

# CEE

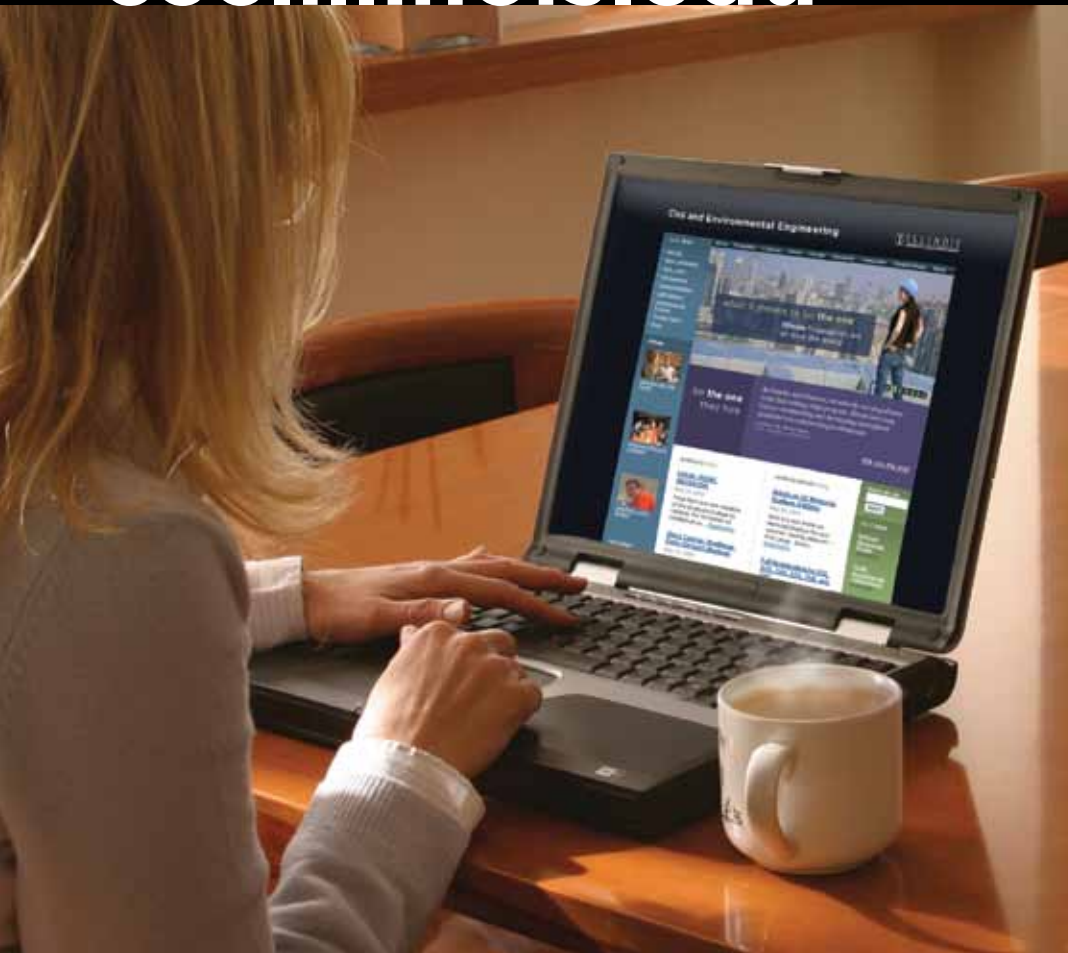
Department of Civil and Environmental Engineering  
University of Illinois at Urbana-Champaign  
*Summer 2010*



## Groundbreaking

The department breaks ground  
on the Yeh Student Center  
Alumni news and features

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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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# On Academic Leadership

BY AMR S. ELNASHAI, PROFESSOR AND HEAD

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



These are interesting times for the academy—times of reassessment, re-focusing, and reinvention. Universities are faced with challenges that are above and beyond anything that they have dealt with in recent times. Eloquent put by Chuck Vest, Past President of MIT and current president of the National Academy of Engineering, universities can “do less, do differently, or gain efficiencies ... we must do all three.”

I often wonder who is facing more severe challenges at the different levels of leadership in the academy. Is it the president, the chancellor, the provost, the deans, or the department heads? I have heard from more than one academic administrator on the Urbana Campus that many consider the Department Heads to be having the toughest time amongst the several layers of leadership. Perhaps so, by virtue of their being where the academic rubber meets the educational road. On the other hand, in terms of responsibility for addressing the challenges facing the academy, we all look toward the President’s office to institute change that creates the conditions under which the university continues to prosper. Why is it then that faculty, staff and alumni by-and-large do not pay much attention to presidents and leave the interaction with presidencies to their representatives?

When we reflect on recent events at Illinois and several other large universities, we note that presidents need continuous advice from all constituencies associated with the academy. For these constituencies to play their indispensable role of engagement, advice, redirection, and oversight, an understanding of the job of

a university president is necessary. On the occasion of the appointment of our new president, I share with the readers of the CEE Magazine my opinion on important features of a successful presidency.

First let me discuss what the job of a university president is all about. Whereas the complex organizations that we refer to as universities and their impact on our lives are akin to large corporations, they are governed, or purport to be governed, by a very different model that cannot be considered as a “business model.” Although presidents and their administra-

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tions, alongside society at large, think of the position as being very prestigious, many constituencies in and on the periphery of the academy have little appreciation of the challenges of a university president, who has to battle regularly on multiple fronts, whilst diligently applying, or resisting, the doctrine of governing boards. This is so much the case that the late Yale President Bartlett Giamatti is quoted to have said, “Being a university president is no way for an adult to make a living.”

The university is part corporation, working in a very competitive environment; part government agency, heavily regulated and controlled; part benevolent organization, offering moral and practical support to under-privileged individuals; part social welfare organization, working

within communities to support prosperity and protect the environment; and part sports organization, running leagues and planning complex sporting events. Universities stimulate social change, manage enormous budgets, invest in stock markets, conduct research for clients, run overseas satellites, build massive infrastructure, and prepare the leaders of the future. Apart from corporate universities associated with mega-industry, which are in their own right worthy of extensive research and analysis (but not in this article), no other organization has such a diverse

portfolio, yet is led by a single office with one executive officer, the university president. To wrap up describing large U.S. universities and emphasize their complexity, I recall an anecdote by Stephen Trachtenberg, ex-president of George Washington University who recalls a con-

versation with a long-haul flight companion who asked what line of work Stephen was in. Trachtenberg did not state his job title, but rather described his usual activities. The flight companion concluded that he must be the mayor of a major U.S. city.

So, what do we want to see in our university presidents? Everything! We expect them to be strategic leaders, executive leaders, intellectual leaders, moral leaders, academic leaders, and certainly political leaders. As academic leaders, we expect them to have a comprehensive understanding of academic affairs, faculty objectives, and student requirements. We expect them to have a deep appreciation of the value of teaching, scholarship, and community service, to engender a learning environment full of excitement and pursuit of what Chuck Vest refers to

## The late Yale President Bartlett Giamatti is quoted to have said, “Being a university president is no way for an adult to make a living.”

as the “endless frontier,” and make our universities “exciting, creative, adventurous, rigorous, demanding and empowering milieus.” We expect our presidents to establish and adhere to academic priorities which focus on new programs and thrusts that are critical to society, to assess the quality, cost-effectiveness, and relevance of programs to the mission, and to play a role in super-star recruitment and retention. I am amazed to note that the presidents of some large universities continued to teach throughout long and successful tenures, thus keeping their fingers on the academic pulse of the university; an example is Raymond Orbach, ex-chancellor of the University of California at Riverside and former Under Secretary of Science in the Bush administration. We also expect them to stay the course. It is widely agreed that a decade or longer is required for presidents to implement and assess the success of their vision.

As strategic and executive leaders, we expect them to develop a vision and a strategy, as well as a plan—with milestones, timelines, and resource allocations to achieve their vision, alongside metrics for measuring their degree of success—a plan that is flexible, adaptable and progressive, with a focus on excellence in every respect. We expect our presidents to develop and implement an assessment process that measures quality, capacity, and breadth of academic programs. We expect them to emphasize the university culture and esprit de corps. We expect them to be fiscally savvy, managing costs, decentralizing resource management, and generating revenue. We expect them to set milestones and metrics, and empower their

selected teams to execute the vision, to be rapid and fearless decision-makers, especially under pressure, to recognize talent and build leadership teams with complementary skills, to integrate, to arbitrate, to serve, and to lead. We also expect them to cultivate close and collaborative relationships with governing boards and to protect and enhance the university infrastructure.

As political and moral leaders, university presidents are expected to display abilities to deal with local, state, and federal government, to make compelling cases

openness. Moreover, holding the moral high ground is of crucial importance to establishing clear positions on behavioral and ethical issues, to supporting diversity, and to enhancing equal opportunity and social justice. Moral leadership can also be exercised in managing university athletics in a non-commercialized environment that protects the academic careers of student-athletes, while still allowing them to compete. The university leaders do not bend to populist requirements, but rather make the case for moral fortitude by simply telling the truth. I recall the words of Jim Duderstadt, ex-president of the University of Michigan: “Moral leadership at the university begins at the top, with the integrity, both real and perceived, of the president.” The lifestyle of the presidents of large universities can be perceived as being regal and hence attract criticism, especially at times of budget reductions and furloughs. We expect our presidents to be sensitive to the hardship that has been endured by many and



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for important political decisions that support the university and advance its interest, to advertise its success, to stay away from controversies, to remain impartial to political divisions, and to have the breadth of mind and determination to cooperate with state and federal government of any political denomination. Presidents are the face of their universities, and as such, dealing with the media in a respectable manner that balances openness with intrusion is critical. We want to see a presidency that analyzes political threats and plans for them, maintains a dialogue with politicians at all levels, and errs toward more rather than less information and

to lead by example.

I started this article by proposing that it is necessary for all constituencies with an interest in the academy to engage with presidents, to advise, criticize and praise as necessary. I hope that the above exposé helps our own CEE community of faculty, staff, students, alumni, and friends to appreciate the complexity of the demands on, as well as the requirements and expectations from, university presidents. I am optimistic that we will see progress under the 17th President, and that we will regroup, renovate, innovate, and continue our journey of academic excellence that started in 1867. **I**



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# What's in a Name?

BY KENNETH M. FLOODY, P.E., S.E. (BS 83)

PRESIDENT, CIVIL AND ENVIRONMENTAL ENGINEERING ALUMNI ASSOCIATION BOARD OF DIRECTORS

It is often asked, what's in a name? To many, a great deal. Corporations, entertainers and even politicians utilize brand managers to protect the images that the public associates with their names.

One might ask why they go through the effort and expense to protect their "brands." The question can be answered most succinctly by considering the fate of those who have lost their reputations, and thus destroyed the value of their brands and their public images. Ask Rod Blagojevich, ask Akio Toyoda, ask Eliot Spitzer, ask Barry Bonds, or John Edwards, or Tiger Woods, or Dennis Kozlowski, or Pete Rose. The list goes on and on. Ask them to describe the difficulties they face in rebuilding their reputations after their fall. At this point, you might also be asking yourselves what any of this has to do with the CEE Alumni Association or the University of Illinois Civil and Environmental Engineering department?

Over the past two years in my semiannual president's message, I have extolled repeatedly on the reputation of the Civil and Environmental Engineering department and the value of that reputation to the University of Illinois and to the CEE alumni. Regrettably, the massive deficits run up by the State of Illinois have resulted in a severe funding crisis for the University, which has led to equally severe restrictions on hiring within the College of Engineering. Every department experiences attrition in its ranks as professors retire or leave to pursue other opportunities. To fill these vacancies in the past, the CEE department was allowed to offer tenure track positions to fill tenured vacancies. However, given the current financial difficulties faced by the University, all of the departments within the College of Engineering have been limited in the number of tenure track positions available to fill vacancies.

One does not need an MBA to imagine what long-term effect such a limitation may have on the Department of Civil and Environmental Engineering. The department will undoubtedly continue to attract highly qualified and competent professors and assistant professors, but will the department still be able to fill every position with the best possible candidate? What impact will such a policy have on attracting candidates who are at the top of their respective fields? How long will the CEE department be able to maintain this policy before causing irreparable harm to the department's reputation, and what will be the impact on the faculty if student enrollment continues to expand, as it has, while faculty levels remain fixed?

Regrettably, this problem is not limited to the Department of Civil and Environmental Engineering. It is affecting the whole College of Engineering

as well as the entire University system. However, if the University of Illinois is the crown of the Illinois educational system, then the Department of Civil and Environmental Engineering is the jewel in that crown that we must not allow to become tarnished.

Perhaps the CEE department should consider hiring its own brand manager to help safeguard the department's reputation. Then again, the CEE department already has many brand managers; in fact it has more than 13,000 of them. Collectively, CEE alumni have a vested interest in protecting the department's reputation, as it affects how future, and past, graduates are perceived by our peers. As alumni, we can no longer sit on the sidelines and wait for others to solve the problems that have the potential to alter what we have all taken for granted for so long: the CEE department's recognition among the top civil and environmental engineering schools in the world. It is time for CEE alumni to make our collective voice heard in Springfield.

I encourage you to contact the Illinois Board of Higher Education and your Illinois state representative and implore them to support legislative action to resolve the budget crisis and restore funding to the University. You should also express your concerns regarding the long-term impact that current hiring policies may have on the reputation of the department to Ilesanmi Adesida, Dean of the College of Engineering; Richard Wheeler, Interim Vice Chancellor for Academic Affairs; and Robert Easter, Interim Chancellor. Offer them your support and encouragement in addressing the funding crisis. Finally, share your concerns with fellow alumni and engage their support, as I am sure that there are more than a few who do not read the CEEAA President's Message in every (or any) CEE Magazine issue.

I was taught a principle by my parents that I have codified for my children, which has become our family motto: "Make do or make better." It says what it means; either you must be willing to accept things as they are, or you have a responsibility to improve them. I joined the CEE board of directors in that spirit and hope that my efforts on the board, and for the past two years as its president, have helped to make things better. I have had exceptional support from our alumni, and in particular from my fellow board members. Yet there is still much work to be done, and I wish Larry Jaworski all the best as he takes over the leadership of the CEEAA. In closing, I wish to extend my gratitude to you all for your support of the Civil and Environmental Engineering Alumni Association and the CEE Department. Your support is vital, now more than ever. 



**CEE alumni have a vested interest in protecting the department's reputation, as it affects how future, and past, graduates are perceived by our peers.**



# CEE breaks ground on Yeh Student Center



The department officially broke ground on the M.T. Geoffrey Yeh Student Center in Newmark Civil Engineering Laboratory on April 7 with a ceremony in the Newmark Lab crane bay. The Yeh Center will be a 20,500-square-foot addition to Newmark Lab that will be entirely student-focused, providing new classrooms and meeting spaces for students in the department.

The ceremonial groundbreaking was held indoors due to inclement weather, with participants turning the earth in a wooden box built for the occasion. Speakers were University of Illinois Interim Vice Chancellor for Academic Affairs and Vice Provost Richard Wheeler, College of Engineering Dean Ilesanmi Adesi-

da, CEE Professor and Head Amr Elnashai, donor/alumnus representative Wilbur C. Milhouse (BS 94, MS 95), and student representative Claire Joseph. An informal reception followed.

New classrooms, a conference room, meeting rooms for student groups, and a spacious atrium with seating for informal gathering are all part of the design. The goal is to improve the student experience by providing CEE students with a designated "home" on campus where they can attend class, hold student group meetings, study and collaborate on projects, and meet informally. Currently, CEE classes are held in various buildings across campus. Move-in is set for April 2011. The construction of the Yeh Student Center

will fulfill the original vision for Newmark Laboratory, which included plans for an additional structure for classrooms. At that time, budget constraints prevented its realization.

Each of the speakers at the groundbreaking ceremony thanked the many private donors to the project and emphasized how significantly the addition will enhance the student experience by providing CEE students a home on campus. Elnashai acknowledged the vision of former CEE head Robert H. Dodds Jr. (MS 75, PhD 78), who revitalized the student center initiative during his time as head.

"Our dedication to our students is reflected by the new structure going up today within civil engineering," said Dean Adesida. "It is gratifying for us that a dream of 40 years is coming true."

"This building is the answer to many, many hopes over the years," Interim Vice Chancellor Wheeler said. "It's exemplary in that it is a donor-sponsored and financed operation. It's exemplary in that it brings into focus a dimension of university life that sometimes gets pushed to the side ... the importance of space. ...The university cares about its students, and the Yeh Center will become the home that civil and environmental engineering students richly deserve, and it will be enduring for many years to come."

Lead donor Yeh was unable to attend the groundbreaking, but Professor and Head Elnashai read a statement from him.

"Some of my fondest memories of my time at the civil engineering department were chit-chatting with fellow students,





**"This is an awesome day. I'm very proud to be an Illini."**

**Wilbur C. Milhouse (BS 94, MS 95)**

discussing academic subjects as well as other worldly topics," Yeh wrote. "Some of them became my lifelong friends. I hope that the student center will enable similar events to happen for today's and tomorrow's CEE students."

CEE alumnus Milhouse echoed Yeh's sentiments about the lasting value of his time at Illinois—both his education and the relationships he formed here.

"The University and this College are home for me. I spent eight years of my life here. I raised two children here. I got married here. I got two degrees here," Milhouse said. "This is an awesome day. I'm very proud to be an Illini."

Current student Joseph, a senior, emphasized the need for the Yeh Center and thanked everyone involved in its realization on behalf of the student body.

"This construction fills a void that students have known for years: CEE students don't have a place to call our own on campus," Joseph said. "The Alma Mater just a few blocks away says it perfectly: 'To thy happy children of the future, those of the past send greetings.' The Yeh Student Center sends a clear message to the future students of our department, and that message is that there's a long tradition of scholarship, leadership and commitment to responsibility in Civil and Environmental Engineering at Illinois, and they too can be a part of it."

The Yeh Center will also serve as a living laboratory with links to the physical structure where displays fed by wireless sensors will show long-span vibrations, energy consumption, and other unique features of the building directly applicable to the students' learning experience. The addition will meet the standards for a silver certification through LEED, Leadership in Energy and Environmental Design, a program administered by the U.S. Green Building Council. 



*Left to right: Jerry Cibulka of Teng; CEE Professor and Head Amr S. Elnashai; College of Engineering Dean Ilesanmi Adesida; Interim Vice Chancellor for Academic Affairs and Vice Provost Richard Wheeler; CEE Professor and former Associate Head David Lange.*

## About M. T. Geoffrey Yeh



The Yeh Student Center is named for M.T. Geoffrey Yeh (BS 53), Chairman of Hsin Chong Construction Group Ltd., Hong Kong, who made the lead gift of \$4 million. Born in 1931 in Shanghai, China, Yeh is a Fellow of the Chartered Institute of Building, United Kingdom; Fellow of the Hong Kong Institute of Directors; Honorary Fellow of the Institute of Construction Managers; and Honorary Fellow of the Asian Institute of Intelligent Buildings.

In addition to serving as Chairman of Hsin Chong International Holdings Ltd., Yeh holds directorships in numerous companies both public-listed and private. During his career, he pioneered various cost- and time-saving construction innovations in Hong Kong that are now in use by all construction companies throughout the region. He was Chairman of the Hong Kong Construction Industry Training Authority in 1975 and Chairman of the Hong Kong Futures Exchange in 1998.

Yeh is a 2010 Distinguished Alumnus of CEE at Illinois. He established the M.T. Geoffrey Yeh Graduate Research Fellowship in the department in 1994 and the M.T. Geoffrey Yeh Endowed Chair Fund in 1998. In 2007, he pledged the lead gift for the Yeh Student Center in Newmark Laboratory. He is a member of the President's Council of the University of Illinois Foundation. 

# Fast track

Illinois' railroad engineering program leads the way in high-speed rail with the nation's first university course and a major conference

High-speed rail is the next big thing in railroad engineering in the United States, and the University of Illinois' Railroad Engineering Program is assuming a leadership role in bringing the latest information about this hot topic to students, fellow educators, and the industry. Last semester, an expert from Taiwan taught, at Illinois, the first university-level class in high-speed rail to be offered in the country. In addition, a major international rail conference was held on the U of I campus in April, featuring high-speed and intercity passenger rail as its primary focus.

High-speed passenger rail has been hailed as an energy-efficient, environmentally friendly mode of transportation. It requires a specialized system of dedicated tracks, trains built to travel at least 155 miles per hour, and advanced technology for support systems like communication and safety monitoring. Currently only one moderately high-speed line is in operation in the United States along the Northeast Corridor, but the Federal Railroad Administration has spent years outlining its vision for a network of true high-speed rail lines in the country,

a plan that came closer to fruition with a funding pledge by the Obama administration.

"Until the new administration's commitment to high-speed rail, it was more of a distant hope than a likely reality to have extensive high-speed rail in this country," says Professor Christopher P.L. Barkan, Krambles Faculty Fellow and Director of the Railroad Engineering Program.

In January, President Obama pledged \$8 billion toward the development of high-speed rail in the United States through the American Recovery and Reinvestment Act plus an additional \$5 billion over five years through the annual budget process. Experts agree this is an important step but not nearly enough to develop a national high-speed rail network, the cost of which has been estimated at \$100 billion. But whether the network takes decades to realize or gets a boost from private funding, high-speed rail will be part of the transportation picture in the U.S., and civil engineering students will benefit from knowledge of the field.

"There will be expanded opportunities for civil engineering students as a result of this initiative in the United States," Barkan says.

The high-speed rail course at Illinois owes its genesis to former U of I student Yung-Cheng (Rex) Lai (MS 04, PhD 08), currently an assistant professor in the Department of Civil Engineering at National Taiwan University. Lai introduced

Barkan to National Taiwan University colleague Tsung-Chung Kao, Ph.D., P.E., who teaches about high-speed rail and project management. Kao

holds a bachelor's degree from National Taiwan University in civil engineering, a master's degree in structural engineering from Rutgers University, and both a master's and a Ph.D. in geotechnical engineering from the University of California at Berkeley. He was a one-time student of former CEE faculty member Ralph Peck. Kao has spent his career working in railroad engineering and served as vice president of the Taiwan High-Speed Rail Corporation. In that capacity, he worked on all aspects of Taiwan's high-speed rail project. Barkan and Kao began discussing the possibility of a high-speed rail class at Illinois, and Barkan saw the benefit of bringing Kao's expertise to Illinois, particularly in the face of the country's new momentum in high-speed rail.

"Professor Kao has excellent academic credentials, and when you combine that with a lifetime of experience working in the rail industry, it's a rare blend," Barkan says. "He has seen every single aspect of the planning, design, construction and operation of a high-speed rail system. The Taiwan system is one of the newest in the world, so he's got a very current understanding of the state of the art of high-speed rail. I'll also add that he's a fantastic teacher."

Kao, who has written a book about his experiences bringing high-speed rail to Taiwan, was eager to share his passion for high-speed rail internationally.

"The development of high-speed rail has pushed rail technology to new frontiers—the aerodynamic design of the train, the more powerful propulsion system, more energy-efficient braking system, the



*Professors Kao (front left) and Barkan (right) pose with students of the first university high-speed rail course in the U.S.*





*Top: Professor T. C. Kao and his wife, Mei, await a Taiwan high-speed rail train. Below: Kao and Barkan discuss a high-speed rail course at U of I while traveling on the Taiwan high-speed rail line.*

digital automatic train control system, the use of GSM [Global System for Mobile Communications] for data transmission, slab track which gives more track strength and stability with much less maintenance, disaster warning systems, innovative financial approaches," Kao says. "And more technology development is underway. I think high-speed rail will bring a renaissance to passenger rail transportation in this country."

About 40 students took Kao's course, which covered all aspects of a high-speed rail system from the technology behind it to operation and management, project planning, and project implementation.

Given the national interest in high-speed rail, Barkan, who chairs the American Society of Civil Engineers' (ASCE) Rail Transportation Committee, thought the topic was a natural choice for the 2010 Joint Rail Conference, held on the U of I campus April 27-29. Nearly 500 railroad engineering professionals, faculty and students attended the 2010 Joint Rail Conference, which was co-sponsored by the American Society of Civil Engineers, the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, the American Railway Engineering and Maintenance-of-Way Association, and the Transportation Research Board.

A highlight of the conference was the keynote address by Kao entitled, "A New Track for U.S. High-Speed Rail," which addressed the challenges that the U.S. will likely face in the development of a high-speed rail network and provided encouragement to engineers and planners who are tasked with designing and constructing it.

The topic is of particular interest in the state of Illinois, which will receive some of the stimulus money for development of a high-speed rail line between Chicago and St. Louis. The near-term plan in Illinois, Barkan says, is to upgrade the existing rail line to allow a maximum speed of 110 miles per hour. To achieve considerably higher speed would require a brand new system with its own, dedicated right-of-way. It would cost much more but enable trains to travel at 220 miles per hour, providing a competitive alternative to driving or air travel, he says.

According to Kao, Taiwan's high-speed rail system transports 100,000 passengers a day—people who would otherwise travel by car or plane, resulting in a much larger carbon footprint. It's a compelling idea for the United States and one whose time is coming quickly.

"I think this country needs it," says Kao. "This country needs high-speed rail." 



## New railroad engineering research center established

Building on its leading academic and research programs in rail engineering and transport, the University of Illinois has established the Rail Transportation and Engineering Center (RailTEC).

The establishment of RailTEC acknowledges the expanding importance of rail transportation to the economy, to society and to a safe and sustainable environment. The center is committed to further growth and development of its teaching and research activities in support of the nation's need for talented young minds and new technologies in the rail industry. RailTEC will be under the direction of Professor Christopher P.L. Barkan, director of the Railroad Engineering Program.

For more than a century, the University of Illinois has been a leader in rail education and research. Illinois has the most extensive curriculum in railroad engineering of any university in North America, complemented by an extensive program of rail engineering and transportation research. Illinois has been an Association of American Railroads Affiliated Laboratory for almost three decades and in this role conducts research on new and emerging technologies with the potential to benefit rail transportation. A strong inter-disciplinary faculty and extensive ties with industry make Illinois a natural spot for the new railroad engineering research center. 

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### 2010 Railroad Environmental Conference

October 26-27, 2010  
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# Black carbon

## Another player in the climate game

BY TAMI BOND

ASSOCIATE PROFESSOR

ARTHUR AND VIRGINIA NAUMAN FACULTY SCHOLAR

If I say “climate change,” you’ll probably think about carbon dioxide and all the wonderful solutions that are popping up: fuel replacements, efficiency improvements, sequestration. But there’s another kind of carbon in the game—black carbon particles, which humans have made ever since we discovered fire. Because it’s black, it absorbs sunlight and transfers that heat to the atmosphere. That makes it a climate-warmer. When it settles on snow, its absorption causes quicker melting. As the surface beneath is exposed, the warm soil absorbs more sunlight than bright snow, an additional cause of warming.

We don’t usually think of particles as a climate change problem, because they are removed from the atmosphere within about a week. Right now, black carbon is probably warming the climate one-third as much as carbon dioxide. Particles other than black carbon also have complex interactions with the climate system. If they are not black, they reflect sunlight from the Earth and cool it. About a third of greenhouse-gas warming has been offset by this reflective screen. These reflecting particles mainly consist of sulfate particles from coal power plants, and they are being cleaned up by air quality regulations. When that happens, the cooling will be gone and the warming greenhouse gases remain.

Some aspects of climate change, like Arctic melting, are happening faster than scientists expected. Even if we rapidly change course and reduce greenhouse gas emissions, we’re still stuck with a lingering burden of carbon dioxide. Removing reflective particles from the atmosphere will exacerbate the rapid warming.

One partial solution is to reduce emis-

sions of black carbon and other warming species with short lifetimes like ozone. Atmospheric warming would be reduced quickly, counteracting the quick reduction in cooling particles. We could also target emissions that directly impact sensitive regions like the Arctic. Although warming will occur if emissions of greenhouse gases continue, taking black carbon out of the atmosphere would delay the rate of warming if it is happening too quickly. Finally, cleanup would also have substantial public health benefits.

Last year, the Arctic Council established a task force to study the science of black carbon impact on the Arctic. The American Clean Energy and Security Act of 2009 (otherwise known as Waxman-Markey) contains provisions for addressing black carbon emissions. The Senate passed a bill asking the Environmental Protection Agency to study black carbon and to determine cost-effective ways of reducing emissions. The Senate bill had bipartisan support. Neither Democrats nor Republicans want to breathe smoke.

How can we take advantage of this opportunity? First, we need to know where these tiny black particles are coming from and where they go. One strength of my research group is “global emission inventories,” or maps of what kinds of particles are released and where. More than a dozen modeling groups around the world use our inventories as a starting point for determining climate impact.

Large emitting sectors are diesel engines, solid fuel combustion in homes, small industrial sources, and burning forests, savannas, and agricultural lands. Only about 5 percent of black carbon emissions in the world come from the United States. Developing countries produce high emissions because their home energy often comes from the combustion of solid fuel—wood, coal and waste—

and because they have not introduced automobile standards as quickly. They may have beneficial effects on the Earth’s climate as they introduce cleaner combustion.

Because we’re engineers, we pay a lot of attention to the kinds of combustion that produce particles. In addition to the traditional atmospheric science question (“What’s happening to the planet?”) we are also interested in the engineering and social decisions that lead to pollution. This is especially important for black carbon, because most of the emissions come from numerous small sources with poor combustion. For example, we investigate how vehicle lifetimes in developing countries will change as income rises; this is quite different from understanding how power plants choose controls based on least cost. We’re also interested in how high-emitting, smoky vehicles affect emissions. It turns out that they can dominate emissions after strict regulations come into play. This knowledge affects the type of policies we might design to improve climate benefits.

Understanding the small combustion sources that emit black carbon is another challenge. We need both emission rates and particle color to model the climate

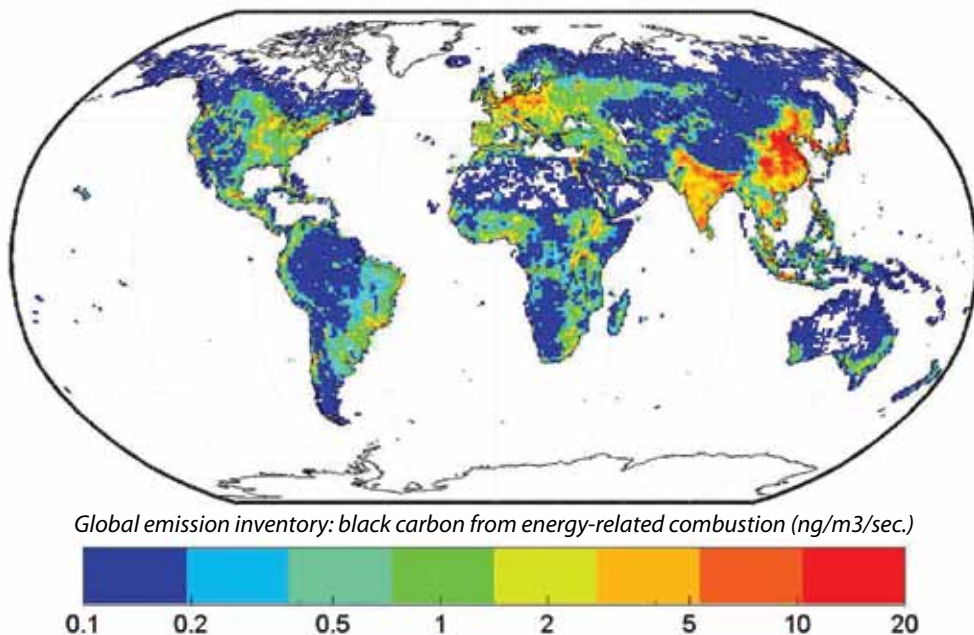


Associate Professor Tami Bond is the Arthur and Virginia Nauman Faculty Scholar in CEE and an Affiliate Professor in the Department of Atmospheric Sciences. She teaches courses in air quality monitoring and modeling. [cee.illinois.edu/research/bondresearch](http://cee.illinois.edu/research/bondresearch)

benefit of programs that would improve sources. Laboratory measurements of particle behavior (in conjunction with CEE Professor Mark Rood) and microphysical models (along with Atmospheric Sciences Assistant Professor Nicole Riemer) provide detailed model inputs. But there's no substitute for measurements of real sources, which previously had been greatly lacking. Very few people had measured sources in developing countries. Many of the model inputs were based on measurements in the United States or Europe, which just don't represent developing countries. We partnered with a World Bank project to measure diesel engines in Bangkok and with non-governmental organizations (NGOs) to measure stoves used for cooking in Central America. These new data sets improve how particles are represented in atmospheric models.

Finally, we want to make a difference: we'd like to solve problems rather than just modeling them. With the political attention to air pollutants in the climate system, it's a good time to develop and propose solutions. Cleaner household energy is one of the areas that really needs attention. Solid-fuel use for cooking and heating produces 25 percent of the black carbon particles globally. Indoor smoke causes severe health impacts; it's estimated to be the eighth-leading global cause of burden of disease. It's especially serious for women and children, and results in an estimated 1.6 million deaths annually.

A single research group can't provide solutions for the 2.5 billion people who rely on household solid fuels. We can, however, leverage our expertise by assisting a network of organizations that will produce global solutions. NGOs in dozens of countries are creating better cooking stoves that are accepted and reliable, but they can't do that work without understanding what a better stove is. About five years ago, we assisted one of our NGO partners, Aprovecho Research, in setting up an emission laboratory. To the best of our knowledge, that was the first time ever that a developer of cooking stoves could measure the emissions of their own



designs. Through our assistance and their own development, they are now training regional testing centers around the world in designing and assessing stoves.

For household energy, there is a natural partnership between education and research. As our group teaches people about measurement, we learn more about model inputs, and we gain understanding about the present and future of household energy and the climate system.

Black carbon has been created by humans since their first use of fire, and it is still emitted from simple combustion. Now we are learning that it has global consequences and needs national and international discussion. The topic bridges from microphysics to global modeling, from fiery soot to Arctic snow, from science to policy, and from social implications to solutions. There is a lot of work to do! 



◀ Graduate student Chris Roden takes cookstove emission measurements in the field.

▲ Bond carries a piece of an old stove out of a home, in preparation for a new, more efficient stove.



# After the quakes

Major earthquakes in Haiti and Chile earlier this year presented unique opportunities for CEE researchers to study the effects. Coincidentally, one CEE faculty member and his family were in Chile during the massive earthquake there. He offered a first-hand account via email (page 16) and later participated in one of a series of field study missions by CEE faculty and students.

## GEER Mission to Haiti

In early February, Associate Professor Scott M. Olson (BS 94, PhD 01) was one of nine engineers and scientists on a Geo-Engineering Extreme Events Reconnaissance team who spent a week in Haiti studying how ground failures such as liquefaction and landslides during the magnitude 7.0 earthquake on Jan. 12 contributed to human casualties and structural damage.

The trip was funded through the U.S. National Science Foundation and the U.S. National Earthquake Hazards Reduction Program. Also participating in the investigation were Ellen Rathje and Oscar Suncar of the University of Texas at Austin; Jeff Bachhuber of Fugro/William Lettis and Associates; Brady Cox of the University of Arkansas; Jim French of AMEC/Geomatrix; Russell Green (MS 94) of Virginia Tech; Glenn Rix of the Georgia Institute of Technology; and Donald Wells of AMEC/Geomatrix.

The group spent the week in tents on the grounds of a hotel near Port-au-Prince that was partially under construction and partially damaged by the earthquake. Power was available for just a couple of hours each day. They ate food they had brought with them and traveled by SUV, accompanied by a local interpreter and security personnel.

The team spent time in Port-au-Prince and other coastal towns, studying the damage, collecting soil samples and running field tests with hand-operated equipment. They observed numerous examples of poor construction quality and ground that had been developed without adequate preparation, both of which contributed to damage and loss of life, Olson said. The wharf in Port-au-Prince, which was completely destroyed by the earthquake, presented a clear case of inadequate engineering practices.

"It was readily apparent that the ground was much too loose to survive an earthquake," Olson said.

The loose sand over which the wharf was constructed made it particularly vulnerable to liquefaction, in which seismic

shaking transforms sandy soil into a thick, viscous liquid almost like quicksand, Olson says.

In addition to contributing to the death toll, engineering failures complicated and delayed humanitarian relief efforts, Olson said. The arrival of supplies was hindered by the destroyed wharf and a damaged airport control tower. The researchers can already attribute much of the damage to ground failure.

While certain ground preparation methods are not feasible in developing countries because of lack of money and equipment, new practices could be developed that would prevent catastrophic loss like what Haiti suffered in January, Olson says. Based on their findings in February, the GEER team hopes to develop some recommendations on how locals could use native materials to prepare the ground before construction.

## NSF RAPID Mission to Haiti

Olson made a second trip to Haiti April 19-25, as part of a team funded by the National Science Foundation Rapid Response Research (RAPID) program, which provides quick funding for the collection of perishable research data. In Haiti, perishable data includes damage which will disappear with reconstruction—such as damage to the seaport in Port-au-Prince—as well as evidence of liquefaction along several rivers, such as the Gris River, north of Port au Prince that will disappear during floods caused by the coming rainy season, Olson says.

Along with Olson, the team included Ellen Rathje of the University of Texas at Austin; Brady Cox of the University of Arkansas; Russell Green of Virginia Tech; and Jeff Bachhuber of Fugro William Lettis and Associates; and several graduate students, including CEE student Nathaniel Martin.

One of the group's goals was to perform broader damage surveys around Port-au-Prince and Carrefour and to look for relationships between structural damage and local geology by measuring the stiffness of the ground. The stiffness of the rock and



Top: the Ministry of Justice in Port-au-Prince. Bottom: recovery efforts in Haiti.





▲ Engineers examine the damage to the port in Port-au-Prince, Haiti. Top left: Associate Professor Scott Olson stands before the destroyed Presidential Palace during his first visit to Haiti. Bottom left: A Haitian girl tries on Olson's signature Illinois hat.

soil under a structure affects how much seismic waves are amplified and how much the ground will move, which in turn affects damage, Olson says.

Olson also was able to examine landslides triggered by liquefaction and damage in areas farther from the fault that he had not been able to visit during his first trip. Using their findings, the team will be developing seismic "microzonation maps" for the Port-au-Prince region that can be used to better plan the rebuilding of structures and communities. These maps combine seismicity, geology, and geotechnical hazards—such as liquefaction and landslides—to estimate how future earthquakes are likely to affect a given area and how far from the fault damage is likely to occur.

Returning to Haiti about three months after his initial visit, Olson was able to view the progress of the recovery efforts. This

time, researchers were able to stay in a downtown Port-au-Prince hotel that had generators providing power for most of the evenings. Medical personnel and international relief workers were present. Some shops were open and food was available, although team members ate food they had brought with them to avoid food-borne illnesses. International humanitarian efforts appear to have succeeded in getting basic sustenance and supplies to people, Olson says, but overall, recovery has been slow. In some areas—generally the poorest neighborhoods of the city—conditions appear to have worsened due to increasing build-up of refuse, the lack of sanitation, and the lack of earthquake-related debris removal.

"The measurements of damage in Haiti are valuable on two fronts," Olson said. "First, collecting and interpreting damage patterns, geology, liquefaction and landsliding distributions will aid in reconstructing the Port-au-Prince region. Second, these data are important to the earthquake  
*Continued on page 17*



On his second trip to Haiti, Associate Professor Scott Olson examines a failed slope.





## The Chilean Earthquake: A First-Hand Account

Associate Professor Jeffery Roesler (BS 92, MS 94, PhD 98) was spending a year at the Catholic University of Chile on a Fulbright award when the magnitude 8.8 earthquake struck on Feb. 27. He emailed an account of the experience.

"My wife and I awoke at 3:30 a.m. on Saturday morning to our 13-story apartment building shaking. We are on the seventh floor. It was obvious to us it was an earthquake and we ran to the rooms of our three kids.

"I recall not being able to move much during the most intense moments of the quake and probably some of it was just fear since there were a lot of noises from things breaking, car alarms going off, the church bell one block away ringing like crazy. I clearly thought that the apartment building was going to fall down based on the motion that we were experiencing. Once the shaking stopped, which I believe was around a minute (seemed much longer), we left our apartment for the ground floor. All the power in the city was now off except for emergency lights we saw on buildings.

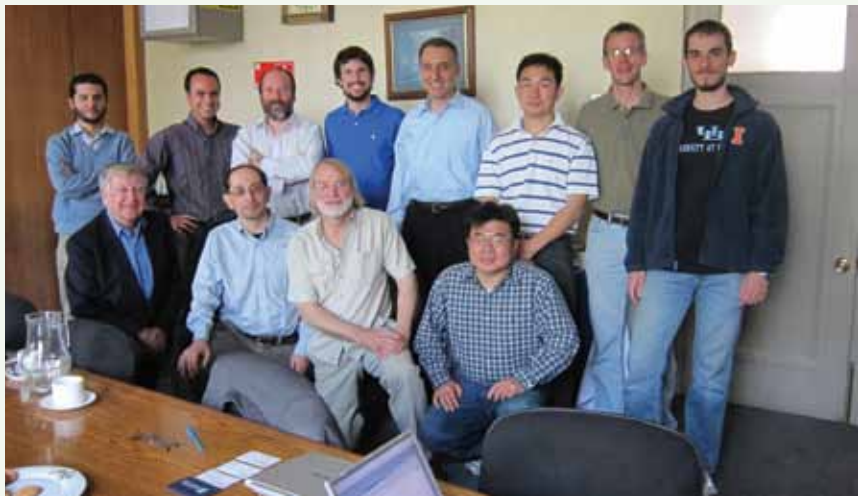
"After 15 minutes in the lobby we decided to go back to our apartment since no one else had come down from the other apartments. We saw an older neighbor, and he assured us that this was the most powerful earthquake he had ever felt. We listened to the radio briefly and learned it was greater than an 8.0, which frightened us even more that we had actually survived that magnitude of an earthquake. Looking out our windows, we didn't notice any fallen buildings immediately after the earthquake but the air had a heavy smell of dust. We tried to sleep after the earthquake but there were a lot of aftershocks that were unnerving to us and our children.

"In the late morning my former PhD student, Erwin Kohler (PhD 05), reached me and invited us to his house in the hills of Santiago. Ironically he and his family had power, water, and gas. We drove to his house and contacted our family who had been frantically trying to reach us. We stayed with him for the next 24 hours so that our nerves could be calmed. There was still too much shaking in our seventh floor apartment. Later that day, we were able to reach other American families here on Fulbrights and sabbaticals, as well as Chilean colleagues. Everyone we knew in the city had survived the quake."



◀ Damage at the Campanario Iglesia Salesiana de Talca in Chile.

▼ Members of the MAE Center team in Chile: Back row from (left to right): two researchers from the University of Chile, Ramon Verdugo, a researcher from the Catholic University of Chile, Amr Elnashai, Oh-Sung Kwon, Jeffery Roesler and Bora Gencturk. Front row (left to right): Claudio Foncea, Youssef Hashash, James Bay and Sung-Jig Kim.



A member of the GEER team examines a failed bridge in Chile.



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engineering profession because it is, fortunately, rare that such extensive damage results from a moderate to large earthquake, and understanding the damage patterns in Port-au-Prince can greatly benefit large cities in other developing nations that are at risk for moderate to large earthquakes."

### **MAE Center Mission to Haiti**

In late February, Professor and Head Amr S. Elnashai and CEE graduate student Amanda Lewis participated in a Mid-America Earthquake (MAE) Center field mission to Haiti under the auspices of the Earthquake Engineering Research Institute (EERI).

The death and damage in Haiti confirms what engineers already knew: without proper building and seismic codes, earthquakes can be devastating, Elnashai says.

"This is the sum total of all the mistakes of mankind—engineering, construction and supervision," he says.

The group was funded by the MAE Center and worked under the National Science Foundation program of the EERI called Learning from Earthquakes. Georgia Tech Professor Reginald DesRoches, an earthquake engineer and native of Haiti, led the team of 17 researchers, which included seismologists, structural and geotechnical earthquake engineers and social scientists. The EERI is a national, nonprofit technical society devoted to reducing earthquake risk through a broad-based approach that examines the impact of earthquakes from many perspectives.

Elnashai, Lewis and a colleague from Purdue University, Civil Engineering Assistant Professor Ayhan Irfanoglu, focused on surveying government buildings, including 14 ministries, the presidential palace and the house of parliament. Over and over, they saw the same thing—concrete structures so insufficiently reinforced as to be nearly plain concrete, decimated by the earthquake.

The team stayed in an apartment building in Port-au-Prince that had running water and intermittent electricity. They were served one meal a day and were on their own for breakfast and lunch. Lewis had brought granola bars but was surprised to find a fully stocked grocery store. In general, she says, the accommodations were better than she expected given the chaos



*Associate Professor Scott Olson examines a failed highway bridge on a study trip to Chile.*

pervading most of the city.

"Everyone is in such horrible conditions," Lewis says, "but all the Haitian people seem to be very positive and looking forward," she says.

### **GEER Mission to Chile**

Associate Professor Scott Olson went to Chile as part of a GEER mission March 22-29, just a month after the country suffered a magnitude 8.8 earthquake, the fifth largest to occur in modern times, on Feb. 27. Olson's team included Robert Kayen of the U.S. Geological Survey, as well as two Chilean engineers and two students from the University of Chile in Santiago.

The mission as a whole included 25 engineers and geologists in four different groups, one of which included CEE Associate Professor Youssef Hashash, who also participated on the MAE Center team. The teams surveyed the extent of the damage from the air; studied the effects of the earthquake including the tsunami, ground motions, geotechnical aspects and landslides; collected field data; and studied the conditions of the soil and how it related to the structural damage. The goal of Olson's team was to collect perishable data on the ground failure patterns and the soil properties that will help the team and future researchers understand how the infrastructure performed, particularly when soil liquefaction occurs.

"In Chile, the liquefaction failures and the effects that it had on the infrastructure are similar to what we would expect to see in the United States," Olson says. "The construction standards, seismic codes and construction techniques are very similar, so what we learned in Chile applies directly to

what we would expect to see in the next big earthquake in the Bay Area or in the Midwest."

Many of the sites Olson's team visited involved bridge failures, a particularly relevant area of study for the U.S. and Japan, where the governments have invested heavily in retrofitting bridges to prevent damage during future earthquakes.

"What we've been doing up to this point to justify a lot of this retrofitting is laboratory testing," Olson says. "These sorts of case histories are ideal."

Significant aftershocks were still taking place even a month after the earthquake, including one greater than magnitude 7, Olson says, which rattled the researchers' nerves even as they recognized the value of their visit.

"Some of the team members were saying, 'This is the event of our lifetime,'" Olson says. "These massive earthquakes only happen once every 20 to 30 years, and often when they do happen, they are so far from population centers that the damage is relatively limited. But this event is an almost perfect analog for what could happen in Portland, Ore., Seattle, Wash.; and Vancouver, British Columbia during the next big Cascadia earthquake. Learning as much as we can from this earthquake is critically important to protecting the Pacific Northwest from the next subduction zone earthquake there."

### **MAE Center Mission to Chile**

In April, a MAE Center team traveled to Chile to study the structural, geotechnical and transportation-related effects of the earthquake.

The team included CEE Professor and  
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Head Amr S. Elnashai; CEE professors Imad Al-Qadi, Youssef Hashash and Jeffery Roesler; U of I Media and Cinema Studies Professor and Head Angharad Valdivia; CEE researcher Bora Gencturk; former graduate students of the MAE Center professors Oh-Sung Kwon (MS 05, PhD 07) from the Missouri University of Science and Technology, and Seong-Hoon Jeong (PhD 05) from INHA University, Korea; post-doctoral researcher Sung-Jig Kim (PhD 08) from the University of Connecticut; and researcher Jazalyn Dukes from the Georgia Institute of Technology. The main host of the Illinois group was Professor Rafeal Riddell (MS 76, PhD 79) from the Catholic University of Chile. Professor Ramon Verdugo and several others from the Universities of Chile and Concepcion have supported the field work in various ways.

The researchers traveled from Santiago to Concepcion and back in three groups—structures, geotechnical and transportation—investigating the effects of the earthquake on buildings, bridges, port structures, dams and roads. The geotechnical group also visited sites exhibiting geotechnical effects such as liquefaction, slope failures and lateral spreading. Valdivia made observations on the role and effectiveness of media in the aftermath of the earthquake.

Given the magnitude of the earthquake, the infrastructure in general performed well and only a very small number of buildings and bridges collapsed, the team reported. Typical failures in high-rise buildings were due to insufficient confinement of concrete in structural walls and irregularities in plan and elevation. Bridges failed due to unseating of the deck resulting from either insufficient bearing widths or failure of shear keys.

The MAE Center team is currently working on a report to be published in the coming months that includes seismological, structural, geotechnical, and social investigations, in addition to a detailed assessment of the causes of the heavy damage inflicted on the transportation system. The Illinois researchers are also cooperating with colleagues from the Pontifical Catholic University of Chile on a special issue of the *Journal of Earthquake Engineering*.

Funding for the trip was provided by a number of organizations, including the MAE Center, GEER, the University of Connecticut, the Missouri University of Science and Technology, Georgia Tech and INHA University. 

# Speeders beware

## Promising research will mean more police cameras in work zones

By LESLIE MYRICK

As the summer heats up, so does the highway construction season. A recent study by CEE researchers sponsored by the Illinois Center for Transportation (ICT) presents encouraging results on the use of speed photo-radar enforcement (SPE) vans to reduce drivers' speeds in work zones. As a result of this study, Illinois drivers are likely to see more SPE vans within work zones during this and future construction seasons.

Between 6,000 and 7,000 crashes occur in Illinois' work zones annually. Contrary to popular belief, motorists are more likely to get hurt in work zones than workers; motorists account for about 85 percent of the total injuries and fatalities in work zones.

To encourage slower driving in work zones, Illinois enacted the Automated Traffic Control Systems in Highway Construction or Maintenance Zones Act in 2004, which authorized the use of the SPE van in work zones for the first time in the U.S. Although this method of SPE has been used in Illinois since 2004, its effects had until recently gone unstudied. CEE Professor Ray Benekohal, along with student researchers Ali Hajbabaie, Juan Medina, Ming-Heng Wang, and Mad-



Interior and exterior of a speed photo-radar enforcement van.

hav Chitturi, evaluated the effects of SPE on speed and degree of speeding

in work zones and compared them to the results from other speed-control methods that included law enforcement presence in work zones.

SPE uses vans equipped with radar and cameras to monitor the speed of approaching vehicles. The registered speeds are displayed on top of the SPE van, which gives speeding drivers one last chance to comply with the speed limit. If a driver does not reduce his or her speed, a camera captures an image of the driver's face and license plate. The SPE also records the speed of the violator, date, location, and time of the violation.

Each van is staffed by an Illinois State Police officer who can issue citations for speeding vehicles if he or she decides it is a clear case of excessive speeding. First, the officer identifies the vehicle's owner from the license plate of the speeding vehicle. The picture of the speeding driver is compared to the owner's picture in the driver's license database. Currently, if the picture of the driver at the time of the violation matches the picture of the registered owner of the vehicle, the ticket is approved. The citation is mailed to the registered owner of



the vehicle within 14 business days.

The CEE researchers compared the effects of the SPE on mean speed and degree of speeding to the conditions without police presence and to some variations of police presence in the work zone. They studied the effects of different treatments on cars and trucks separately, free flowing and general traffic stream vehicles, and on the median (passing lane) and the shoulder lane (driving lane).

In most cases, the investigators found that the SPE was just as effective in reducing drivers' speeds as having a police car with its flashing lights off present in the work zone. The SPE lowered the average speed of the general traffic stream below the speed limit in all cases.

"SPE was very effective in reducing the average speed of cars and trucks, thus calming traffic and improving safety in work zones," says Benekohal. "The research found the reductions to be significant. When the SPE was present, on average, cars traveled 5.1-8.0 mph slower in the median lane and 4.3-7.7 mph slower in the shoulder lane."

Trucks traveled 3.7-5.7 mph slower in the median lane and 3.9-6.4 mph slower in the shoulder lane.

"SPE not only reduced the average speeds, but also reduced the speeding by 40-51 percent in the median lane and by 7-57 percent in the shoulder lane for free flowing cars," said Benekohal.

A free flowing car is at least four seconds behind the vehicle in front of it. Similarly, for free flowing trucks, the SPE reduced speeding by 10-53 percent in the median lane and by 0-56 percent in the shoulder lane.

The study showed SPE as a feasible and effective technique to reduce drivers' speeds in work zones. These findings are significant considering that it is not feasible for police officers to stop all speeding vehicles or be in all locations at all times. As a result of this research project, the Illinois Department of Transportation and the Illinois State Police have expanded the use of SPE, and it is now used in all IDOT districts.

The final report, which details the net effects of using SPE to improve work zone safety, is posted on the ICT Publications Page. 



## CEE Transportation Research Center Celebrates Five Years of Growth and Diversification

Since its inception in 2005, the Illinois Center for Transportation (ICT) has grown to become one of the leading transportation centers in the nation. ICT's varied research includes timely topics such as developing better designs for pavements that use recycled materials, improving work zone safety, and implementing technologies to improve bridge safety and earthquake resistance.

The result of a partnership between the University of Illinois at Urbana-Champaign and the Illinois Department of Transportation (IDOT), the center has developed effective technologies that improve safety and reliability, reduce congestion, improve utilization of the state's infrastructure, and optimize the limited resources of IDOT.

Although headquartered at the Urbana-Champaign campus, ICT funds research on all three U of I campuses. The center also outsources funds and research projects to other universities and private researchers. ICT currently has 85 participating investigators; this number includes 24 CEE researchers as well as faculty from three other departments within the College of Engineering and one other U of I college. In addition to IDOT, ICT's researchers are working on projects sponsored by the Toll Authority, Federal Highway Administration, the National Cooperative Highway Research Program, the National Science Foundation, and many major industries. ICT's research of the past five years has helped support more than 100 graduate students, and this number rises every year.

"In 2005, ICT started with 12 projects; nine of these were pavement projects,

and all of the investigators were from the CEE transportation group," says ICT Director Imad L. Al-Qadi, University of Illinois Founder Professor of Engineering. "Today, our center has a total of 114 projects, and less than 30 percent of these focus on pavements and transportation materials. The tremendous growth and success of the center has given us the opportunity to create relationships with more than 10 other universities through outsourcing to match new research needs with the most specialized investigators."

To date, the center has completed 61 research projects with another 53 projects ongoing. ICT also keeps interested parties informed through its website, <http://ict.illinois.edu>, a quarterly newsletter, and through outreach activities such as online classes, webinars, short courses, and certification training.

ICT is headquartered at the Advanced Transportation Research and Engineering Laboratory (ATREL), located on 47 acres in Rantoul, Ill. The facility has 60,000 square feet of laboratories and three major buildings for transportation research. Its full-scale pavement testing facility includes an Accelerated Transportation Loading ASsembly (ATLAS), capable of evaluating multiple transportation support systems under real environmental and vehicular loading conditions. 



[ict.illinois.edu](http://ict.illinois.edu)

*Photo: Former CEE student Victor Cervantes (MS 09) poses by the ATLAS, part of ICT's full-scale pavement testing facility.*

# FAREWELL <sup>IS</sup>~~NOT~~ GOODBYE

Working in a rural African village in January, some CEE students involved with the Illinois student chapter of Engineers Without Borders learned that designing a water system is more than just an exercise in gravity, viscosity and pipe sizing

By CLAIRE JOSEPH (BS 10)

"I wish we could Google that!" my teammate exclaimed. He was referring to the frictional headloss factors for  $\frac{3}{4}$ " PVC that we needed for our water system design. "To Google" means nothing in Ntisaw, Cameroon, because there are no computers. In fact, Ntisaw village has no electricity, running water or flushable toilets. There are no paved roads, medical providers, televisions or grocery stores. There were several times during our stay in Ntisaw, Cameroon, that we wished we had access to Google's omniscience. But becoming disconnected from our fast-paced world, if just for a short while, made us reflect on the tremendous resources we have as Illinois engineering students and the opportunities we have to put our education and newly acquired skills to good use.

Our campus chapter of Engineers Without Borders (EWB-UIUC) has been collaborating with Ntisaw since fall 2008, when the village contacted the EWB-USA organization. The village leaders sought assistance for the design and construction of a water distribution system. EWB-USA matched Ntisaw with our EWB student chapter, and the Ntisaw Village



Jack Kendall

Water Partnership began. We sent five Illinois engineering students to Cameroon in May 2009 to collect water quality samples, conduct health surveys, and meet with the village water committee. During fall 2009, more than 30 students on campus worked to synthesize the information collected in May. As we worked to develop a plan to help Ntisaw pipe clean water throughout the village, we realized that we had more questions than answers. We raised additional travel funding and sent five more students back to Cameroon in late December 2009 and early January 2010: four engineering students, three of whom are studying in the CEE department and one Materials Science major, plus a photography student, and the project mentor, David Wortman, P.E., (BS 93, General Engineering) an engineer from Mattoon, Ill.

The project's problem statement, which the team refined on the January 2010 trip, could easily be mistaken for a

*Andrew Rehn, right, a CEE sophomore, receives a bit of assistance from Wilma, age 8, in carrying the surveying equipment along the main road in Ntisaw.*

homework assignment: Given a hillside spring with flow of 0.55 liters per second, design a piped distribution system to transport the water 2 km to a nearby village. The team quickly discovered that the situation was a bit more complicated than originally believed. Ntisaw (pop. 930), is located in the mountains in the northwest region of Cameroon, West Africa. Drastic elevation changes, even between neighboring compounds, make designing a water system particularly tricky because areas of low pressure and high pressure must be correctly managed. There are streams running through Ntisaw that the villagers use to wash clothes, bathe in, and drink from, but these same streams are contaminated with livestock and human waste. The fresh water spring that is located about 2 km from the village is too far away to be of



good use for the community.

The water distribution system that we designed in January 2010 will fix that. We surveyed the project area and scoped out the pipeline route. In the evenings, we made hydraulic grade lines by flashlight using graph paper, pencils and calculators we carried with us. Every change in pipe size to adjust pressure had to be accommodated using a “good old-fashioned” eraser. We visited hardware stores about 40km from Ntisaw to obtain price quotations for PVC and galvanized pipes, valves, fittings and cement. After carefully surveying and checking our calculations, we determined that we can bring the spring water to Ntisaw using a system of pressurized pipes, communal water standpipes, and water storage tanks. One of the most exciting aspects of the water system is that it uses no energy, power or pumps. It requires only one of nature’s most fundamental laws—gravity.

We developed a project completion budget of approximately \$17,000. That total will buy all of the pipes, valves, fittings and cement necessary to provide clean water to 930 people. We were pleasantly surprised to discover that the villagers have been saving money for this

project and will contribute more than \$3,000. Additionally, Ntisaw will donate all sand, gravel, stone and skilled/unskilled labor. The Ntisaw community is willing to save, sacrifice and work hard to improve their community. The enthusiasm and desire for a substance so basic to us as water reminds us just how lucky we are. We are excited to be partnering with the village and are now pursuing funding opportunities to begin construction.

For the Ntisaw villagers, this water project will improve the health and quality of life for their children. In the evenings, we conducted a full health and population census of the village (more than 80 compounds), and more than 78 percent of the village families had suffered from diarrhea within the previous 6 months. Reducing this number is just one of our metrics for project success. Another good indicator is the reduction in the time that women and children are spending fetching water. Having water sources closer to their homes will allow children



*Andrew Rehn, David Wortman, Janina Stojak, and Jack Kendall prepare to survey between two key points in the proposed water system.*

to work on homework and women to participate in entrepreneurial endeavors such as traditional crafts that can supplement their families’ incomes.

Our EWB team members have been forced to step outside of our comfort zones as engineering students. Protecting the water source from fecal contamination by cattle is a major challenge, and we’ve learned about the steps required to develop a “live fence” of plants to surround the water catchment area. We’ve studied examples of good community organization that is required to make such an effort successful. We’ve developed education programs for health and hygiene to bring to the schools and individual homes. We re-wrote native songs that we heard to emphasize the importance of simple tasks that we take for granted—like washing hands.

The Ntisaw Village Water Partnership is just a small contribution to the very important problem of providing access to clean water for the global population. It’s also excellent training for a group of committed engineering students developing skills that are useful now and in the future. It’s been an entirely student-run project from the start. We’ve secured our own travel funding and corporate sponsorship. We’ve planned trip logistics and sought help from local experts. We know  
*Continued on the next page*



*Jack Kendall*

*This stream located conveniently near the center of Ntisaw is contaminated with livestock and human waste. It is still used as drinking water and is a prime location for baths, washing clothes and shining motorcycles.*





*Continued from the previous page*

that engineering principles remain constant wherever we travel, but the culture, politics, and challenges aren't so straightforward. This project has been a perfect example.

Returning to campus and "regular" life was surprisingly difficult. We didn't just visit Cameroon. We lived with the Ntisaw community. We sang with the children, stayed up late playing cards with the village elders, and danced at a local New Year's celebration. We're helping a community achieve one of their most important goals, and it's a tremendous responsibility. On our last day in Ntisaw, the villagers gathered to send us off. One of the women stepped forward and told us that "farewell is not goodbye." She wished us safe travels not only home to our families in the US, but also back to our new family in Cameroon. It was a touching sentiment. But I was particularly taken with her first statement: Farewell is not goodbye.

I'll admit that I often use the send-offs "see ya, (or c-ya), bye, and goodbye" without much consideration. But I've been thinking a lot more about what this means lately. My classmates and I are preparing to graduate, and it's possible that I won't see some of them again. Unlikely, but entirely possible. The woman in Ntisaw can't be sure that we'll return, but she has faith that she'll soon greet EWB-UIUC students who are returning to Ntisaw to help construct the water system. Farewell is a temporary sendoff, filled with good wishes and genuine sentiments with no indication of permanent separation. Farewell is a much better word choice, I've decided, for my last discussions with friends before graduation. I'm confident that we'll

*Photo: The EWB-UIUC team dressed in traditional Wimbum clothing given to them by the community. From left, Andrew Rehn; David Wortman; Kenny Long; Janina Stojak; Pastor Julius, a community representative; Claire Joseph; and Jack Kendall.*

see each other again—whether in the workforce or as alumni back on campus. It's amazing to think about the size of our CEE-Illinois community. It extends around the world—to Abu Dhabi, Germany, and beyond. The bond of a community doesn't break when someone leaves. The connections just stretch a little farther. I learned that lesson when I met a CEE master's alumnus from 1951 when visiting National Taiwan University and again when I met Henry Petroski, an Illinois alumnus, Duke professor and prolific author.

I was reminded most recently that farewell is not goodbye by the village elder in Cameroon and I wanted to pass the message along to all of you. Please help us celebrate our department's legacy and achievements. Contact friends and former classmates. Share your experiences on campus. Mentor current students through an internship, job shadow, or student organization (like the American Society of Civil Engineers, Chi Epsilon, or EWB). Farewell is not goodbye—not in Ntisaw or at Illinois. 

*Claire Joseph is a recent graduate of CEE with an environmental engineering primary. She was project coordinator for the Ntisaw Village Water Partnership from Fall 2008-Spring 2010. To learn more about the Ntisaw Village Water Partnership, join the team, or contribute, please email [ewb.uiuc.ntisaw@gmail.com](mailto:ewb.uiuc.ntisaw@gmail.com). To learn more about EWB-UIUC, please visit the chapter website at: <http://www.ewb-uiuc.org/>*

## StudentTeam

Students working on an Engineers Without Borders (EWB) project to bring clean drinking water to a rural community in Guatemala exhibited their research at the National Sustainable Design Expo April 23-25 in Washington, D.C., and returned with two awards: a \$75,000 grant from the Environmental Protection Agency's (EPA) 2010 P3 (People, Prosperity and the Planet) program and a \$1,000 American Society of Civil Engineers (ASCE)-EWB Sustainable Development Award.

CEE Assistant Professor Thanh Helen Nguyen mentors the group, which includes about 20 engineering students altogether, many of them from CEE. They are researching, designing, and implementing an innovative household water filtration system that uses iron-amended biosand filters for the town of Socorro, Guatemala.



*The group's Engineering Open House display*

Last year, the team was awarded a \$10,000 grant through the Environmental Protection Agency's People, Prosperity and the Planet (P3) program, which qualified them to compete in April 2010 for Phase II of the P3 grant, intended to facilitate implementation of the project.

The annual Sustainable Design Expo, held on the National Mall, features an award competition for college and uni-



# Wins Big for Guatemalan Water Project

versity students who have designed sustainable technologies. The P3 Award is given to the highest-rated student designs based on recommendations from the American Association for the Advancement of Science judging panel. The award includes a recycled glass sculpture and eligibility for additional funding of up to \$75,000. The award money is intended to enable winners to further develop their designs, implement them in the field, and move them to the marketplace with the ultimate goal of benefiting people, promoting prosperity, and protecting the planet.

The ASCE National Capital Section, ASCE Committee on Sustainability, and the EWB D.C. Chapter jointly sponsor the ASCE/EWB Sustainable Development Award. The \$1,000 award recognizes the student team which best represents the project that solves a pressing need in a developing country. Judging criteria include the use of local raw materials, simplicity of design and widespread impact on quality of life for the developing region.

About 20 engineering students are involved in the multi-disciplinary project, which has succeeded in researching and designing an innovative household water filtration system in Socorro, Guatemala. The filters are different from others currently in use in that they are amended with iron, which allows them to remove from the water not just bacteria but also viruses. Viruses contribute to the severe diarrhea suffered by an estimated 75 percent of the children of Socorro at the start of the rainy season. Five CEE students traveled to Socorro over their 2009-2010 winter break to kick off the process of introducing the use of traditional biosand filters in each of Socorro's 150 households. As their research on their iron-amended filters progresses, and pending appropriate approvals for use, they will bring this new technology to Socorro as well.

The wins in Washington are just two



*CEE students Anjili Patel, Sheila Markazi, and Kimberly Parker. Back row: CEE student Peter Maracini; Laura Hahn, Center for Teaching Excellence; CEE graduate student Ian Bradley; EPA Assistant Administrator Paul Anastas.*

of a string of successes for this student research team. The Guatemala Water Project won first place in the 2010 Central State Water Environment Association and Water Environment Federation (WEF) Student Design Competition held April 5 in Madison, Wis. The Student Design Competition is intended to promote "real-world and hands-on" design experience for students interested in pursuing an education and career in the water/wastewater engineering and sciences field. This fall, the team will head to WEF TEC, the organization's technical conference held October 2-6 in New Orleans, to compete in the national Environmental Design competition.

Also in April, the group won first place in the National Academy of Engineer-

ing Grand Challenge Chicago Summit Student Poster Contest. The prize was a check for \$500 and a stipend to help send one person to the National Grand Challenges Summit in Los Angeles, Calif., October 5-6.

The students have also participated in community outreach and education activities, including presenting to Illinois science teachers and numerous student groups at the elementary and high school levels. They were the featured presentation at the University's third annual, campus-wide Undergraduate Research Symposium on Thursday, April 15.

A display about their project also won first place in the Real World category of the 2010 Engineering Open House at the University of Illinois in March. 

# Steel Bridge Team finishes successful season at nationals

By JARED THOELE, CAPTAIN

This year's Steel Bridge Team had a successful season, making a good showing at both the regional and national competitions.

The Steel Bridge Team traveled to Rose-Hulman Institute of Technology on April 24 to compete in the Great Lakes Regional Competition, sponsored by the American Society of Civil Engineers and the American Institute of Steel Construction. The Illinois team faced 12 teams this year from the Great Lakes region.

Coming off a second place finish the previous year, this year's team strove to finish in the top of the competition yet again. We achieved our goals by finishing 3rd overall and first in stiffness, qualifying for Nationals.

The team was very excited to qualify again for the national competition. We attended the National Student Steel Bridge Competition at Purdue University May 28-29. We finished 29th overall out of 46 teams, with a 14th place finish in stiffness. Not only did we come away from the competition proud of what we had accomplished, but we took note of several ways that can be used to improve our bridge designs in the coming years.

The rules for this year's competition dictated that the structure bridge an 18½-foot-long theoretical river with a single span and sustain a 2500-pound load spread over two



Members of the 2009-2010 Steel Bridge Team: (front row) Adam Maurer, Nathan Braker, Oana Toma, Joe Riddle, (back row) Scott Earnest, Kirk Atwater, Brett Mattas, James Triezenberg, Jared Thoele, Anthony Mbuthia.

random locations along the bridge deck. In addition to this, the bridge had to be designed for ease of construction, as construction speed is a large factor in determining the score at the competition. The defining change in this year's rules was that the bridge had to have a designated decking support surface. From previous year's experience, we knew that bridges with transfer beams under a loading surface would deflect considerably more than other bridge designs. Therefore, we decided on an out-of-plane truss design that would connect to the decking support surface, which acted

as the top chord.

Future years look quite promising for the Illini Steel Bridge Team to continue the recent success at the Conference and National levels. Four out of the current 10 team members will be returning, and two of the seniors from this year will be involved throughout the design phase.

For more information about sponsoring the team for the 2010-2011 school year, please contact Scott Earnest (earnest1@illinois.edu), Joe Riddle (riddle3@illinois.edu), James Triezenberg (triezen1@illinois.edu), or Oana Toma (toma1@illinois.edu). 





# Concrete Canoe Team races to second at regionals

By ROMAN VOVCHAK, CAPTAIN

This year the Boneyard Yacht Club (the tongue-in-cheek name for the concrete canoe team) entered a tiger striped canoe aptly named "I of the Illini" at the regional competition. For a period of nine months, team members spent thousands of hours working on the project. The entire project came together during two days in April at the regional competition in which the team placed second overall, behind the University of Wisconsin-Madison. The team was excited about these results and began planning for next year as soon as they were back.

Significant changes were made to the form construction compared to previous years. Since the design of the hull shape was already given, form construction started immediately once the rules were released. One of the biggest innovations this year was the successful use of a female fiberglass form, which is a labor intensive activity since a male form must first be constructed. This method was chosen because of the greater dimensional tolerances as compared to a male form. A team could lose half of their design points if any one dimension were greater than 0.5 inches out of tolerance.

Significant testing was done to create an optimal mixture of concrete. A new rule change made it mandatory for the mix to have at least two different recycled aggregates with each comprising a minimum of 25 percent of the total amount of aggregate by weight. For one of the recycled aggregates, the team collected glass



▲ Four of the 10 Boneyard Yacht Club paddlers, front to back: Roman Vovchak, Ericka Rogers, Jennifer Fornek and Ben Rasmussen

◀ Canoe team co-captains Roman Vovchak and Ericka Rogers pose at regionals with the team's second place plaque.

bottles around the campus and then crushed them to uniform size. The final mix design for the canoe was comprised of 12 different materials and was one of the greenest concrete mixes designed by the team.

This entire project, while tiring at times, gives team members valuable experiences that cannot be learned in the classroom.

Everything, from concrete mix design to project management, is covered by this project and I feel honored to have been a part of it and serve the team as captain.

To get involved or sponsor the team, please contact the 2010-2011 team captains, David Nauheimer (nauheim1@illinois.edu) or Jacob Thede (thede1@illinois.edu).



In front of canoe: team co-captains Roman Vovchak and Ericka Rogers. Behind canoe, left to right: Kyle Troka, David Nauheimer, Jacob Thede, Brian Spencer, Pam Gronkowski, Katie Latham, Amanda Bordelon, Jennifer Fornek, Steven Gresk, Raphael Stern, Kyle Klepitch, Chris Walton, Piyush Gupta, Arielle Malinowski, and Emma Israel.



## Al-Qadi elected ASCE Distinguished Member



Professor Imad Al-Qadi has been elected a Distinguished Member of the American Society of Civil Engineers.

He was recognized for his extraordinary research and technical contributions in pavement engineering, modeling, rehabilitation technologies, pavement interlayer systems, asphaltic mixtures, transportation infrastructure sensing, and ground penetrating radar and for his exemplary leadership in professional service and technology transfer.

Al-Qadi is Founder Professor of Civil and Environmental Engineering, Director of the Advanced Transportation Research and Engineering Lab, and the Founding Director of the Illinois Center for Transportation.

## Nguyen wins CAREER award



Assistant Professor Thanh (Helen) Nguyen has won a National Science Foundation (NSF) Faculty Early Career Development (CAREER) Award.

With the goal of making wastewater reuse more cost-effective, especially for developing countries, Nguyen is studying how pathogen mobility and inactivation are influenced by surface interaction between pathogens and wastewater organic matter.

The five-year CAREER grants are the NSF's most prestigious form of support for junior faculty.

CEE students **Chris DeSilva**, a member of the Fighting Illini Men's Cross Country team, and **Michelle Mehnert**, a member of the Fighting Illini Women's Swimming and Diving team, qualified for Academic All-Big Ten status this year. To qualify, student-athletes must be letter winners in at least their second academic year at the university and carry a 3.0 GPA or better.



DeSilva



Mehnert

Three CEE students were inducted into the engineering honor society the Knights of St. Patrick: **Claire Joseph**, **Peter Maraccini** and **Victoria Wierec**.

Assistant Professor **Larry Fahnestock** was named as one of two recipients of the College of Engineering 2010 Rose Award for Teaching Excellence in the College of Engineering, given for achieving excellence in undergraduate teaching and recognizing innovative teaching methods and instructional programs which motivate freshman and sophomore students to learn and appreciate engineering.



Fahnestock

Professor **David A. Lange** was elected a new member of the American Concrete Institute's Board of Direction.

Assistant Professor **Yanfeng Ouyang** and Associate Professor **Jeffery Roesler** won 2010 Xerox Awards for Faculty Research. This award is made annually by the College of Engineering to four associate professors in recognition of outstanding research conducted during the past five years.

Professor **Glaucio Paulino** has been elected Member-at-Large of the United States Association for Computational Mechanics for the upcoming term.



Paulino

Undergraduate Program Coordinator **Rebecca Stillwell** was recognized as one of the top 10 percent of engineering advisers on campus with a 2010 Engineering Council Award for Excellence in Advising Award.

Associate Professor **Timothy Strathmann** received

the Excellence in Guiding Undergraduate Research Award, designed to foster and reward excellence in involving and guiding undergraduate students in scholarly research. Strathmann is only the third faculty member in the College of Engineering to win this campus award since its inception in 1995.

The following CEE graduate students were selected to receive College of Engineering fellowships: **Hao Wang**, Yee Fellowship for Chinese Graduate Students; **Ciaran Harman**, Mavis Future Faculty Fellows Award; **Zhen Leng**, Mavis Future Faculty Fellows Award

The Best Paper Awards Committee of the *ASCE Journal of Construction Engineering and Management* has selected Associate Professor **Khaled El-Rayes** to receive the 2009 Best Journal Paper Award for his paper titled "Optimizing Post-disaster Reconstruction Planning for Damaged Transportation Networks."



El-Rayes

CEE seniors **Peter Maraccini** and **Mark Messner** received the University's Bronze Tablet award. This honor recognizes students who maintain at least a 3.5 cumulative grade point average through the academic term prior to graduation and rank in the top 3 percent of their graduating classes. Their names will be inscribed on a Bronze Tablet hanging in the University's Main Library.

CEE student **Kimberly M. Parker** has received a Goldwater Scholarship.

The Air & Waste Management Association has chosen Professor **Mark J. Rood** as the 2010 recipient of their Lyman A. Ripperton Environmental Educator Award.



Rood

Assistant Professor **Junho Song** received the Junior Research Prize from the International Association for Structural Safety and Reliability. It was presented in September at the 10<sup>th</sup> International Conference on Structural Safety and Reliability, Osaka, Japan.



Song

CEE graduate student **Laura M. Fierce** was among those honored for outstanding individual and group outreach efforts with the 2010 Campus Awards for Excellence in Public Engagement for her work with Engineers Without Borders, particularly on the EWB-Illinois Water Project in Enugu, Nigeria.

*Continued on Page 28.*



# CEE Job Fair Draws a Crowd

Hundreds of CEE students turned out on February 26 to meet with recruiters from nearly 60 companies at the department's Professional Development Fair. The annual event, held in Newmark Lab, connects CEE students with potential employers for internships, summer jobs and permanent positions. As always, many of the recruiters were department alumni. Ken Floody (BS 83) of Ingenii LLC, the president of the CEE Alumni Association, was on hand to critique student resumes, and a continuous queue of students kept him busy until two hours after the fair had ended.

The week before, Floody presented a resume workshop designed to help students get ready in anticipation of the job fair. About 150 students showed up on February 19 for a presentation by Floody, free pizza, and a chance to have their resumes critiqued individually by an alumni volunteer. The RSVP response from students was so great that organizers had to call in additional alumni volunteers at the last minute. The department would like to thank the following Illinois alumni for offering resume advice that evening:

- Dave Byrd (BS 01, MS 06), EFI Global Inc.
- Stan Herrin (BS 74, MS 78), Crawford, Murphy & Tilly Inc.
- Gen Long (BS 02, MS 03), Applied Pavement Technology
- Monty Wade (BS 91, MS 93), Applied Pavement Technology
- Keith Schinkoeth (BS 02, MS 03), Clark Dietz Inc.
- Nirav Patel (BSME 02, Mechanical Engineering), Clark Dietz Inc.
- Amy Russell (BS 98, Agricultural Engineering), Illinois State Water Survey



▲ CEE students Claire Joseph and Amna Mahmud helped out with the registration table. A third student volunteer, Mike Roggeman, is not pictured.

► Kevin Corzatt (MS 05) and Joseph Kaiser (BS 70, MS 71) of BSI Constructors.



▲ Robert Pekelnicki (BS 00, MS 01) of Degenkolb speaks with a student.

◀ Pierre Henderson and Flashette McKee of Milhouse Engineering and Constructors.

## Sponsors

The department extends a special thanks to the following company sponsors of the 2010 Professional Development Fair:

### Gold Level

MWH

### Silver Level

Bowman, Barrett & Associates Inc.  
Civiltech  
Golder Associates  
Milhouse Engineering and Construction Co.  
Wiss, Janney, Elstner Associates Inc.

### Bronze Level

Thomas Engineering Group

# Department News

## Student's system revolutionizes construction progress visualization and monitoring



*Golparvar-Fard poses with images from his 4D augmented reality models of Ikenberry hall and the Yeh Center construction project.*

The use of digital photos to monitor construction projects has become commonplace, thanks to inexpensive cameras, low-cost memory and Internet access on construction sites. CEE student Mani Golparvar-Fard (PhD 10) developed a new modeling technique that uses such common photos to visualize and automatically track construction progress in four dimensions, offering construction professionals a new, low-cost way to monitor projects.

To develop the system that generates these D<sup>4</sup>AR – 4D Augmented Reality models, Golparvar-Fard worked with his advisers, Feniosky Peña-Mora, formerly on the CEE faculty and now Dean of Engineering and Applied Science at Columbia University, and Silvio Savarese of the Department of Electrical Engineering at the University of Michigan.

Using digital photos of modest resolution, the system constructs dense, three-dimensional point cloud models of the construction site, automatically computing each photo's viewpoint. Using different photo collections taken over time, it generates four-dimensional (3D plus time) point cloud models. Finally, Building Information Models (BIM) are linked with construction schedules and superimposed with the point cloud models. The results are D<sup>4</sup>AR models that visualize actual and expected models

together and automatically color code progress deviations based on a simple traffic light metaphor.

"Imagine you are sitting at your office and would like to conduct a walk-through on your job site, but you are miles away," Golparvar-Fard says. "What you can do now, is to make a phone call to your construction site and ask your superintendents and field engineers to walk around the site, take photos and send them back to you. You can automatically reconstruct actual 3D models of the site using these photos and register the 3D model and the photos with as-designed Building Information Models. Using the D<sup>4</sup>AR models, you would be able to remotely walk through the site and study both the actual and expected status of the project. You can monitor progress, productivity, safety, quality and even analyze constructability and site logistics."

The system has already garnered both awards and the attention of industry. The work won Best Student Paper at the 2010 International Conference on Innovation in AEC; the FIATECH CETI award in the outstanding student researcher category; and a first place poster award at the 2009 Construction Research Congress. Several construction companies are studying the feasibility of using the system for their projects. Meanwhile, Golparvar-Fard has demonstrated its usefulness by generating D<sup>4</sup>AR models for several ongoing or recently completed construction projects, including Ikenberry Student Dining and Residence Hall and the Yeh Student Center, both on the U of I campus.

"A picture is worth a thousand words, so you can imagine the value of hundreds of pictures combined together," he says. **I** Golparvar-Fard has accepted a faculty position at Virginia Tech in the CEE department and Myers-Lawson School of Construction. For more information, visit [www.manigolparvar.com](http://www.manigolparvar.com).

*Continued from Page 26.*

CEE graduate student **Wang Hao** won the Yee Fellowship.

CEE student **Kim Walker** won the Udall scholarship.



Professor **Murugesu Sivapalan** has won the International Hydrology Prize from the International Association of Hydrological Sciences.

**Sivapalan** CEE student **Claire Joseph** won the H.L. Wakeland Undergraduate Leadership Award and the Stanley H. Pierce Award, awarded by the College of Engineering.

CEE student **Jill McClary** won the Fred Eggers Engineering Scholarship, awarded by the College of Engineering.

CEE student **Gregory Johnson** won the John W. Page Scholarship, awarded by the College of Engineering.

CEE students **Kimberly Parker** and **Steven Gresk** won the Caterpillar Foundation Engineering Merit Scholarship, awarded by the College of Engineering.

CEE student **Maria Quinones** won the Corporate Scholars Women in Engineering scholarship, awarded by the College of Engineering.

CEE students **Dean Graves** and **Jordan Taylor** won Mc4West scholarships, awarded by the College of Engineering.

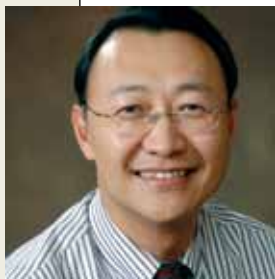
CEE student **Jayce Locke** won the Dale and Wanda Weaver Scholarship, awarded by the College of Engineering.

The following CEE professors made the List of Teachers Ranked as Excellent for fall 2009:

|                           |                |
|---------------------------|----------------|
| Imad Al-Qadi              | Liang Liu      |
| Bassem Andrawes           | James Long     |
| William Buttler           | Benito Mariñas |
| Larry Fahnstock           | Scott Olson    |
| Kevin Finneran            | John Popovics  |
| Marcelo García            | Junho Song     |
| Youssef Hashash           | Tim Stark      |
| Sotiria Koloutsou-Vakakis | Don Uzarski    |
| Dan Kuchma                | Julie Zilles   |
| David Lange               |                |



## Liu is new Associate Head, Dir. of Undergrad Studies



Associate Professor Liang Y. Liu has been appointed CEE's new Associate Head and Director of Undergraduate Studies. He succeeds Professor David A. Lange, who has served in the position since 2004.

Since Liu joined the faculty in 1992, he has taught graduate and undergraduate courses in Construction Productivity, Cost Estimating, Construction Management Information Systems, and Construction Case Studies. His research program includes basic and applied research in construction engineering and management, including project

controls, productivity analysis and improvement, cost engineering, information technologies, facility life-cycle analysis, risk management, and computer simulation.

Liu has been recognized for excellence in research, teaching and advising. In 2001, he was named the W. E. O'Neil Faculty Research Scholar. In 2003, he won the Teaching Excellence Award of the University of Illinois College of Engineering. He received the Engineering Council Award for Excellence in Advising in 2007.

"As an administrator, I will have the unique opportunity to work closely with students, faculty, alumni, and industry leaders on improving the CEE curriculum and implementing new initiatives to enhance the undergraduate experience here."   
[cee.illinois.edu/faculty/liangliu](http://cee.illinois.edu/faculty/liangliu)

## New faculty Nora El-Gohary



The newest member of the Construction Engineering and Management faculty is Assistant Professor Nora El-Gohary.

El-Gohary earned her bachelor of science (1991) and master of science (2002) degrees from the American University in Cairo, both in construction engineering. She earned her Ph.D. (2008) from the University of Toronto in construction engineering and management. She joined the faculty at Illinois in 2009, after serving on the fac-

ulty of the University of Manitoba's civil engineering department.

El-Gohary will teach CEE422 Construction Cost Analysis and CEE528 Construction Data Modeling.

El-Gohary has research interests in collaborative, integrated, intelligent and sustainable construction including: information and knowledge modeling and management; knowledge-based construction management systems; semantic systems; ontologies; context-aware systems; semantic interoperability; and semantic mergers.   
[cee.illinois.edu/faculty/noraelgohary](http://cee.illinois.edu/faculty/noraelgohary)



## Cai is first Ven T. Chow Faculty Scholar

Associate Professor Ximing Cai has been named the first Ven T. Chow Faculty Scholar in Water Resources.

The late Professor Ven Te Chow (PhD 50) developed a world-renowned program in the field of water resources engineering at the University of Illinois. His books, *Open-Channel Hydraulics* (1959), *Handbook in Applied Hydrology* (1964), and *Applied Hydrology* (1981), are classics in the water resources literature. Chow was instrumental in obtaining funding from the National Science Foundation to build the Hydrosystems Laboratory.

Cai is one of the department's rising stars in the field of water resources engineering and management. Since joining the faculty at Illinois in 2003, Professor Cai has developed a vigorous and well-funded research program with support from NSF, NASA, USDA/DOE, International Food Policy Research Institute, and Illinois-Indiana Sea-Grant, among others.

His publications address a broad range of water issues: river basin management, floods and droughts, impact of biofuels on water use, water development for food security, and land use impact on ecosystems. 

[cee.illinois.edu/faculty/ximingcai](http://cee.illinois.edu/faculty/ximingcai)

# Department News



One of the Herricks' team's avian radar research trailers.

## New bird tracking information system deployed

In January 2009, an airplane's collision with a flock of birds during take-off in New York City caused it to make an emergency landing in what is now known as "Miracle on the Hudson" for its surprising lack of casualties. One year later, Illinois researchers led by CEE Professor Edwin E. Herricks announced the commissioning of an advanced new bird tracking information system that promises to improve wildlife management and overall safety at airports.

The system was deployed last winter at Seattle-Tacoma International airport in Washington State by the Federal Aviation Administration (FAA)-designated Center of Excellence for Airport Technology (CEAT) at the University of Illinois, with the support of wildlife biologists at the Port of Seattle and equipment from Accipiter Radar. It



Herricks, left, explains a live image from Seattle-Tacoma International Airport bird radar.

is now live and provides wildlife managers with real-time displays of bird activity on and around an airport, presented as overlays on a Google Earth™ map of the area. The system also includes radar tracking information from the Naval Air Station Whidbey Island in Oak Harbor, Wash., and will include information from O'Hare and John F. Kennedy airports as soon as radars there become fully operational.

Using this enhanced technology, wildlife staff can access the "as it happens" data from airport avian radars using laptop computers as they patrol the airport and its known bird hazard "hot spots." Other options are available to follow movements on larger monitoring screens, or on screens at other locations. System users can also call up daily summaries of bird track histories on a day-to-day, week-to-week, or season-to-season basis to better assess bird movement patterns and analyze flock and individual bird dynamics.

In 2006, commercially available avian radar systems were identified and the FAA tasked CEAT with the performance assessments of radar use in wildlife management and operational safety. 

Full story online at [http://cee.illinois.edu/herricks\\_seattle\\_deployment](http://cee.illinois.edu/herricks_seattle_deployment)

## Sensor board for structural health monitoring licensed for release

A sensor board for wireless structural health monitoring that was developed by researchers at Illinois has been licensed for commercial release by MEMSIC Inc.

The Imote 2 Structural Health Monitoring Board (ISM400) is an integrated sensor board that enables an inexpensive means for continuous and reliable structural health monitoring using dense arrays of wireless smart sensors. It is part of a system developed by researchers in the Illinois Structural Health Monitoring Project (ISHMP)—led by professors Bill Spencer of the Department of Civil and Environmental Engineering and Gul Agha of the Department of Computer Science.

The system, currently deployed at



The Jindo Bridge in South Korea, on which the wireless monitoring is currently deployed.

full scale on the Jindo Bridge in South Korea, is the first inexpensive, wireless means for continuous and reliable structural health monitoring. Its use on the Jindo Bridge, a joint project between the University of Illinois at Urbana-Champaign, KAIST in Korea, and the University of Tokyo, is the

first dense deployment of a wireless sensor network on a cable-stayed bridge and the largest of its kind for civil infrastructure to date.

Structural health monitoring is an emerging field that combines civil engineering knowledge with developments in sensor technology, information management, and networking technologies. The goal is to achieve a more reliable alternative to traditional structure inspection techniques. 

Full story online at <http://cee.illinois.edu/sensorboard>



A box containing one of many wireless smart sensors, affixed to the Jindo Bridge.





# 2010 CEE Alumni Awards

The Civil and Environmental Engineering Alumni Association is pleased to announce the 2010 recipients of its Distinguished Alumnus/Alumna Award and Young Alumnus/Alumna Achievement Award. The Distinguished Alumnus/Alumna Award recognizes professional accomplishments or unique contributions to society by alumni of the department. The Young Alumnus/Alumna Achievement Award recognizes a recent graduate who has achieved distinction in his or her field and reached a level of accomplishment significantly greater than that of other recent graduates. The honorees were recognized at the Chicago Regional Dinner Meeting on Feb. 11. For more information about the winners, visit [cee.illinois.edu/alumni\\_awards\\_2010](http://cee.illinois.edu/alumni_awards_2010).

## Distinguished Alumnus/Alumna Award



**Walter D. Linzing, P.E., (BS 49)**  
Consulting Engineer,  
Park Ridge, Illinois  
*For dedication to developing increased public awareness about the contributions engineers make to our standard of living, public health and safety; for service to the engineering profession through practice; and for assuming leadership roles in major professional engineering organizations.*



**Doris I. Willmer, P.E., LEED AP, (BS 72, MS 73)**  
Founder and President, Willmer Engineering Inc., Doraville, Georgia  
*For exemplary performance and outstanding achievement in the consulting engineering profession; for extensive service to civic, humanitarian and professional organizations; for strong commitment to encouraging women to join the engineering field; and for enduring support of the Department of Civil and Environmental Engineering at the University of Illinois.*



**M.T. Geoffrey Yeh (BS 53)**  
Chairman, Hsin Chong Construction Group Ltd., Hong Kong  
*For management of construction and property development companies instrumental in rebuilding Hong Kong after WWII; for development and application of innovative construction tools; for outstanding civic leadership; and for long-standing philanthropic support to several universities including the Department of Civil and Environmental Engineering at the University of Illinois.*



**Kathryn A. Zimmerman, P.E., (BS 83, MS 85)**  
President, Applied Pavement Technology Inc., Champaign  
*For outstanding leadership in, as well as contributions to, pavement research, design, construction and management technology; and for extensive service and dedication to engineering education, particularly the Department of Civil and Environmental Engineering at the University of Illinois.*

## Young Alumnus/Alumna Award



**Kurt A. Keifer (BS 97, MS 99, PhD 06)**  
Project Engineer, Dynatest Consulting, Chicago  
*For business development of infrastructure design and analysis approaches, and particularly for the implementation of pavement management systems for roadways, parking lots, and airfield pavements.*



### Nominations invited: CEE alumni awards

If you know of a deserving colleague who graduated from CEE at Illinois, consider nominating him or her for a CEE Alumni Association award. The Distinguished Alumnus/Alumna Award and the Young Alumnus/Alumna Achievement Award recognize those who have distinguished themselves in the field at different career stages. For more information, please visit our alumni awards page of the CEE website at [cee.illinois.edu/CEEAAwards](http://cee.illinois.edu/CEEAAwards).



# 2010 CEE Student Awards

## **A. Epstein Award in Civil Engineering**

Esvina Litia Choo Mei Seng

## **Alvord, Burdick & Howson Award**

Jessica Lambert

## **Anna Lee and James T.P. Yao Scholarship**

Kevin Law

## **Bates and Rogers Scholarship**

Jose Garcia  
Ronald Halicke

## **Bowman, Barrett & Associates Outstanding Scholar Award**

Benjamin Zeman

## **Caterpillar Scholars Scholarship**

Jeanine Genchanok  
Krystian Powala  
Andrew Rehn  
Lauren Valentino

## **CH2M Hill Transportation Endowed Scholarship**

Carrie Desmond  
Lauren Payne

## **Chester P. Siess Award**

Yuan Yuan Liu  
Moochul Shin

## **Chicago Outer Belt Contractors Association Scholarship**

Jung Sheng Chiu

## **Civil Engineering Class of 1943 Undergraduate Leadership Award**

John Sarsfield

## **Clement C. Lee Outstanding Scholar Award in honor of Houssam Mahmoud Karara**

Paul Vizenor

## **CRSI Education and Research Foundation Scholarship**

Hemal Patel

## **Crawford, Murphy, & Tilly Inc. Award**

Ugwem Eneyo

## **Delores Wade Huber Scholarship**

Yunfei Yang

## **DFI Educational Trust Berkel & Company Contractors, Inc. Scholarship**

Jason Fifarek  
Daniel Friederich  
James Pforr

## **Doris I. and James L. Willmer Endowed Scholarship in Civil and Environmental Engineering**

Stephanie Tong

## **Earle J. Wheeler Scholarship**

Oana Toma  
Denglin Wu

## **Eli W. Cohen – Thornton Tomasetti Foundation Scholarship**

Spencer Koehler

## **Ernest L. Doctor Memorial Award (IAPA)**

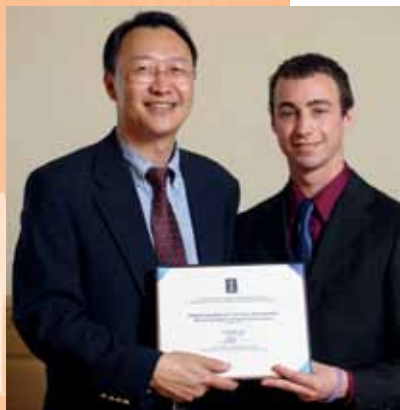
Ryan Altemare

## **George L. Farnsworth Jr. Scholarship**

John Jurevis  
Andrew Kustusich  
Chuan Li

## **Glenn E. and Helen L. Stout Water Resources Research Award**

Joshua Cantone  
Blake Landry



*Jacob Thiede, right, presents the ASCE Outstanding Instructor Award to Associate Professor Liang Y. Liu.*



*Don Brennan (BS 67) of River City Construction in East Peoria, Ill., left, presented the Industry Advancement Foundation of Central Illinois Builders of the AGC Scholarship to Elizabeth M. Tewolde.*



*Nan Newlon (BS 81) of the Department of Public Works in Downers Grove, Ill., right, presented the Max Whitman APWA Memorial Scholarship to Justin S. Grasse.*



*Rudy Frizzi (BS 87) of DFI Educational Trust in Hawthorne, NJ, left, presented the Deep Foundations Institute Educational Trust Berkel & Co. Contractors Inc. Scholarship to (left to right) Daniel S. Friederich, Jason D. Fifarek, and James E. Pforr.*





*Bill and Coletta Ackermann (far left and right) presented the William C. Ackermann Sr. Civil Engineering Scholarship to recipients Shohei Kurokawa, second from left, and Arielle L. Malinowski, third from left.*



*Professor and Head Amr S. Elnashai (center) presented the Ira O. Baker Prize to Derek R. Vardon, left - Second Prize, and Peter A. Marccini, right - First Prize.*

**Golf Course Builders Association of America Foundation Scholarship (GCBAF)**

Doug Houser

**Grant W. Shaw Memorial Scholarship**

Ryan Altemare  
Kathryn Born

**Harold R. Sandberg Scholarship**

Kimberly Parker

**Henry T. Heald Award**

Jared Thoele

**Illinois Association of County Engineers Award**

Tyler James  
Matthew Landstrom  
David Nauheimer  
Joseph Zeller

**Industry Advancement Foundation of Central Illinois Builders of the AGC Scholarship**

Elizabeth Tewolde

**Ira O Baker Prize - First Prize**

Peter Maraccini

**Ira O Baker Prize - Second Prize**

Derek Vardon

**Ira O. Baker Memorial Scholarships**

Gilberto Chaidez  
Jasmine Winston

**Klein and Hoffman, Inc. Scholarship**

Johanna Gemperline  
Vincent Kania

**Koch Scholarship in Civil and Environmental Engineering**

Alex Beugelsdijk

**Lawrence J. Fritz Undergraduate Scholarship**

Steven Gresk

**Leigh F. J. Zerbee Scholarship in Civil Engineering**

Eric Anderson

**Margaret J. Holden – American Council of Railroad Women Scholarship**

Samantha Chadwick

**Maude E. Eide Memorial Scholarship**

Kimberly Foster  
Ahn Le  
Matej Lesko

**Max Whitman APWA Memorial Scholarship**

Justin Grasse

**Melih T. Dural Undergraduate Research Prize**

Michael Kehoe

**Moreland Herrin Scholarship**

Michael Lodes

**Norman Carlson Scholarship**

Amanda Koenig  
Michael Wnek

**RJN Foundation Civil Engineering Scholarship**

Sandra Peters

*The Koch family presented the Koch Scholarship in Civil and Environmental Engineering to Alex M. Beugelsdijk, center. Members of the Koch family, left to right, are: Greg Koch (BS 96, MS 98), Paul Koch (BS 66, MS 68), Barbara Koch, and Doug Koch.*



**Walker Parking Consultants Scholarship**

Deborah Gaskins

**Walter E. Hanson Graduate Study Award**

Daniel Schriks

**Walter L. and Carole A. Crowley Scholarship**

Derek Vardon

**Wayne C. Teng Scholarship**

Michael Byrnes  
Zachary Sasnow  
Ryan Smith  
Timothy Veldman  
Richael Young

**Wilfred F. and Ruth Davison Langlier Scholarship in Sanitary/Environmental Engineering**

Kimberly Parker

**William C. Ackermann, Sr. Civil Engineering Scholarship**

Shohei Kurokawa  
Arielle Malinowski

**William E. O'Neil Award**

Tarek Elghamrawy

**William John MacKay Award**

Quinton Champer  
Elizabeth Rehwoldt  
Derek Vardon

## 2000s

**Michael N. Mendenhall**, P.E., S.E., (BS 02) of Hanson Professional Services Inc. is currently serving as vice president of the Illinois Society of Professional Engineers – Capital Chapter.

**Daniel B. Oerther** (MS 98, PhD 02) has been named the John A. and Susan Mathes Chair of Civil Engineering at Missouri University of Science and Technology. Oerther is considered an interdisciplinary researcher, combining biotechnology with environmental engineering to form environmental biotechnology. His research integrates concepts from ecological theory, engineering modeling processes and molecular biology to assess the metabolic activity of various microbial populations. Until July 1, Oerther was director of the Ohio Center of Excellence in Sustaining the Urban Environment and professor of environmental engineering at the University of Cincinnati.

**Sean Poust** (BS 07) was named Research Assistant of the Year at the Construction Engineering Research Laboratory in Champaign. Poust was cited for basic research that made it possible to manipulate man-made polymers into synthetic, cell-like structures. He incorporated the synthetic cells into a protein-based transport mechanism that allows selective exchange of chemicals with the surrounding environment. The research will be used to improve remediation and sensing technologies for environmental contamination at Department of Defense sites.

## 1990s

The following alumni qualified as Board Certified Environmental Engineers of the American Academy of Environmental Engineers in the class of 2009: **Anthony J. Dill**, P.E., BCEE (MS 94); **Mark P. Cal**, Ph.D., BCEE (MS 93, PhD 95); **Allen B. Gelderloos**, P.E., BCEE (MS 90); **Brian L. Hackman**, P.E., BCEE (BS 96, MS 98); and **Sava S. Nedic**, P.E., BCEE (MS 92).

**Thomas J. Hamernik**, P.E., (BS 90) of Hanson Professional Services Inc., project manager, was named an Accredited Tier Designer from the Uptime Institute of Professional Services.

**Mark Heaton**, P.E., (BS 98) joined Hanson Professional Services Inc.'s corporate headquarters, serving in the company's infrastructure market. A transportation engineer, he specializes in engineering consulting services for state, county and local governments. His current duties include assisting with temporary traffic control designs for the Interstate 74 Mississippi River crossing project in the Quad Cities.

**Mohammed T.M. Obaidat** (MS 94, PhD 94) is Minister of Public Works and Housing in Jordan and a member of the

Cabinet of Jordanian Prime Minister Samir Rifai, a position he has held since Dec. 14, 2009.

## 1980s

**Richard M. Bennett** (MS 81, PhD 83) was honored by the University of Tennessee at Knoxville during Faculty Appreciation Week. Bennett was cited for his work to improve the teaching of freshman undergraduate engineering students. As the director of the ENGAGE Engineering Fundamentals Division in the College of Engineering and a professor of civil and environmental engineering, Bennett oversees the work of helping guide freshmen through a core curriculum that is designed to prepare them not only for the rigors of an undergraduate engineering degree, but also for their future careers.

**James R. Harris** (MS 75, PhD 80) has been honored with the College of Engineering Alumni Award for Distinguished Service. Harris is president of J.R. Harris and Co. of Denver, Colo. Before coming to Illinois for his master's and doctorate, Harris earned his bachelor's degree in civil engineering from the University of Colorado at Boulder. Harris was cited, "For contributions to the development, improvement, and implementation of modern structural codes and standards, and as a principal in the design and restoration of many signature buildings."

**Sally McConkey** (MS 84) has been certified as a Diplomate by the American Academy of Water Resources Engineers. She is a water resources engineer at the Illinois State Water Survey in Champaign.

**Jack Moehle** (BS 78, MS 78, PhD 80) was elected a new member of the American Concrete Institute's Board of Direction. Moehle is a professor of the civil and environmental engineering department at the University of California, Berkeley, Calif.

**David L. Peters**, P.E., (BS 81, MS 89), regional vice president at Hanson Professional Services Inc. was named chairman of a new Green Energy Council group called the Green Energy Cluster for the Business Development Board of Palm Beach County, Fla.

**David Sabatini** (BS 81), a professor of civil engineering and environmental science at the University of Oklahoma (OU), received the Oklahoma Medal for Excellence in Teaching at a Research University during the 24th annual Oklahoma Foundation for Excellence Academic Awards Banquet in Tulsa, Okla., on May 22. The prestigious award is presented to only

## Warner Receives UIAA Humanitarian Award

**Dennis Warner** (BS 63, MS 66), was selected by the University of Illinois Alumni Association as the recipient of this year's Humanitarian Award. He was recognized during commencement weekend.



Warner is a Senior Technical Adviser for water supply, sanitation and water resources development with Catholic Relief Services in Baltimore, Md. He has more than 40 years experience in international development, working on problems of water supply, sanitation, environmental health and emergency relief assistance. Warner is a Member of Pax Christi, the international Catholic peace movement, and in 2000 served as representative of Pax Christi International to the United Nations in Geneva. 

## Fisher in Engineering at Illinois Hall of Fame



**George M. C. Fisher** (BS 62) was inducted into the Engineering at Illinois Hall of Fame on April 23. The Hall of Fame recognizes Illinois engineering alumni, and others

affiliated with the college, who have had significant achievements in leadership, entrepreneurship, and innovation of great impact to society.

Fisher is a worldwide entrepreneurial leader, former President and Chief Executive Officer of Motorola, and retired Chief Executive Officer of Eastman Kodak Company. In addition to earning his bachelor's degree in Civil Engineering, Fisher was awarded an Honorary Degree from the University of Illinois in 1996. 





one Oklahoma educator a year at the research university level. The awards ceremony featured a keynote address by Pulitzer Prize-winning historian David McCullough. Sabatini, David Ross Boyd Professor and Sun Oil Company Endowed Chair at the OU School of Civil Engineering and Environmental Science, received his B.S. from the University of Illinois, M.S. from Memphis State University and Ph.D. from Iowa State University and joined the OU faculty in 1989.

**Daniel J. Whalen**, P.E., (BS 84, MS 85) was promoted to assistant vice president at Hanson Professional Services Inc. He is a project manager in the energy and industry market.

## 1970s

**Gregory D. Cargill** (BS 71) and **Theodore M. Denning** (BS 70) are featured in a three-part history of the Illinois Environmental Protection Association and the Illinois Water Environment Association in the Winter 2010 issue of the Illinois Water Environment Association newsletter (Issue 4). The article is available online at [iweasite.org/newsletters](http://iweasite.org/newsletters).

**"Satch" Pecori**, P.E., (BS 73, MS 74) president and CEO of Hanson Professional Services Inc., was elected treasurer of the American Council of Engineering Companies' (ACEC) executive committee. He will serve a two-year term. With more than 35 years of experience in the engineering industry, Pecori leads Hanson Professional Services, directing the company's senior-level management, developing and implementing the firm's strategic growth plans, and overseeing operations in 20 offices nationwide.

**James K. Wight** (PhD 73) is serving a two-year term as Vice President of the American Concrete Institute. Wight is the F.E. Richart Jr. Collegiate Professor of Civil Engineering at the University of Michigan, Ann Arbor, Mich. He teaches undergraduate and graduate classes on structural analysis and design of reinforced concrete structures.

## 1960s

**Bruce R. Ellingwood** (BS 68, MS 69, PhD 72) received the Senior Research Prize at the International Association for Structural Safety and Reliability's 10th International Conference on Structural Safety and Reliability in Osaka, Japan.

**Paul D. Koch** (BS 66, MS 68) was awarded the University of Illinois Alumni Association (UIAA) Loyalty Award. UIAA President and CEO Loren Taylor presented the award to Koch at the April 10 department awards convocation. The award recognizes  
*Continued on Page 36.*

## National Academy of Engineering elects Khachaturian

CEE alumnus **Jon Khachaturian** (BS 78) was elected to the National Academy of Engineering, "for developing innovative, safe, reusable, and economical heavy lifting systems to advance the international marine industry." Khachaturian is the founder, president, and chief executive officer of Versabar Inc. in Houston, Texas.

In the 1980s, Khachaturian carved out a niche for himself by inventing a



patented system to lift unwieldy loads—including toppled off-shore oil rigs—safely and cost-effectively. He has since registered more than 40 patents and operates a family of engineering companies, including VersaMarine, VersaBuoy,

and the core company, Versabar.

He credits his father, the late CEE Professor Emeritus Narbey Khachaturian (BS 1947, MS 1948, PhD 1952), with sparking his interest in civil engineering. 1

## Baker awarded IStructE Gold Medal

**William F. Baker** P.E., S.E., FISTructE, (MS 80), Structural Engineering Partner at Skidmore, Owings & Merrill LLP was awarded the Gold Medal by The Institution of Structural Engineers (IStructE) in May for his work as an internationally acclaimed structural

engineer. Headquartered in the United Kingdom, IStructE is the world's largest membership organization dedicated to the art and science of structural engineering. The Gold Medal is the Institution's highest individual award for



exceptional and outstanding contributions to the advancement of structural engineering. Previous winners have included only four Americans, three of whom were affiliated with the University of Illinois: Baker, Hardy Cross, and Nathan Newmark.

Throughout his career, Baker has

dedicated himself to structural innovation, most notably in the design of tall buildings. His most recent contribution has been to develop the "buttressed core" structural system for the Burj Khalifa, a system which, in conjunction with sophisticated wind engineering, makes it possible to construct skyscrapers of extreme elevation. The Burj Khalifa is currently the world's tallest manmade structure.

According to the Council on Tall Buildings and Urban Habitat (CTBUH), three of the five tallest buildings to top out in 2009 are credited to Skidmore, Owings & Merrill where Baker led the structural engineering: Burj Khalifa (Dubai), Nanjing Greenland Financial Center (Nanjing), and Trump International Hotel & Tower (Chicago).

In 2009, Baker became the first American to receive the Fritz Leonhardt Prize, given by the German Baden-Wuerttemberg Chamber of Engineers and the Association of Consulting Engineers in recognition of his engineering accomplishments. In 2008, Baker received the Fazlur Rahman Khan Medal for lifetime achievement from the Council on Tall Buildings and Urban Habitat. 1



## Illini in Egypt

A group of distinguished Illinois alumni met with CEE Department Head Amr Elnashai in May at the Cairo Automobile Club in Cairo, Egypt. In attendance were CEE alumni Amr Hassanein (Finance MS 89; CEE PhD 90) Osama Khalifa (PhD 69), Salah Nosseir (MS 64), Hassan Osman (PhD 66), Nabil Shoeb (MS 64, PhD 67) and Mohamed Talha (MS 62, PhD 66), and Illinois alumni Ali El-Saiedi (NPPE PhD 69), Abou Zeid Rageh (Architecture PhD 53) and Mohamed Ismaili Youssef (Education MS 61, PhD 66). All hold prestigious positions in government, academia and industry.

Continued from Page 35.

nizes those who have demonstrated exceptional loyalty, commitment, dedication and service to UIAA for the advancement of their Alma Mater.

## 1950s

**Alfredo H-S. Ang** (MS 57, PhD 59) received the Freudenthal Ring for delivering the Freudenthal lecture at the International Association for Structural Safety and Reliability's 10th International Conference on Structural Safety and Reliability in Osaka, Japan.

**John E. Barrett** (BS 52), P.E., S.E., Vice Chairman of Bowman, Barrett & Associates, was honored with the John Parmer Award from the Structural Engineers Association of Illinois (SEAII). The award was presented during SEAII's Annual Excellence in Structural Engineering Awards Banquet June 5 at Murphy Auditorium of the American College of Surgeons in Chicago. The Award is presented each year to a structural engineer in recognition of outstanding contributions in the field of structural engineering whose distinguished career is acknowledged by peers to be an example of excellence.

**Send your news for publication to the editor at: celeste@illinois.edu. Photos are welcome!**

## Ballot to select new officers for the CEE Alumni Association Board of Directors

According to the bylaws of the CEE Alumni Association, the board is required to publish the slate of nominations for constituent approval. Members of the Alumni Association are asked to cast their votes and return this ballot to Carla Blue, Alumni Coordinator, at the department. Alternatively, votes may be emailed to: blue1@illinois.edu.

### Open positions for Board of Directors for the new term:

*President 2010-2012:*

- ☐ **Lawrence P. Jaworski** (BS 72, MS 73), Greeley & Hansen LLC  
Write in: \_\_\_\_\_

*Past President 2010-2012:*

- ☐ **Kenneth M. Floody** (BS 83), Ingenii LLC, Oak Park, Ill.

*Vice President 2010-2012:*

- ☐ **Tracy K. Lundin** (BS 80, MS 82)  
Write in: \_\_\_\_\_

*Second Vice President 2010-2012:*

- ☐ **Allen J. Staron**, P.E., (BS 74), Clark Dietz Inc., Chicago  
☐ Write in: \_\_\_\_\_

*Board Members 2010-2012 (vote for three):*

- ☐ **Daniel F. Burke** (BS 92, MS 93), City of Chicago  
Department of Transportation  
☐ **Julian C. Rueda** (BS 80, MS 82), Geo Services Inc., Naperville, Ill.

- ☐ **Robert Scott Trotter**, P.E., (BS 89),  
Trotter and Associates Inc., St. Charles, Ill.  
☐ Write in: \_\_\_\_\_



# Engineer and Brave

Four CEE alumni traveled to Spain at New Year's for two events that celebrated international exchange, engineering, athleticism, and the University of Illinois.

Fernando Moreu (MS 05), a structural engineer at ESCA Consultants Inc. in Urbana and a CEE Ph.D. student, organized a roundtable discussion in his native city of Granada, Spain, called,

The mastermind behind both events is the energetic Moreu, who has frequently hosted University of Illinois alumni in Granada over the years. In 2002, he established the Spanish organization Ingeniero & Joven (Engineer and Young), along with an award of the same name, to recognize young engineers at the beginning of their careers. He founded the Canales Dam race three years ago with an engineering colleague who is also from Spain. When some fellow CEE alumni expressed interest in running the 2010 race, Moreu seized the opportunity for cultural and professional exchange and organized the roundtable discussion.

The discussion was hosted by P. Ferrer, provincial representative of the Colegio de Ingenieros de Caminos, Canales y Puertos, the head civil engineer of Granada. Bennier, Long and Schinkoeth each briefly spoke then fielded questions from attendees. As a nod to U of I, Moreu had arranged for the ushers to wear orange. Collaborators on the roundtable included the Colegio de Ingenieros de Caminos, Canales y Puertos; the Asociación de Ingenieros de Caminos, Canales y Puertos; the Structures and Hydraulics departments of the University of Granada; and the Graduate Discussion Group of the U of I.

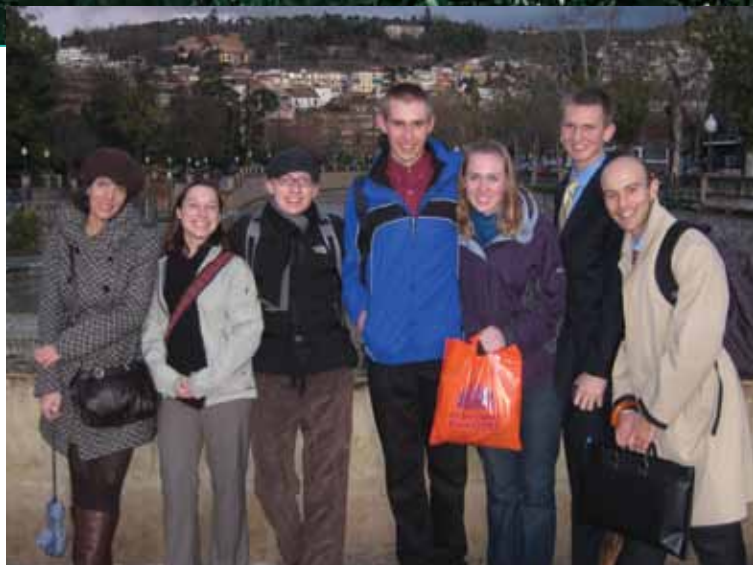
Sponsored by the Colegio de Ingenieros de Caminos, Canales y Puertos, the race pays homage both to the Canales Dam and to the engineer who designed and built it, D. Guillermo Bravo. Completed in 1986, it was the tallest earth dam in Spain at the time. Its construction presented a number of engineering challenges due to the difficult geology of the site, and its completion brought multiple improvements to the region, including fresh water to Granada, flood protection to Granada and the small villages through which the race is run, and hydroelectric power. The name of the race, Ingeniero &

Bravo, is a play on words referencing both the lead engineer's name and the courage and persistence it takes to complete the uphill run. Now 81, Bravo takes part in the awards presentation.

In addition to participating in the roundtable and the race, the group toured the surrounding area, even taking part in the local seasonal tradition of olive-picking, Moreu says. International exchanges like these, in addition to being fun, are important for engineers, he says.

"Our profession is one of constant travel, exposure and change," he says. "We have to be ready to communicate with different professionals, nationalities and cultures, and in many different settings."

Full story at: [cee.illinois.edu/engineerandbrave](http://cee.illinois.edu/engineerandbrave)



Alumni and friends on New Year's Eve in Granada: (left to right) Rocío Rodríguez Belmonte, Gen Long, Keith Schinkoeth, Paul Bennier, Kristine Bennier, David Bennier, Fernando Moreu.



Organizers and participants pose in front of the Alhambra in Grenada. At front left are Moreu's nephews, Kiko, 14, and Baldo, 15. Along with Moreu's nieces, Cristina, 11, and Maria, 13, they served as ushers during the roundtable discussion and wore orange in tribute to the University of Illinois.

"Engineer & Young: the American Experience." Presented at the Carmen de la Victoria on Dec. 31, 2009, the discussion featured three more CEE alumni—David J. Bennier (MS 09), a bridges and highway engineer with HNTB in Kansas City, Kan.; Genevieve E. Long (BS 02, MS 03), a road and airport engineer with Applied Pavement Technology Inc. in Urbana; and Keith M. Schinkoeth (BS 02, MS 03), a structural engineer with Clark Dietz Engineers in Champaign—who spoke about their education and careers for an audience made up primarily of young Spanish engineers. Two days later, Long, Moreu and Schinkoeth also participated in the third annual Race to Canales, dubbed Ingeniero & Bravo (Engineer and Brave), an eight-mile run to the top of the Canales Dam with prizes awarded to the top runners overall and in a special engineers category.



Keith Schinkoeth, D. Guillermo Bravo, and Gen Long after the race. The Canales Dam is in the background.

## Leonardo Zeevaert

**L**eonardo Zeevaert (PhD 49), 95, who worked with Nathan M. Newmark on the Latino-Americana Tower in Mexico City, died February 16. He was Professor Emeritus of the Universidad Nacional Autónoma de México (UNAM), where he taught soil mechanics for 64 years.



Zeevaert obtained the Civil Engineer title at UNAM in 1939 and earned his M.Sc. at the Massachusetts Institute of Technology in 1940. He then worked for the Comisión Nacional de Irrigación of Mexico on the Necaxa Dam project, where he met CEE Professor Karl Terzaghi who encouraged him to continue his graduate work at the University of Illinois.

Through his active professional practice, Zeevaert was involved in more than 700 projects. He wrote more than 213 papers and five soil mechanics and seismic geotechnical engineering books.

Zeevaert designed the foundation of the Latino-Americana Tower in Mexico City, for which Nathan M. Newmark was the seismic design consultant. Zeevaert's brother, Adolfo Zeevaert, served as Chief Constructor for the building. The tower was the first 43-floor skyscraper in the world to be constructed in a high seismic zone. It successfully survived three major earthquakes in 1957, 1962 and 1985.

Zeevaert's many professional honors included presenting the 23rd Terzaghi Lecture for the American Society of Civil Engineers on October 27, 1987, "Seismo-soil Dynamics of Foundations in Mexico City Earthquake." 1

## 2000s

**Brian G. Fait** (BS 04), 28, died March 8. He was employed by AECOM Transportation for five years and was a licensed professional engineer in the Structural Midwest Division.

University of Illinois graduate student **Maren L. Somers**, 26, (BS 08) died June 20.

**Jeronymo P. Pereira**, a CEE graduate student, died April 1.

## 1970s

**Richard H. Schneider** (BS 78), 54, died April 2. A graduate of Harvard Law School, Schneider worked at Kirkland & Ellis in Chicago and Rosenfeld, Meyer & Sussman in Los Angeles, and Paine Webber in New York. He retired in 2008 as a Managing Director at Highbridge Capital.

**Charles K. Webster** (BS 70), 62, died April 17 in Fernandina Beach, Fla.

## 1960s

**Furman W. Barton** (MS 59, PhD 62), 77, of Williamsburg, Va., died on June 1. He served in the U.S. Navy for three years and remained in the Naval Reserve, retiring as Commander. He served on the engineering faculties of Duke University and the University of Virginia, where he was Chairman of the Civil Engineering Department.

**Wilbur C. Buckheit** (MS 60), 78, died April 25 in Kansas City, Mo. He spent 20 years on active duty with the U.S. Army Corps of Engineers, retiring with the rank of Lieutenant Colonel. After his military retirement, he joined Black & Veatch and worked as a civil engineer until he retired in 2004.

**Robert W. Emerson** (MS 67), 67, died April 5. His career included employment with Phillips Petroleum Co. He was an active volunteer for Habitat for Humanity.

**Henry E. Thompson** (MS 61), 77, died March 25. He was a licensed engineer and surveyor in 32 states. He was the lead engineer on the construction of the Liberty Bowl Stadium in Memphis, Tenn., as well as numerous bridges throughout the area.

## 1950s

**Yngve S. Bloomquist** (BS 51), 82, died March 11 in Park Ridge, Ill. He was a retired civil engineer involved with bridge and road construction for the Illinois Department of Transportation with 36 years of service.

## James T.P. Yao

James T.P. Yao (BS 57, MS 58, PhD 61), 77, died Dec. 23, 2009, in Lisle, Ill.



He was a civil engineering professor at the University of New Mexico, Purdue University, and Texas A&M, where he served as department head. During his career he made significant contributions in the areas of earthquake engineering, structural safety and reliability, structural control, civil infrastructure management and engineering education.

He was known for his love of the art of paper folding.

He and his wife, Anna Lee, who preceded him in death, sponsored a scholarship in civil engineering at the U of I. 1

**Carl N. Falkenstrom** (BS 50) died April 20. His career included working as an engineer at Standard Oil of Indiana for 12 years and then as a manufacturer's representative for the firm of Stolley and Orlebeke for many years.

**Donald R. Henderson** (BS 59), 73, died April 2 in Springfield, Ill. He worked for the city of Springfield as a civil engineer.

**John W. Schnake** (BS 50), 86, died March 13 in Decatur, Ill. At the U of I, he was a Bronze Tablet honoree. An active member of Central Illinois Builders (CIB) of Associated General Contractors (AGC) for more than 40 years, Schnake served on the Board of Directors, including two terms as president. In 1998, CIB honored him with the title of Life Director. He was president and owner of Fisher-Stoune Inc. of Decatur.

**Charles C. Swensen** (BS 51), 81, died May 10. While at Illinois, he fenced on the varsity team. In 1974, he started his own engineering and construction management company in San Rafael, Calif. He taught a construction management course at San Francisco State University for many years.

## 1940s

**Albert Logli** (BS 40), 93, died May 4 in Rockford, Ill. He was the founder and president of Special Machine Co. in Rockford from 1956-1973. He was a member of the University Club and the U of I Alumni Association, and a supporter of the fighting Illini.



## Herbert O. Ireland (1919-2010)

By WILLIAM J. HALL

**H**erbert Orin Ireland, Professor Emeritus of Civil Engineering, passed away on June 3 in Paxton, Ill. He was born on June 12, 1919, in Buckley, Ill., a son of H. Glenn and Stella Perkinson Ireland. He married Mary L. Austin on March 1, 1941; she preceded him in death on July 6, 2007.



Ireland entered the University of Illinois in 1937 and received his B.S. degree in General Engineering in 1941, along with a commission as a second lieutenant in the U.S. Army Reserves. Later in 1941 he was called to duty with the U.S. Army Corps of Engineers. He saw service in the continental U.S. as well as in Northern Ireland, Scotland, Northern Africa and Italy during WWII, was dis-

charged with the rank of captain, and later promoted to the rank of major in the Reserves.

He returned to the University of Illinois in 1946, earned his M.S. and Ph.D. degrees in 1947 and 1955 respectively, and rose through

the ranks to become a Professor of Civil Engineering in 1959. His technical studies and instruction were in the areas of soil mechanics and foundation engineering. He worked closely with Professor Ralph B. Peck in departmental instruction and research. He offered consulting advice on many outside projects on such varied technical matters as deep foundations, settlement, bearing capacity, pressures on retaining walls and soil

stabilization. He described most of this work later for the benefit of others in his extensive published work.

Ireland's involvement in professional organizations included: Fellow, American Society of Civil Engineers; Fellow, Geological Society of America; and, member of the American Railway Engineering Association. He participated in other national and international organizations such as the Committee on Large Dams.

He was a member of the honoraries Tau Beta Pi and Chi Epsilon, recipient of the 1967 Epstein Award, selected to present lectures in the "Fourth Across Canada Tour" in 1967, and was licensed as a Professional and Structural Engineer in the State of Illinois. He retired in 1979.

He will be missed by many in the department. I

## Walter E. Hanson (1916-2010)

**W**alter E. Hanson (MS 47), former CEE faculty member, active alumnus, and founder of Hanson Professional Services Inc., passed away in Springfield, Ill., on April 4.



Born on July 14, 1916, on a farm near Lyndon, Kan., Hanson earned his B.S.C.E. degree in 1939 from Kansas State University in Manhattan, Kan. After working as an engineer for several years, he accepted a post as an instructor in the Department of Civil Engineering at the University of Illinois in 1942. During WWII, Hanson served in the U.S. Navy, operating and instructing others in air-borne radar. In 1946 he rejoined the department faculty. He taught as an assistant professor while he finished his M.S. degree (1947) and was promoted to associate professor in 1951.

He returned to practice in 1951

as an Engineer of Bridges and Traffic Structures for the Illinois Department of Transportation.

In 1954, Hanson founded the consulting engineering firm Hanson Engineers Inc.,

now Hanson Professional Services Inc. Under his direction, the firm undertook hundreds of major assignments, including bridges for the Kansas Turnpike, dams such as the Loud Thunder Dam near Rock Island, Ill., novel parking garages, and the New Clark Bridge.

Novel, award-winning achievements by Walter and his staff included the first use of hyperbolic parabolic slabs to support heavy loads in underground construction, and the first use of lime-fly ash stabilized fill to support heavy loads of a power plant.

Hanson is co-author with Ralph B. Peck and T.H. Thornburn of the seminal text *Foundation Engineering*, used in education and practice around the world even today. He was a licensed P.E. or S.E. in many states.

Hanson's extensive professional and civic activities included serving as Chairman of the State of Illinois Commission of Higher Education in 1957. He served in leadership positions in numerous professional organization.

In 1964, Hanson was elected to the Board of Directors of the newly formed Civil Engineering Alumni Association of the U of I Civil Engineering department; he served as president in 1972. In 1973, he received the U of I College of Engineering Alumni Honor Award for Distinguished Service. He was a longtime member of the Presidents Council.

Hanson married Sue Roling on Sept. 14, 1940; she preceded him in death. I

# CEE Alumni Events

## Transportation Research Board Washington, D.C.



University of Illinois railroad faculty, students and alumni gathered for the Railroad Caucus, held each year at the Transportation Research Board Annual Meeting.



Professor Chris Barkan, right, director of the Railroad Engineering Program, with Joseph Szabo, who was appointed last year by President Obama to head the Federal Railroad Administration.



From left: Professor and Head Amr Elnashai; Dr. Patricia Watts, Program Director, FAA Air Transportation Centers of Excellence; Professor David Lange; and Professor Bill Buttlar at the alumni reception at the Lebanese Taverna.



Professor Imad Al-Qadi, fourth from left, with guests at the TRB alumni reception at the Lebanese Taverna.

Alumni, faculty and friends of the department gathered in Washington, D.C., in January for the 17<sup>th</sup> annual CEE alumni reception at the 89<sup>th</sup> annual Transportation Research Board meeting.

At a get-together for CEE alumni, approximately 200 guests enjoyed hors d'oeuvres and cocktails at the Lebanese Taverna restaurant.

The department gratefully acknowledges the following sponsors of the alumni reception at the 2009 Transportation Research Board meeting:

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Illinois Transportation faculty



# Chicago Regional Dinner Meeting

Chicago-area alumni, CEE faculty, students and friends of the department gathered February 11 at the Union League Club in Chicago for the annual Chicago Regional Dinner Meeting. The event included a cocktail reception, dinner, the presentation of the CEE Alumni Association awards, and a department update by Professor and Head Amr S. Elnashai.

For the CEE students who signed up to attend the dinner, the day also included a tour of O'Hare International Airport. The department thanks the following people for arranging the tour: Christopher Thomas (BS 96, MS 97) and Larry Martin of CH2M HILL and Cyle Cantrell of the O'Hare Modernization Program, City of Chicago.

With gratitude, CEE acknowledges the following sponsors of the Chicago Regional Dinner Meeting 2010:

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The winners of the 2010 CEE Alumni Association awards (see page 31). From left: (front row) Doris I. Willmer (BS 72, MS 73), Kurt A. Keifer (BS 97, MS 99, PhD 06), Kathryn A. Zimmerman (BS 83, MS 85), (back row) M.T. Geoffrey Yeh (BS 53) and Walter D. Linzing (BS 49).



From left: Matt Parkolap, CEE student; Angela Wolters (BS 99, MS 00); and David Byrd (BS 01, MS 06).



From left: CEE student Jinyong Liu with Helen and M.T. Geoffrey Yeh (BS 53).

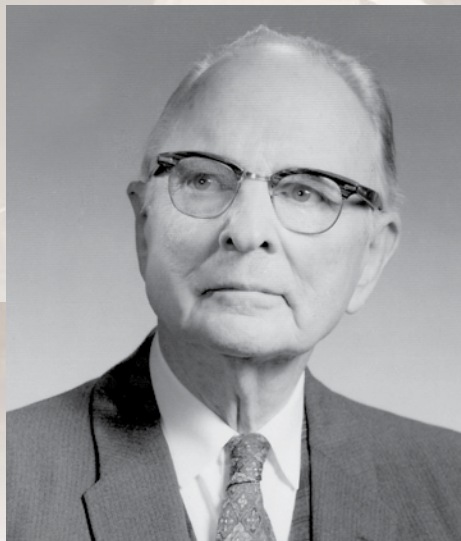
From left: Dean Arnold (MS 72), W.E. O'Neil Construction; CEE students Kevin Foster and Westley Bauling; Stephanie Larson (BS 08, MS 09), Bowman, Barrett & Associates Inc.



From left: Tony Shkurti (PhD 98), HNTB; CEE student John Sapp; Burton A. Lewis (MS 50).

# Old Masters

## Engineering giants of the department's history



BY PROFESSORS EMERITUS WILLIAM J. HALL  
AND JOHN D. HALTIWANGER

**W**illiam A. Oliver was born in Tedford, Ontario, Canada, on January 10, 1898. He earned his bachelor of science degree in Civil Engineering from the University of Michigan, Ann Arbor, in 1922.

From 1922-23, he worked as an engineer with the American Malleables Company in Owosso, Michigan. He served as an instructor in mathematics at Beloit College, Wis., from 1924-26. From 1926-27, he was a structural engineer with the Office of the State Architect and Engineer, Columbus, Ohio. He then taught mathematics at Case School of Applied Science, Cleveland, Ohio, from 1928-29.

Oliver earned his master of science and Civil Engineer degrees at the University of Illinois at Urbana-Champaign in 1928 and 1933, respectively. He joined the faculty at the U of I in 1929, bringing with him experience in industry, education, writing and consulting. He became a member of the faculty of the Civil Engineering department, rose through the ranks to Professor, and retired in 1966, at which time he was awarded Emeritus status. His retirement was in name only; he continued to work for the department for years thereafter.

Oliver was a registered structural and

### William A. Oliver

1898 – 1982

**Educator, Specialist in Timber Structures,  
“Backbone” of Student and Alumni Activities**

professional engineer. In 1970 he received the highly unusual and coveted award of Honorary Member of the Illinois Society of Professional Engineers, and at one time was editor of Illinois Engineer. He served for a time as Director of the National Society of Professional Engineers.

In 1930 Oliver co-authored with W. M. Wilson the University of Illinois College of Engineering Experiment Station Bulletin No. 130, Tension Tests of Rivets. He was the author of several other special publications, principally in the field of wood structures.

His many long-time professional accomplishments included membership on Committee D-7, Wood, of the American Society for Testing and Materials (ASTM) and at one time he served as Director of

which certified lumber grading agencies, and controlled lumber grading practices.

Oliver was the favorite teacher of many students, his instruction centering on structural analysis and timber engineering. He was affectionately known as “Wild Bill” by his students at the U of I because of the way he kept his classes hopping from bell to bell, and because of his deep involvement in student and alumni activities. He received the Blue Ox Award for teaching from the Graduating Class of 1943 and the Loyalty Award from the U of I Alumni Association in 1968.

Oliver was the perennial advisor for Chi Epsilon and was a “guiding light” to the officers and members of this Civil Engineering honorary society. He was instrumental in the development of the Civil

Engineering Alumni Association and served as its first president in 1962-63. He was Editor-In-Chief of the Civil Engineering Alumni News during 1970-78, following his retirement. The Civil Engineering Alumni Directory, published in 1977, was

dedicated as follows: “...with affection and appreciation to Professor and Mrs. William A. Oliver in recognition of their outstanding devotion and service to the Department of Civil Engineering, its students, alumni and friends.” This latter statement truly reflects the position in the department held by Oliver and his wife, Maude.

Professor Oliver is remembered by his students and colleagues for his significant technical contributions to the advancement of the engineering profession and for his many years of loyal and devoted service to the civil engineering department and the University of Illinois.

William A. Oliver, Emeritus Professor of Civil Engineering, passed away in Urbana on November 10, 1982. 1

**He was affectionately known as “Wild Bill” by his students at the U of I because of the way he kept his classes hopping from bell to bell, and because of his deep involvement in student and alumni activities.**

ASTM. He received the Award of Merit from that Society in 1977. Oliver also was an active member of the American Railway Engineering Association. But most of all, he was extremely active and influential as a member of the American Institute of Timber Construction. He was a leading authority on wood and its use as a structural material and was a contributor to the Fifth Edition of Modern Timber Engineering, published by the Southern Pine Association, a professional and educational text on uses and specifications for wood structures. Oliver served several terms on the U.S. Department of Commerce's American Lumber Standards Committee (ALSC), and at one point was chairman of the ALSC Board of Review, a semi-judiciary body



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