthquake Engineering Research Institute (EERI) has the goal of educating students about earthquake risks and encouraging innovative and realistic measures for reducing the harmful effects of earthquakes. In the past year, the chapter's Seismic Design Team received third place in the national competition, and they are already working on their model for next year. The student chapter has organized several earthquake-related lectures this year and plans to participate in Engineering Open House this coming spring. As a new event this academic year, the student chapter is planning for a group of students to attend the EERI Annual Meeting in Memphis in April 2012. We encourage any practitioners or academics involved with EERI or

knowledgeable on earthquake issues to speak at our lectures. For more information and contact information please visit our new site at <https://sites.google.com/a/illinois.edu/eeri/>. —Evgueni Filipov, President

## **Engineers Without Borders**

For years, Engineers Without Borders at Illinois has been working to integrate students and communities through sustainable development projects around the world. Currently students are partnered with communities in Nigeria, Cameroon, Guatemala, and Haiti, with plans this year to travel, conduct site assessments, and implement their designs. The projects include water, sanitation, and sustainable energy solutions, such as the Clean Cook Stove project in Haiti. All projects give students the opportunity to get hands-on experience with real-world engineering design challenges, while at the same time building strong partnerships with communities abroad. Alumni can help fund these student initiatives and provide guidance and support. For more information, visit the website at <http://www.ewb-uiuc.org/>

## **Geotechnical Engineering Student Organization**

The Geotechnical Engineering Student Organization (GESO) will once again offer many events for U of I geotechnical engineering students, faculty, staff, and alumni during the 2011-2012 school year. GESO, a student chapter of the Geo Institute (GI) of the American Society of Civil Engineers (ASCE), will provide students opportunities to attend the Geo-Congress 2012 conference. Held in Oakland, Calif., it features conferences, short courses, a career fair, and numerous networking opportunities for our attendees. Additionally, GESO will fund teams to participate in the GeoWall, GeoPrediction, and poster competitions. During this year we will also hold lectures by prominent researchers and practitioners on important geotechnical engineering current research and practical information. We also plan to present an exhibit in the 2012 Engineering Open House. Additionally, graduate discussion forums are being held where graduate students undertaking geotechnical research may present their research to colleagues. As part of our goal to act as a link between the industry and students, we would like to collaborate with different geotechnical engineering consulting and construction companies in arranging lectures and field trips. —Navid Jafari, President ([njafari2@illinois.edu](mailto:njafari2@illinois.edu))





### Institute of Transportation Engineers

The student chapter of the Institute of Transportation Engineers (ITE) is affiliated with the professional organization ITE, an international network of more than 17,000 professionals spanning more than 100 countries who are committed to solving contemporary transportation problems and challenges. So far this year, the ITE student chapter has heard presentations from Professor Dan Work and Bill Gray, Director of Public Works for the City of Urbana. Students from ITE were active at the 60th Annual Traffic Engineering and Safety (TES) Conference held on campus as student hosts for the sessions, and they attended a special dinner co-hosted by the Illinois Section of ITE and the TES Conference to commemorate the 60th anniversary. In the future, the ITE student chapter will host webinars from professional organizations, invite professionals to speak at general meetings, present an exhibit at Engineering Open House, and field a team at the Annual Midwestern Traffic Bowl Competition. For more information, contact Mike Lodes, [lodes@illinois.edu](mailto:lodes@illinois.edu), [iteuiuc@gmail.com](mailto:iteuiuc@gmail.com) or visit the website, <http://ict.illinois.edu/groups/tol/ITE/default.htm>.

### International Association of Hydraulics Research

The International Association of Hydraulics Research (IAHR) is one of the largest organizations dedicated to engineering applications for hydro-environment sciences, including: river and oceanic hydraulics, eco-hydraulics, hydroinformatics, and related fields. At Illinois, the IAHR student chapter is housed at the Ven Te Chow Hydrosystems Laboratory. The function of our chapter is to stimulate growth in student development through improvement of research, interpersonal, and networking skills. Each year, we sponsor several picnics, mixers, and other events to provide outside-of-the-classroom interaction among students and faculty. As the hydro-environment research field is vast, different universities focus on different issues related to IAHR. Recently, we held a chapter meeting with an IAHR student-branch at University of Iowa. This event was very successful in providing students with some insight on the research projects occurring outside of Illinois, as well as excellent networking tools with possibilities of future collaboration. In addition, our student group volunteers to help teach the public about hydraulics issues at Engineering Open House and various science fairs, such as

the Kid's Building Fair at the Orpheum Children's Museum in spring 2011. Each year, IAHR is very influential in the setup and design of exhibits seen throughout the Hydrosystems Laboratory. For information, contact President Matt Czapiga, [czapiga2@illinois.edu](mailto:czapiga2@illinois.edu), or general address: [iahr.uiuc@gmail.com](mailto:iahr.uiuc@gmail.com).

### International Water Resources Association

The Illinois student chapter of the International Water Resources Association is dedicated to promoting education and collaboration in research to further water resources understanding. We work to raise awareness of water resources issues through outreach events open to the local community. We also host networking opportunities for students, alumni, companies, and other chapters, as well as organize social events to facilitate interaction among students and faculty in the Hydrosystems Lab. This semester, we have also established a Professional Development Committee to help our members form valuable connections with alumni in the academic and professional world. We invite alumni to contribute to this effort by participating in info-sessions, seminars, and informal meetings with students. For more information, contact Sayo Chaoka at [schaoka2@illinois.edu](mailto:schaoka2@illinois.edu).

### Structural Engineers Association

The Structural Engineers Association student chapter is dedicated to creating professional and social opportunities for its members. This year, we implemented two new committees, the graduate student and outreach committees,

who work alongside the professional and social committees to create additional events for our members. We have had a variety of events from a Welcome Back Barbeque, to a luncheon with professor and department head Amr Elnashai, to a job site tour with Clayco. We also hosted corporate speakers from SOM, HNTB, and Bechtel, held a mock interview and resume critique workshop, and hosted a bridge-building contest. This year we plan to arrange similar events, including job tours, job shadows, and meet-and-greet sessions with company representatives. If you would like to participate in any of these events or have any new ideas, we would love to get you involved. Please contact Amna Mahmud, [mahmud1@illinois.edu](mailto:mahmud1@illinois.edu), if you have any questions, suggestions, or concerns. Help us make this another successful year for the Structural Engineers Association! —Maria C. Warnock

### U.S. Green Building Council Students

U.S. Green Building Council (USGBC) Students is a group of engineers with the mission to help students grasp a thorough understanding of sustainability: what it means and how it can be an asset to their professional careers. For the 2012 calendar year, we have arranged for seminars with green companies and experts. In these seminars, our speakers expose our members to the role sustainability plays in the professional field. We also provide our members with LEED (Leadership in Energy and Environmental Design) workshops. The next step of our organization is to compete in the Natural Talent Competition hosted by the USGBC. We plan to form a team and get our designs underway this upcoming semester.

*Photos, top l to r: The annual IAHR&IWRA Halloween Mixer and Pumpkin Carving Contest for students, faculty and families. The GESO annual student and professor picnic. Members of the AREMA Student Chapter constructing new track for the Monticello Railway Museum. Engineers Without Borders students implementing a biosand filter in Guatemala. Students from GESO compete in the GeoWall Competition at the Geo-Frontiers conference in Dallas, Texas. Below: Students in front of a boxcar at the AREMA conference outdoor exhibits (l to r): Mike Wnek, Matt Grieves, Carrie Desmond, Anna Delheimer, Justin Pacheco.*

# Old Masters

Engineering giants of the department's history

## William W. Hay

1908-1998

**Educator, researcher, international railroad expert**

BY PROFESSOR EMERITUS WILLIAM J. HALL (MS 51, PhD 54)

AND PROFESSOR CHRISTOPHER P.L. BARKAN

**W**illiam W. Hay was born December 10, 1908, in Bay City, Mich. By virtue of his education and practical experience in his profession of railroading, he became the academic leader in railroad engineering for more than a quarter century.

Hay graduated from Carnegie-Mellon University with a B.S. in Management Engineering in 1931. This was followed with interspersed work on the Pennsylvania Railroad and in a chemical plant, after which he took advanced coursework on railway operations at Yale University in 1932-33. During the Depression he held a succession of positions with railroads and rapid transit lines, such as the Pennsylvania Railroad, the Long Island Railroad, the 8th Ave. subway, and the Pittsburgh & Lake Erie Railroad.

As WWII developed Hay was called to service with the Military Railway Service, rising in rank from 1st Lieutenant to Lieutenant Colonel. He served first in various positions in the European Theater of Operations, then moved to the Pacific, ending up in Korea where he was Chief Engineer of Korean Railways. After the war he undertook further study in transportation at Yale University and in economics at New York University, followed by a post on the Reading Railroad. He joined the faculty of the University of Illinois at Urbana-Champaign in February 1947 as an Assistant Professor of Railway Civil Engineering and rose through the ranks rapidly to Professor of Railway Civil Engineering in 1956, receiving along the way an M.S. degree in 1948, and a Ph.D. in 1956, both from Illinois. He retired in 1977 with the rank of Professor Emeritus of Railway Civil Engineering.

During his career at Illinois, Hay was adviser (and mentor) to more than 72 railroad engineering majors and taught railway engineering to more than 600 students. After WWII, Illinois was the only major institution providing instruction in railroad engineering. Many of the senior personnel in the railroad industry today studied under Hay; 64 of his former students are known to have (or have had) wide-ranging positions of influence and responsibility in railroad engineering and management throughout the world. Examples include: Mostafa Khalil Mostafa, who later became Prime Minister of Egypt under President Anwar Sadat, and Ian Campbell who became vice-chairman of the British Railways Board, Chairman of Transmark, and a President of the Institution of Civil Engineers of Great Britain.

Hay was an active member of many professional organizations, including the American Railway Engineering Association, Roadmasters and Maintenance-of-Way Association, and the American Railway Engineering Association. National committee and council memberships included the National Research Council, the U.S. Department of Commerce Panel on High Speed Ground Transportation, and many significant assignments. In his later years Hay carried major responsibility as a member of the National Council of Engineering Examiners.


During his career Hay served as a consultant to many groups and railroads throughout the world, including the Illinois High-Speed Rail Transit Commission, and railroads in many of the United States, Canada, Southern Africa and South America.



As a part of his career at the University of Illinois, Hay wrote two highly successful texts, namely *Railroad Engineering* (1953, updated 1982) and *An Introduction to Transportation Engineering* (1961, updated 1977). Both of these texts are still in current use and referenced heavily. In addition, he is the author of numerous journal articles, chapters in books and professional manuals and reports of wide distribution.

Hay received many professional honors. In March 1979 he was made an Honorary Member of the American Railway Engineering Association, and in that same year received the Alumni Merit award from his Alma Mater, Carnegie-Mellon University. In 1985 he was elected an Honorary Member of the Roadmasters and Maintenance-of-Way Association of America.

As the unquestioned academic leader in his profession for more than 25 years and a highly respected faculty member in the department, Hay's efforts have helped immeasurably in maintaining the position of the railroad as a vital component in the world's economy and brought distinction to himself, his students and the institutions he has served. He was, and is, truly revered by his former students and colleagues.

Hay married Mary Clark Hubley in Harrisburg, Penn., on February 20, 1943. They had two children: a son, William Walter Hay Jr., and a daughter, Mary Elizabeth Hay. Hay passed away March 26, 1998. His wife, Mary, died on March 22, 2004. 



# Department News

The following professors were ranked as excellent by students for spring 2011: **Imad Al-Qadi**, **Bassem Andrawes**, **Christopher Barkan**, **William Buttlar**, **Robert Dodds** (BS 73, MS 75, PhD 78), **Armando Duarte**, **J. Riley Edwards** (MS 06), **Larry Fahnestock**, **Marcelo Garcia**, **Youssef Hashash**, **Praveen Kumar**, **James LaFave** (BS 86, MS 87), **Liang Liu**, **James Long**, **Benito Mariñas**, **Scott Olson** (BS 94, MS 95, PhD 01), **Gary Parker**, **John Popovics**, **Murugesu Sivapalan**, **Timothy Stark**, **Don Uzarski**, **Albert Valocchi**, and **Brent Young** (MS 06).

A student team from U of I won second place and \$1,500 in the Water Environment Federation 2011 Design Competition in Los Angeles. The Illinois team included Jacob Becraft (lead), Jason Freeck, and CEE students **Yana Genchanok** and **Marika Nell**. Their adviser is CEE Professor **Charles Werth**.

Professor **Imad Al-Qadi** has been appointed a Member Emeritus of the Transportation Research Board (TRB) Committee on Sealants and Fillers for Joints and Cracks.

**Rahim Benekohal** was recognized for conducting "high-value research projects" in the U.S. by the American Association of State Highway and Transportation Officials Research Advisory Committee.

Professor **William Buttlar** has been appointed an Associate Dean in the Graduate College. Buttlar is also CEE's Director of Online Programs.

Lecturer **J. Riley Edwards** (MS 06) was named a 2011 Engineering Council Outstanding Adviser.

CEE student **Young Joo Lee** was named an inaugural recipient of the International Civil Engineering Risk and Reliability Association Student Recognition Award at the 11th International Conference on Applications of Statistics and Probability in Civil Engineering in Zurich, Switzerland, in August. Lee was recognized for his paper, "Risk quantification of fatigue-induced sequential failures by branch-and-bound method employing system reliability bounds," coauthored by Associate Professor **Junho Song**.

CEE graduate student **Sophie Leon** won a Best Poster award at the 11th U.S. National Congress on Computational Mechanics in Minneapolis-St. Paul in July, for her poster, "A unified library of nonlinear solution schemes."

Professor **Liang Liu** won an Undergraduate Advising Award and was named a 2011 Engineering Council Outstanding Adviser.

*Continued on page 26.*

## Water use of crops for bioenergy studied

**P**rofessor Praveen Kumar led a study detailing effects to the hydrologic cycle of large-scale land conversion, both now and as growing conditions change in the future.

The water needs of bioenergy crops have been ignored, although water "can be a significant limiting factor," Kumar said.

Miscanthus and switchgrass have a very different above-ground foliage structure from corn—more surface area and much denser growth. This is good for maximizing the amount of biomass that an acre of land can pro-



*Professor Praveen Kumar, right, and graduate student Phong V.V. Le found that bioenergy crops such as miscanthus and switchgrass use more water than corn.*

duce, but it also increases water use. Miscanthus and switchgrass intercept light and rain differently from corn, and lose more water through transpiration, causing them to pull more water from the soil. The result of large-scale adoption would be a reduction in soil moisture and runoff, but an increase in atmospheric humidity.

*For more information, visit [cee.illinois.edu/kumar\\_water\\_use\\_biofuels](http://cee.illinois.edu/kumar_water_use_biofuels)*

## Smoothing the way for high-speed rail

**R**ailway track transitions at bridges, crossings and stations frequently experience differential movement, or bumps in the track. This differential movement is especially problematic for high-speed rail (HSR) infrastructure, because bumps at the transitions are accentuated at high speeds and can lead to car uncoupling, derailment, bridge damage or passenger injury. A \$1.7 million study by CEE researchers, funded by the Federal Railroad Administration, aims to minimize this differential movement and smooth the way for high-speed trains.

Researchers led by CEE professors Erol Tutumluer and Timothy D. Stark will instrument and monitor newly constructed HSR transitions along the Union Pacific railroad (UP) from Dwight, Ill., to East St. Louis, Ill. This existing freight railway is being upgraded to accommodate high-speed passenger rail and will be a shared cor-



*Lecturer J. Riley Edwards inspects closely spaced concrete ties at a recently upgraded UP crossing near Springfield, Ill.*

ridor for freight and HSR.

The researchers will also retrofit and monitor existing Amtrak bridge transitions in the heavily traveled northeast corridor to better understand the causes of the observed differential movements and performance of various remedial measures.

*For more information about this study, visit [cee.illinois.edu/HSRtransitions](http://cee.illinois.edu/HSRtransitions).*

# Department News

## *New faculty*

The department welcomed three new assistant professors in 2011: Jeremy S. Guest, Oscar Lopez-Pamies and Cassandra J. Rutherford.



*Guest*

**Jeremy S. Guest** has a Ph.D. in environmental engineering from the University of Michigan (2011), an M.S. in environmental engineering from Virginia Polytechnic Institute and State University (2007), and a B.S. in civil engineering from Bucknell University (2005).

Guest has research interests in the development of biotechnologies and decision-making tools that enable the design of more sustainable environmental infrastructure systems. His primary focus is on sanitation and the development of bioprocesses that reduce life cycle environmental impacts, reduce costs, and increase performance reliability by achieving energy, nutrient, and product recovery from wastewaters.



*Lopez-Pamies*

**Oscar Lopez-Pamies** has a Ph.D. in Mechanical Engineering and Applied Mechanics from the University of Pennsylvania and École Polytechnique (2006), an M.S. in Mechanical Engineering from the University of Maryland Baltimore County (2002), and bachelor of science degrees in Mechanical Engineering and Mathematics from the University of Maryland Baltimore County (2001).

Lopez-Pamies has research interests in the mechanics and physics of heterogeneous materials with a particular emphasis on soft-matter systems. He focuses on the development of mathematical theories to describe, explain, and predict the macroscopic behavior and stability of these materials in terms of their microscopic behavior. His work provides bridges between material science and a wide range of applications in civil, environmental, mechanical and other engineering disciplines.



*Rutherford*

**Cassandra J. Rutherford** has a Ph.D. (2011), M.S. (2004) and B.S. (2002), all in Civil Engineering, from Texas A&M University.

Rutherford's research interests lie in the characterization of marine sediments subjected to dynamic loading and the relationship between geohazard triggering mechanisms and sediment properties. She is also interested in the advancement of laboratory testing devices, offshore sampling equipment, and procedures to minimize and quantify disturbance. Her research contributes to the development of offshore foundations, such as wind turbine foundations and subsea structures for oil production.

*Continued from page 25.*

**Wen-Tso Liu** was promoted from associate professor to full professor.

**Benito Mariñas** is Acting Director of the National Science Foundation Center of Advanced Materials for the Purification of Water with Systems (WaterCAMPWS).

Three CEE graduate students won the EPA Star Fellowship: **Kayleigh Millerrick**, **Alexander Torres-Negron**, and **Derek Vardon**.

Associate Professor **Scott Olson** (BS 93, MS 95, PhD 01) received a CEE Undergraduate Advising and Mentoring Award.

The following faculty members have been promoted from assistant to associate professor: **Yanfeng Ouyang** and **Junho Song**.

Professor **Gary Parker** won the Best Paper Award at the 5th International Symposium on Submarine Mass Movements and their Consequences, Kyoto, Japan, for, "Upstream migration of knickpoints: Geotechnical considerations," coauthored with Dominique Turmel and Jacques Locat.

Professor **Glaucio Paulino** was named a Fellow of the U.S. Association for Computational Mechanics in recognition of his contributions to the field of computational mechanics.

Professor **Jeffery Roesler** (BS 92, MS 94, PhD 98) won the American Concrete Pavement Association 2011 Marlin J. Knutson Award for Technical Achievement in recognition of his persistent pursuit of research to advance thin, economical concrete pavement systems. Roesler was recently promoted from associate professor to full professor.

Professor **Murugesu Sivapalan** is the 2011 winner of the Robert E. Horton Medal of the American Geophysical Union "for fundamental contributions to the science of hydrologic predictions at the watershed scale."

Research Assistant Professor **Arthur Schmidt** (BS 83, MS 84, PhD 02) won a 2011 Engineering Council Outstanding Adviser Award.

Professor **Timothy Stark** won a 2011 Best Scholarly, Feature, Case Study Paper Award from the American Society of Civil Engineers' Journal of Legal Affairs and Dispute Resolution in Engineering and Construction. The paper was titled, "Is Construction Blasting Still Abnormally Dangerous."

Assistant Professor **Daniel Work** was awarded the 2011 Best PhD Dissertation Award from IEEE Intelligent Transportation Systems Society.





## Albert J. Valocchi invested as a Bliss Professor of Engineering

Professor Albert J. Valocchi was invested Nov. 11 as a Bliss Professor of Engineering.

A faculty member since 1981, Valocchi is a professor and associate department head, teaching undergraduate and graduate courses in water resources engineering, groundwater hydrology and contaminant transport, groundwater modeling and numerical methods, and stochastic analysis of porous media transport.

As an expert in the numerical simulation of the flow of water and pollutants underground, his research focuses on mathematical modeling of pollutant fate and transport in porous media, with appli-

cations to groundwater contamination and remediation. He specializes in the development and application of models that couple physical, geochemical, and microbiological processes over a wide range of spatial scales ranging from the pore scale to the field scale.

The Bliss Professor of Engineering is the result of a bequest from the late Helen Eva Bliss in memory of her father, Abel Bliss Jr., who entered the University in 1872 to study civil engineering, but was forced to leave before completing his degree. In June 1874, he was granted a partial certificate in civil engineering. i

## CEE publishes history of the department

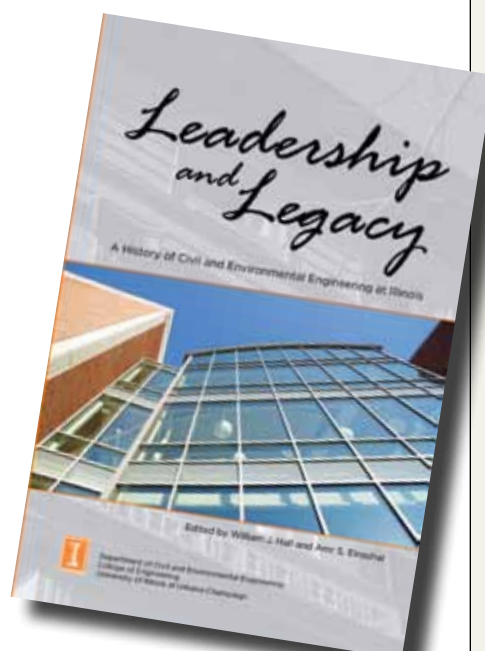
This fall, CEE at Illinois published a book about its history. "Leadership and Legacy: A History of Civil and Environmental Engineering at Illinois," edited by Professor Emeritus William J. Hall and Professor and Head Amr S. Elnashai, features the writing of many distinguished contributors, as well as archival photos and a timeline of significant events.

Hall undertook the project this past spring, gathering previously published writings about the department's history and encouraging current and retired faculty to contribute. Three pieces written for the CEE magazine in 2004 by Professor Emeritus John Haltiwanger (MS 49, PhD 57), now deceased, were revised for inclusion in

the book. Elnashai, in addition to serving as co-editor with Hall, wrote about the department's vision for the future.

A timeline of events, stretching from the department's earliest years to the present day, marks such significant dates as the construction of Newmark Lab and the Hydrosystems laboratory, the tenures of department heads through the years, and significant research accomplishments. Photographs from the University of Illinois Archives, some dating to the early 20th century, illustrate the instructional and research environment of previous generations.

For information on how to obtain a copy of *Leadership and Legacy*, please contact Alumni Coordinator Breanne Ertmer, [ertmer@illinois.edu](mailto:ertmer@illinois.edu). i



# Department News

## Structures students learn about engineering practice on Chicago trip

By DAN MALSOM

Seventy-four structural engineering students seized an opportunity to meet representatives from major engineering firms and explore a massive infrastructure renewal project in Chicago, all in the span of one whirlwind weekend. The trip, organized by Professor Dan

Abrams (MS 74, PhD 79), took place over Halloween weekend.

Fifteen firms, many of them represented by Illinois alumni, met with students at the Illini Center in downtown Chicago that Saturday morning. Each company made a presentation, followed by a panel discussion about qualities engineering firms look for when hiring.

"The forum addressed key issues regarding graduate student concerns when transitioning to the workplace and offered a multitude of advice," said CEE graduate student Michael Zelisko (BS 11).

On Sunday morning, the students toured Lower Wacker Drive, currently undergoing Chicago's largest infrastructure renewal project since the rebuilding period after the 1871 Chicago fire. Department alumni Marc Beisler (BS 84) and An-

drew Keaschall (BS 04, MS 05) of Alfred Benesch & Company led the three-hour walking tour.

The weekend's additional activities included an architectural boat tour of the Bascule bridges and high-rise development along the Chicago River, a group dinner at Gino's East Pizzeria, and a chance for students to explore the city in small groups.

"Many are not from Chicago," Abrams said. "Many are international students. So this was an opportunity for them to see Chicago for the first time—not just in passing, but to stay for an actual weekend."

*Photo: Professor Dan Abrams, right, with CEE structures students on a walking tour of the Chicago Lower Wacker renewal project.*



## First Yen Fellowship awarded to Waterman

CEE graduate student David M. Waterman became the inaugural recipient of the Ben Chie Yen Fellowship on Sept. 30. The fellowship fund was established to honor Yen, a CEE faculty member who died in 2001.

Yen's widow, Ruth Yen, was on hand for the ceremony. Professor Charles S. Melching (MS 83, PhD 87) of Marquette University, a former student of Yen's, gave a talk about Yen's life and research.

Yen is remembered fondly in the Hydrosystems Lab as a mentor and friend to many. His first major breakthrough paper was "Open Channel Flow Equations Revisited" in 1973, in which he derived the dynamic-wave equations from fundamental fluid

mechanics principles. He worked with Ven Te Chow (PhD 50) on the high-profile Watershed Experimentation System, for which a rainfall generator was built in the Hydro Lab. Melching has used data from that project in his teaching to evaluate various aspects of design practice in urban hydrology and the application of rainfall-runoff models.

Waterman earned a B.S. from Purdue University in 1996 in Interdisciplinary Engineering; his studies were focused in civil engineering, natural resources, and biology, with the curriculum tailored to an interest in engineered natural systems. He then worked for a consulting engineering firm in Washington and Oregon, returning to graduate school at Illinois in 2009. His master's degree will be issued in Decem-

ber 2011, and he will continue in the Ph.D. program. His research interests are in stream mechanics, with an emphasis in investigating the fundamental physical basis for observed channel geometries and the form adjustments that may occur due to changes in flow regime and/or sediment supply.

*Photo (l to r): Professor Marcelo García, Ruth Yen, and David Waterman.*





# In Memoriam

## 1970s

**Paul G. Kimball** (BS 75) died June 9. He was 61.

**James R. Scott**, (MS 76) died Sept. 28. Scott was an Air Force officer for 10 years and completed his career with 24 years at Southwest Research Institute in San Antonio, Texas.

## 1960s

**Raymond Beazley** (BS 63, MS 65) died Oct. 30. He was 70. Beazley's career included working for Exxon Engineering from 1965-2000.

## 1950s

**Fred B. Friedewald** (BS 55) died Dec. 5, 2010. He was 78. Friedewald was a city engineer in Kemmerer, Wyo.

**Ben Gatch Jr.** (BS 58) died Oct. 20. He was 82. Gatch served in the Marine Corps in Korea from 1948-1951. He retired in 1998 from the Metropolitan Water Reclamation District of Greater Chicago.

**William A. Morse** (BS 50) died Sept. 7. He was 85. Morse served as a Marine during WWII. He was awarded the Purple Heart after being injured at Iwo Jima. Morse cofounded Morse, McCormack Inc. in the late 1960s.

**Donald W. Pfeifer** (BS 59) died Dec. 4. He was 75. Pfeifer was a retired engineer from Wiss, Janney, Elstner Associates Inc. and a nationally recognized expert in concrete structures, concrete materials, and the investigation and repair of concrete-related problems.



*Pfeifer*

**Joseph S. Stefanik** (BS 57) died in June. He was 75. Stefanik was a U.S. Army veteran.

## 1940s

**William S. Mollenhauer** (BS 45, MS 47) died June 16. He was 86. Mollenhauer served in the U.S. Navy in the Civil Engineering Corps during WWII, stationed in Okinawa. He was an engineer for Western Electric in Chicago, retiring in 1985 after 40 years with the company.

**Lloyd W. Weller** (BS 45) died June 6. He was 89. Weller served in the U.S. Army during WWII. He was a consulting engineer for Black and Veatch Consulting and retired as a partner in the 1990s.

## Joseph Murtha

Joseph P. Murtha, former CEE faculty member, passed away on October 18, 2011 in Mount Lebanon, Penn. Born July 18, 1931, in Connellsville, Penn., Murtha attended the Carnegie Institute of Technology, receiving his B.S. degree in 1953 and M.S. degree in 1955. He became an instructor in CE at Carnegie, followed shortly by service with the U.S. Navy from 1955 until 1958.


In 1958 he entered graduate study at the University of Illinois and received his Ph.D. degree in CE in 1961. During 1961 to 1966 he advanced from assistant professor to professor. After a leave of absence to further his training in oceanography in the U.S. Navy, as well as in industry with the Fluor Corp. and Pike Corp, he returned in 1969 as a Professor of Structural and Hydraulic Engineering. In 1995 he retired and

was appointed Emeritus Professor.

Murtha held several noteworthy positions, including director of the Water Resources Center; visiting professor at Heriot-Watt University, Edinburgh, Scotland; and director of the Advanced Construction Technology Center.

He was active with such national organizations as ASCE, the Construction Industry Institute and the National Research Council Committee on Marine Structures. He was the co-author of one book, and author/co-author of about 40 journal papers and important proceedings.

Murtha contributed significantly to the research and instructional program in hydraulic engineering.

He is survived by his wife Rita, five children and many grandchildren. 

—William J. Hall



## Glenn Stout

Glenn E. Stout, former director of the Illinois Water Resources Center, died June 27. He was 91.

Stout was born on March 23, 1920, in Fostoria, Ohio. He earned his A.B. (1942) from the University of Findlay, his M.S. (1943) from the University of Chicago, and his D.S.C (1973) from Findlay.

Stout spent 25 years on the staff of the Illinois State Water Survey, in positions including Head of the Atmospheric Science Section and Assistant to the Chief. In 1973, he joined the Water Resources Center at the University of Illinois, retiring as director in 1995.


He was recognized as a pioneer in research on precipitation management through cloud seeding, about



which he published several papers. He developed radar-based methods for tracking storms, including tornados.

Stout was also heavily involved with the International Water Resources Association. He was elected Fellow in 1981, appointed Executive Director in 1987, and elected President in 1994. In 2000, he was elected an Honorary Member for his outstanding contributions to the organization.

A longtime supporter of Illinois, Stout and his wife, Helen, sponsored CEE's Glenn E. and Helen L. Stout Water Resources Research Award.

He is survived by his wife, Helen, two children, five grandchildren, and six great-grandchildren. 

# Alumni News

## 2010s

**Jared G. Thoele** (BS 10, MS 11), an engineer intern, recently joined Hanson's corporate headquarter and serves in the company's infrastructure market. He currently is assisting with design services for a single-span bridge in Knox County, Ill., as well as for a box culvert located in Logan County, Ill.

## 2000s

**Yovanni A. Cataño-Lopera** (PhD 05) and Allyson A. West (BS 08 ACES) married on October 11, 2011, in Santa Fe, NM. Cataño-Lopera is working as a water resources engineer at CH2MHill in Boston, and West is finishing a Ph.D. in nutritional science at Cornell University.

**Mark S. Cochran** (BS 01) of S.M. Wilson & Co. has been promoted to director of field operations. He will supervise job site progress for the general contracting business.



*Patrick*

**Amy Patrick, P.E., A.M.ASCE, (MS 06)**, an engineer with Walter P. Moore of Houston, Texas, has been appointed to a delegation of eight American women scientists who were sent on a special diplomatic mission to Brazil in December by the U.S. Department of State's Secretary's Office of Global Women's Issues. The group studied the recruitment, retention and advancement

of women in science, technology, engineering and mathematics through visits to various government, academic and nonprofit organizations. Patrick is the sole representative for engineering and the private sector.

**Janice M. Wenzel, P.E., (BS 07)** was promoted to senior engineer at Crawford, Murphy & Tilly Inc. She is currently assigned to the St. Louis Highways and Bridges Group and is working on the structural design of three M.S.E. walls for the Illinois Route 13 Grade Separation Project in Marion, Ill., and the structural design of a steel plate girder bridge over Finley River in Ozark, Mo.

## 1990s

**Curt Beckemeyer** (BS 86, MS 90), Senior Vice President and Transportation Sector Manager at Applied Research Associates Inc. (ARA) has been named President of Geo-Marine Inc., a wholly owned subsidiary of ARA. Beckemeyer has been with ARA since 1999.

**Cmdr. (Ret.) Joseph S. Calnan** (MS 98) relinquished command of the U.S. Coast Guard Rescue 21 Project Resident Office Alaska. Calnan retired from the Coast Guard after 24 years of service to pursue endeavors in civil engineering and project management. He has served three separate tours and more than 10 years in Juneau. His military decorations include a Meritorious Service Medal, the Coast Guard Commendation Medal, three Coast Guard Achievement Medals, the Commandant's Letter of Commendation, and several personal and unit awards.

**Alan W. Flenner, J.D., P.E., (MS 93)** a municipal, land use and environmental law attorney with High Swartz LLP in Norristown, has joined the Board of Directors of the Water Resources Association of the Delaware River Basin and has been appointed to serve on the Association's Executive Committee.

**Roger E. Snyder** (BS 90) has been selected by the Department of Energy as the new manager of the Pacific Northwest Site Office in Richland, Wash., the office that oversees the DOE's national laboratory in Richland, Pacific Northwest National Laboratory.

**Ronald W. Welch** (MS 90, PhD 99) is dean of The Citadel School of Engineering. He was previously a professor and chairman of the Department of Civil Engineering at the University of Texas at Tyler. Welch is a graduate of the U.S. Military Academy at West Point.

**Chad Masching** (BS 98) was recently promoted by GEI Consultants. Masching works in their Denver office and has expertise in civil, geotechnical and hydraulic design.



*Masching*

## 1980s

**Sonia M. Jacobsen, P.E., (MS 80)** is serving as president of the American Society of Agricultural and Biological Engineers (ASABE). Jacobsen lives in Roseville, Minn. Jacobsen

was awarded ASABE's Professional Engineer of the Year Award in 2007 and was named an ASABE Fellow in 2008, the third woman, and only non-academic female, to receive this honor. Jacobsen is a public sector engineer specializing in hydrology and water resources, notably wetland hydrology.

**Gennaro G. Marino, P.E. (PhD 85)** was named Civil Engineer of the Year by the American Society of Civil Engineers (ASCE), Central Illinois Section. Marino was recognized in his award nomination for his commitment to excellence in civil and geotechnical engineering practices. His work in the areas of forensic and design engineering is respected by his peers throughout the profession, and he is known internationally for his expertise and research in mine subsidence engineering. Marino is the founder and principal engineer of Marino Engineering Associates Inc. in Urbana.

## 1970s

**Robert W. Bailey** (BS 77), President of CH2M HILL's Water Business Group and member of the firm's Board of Directors, was recently appointed to the World Economic Forum's Global Agenda Council on Water Security. He currently serves on the Water Initiative Steering Board of the World Economic Forum and has written a chapter about water scarcity for the Forum's book *Water Security: The Water-Food-Energy-Climate Nexus*. Bailey was named a Distinguished Alumnus of CEE in 2009.

**Robert Cusick, P.E., S.E., (BS 75, MS 76)** celebrated 35 years of service at Hanson Professional Services Inc. Cusick is an executive vice president who serves as Hanson's chief technical officer and director of government and commercial services.

## 1960s

**Daniel W. Halpin** (MS 69, PhD 73), professor emeritus and retired Bowen Head of the Division of Construction Engineering and Management at Purdue University, has been honored with the establishment of a new American Society of Civil Engineers award in his name.



*Halpin*





The Daniel W. Halpin Award for Scholarship in Construction was named in honor of the world-renowned expert on the use of simulation in studying construction processes.

Halpin is the developer of the CYCLONE simulation system, which is used to simulate and study construction processes. The system is used worldwide by construction researchers and educators. His contributions have led to construction simulation becoming an essential part of university construction engineering curricula. He was elected by ASCE to Distinguished Membership (Dist.M.ASCE) in 2006 and is a 2008 Distinguished Alumnus of CEE at Illinois.

Former CEE Department Head **Neil Hawkins** (MS 59, PhD 61) has been elected to Distinguished Membership in the American Society of Civil Engineers.

**Shamsher Prakash**, P.E., (MS 61, PhD 62) Emeritus Professor at Missouri University of Science and Technology in Rolla, Mo., was recently named a Distinguished Member of the American Society of Civil Engineers (ASCE). It is the Society's highest accolade. Prakash will be presented the award in honor of his pioneering work in soil dynamics, seismic analysis and revolutionizing geotechnical engineering.



*Prakash*

## 1950s

**Phillip Gould**, P.E., S.E. (BS 59, MS 60), a retired professor of structural engineering from Washington University in St. Louis, Mo., was named a Distinguished Member of the American Society of Civil Engineers. It is the society's highest accolade. Gould was cited for developing innovative technology for the design and construction of large cooling tower shells, applying finite element technology to the development of prosthetic heart valves, and promoting earthquake hazard mitigation worldwide through research, teaching and professional leadership.

Are you interested in serving on the CEE Alumni Association Board of Directors?

Applications are available online at [cee.illinois.edu/alumni](http://cee.illinois.edu/alumni). For more information, contact John Kelley, Director of Advancement, [jekelley@illinois.edu](mailto:jekelley@illinois.edu), (217) 333-5120.

## Letters

### Concrete canoe correction

I believe the person identified as Sue Coryell in the picture of the 1980 concrete canoe team on p. 17 of the Winter 2011 CEE magazine is me [above, circled]. I was known as Beth Miller at the time. Due to the crunching noise as we put the concrete canoe on top of Pat Burke's car I wanted to name it the Orange Crunch but Orange Crush was the winning name. We didn't paint the name on the boat until it was on top of the car, so in addition to a dented roof, Pat also got some color to add to her car's character! A few years ago I took up paddling again as part of the Team Survivor Madison dragon boat team.

**Elizabeth D.M. Wroblewski** (BS 82)

### Alum recalls work on tallest structure

In the Alumni News section, it was great to read about William Baker's accomplishments in the design of tall buildings. I am a 1979 graduate with BS degrees in Civil Engineering and Geology. I have been with Chevron for over 32 years now. While with the company in the late 1990's in New Orleans (then Texaco), I was the Petronius Project Manager. That project built the Petronius Tower to develop an oil field in 1786 feet of water. At 2002 feet tall, Petronius was the tallest free standing structure in the world at the time.

**Bruce Johnson** (BS 79)



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Photos: Alex Bragorgos

# Sponsored Research

Research is an important part of the mission of the Department of Civil and Environmental Engineering. The many and varied projects of our faculty contribute to knowledge, enhance the education of our students, and improve the practice of civil and environmental engineering. On this page we acknowledge companies and organizations that are currently providing research funding in the department. Listed are the sponsoring agencies, the faculty members who are conducting the research, and project names.

Principal Investigator	Funding Agency	Title of Project
Daniel P. Abrams	US National Science Foundation	Hybrid Masonry Seismic Structural Systems
Imad Al-Qadi	Federal Highway Administration	Impact of Wide Base Tires on Pavements
Imad Al-Qadi	Virginia Transportation Research Council	Validation of Hot Poured Crack Sealant Performance-Based Guidelines
Imad Al-Qadi	Akzo Nobel Surface Chemistry	Early-Age Performance of Warm Mix Asphalt with Rediset WMX Additives
Imad Al-Qadi	IL Department of Transportation	Best Practices for Implementing Tack Coat TRP Recommendations
Imad Al-Qadi	IL Department of Transportation	ICT Program Management FY12
Imad Al-Qadi	IL Department of Transportation	Asphalt Binder Additives Modifiers of Moisture Sensitivity in HMA
Imad Al-Qadi	IL Department of Transportation	Special Projects Engineering
Imad Al-Qadi	IL Department of Transportation	Information Technology Support
Imad Al-Qadi	IL Department of Transportation	Technology Transfer and Editorial Support
Imad Al-Qadi	IL Department of Transportation	Thin Quiet Long Lasting Hi-Friction Surface Layer
Imad Al-Qadi	IL Department of Transportation	High RAP Content and Pavement Performance
Imad Al-Qadi	IL Department of Transportation	Illinois Center for Transportation
Imad Al-Qadi	IL State Toll Highway	Support for Pavement Research at Illinois Proposal to the Illinois State Toll Highway Authority 2010
Bassem Andrawes	US National Science Foundation	CAREER: Innovative Confinement Technology for Strong Main Shock-AfterShock Damage Mitigation
Bassem Andrawes	National Academy of Sciences	Response Modification Factors of Typical Pakistani Reinforced Concrete and Masonry Bldg for Pakistan Seismic Code Devel.
Bassem Andrawes	IL Department of Transportation	Strengthening Wood Pilings Retrofits for Moment Resistance
Christopher Barkan	Federal Highway Administration	Eisenhower Transportation Fellowship
Christopher Barkan	Trustees of Purdue University	NEXTRANS Integrated Hazardous Materials Transportation Safety Risk Management
Christopher Barkan	Engineering Systems Inc.	Accident Performance Data of Bulk Packages Used for Hazardous Material
Christopher Barkan	IL Department of Transportation	A Preliminary Feasibility Study for the Chicago Champaign Link in the Midwest High-Speed Rail Network
Rahim F. Benekohal	Trustees of Purdue University	NEXTRANS Agent-Based Traffic Management and Reinforcement Learning in Congested
Rahim F. Benekohal	Trustees of Purdue University	NEXTRANS Computing Moving and Intermittent Queue Propagation in HW Work Zones
Rahim F. Benekohal	IL Department of Transportation	Field Eval of Smart Sensor Detectors at Intersections and RR Crossings
Rahim F. Benekohal	IL Department of Transportation	LED Roadway Lighting Evaluation and Field Testing
Lawrence A. Bergman	Defense Advanced Research Proj Agency	Structural Logic Tailoring Stiffness and Damping of Large-Scale Structures Via Passive Nonlinear Targeted Energy Transfer
Tami C. Bond	US Environmental Protection Agency	Linking Regional Emission Changes with Multiple Impact Measures Through Direct and Cloud-Related Forcing Estimates
Tami C. Bond	Pacific Northwest National Lab	Harmonized Emission And Activity Databases for 1850-2010
Tami C. Bond	US Environmental Protection Agency	Global to Urban Models for Minimizing Air Quality and Climate Impacts of Freight Choice
Tami C. Bond	US National Science Foundation	A Chemical History of Anthropogenic Input to the Atmosphere Throughout the Industrial Era
Tami C. Bond	NASA Shared Services Center	Bridging the Last Few Kilometers: Accounting for Subgrid Mixing and Spatial Gradients in Global Aerosol Models
Tami C. Bond	US Department of Energy	Optical Properties Of Moderately Absorbing Organic And Mixed Organic Particles At Very High Humidity



Principal Investigator	Funding Agency	Title of Project
William G. Buttlar	Trustees of Purdue University	NEXTRANS Integration of Pavement Cracking Prediction Model
William G. Buttlar	US National Science Foundation	GOALI: A Hybrid Failure Approach Using Digital Image Correlation for Functionally Graded Thin-Bonded Overlays
William G. Buttlar	University of Minnesota	Investigation of Low Temperature Cracking in Asphalt Pavements National Pooled Fund Phase II
William G. Buttlar	Nachtech	Characterization of NACHTECH Experimental Lab and Field Specimens
William G. Buttlar	Total Raffinage Marketing	Crack Propagation in Asphalt Pavement and Low Temperature Resistance
William G. Buttlar	IL Department of Transportation	Distance Technology Transfer Course Content Development
William G. Buttlar	IL Department of Transportation	Designing Producing & Constructing Fine-Graded HMA in Illinois
Ximing Cai	Texas A&M University	Agricultural Water Security and Instream Flows for Endangered Salmonids in Coastal Californias Watersheds
Ximing Cai	Trustees of Purdue University	Analysis of the Global Impacts of Sec Gen Biofuels in the Context of Other Energy Tech and Alt Econ and Clim Change Policy Options
Ximing Cai	US National Science Foundation	Interdependence Resilience and Sustainability of Infrastructures for Biofuel Development
Ximing Cai	NASA Shared Services Center	Developing Seasonal Predictive Capability for Drought Mitigation Decision Support System
Ximing Cai	US National Science Foundation	Planning for Drought Preparedness in the Watershed Context: A Risk-Based Decision Analysis
Ximing Cai	US National Science Foundation	CAREER: Quantifying Environmental Ecological Relationships for Watershed Sustainability Analysis
Mark M. Clark	US Environmental Protection Agency (EPA)	Fellowship for Manish Kumar
Mark M. Clark	US National Science Foundation	Development of Highly Efficient Aquaporin-Based Membranes for Aqueous Separations
Mark M. Clark	American Water Works Association	Phytoplankton Fouling of Pretreatment and Reverse Osmosis Membranes in Seawater Desalination
Barry J. Dempsey	IL Department of Transportation	Developing Best Practices for Bicycle Trail Pavement Construction and Maintenance in Illinois
Robert H. Dodds	Oak Ridge National Lab	An Engineering Approach to Adjust Cleavage Fracture Toughness Values for Standardized to Determination
Robert H. Dodds	US National Science Foundation	Dr. Glaucio Paulino's Intergovernmental Personnel Act
Armando Duarte	US National Science Foundation	GOALI: Validated Multiscale Simulations of Ceramic Matrix Composites for Power Generation
Armando Duarte	Air Force Office of Scientific Research	Generalized Finite Element Method for Multiscale Simulations
John Riley Edwards	TRB/IDEA Program Office	Eisenhower Transportation Fellowship
John Riley Edwards	Federal Railroad Administration	Improved Concrete Crossties and Fastening Systems for US High-Speed Passenger Rail and Joint Passenger/Freight Corridors
John Riley Edwards	Trustees of Purdue University	NEXTRANS Improved Concrete Railway Crosstie Design and Performance
John Riley Edwards	Amsted Rail Inc	Testing of Concrete Crosstie Fastening Systems
Khaled A. El-Rayes	IL Department of Transportation	Green Friendly BMPs for Interstate Rest Areas Phase 2
Amr S. Elnashai	US National Science Foundation	7th Internat'l Conf on Urban Earthquake Engineering, 5th Internat'l Conf on Earthquake Engineering; Tokyo, March 3-5, 2010
Larry Fahnestock	US National Science Foundation	Collaborative Research: Structural Integrity of Steel Gravity Framing Systems
Larry Fahnestock	University of Washington	Smart and Resilient Steel Walls for Reducing Earthquake Impacts
Larry Fahnestock	US National Science Foundation	Innovative Self-Centering Braces for Advanced Seismic Performance
Larry Fahnestock	American Institute of Steel Construction	Seismic Steel Design in the East: Balancing Strength Ductility and Reserve Capacity
Kevin Finneran	US Department of Energy	Charac the Comb Roles of Iron and Transverse Mixing on Uranium Bioremed in Groundwater Using Microfluidic Pore Networks
Kevin Finneran	US National Science Foundation	Complete Reductive Dechlorination of Tricloroethylene by Non-Dehalococcoides Microorganisms
Marcelo H. García	Office of Naval Research	Characterization of Bed Morphodynamics Using Multi-Beam Echo Sounding and Wavelet Transform Analysis
Marcelo H. García	USDA Agricultural Research Service	Enhancement Of The Channel Evolution Model Concepts for Predicting Lateral Channel Migration
Marcelo H. García	US Department of Interior	Collocation Lease for Office Space in North Campus Parking Deck
Marcelo H. García	Metropolitan Water Reclamation	TARP Modeling - Phase II of the Mainstream Des Plaines TARP System
Marcelo H. García	Metropolitan Water Reclamation	Modeling of Settling and Aeration Tanks, and Appurt Flow Distrib Structures for the N Side Water Recl Dist Greater Chicago
Marcelo H. García	Holcim (US) Inc.	Holcim Ste. Genevieve Missouri - Harbor Siltation Study
Youssef Hashash	US National Science Foundation	GOALI: Performance of Deep and Wide Excavations in Congested Urban Areas
Youssef Hashash	University of California Berkeley	Geotechnical Working Group Integration Project
Youssef Hashash	US National Science Foundation	Towards an Integrated Comput-Experimental Lab Testing Framework for Soil Behavior Characterization and Modeling

Principal Investigator	Funding Agency	Title of Project
Edwin E. Herricks	Federal Aviation Administration	Center of Excellence for Airport Technology Low Cost Surveillance System Program
Edwin E. Herricks	Federal Aviation Administration	Center of Excellence for Airport Technology Avian Radar Assessments
Edwin E. Herricks	Federal Aviation Administration	Proposal for Wildlife Hazard and Safety Technology Research
Edwin E. Herricks	Federal Aviation Administration	Center of Excellence for Airport Technology Foreign Object Debris Program Support
Daniel A. Kuchma	Trustees of Purdue University	NEES Operations
Daniel A. Kuchma	University of Washington	Hybrid Precast Wall Systems for Seismic Regions
Praveen Kumar	US National Science Foundation	RAPID: Mississippi Flood of 2011 - Investigation of Initial Impact on the Landscape
Praveen Kumar	US National Science Foundation	Interactions Between Water Energy Carbon Dynamics as Predictors of Canopy to Ecosystem Scale Veg Pattern and Function
James Lafave	IL Department of Transportation	Earthquake Resisting System Bridge Design
David A. Lange	FAA William J Hughes Technical Center	Center of Excellence for Airport Technology
David A. Lange	BPC Airport Partners	The Center of Excellence for Airport Technology A Partnership in Research and Outreach O'Hare Modernization Program
Wen-Tso Liu	US Geological Survey	Development of a Rapid and Quantitative Genetic Based Asian Carp Detection Method
Wen-Tso Liu	The AWWA Research Foundation	Development of a Microbial Standard for Assessment of Performance of Total Coliform Analytical Methods
Wen-Tso Liu	PepsiCo International	Anaerobic Membrane Bioreactors Using Advanced Membrane for Treating Industrial and Domestic Wastewater
Wen-Tso Liu	The AWWA Research Foundation	Developing a Genetic based Approach that Complements Enzyme based Coliform Methods
Wen-Tso Liu	The AWWA Research Foundation	Microbial Ecology of Drinking Water Distribution System Joint Research Project with Singapore Public Utilities Board
James H. Long	Wisconsin Dept of Transportation	USDOT Comparison of LRFD and LFD Cast in Place Pile Design and Construction Methods
James H. Long	IL Department of Transportation	Designing Driven Piles Using a Pile Load Test Program
Benito J. Mariñas	US Environmental Protection Agency	Toxicity of Drinking Water Associated with Alternative Distribution System Rehabilitation Strategies
Benito J. Mariñas	US Environmental Protection Agency	Conference on Advances in Water Disinfection and Disinfection By-Products Chemistry
Arif Masud	US National Science Foundation	A Computational/Experimental Multiscale Approach to the Analysis of Structures Containing Mechanical Joints
James Meister	Not Specified	Work Plan for Asphalt Pavement Compaction Status Monitoring and Density Estimation Using Ground Penetrating Radar
Barbara S. Minsker	Archer Daniels Midland Company	Project Catfish
Barbara S. Minsker	Deere & Company	Demonstrating the Feasibility of Agronomic Decision Support Using a Field Readiness Virtual Sensor
Paramita Mondal	IL Department of Transportation	Bridge Decks Mitigation of Cracking & Increased Durability
Thanh H. Nguyen	US National Science Foundation	Collaborative Research Horizontal Gene Transfer in Porous Media Experiments and Modeling
Thanh H. Nguyen	US National Science Foundation	US Singapore Planning Visit: Survivability of Human Enteric Virus in Surface Water
Thanh H. Nguyen	US Environmental Protection Agency	Association of Pathogens With Biofilms In Drinking Water Distribution Systems
Thanh H. Nguyen	Not Specified	Reclamation of Secondary Effluents with Reverse Osmosis Membranes Fouling Mechanisms and Control
Thanh H. Nguyen	US Environmental Protection Agency	Virus Removal in Slow Sand Filters for Rural Mayan
Thanh H. Nguyen	US National Science Foundation	CAREER: Pathogen Control for a Sustainable Reuse of Wastewater
Thanh H. Nguyen	USDA Coop State Rsrch Educ & Ext Serv	Investigating the Spread of Antimicrobial Resistance Near Animal Facilities
Scott Olson	US National Science Foundation	CAREER: Impact of Liquefaction-Induced Water Layers on Forward and Inverse Geoengineering Analyses
Yanfeng Ouyang	US National Science Foundation	Workshop on Modeling Sustainable and Resilient and Robust Infrastructure Systems
Yanfeng Ouyang	US National Science Foundation	CAREER: Information Mechanisms and Robust Stabilization of Nonlinear, Stochastic Transportation Networks"
Yanfeng Ouyang	Lake County Illinois	Snow Plow Route Analysis and Design for Lake County
Gary Parker	US National Science Foundation	Collaborative Research: A Field Laboratory and Theoretical Study of Mixed Bedrock-Alluvial Meandering Rivers
Gary Parker	Office of Naval Research	Navy N00014-10-1-0617 Morphologic Quantification of River Traversability
Gary Parker	National Center for Earth-Surface Dynamics	National Center for Earth-Surface Dynamics
Glauco Paulino	US National Science Foundation	Functionally Graded Concrete for the Civil Infrastructure - A Multifunctional Material System Approach
John S. Popovics	University Texas Arlington	Full-Scale RC and HPFRCC Frame Sub-Assemblages Subjected to Collapse-Consistent Loading Protocols
John S. Popovics	IL Department of Transportation	Evaluation of Concrete Cylinder Match Curing & 4 x 8 Cylinders
Nancy J. Rader	Food & Agriculture Research Act	Illinois Council on Food and Agricultural Research Program
Jeffery R. Roesler	Iowa State University	Improving the Foundation Layers for Concrete Pavement



Principal Investigator	Funding Agency	Title of Project
Jeffery R. Roesler	IL Department of Transportation	Mech Empirical Design I & M for Rigid Pavements
Mark J. Rood	Colorado State Univ	Bondville Environmental and Atmospheric Research Site
Mark J. Rood	US National Science Foundation	International DDEP: Understanding and Enhancing Post-Combustion Multi-Pollutant Control with Carbon-Based Materials
Mark J. Rood	US National Science Foundation	International DDEP: Understanding and Enhancing Post-Combustion Multi-Pollutant Control with Carbon-Based Materials
Mark J. Rood	US Dept of Commerce NOAA	Bondville Environmental and Atmospheric Research Site
Mark J. Rood	US National Science Foundation	Understanding and Enhancing Post-Combustion Multi-Pollutant Control with Carbon-Based Materials
Mark J. Rood	Office of Naval Research	Vapor Recovery by Electrothermal Swing Adsorption
Mark J. Rood	Pregis Corporation	Adsorption Isotherms for Gas Capture and Recovery System
Mohd Saat	US Department of Transportation	Tech Challenges and Research Needs Related to Shared Corridors for High-Speed Passenger and Railroad Freight Operations
Murugesu Sivapalan	US National Science Foundation	Biotic Alteration of Soil Hydrologic Properties and Feedback with Vegetation Dynamics in Water Limited Ecosystems
Nahil A. Sobh	Caterpillar Inc	Mr. Khaldoon Tahhan Caterpillar Champaign Simulation Center
Junho Song	US National Science Foundation	Risk-Informed Mgmt and Post-Disaster Operations of Lifeline Networks by Rapid Condition-Based System Reliability Analysis
Junho Song	US National Science Foundation	An Integrated Platform for Validated Prediction of Collapse of Structures
B.F. Spencer	US National Science Foundation	Asia-Pacific Summer School on Smart Structures Technology
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B.F. Spencer	Trustees of Purdue University	Performance-Based Design and Real-Time Large-Scale Testing to Enable Implementation of Advanced Damping Systems
B.F. Spencer	Trustees of Purdue University	NEES Operations FY 2010 - FY 2014
B.F. Spencer	US National Science Foundation	Bio-Informed Framework Enabling Multimetric Infrastructure Monitoring
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B.F. Spencer	US National Science Foundation	International Workshop on Advanced Smart Materials and Smart Structures Technology
B.F. Spencer	US National Science Foundation	Smart Structures Technology Summer School
Timothy J. Strathmann	US National Science Foundation	Fouling, Regen, and Sustainability of Heterogeneous Catalytic Treatment Processes: An Integrated Research and Educ Plan
Timothy J. Strathmann	US Environmental Protection Agency	Fellowship for Tias Paul
Leslie J. Struble	US National Science Foundation	Materials World Network: Effects of Precursor Nanostructure on Geopolymer Structure and Properties
Leslie J. Struble	Federal Highway Administration	Predicting Aggregate Reaction Based on Chemistry and Nanostructure of Alkali-Silica Gel
Leslie J. Struble	R J Lee Group Inc.	Freeze-Thaw Testing
Marshall Thompson	IL Department of Transportation	Design I & M for Flexible Pavements
Erol Tutumluer	US Department of Transportation	Mitigation of Diff Movement at Railway Transitions for US High-Speed Passenger Rail and Joint Passenger Freight Corridors
Erol Tutumluer	Federal Railroad Administration	Discrete Element Modeling of Railroad Ballast Behavior
Erol Tutumluer	Minnesota Department of Transportation	Cost-Effective Base Type and Thickness for Long Life Concrete Pavements
Erol Tutumluer	IL Department of Transportation	Characterization of Illinois Aggregates for Subgrade Replacement and Subbase
Albert J. Valocchi	US National Science Foundation	Conference Support for the XIX International Conference on Computational Methods in Water Resources
Albert J. Valocchi	Los Alamos National Lab	Integ Exper and Hybrid Modeling for Prediction and Control of Multiphase Flow and Reaction in CO2 Injection and Storage
Albert J. Valocchi	US National Science Foundation	Improving Prediction of Subsurface Flow and Transport through Exploratory Data Analysis and Complementary Modeling
Albert J. Valocchi	US Department of Energy	Modeling Multiscale Multiphase Multicomponent Subsurface Reactive Flows
Charles J. Werth	US Environmental Protection Agency	Use of Bone Char for the Removal of Arsenic and Uranium From Groundwater at the Pine Ridge Reservation
Charles J. Werth	Clemson Univ	Integ Exper and Hybrid Modeling for Prediction and Control of Multiphase Flow and Reaction in CO2 Injection and Storage
Charles J. Werth	USDA Coop State Rsrch Educ & Ext Serv	Gene Expression and Genetic Adaptation for Herbicide Degradation in a Model Dynamic Soil System
Charles J. Werth	KAUST	Collaborative Research on Sustainable Water Development and Engineering
Daniel Work	NAVTEQ	Traffic Flow Model Research
Julie Zilles	US National Science Foundation	Identifying Design Principles for Engineered Ecosystems: Denitrifying Biofilters for Sustainable Agriculture

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A fund established through an estate gift by John W. “Jack” Briscoe (BS 47, MS 53) and his wife, Kay, will provide scholarships for student-athletes or Marching Illini members in the department. Professor Briscoe, who passed away in 2001, was a member of the civil engineering faculty and a leader in the department and the university. Mrs. Briscoe passed away in December 2010.

Briscoe was born in Westfield, Ill., and raised on the family farm. He earned his first degree from the University of Illinois in 1940, a B.S. in ceramic engineering. After working for a year as a ceramic engineer, he entered U.S. Army Air Corps pilot training in 1941. He served on active duty until 1946, attaining the rank of Major.

On July 4, 1942, while stationed at Shaw Air Force Base in South Carolina, Briscoe married Mary Catherine “Kay” Moore, whom he had met while a student at Illinois. Kay had earned a B.S. in journalism in 1939. The two went on to have a son, Richard Briscoe of Carmel Valley, Calif.

Following his release from military service, Briscoe returned to the University of Illinois in February 1946 and was awarded a B.S. degree in Civil Engineering in 1947. He worked briefly with the Chicago, Burlington and Quincy Railroad than joined the faculty in 1948 as an Instructor in Civil Engineering. From March 1951 until February 1953, his service with the University was interrupted by a recall to duty with the Air Force during the Korean War. Upon his return, he completed his graduate studies and was awarded the M.S. degree in Civil Engineering in 1953 and was appointed Assistant Professor of Civil Engineering. He progressed rapidly through the academic ranks, being appointed Professor and Assistant Head of the department in 1957. In 1959, he was named Associate Head, a position he held until 1965. From 1965 until 1967, he served as Associate Provost of the University, and in 1967 he was appointed Vice Chancellor for Administrative Affairs for the Urbana Campus. In 1975, he resigned to return to teaching in Civil Engineering. He retired from active service in 1981, at which time he was appointed Professor Emeritus of Civil Engineering.



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—CEE alumnus M.T. Geoffrey Yeh (BS 53) on the occasion of the dedication of the Yeh Student Center in Newmark Civil Engineering Laboratory.



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