Beyond Bridges

How today’s graduating civil engineers are capitalizing on a variety of career options

Half a World Away
A CE internship overseas

Classroom Innovators
Profiling three award-winning faculty
Looking for Impact Feedback

This winter 2008 edition of Civil Engineering Impact marks our fifth issue. We would like to know what impact we’re making on you. Feel free to send us an e-mail about anything you liked, disliked, or would like to see in future issues.

Send your e-mails to peimpact@purdue.edu

On My Mind

In this issue of Civil Engineering Impact, we are focusing on engineering education. Throughout this magazine—from the cover story, which describes our successful recruitment initiative, to the faculty, student, and alumni features—we are examining how our evolving role as educators is leading to our students’ success. The need for young civil engineers continues to be strong, and our commitment to improving the methods by which we educate our students stands foremost in our mission.

Whether you are a Purdue civil engineer or just a friend of our school, I am sure we share a sense of pride in the School of Civil Engineering. If you are interested in learning more about the programs described in this magazine, please drop us a line with your thoughts.

M. Katherine Banks
Professor and Bowen Engineering Head of Civil Engineering

Cover illustration by Sue Ferringer • Corbis & iStock photos
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Calendar 2008

January

13  Transportation Research Board (TRB) Alumni Reception  Washington, D.C.

February

7   CE Alumni Reception  Naples, Florida
16  Chicagoland Alumni Basketball Event  Evanston, Illinois

April

10  Civil Engineering Alumni Achievement Awards (CEAAA)  Purdue
11  CE Advisory Council Meeting  Purdue
12  CE Gala Weekend Breakfast/ Spring Fest  Purdue

May

7   CE Golf Open  Purdue
9   Commencement Reception  Purdue

Construction Field Trip. In late September, Bryan Hubbard, director of industrial relations, took his “Engineering 103” class, also known as “Civil Engineering in Action,” on a field trip to get a firsthand look at the construction of Lucas Oil Stadium. While the Indianapolis Colts won’t play in their new home until August 2008, builders, led by the Hunt Construction Group, are working fast and furious to deliver the retractable-roof stadium on time. To read more about it, see “Construction Countdown” on page 20 of the college side.
Building a New Emphasis Area
School administrators see architectural engineering on the horizon.

Whenever Judy Liu finds herself in the role of spokesperson for the School of Civil Engineering, people, and students in particular, often become envious of something she has. Whether she’s speaking to high school students at one of the Women in Engineering “Discovery Days” or educating freshmen and sophomores on the various emphasis areas within the school, someone invariably wants to learn more about her bachelor’s degree in architectural engineering. And starting with graduates in 2011, civil engineering students will have the chance to leave campus with an “architectural engineering” emphasis on their resumes.

For Liu, an associate professor who earned her “BAE” from Penn State in 1995, the new emphasis area builds upon the strong construction and structural engineering areas in Civil Engineering. She describes architectural engineering as “all the engineering you would need for design and construction of a building.” In addition to structural and construction engineering, architectural engineering “includes all the engineered systems within the building: electrical, lighting, and mechanical systems, such as heating, ventilation, and air conditioning, and more.”

Architectural engineering, which takes a soup-to-nuts view of the building process, is beginning to take shape at Purdue as committees go about advertising for up to three new faculty positions and consider the makeup of courses that students can take. “A typical plan of study would include the core civil engineering courses, plus a number of structural, construction, and geotechnical engineering classes,” Liu says. “From there, it looks like three courses—mechanical systems and building envelopes, electrical and lighting systems, and a class we’re calling ‘working drawings’—would fill out the program.”

So next summer, when some artistic and technically inclined teenager tells a Purdue spokesperson that she’s always wanted to be an architectural engineer, Judy Liu can tell her that she knows just the right place to start.

William Meiners
Celebrity chefs (by day CE professors Judy Liu, Fred Mannering, Mike Kreger, and Robert Frosch) prepare omelets and chat with Chris Burke (BSCE ’77, MSCE ’79, PhD ’81) at the Civil Engineering Homecoming Breakfast.

**Awards**

**M. Katherine Banks,** professor of civil engineering and Bowen Engineering Head has been elected Fellow of American Society of Civil Engineers (ASCE). ASCE fellows are registered professional engineers or land surveyors who have made significant technical or professional contributions and have demonstrated notable achievement in responsible charge of engineering activity for at least 10 years following election to the ASCE grade of member. Fellows occupy ASCE’s second-highest membership grade, exceeded only by honorary members.

Professors **James Bethel, Edward Mikhail,** and **Jie Shan** have received the 2007 Acorn Award to recognize their efforts in research at Purdue University. The Acorn Award is provided through a program, established in 2003, that recognizes faculty members who attract large sponsored research grants to Purdue. Called “the seed of excellence,” the award is given to any principal investigator (PI) or Co-PI that is awarded $1 million in grants/funding.

**Rob Connor,** assistant professor of civil engineering working in the structures area, has been selected to serve on the federal review team that’s examining the bridge disaster in Minnesota. Connor’s specialty is steel bridges, and he studies fracture critical connections in bridges.

**Robert Frosch,** associate professor of civil engineering, received the Precast/Prestressed Concrete Institute’s 2007 PCI Young Educator Achievement Award. The award recognizes an educator in the fields of engineering, architecture, and construction who have made significant contributions early in their careers to the precast/prestressed concrete industry.

**Aleksandra Radlinska,** a graduate student, received the Portland Cement Association (PCA) Education Foundation Research Fellowship to conduct research on the Use of Limestone Fillers to Reduce Cracking Potential and Improve Shrinkage Performance of Low Water Content Mixtures. The support provided by the PCA Education Foundation is used to identify and attract outstanding candidates in the field of engineering and the physical sciences and provide them with the necessary support to complete their studies.

**Maeve Drummond** (left), shown here with Kathy Banks, was recently selected to receive the first annual Civil Engineering Service Award. This award is presented by the school to recognize, encourage, and promote outstanding staff who continuously go above and beyond the expectations of his or her position.
Raising the Engineering Bar

Reforming engineering education is actually revitalization.

The technical fundamentals required of today’s engineer are astonishing. Engineers must develop prowess in the scientific and mathematical aspects of the profession, and they must be able to think creatively, design with innovation, and present and lead projects that benefit society. Are engineers being adequately educated to meet the challenges of a modern, interconnected world?

Once one of the most learned of professions, engineers have been bypassed by professional groups such as pharmacists, lawyers, and accountants. They have been bypassed in terms of credit requirements for a degree, salary levels, and, this is where it gets really important, in leadership and ability to communicate and articulate a vision for a particular project.

This is not a new topic of discussion. For much of the past century, observers have written about the need to reform engineering education; conferences have focused on this topic, papers presented, and here again, another article. Given all this focus, what has been accomplished? We have made some progress in moving toward outcome-based assessments, but the need is greater than at any point in our history to expect more in the educational preparation of engineers.

However, widespread change in the education of engineers will take years, perhaps decades, to engineer. There is no quick fix to such monumental change. Consider how much our world has changed in just three decades: the development and widespread use of computer technology, wireless communications, and the unbridled growth of entire new economies in countries such as India and China. With an emerging global marketplace there is also increasing attention paid to societal concerns and quality of life based on issues such as population growth, environmental pollution, water quality, and waste disposal.

During a time of increasing need, it appears that a BS in engineering is not what it used to be. In the 1920s, the coursework for an engineering degree was more than 150 credits compared to about 128 credits today. Furthermore, American Society for Engineering Education data reports that from 1998 to 2003, 33 percent of schools reduced the number of credits required for an engineering degree. The National Academy of Engineering, in its 2005 report Educating the Engineer of 2020, concluded that “it is evident that the exploding body of science and engineering knowledge cannot be accommodated within the context of the traditional four-year baccalaureate degree.” Furthermore, the U.S. Department of Education, in a 2006 report titled A Test of Leadership, Charting the Future of U.S. Higher Education, notes that “the challenges facing higher education have brought us to the uneasy conclusion that the sector’s past attainments have led our nation to unwarranted complacency about its future.”

The status quo is not an option. We are experiencing a decrease in core engineering courses, technical breadth, and depth at the same time that we see a need for more technical specialization, more emphasis on management and leadership development, and an understanding of the regional and global impact of our work as engineers. These modern-day challenges encourage many of us to think about ways to revitalize the engineering curriculum. If we are to evolve to a profession, serving the public through preserving and protecting public health, safety, and welfare, engineering education beyond the four-year degree is essential in the future.

The American Society of Civil Engineers (ASCE), through its 2007 publication, The Vision for Civil Engineering in 2025, and the evolution of the civil engineering Body of Knowledge (BOK), is providing some direction regarding the future. You can download these documents and comment on the evolving BOK at www.asce.org/raisethebar. We welcome your ideas and opinions on how we shape our own future. Working together, we can revitalize engineering, creating a profession and service to society that will best meet the demands, as well as the challenges and opportunities, of a modern, interconnected world.

Jeffrey S. Russell, PE, PhD
Professor and Chair, University of Wisconsin-Madison, and Chair of ASCE’s Committee on Academic Prerequisites for Professional Practice
Reversing Trends and Guiding Futures

With declining enrollment and a pressing industry need for engineers trained in infrastructure design and maintenance, the School of Civil Engineering turned the numbers around.
Although years apart in their Purdue University experiences, senior Nick Woodruff and Dick O’Connor (BSCE ’74, MSCE ’75) are together in this thought: There’s never been a better time to be a civil engineer.

“Civil engineering is the lifeblood of the environment we’re living in. Everything around us is encompassed in our discipline, and that’s exciting and creates opportunity,” says Woodruff, a senior from Pittsburgh who graduated in December.

O’Connor sees the field on the threshold of significant advancement. The aging national infrastructure, the growing need for international infrastructure, and the bubble of baby boomer retirements are creating a sense of urgency, says O’Connor, a professional engineer, transportation expert, and senior vice president for RQAW Corporation in Indianapolis. “There is tremendous opportunity right now, and it’s growing exponentially,” he says. “It’s definitely an exciting time to be a civil engineer.”

That excitement has translated to a surge in civil engineering majors nationwide in recent years. But while enrollment around the country exploded, Purdue—with the No. 8 civil engineering program, ranked by U.S. News & World Report—had a stagnating number of majors, says Katherine Banks, Bowen Engineering Head of Civil Engineering. “My counterparts at schools like Penn State, Ohio State, Illinois, and Virginia Tech were all reporting skyrocketing enrollments, and ours were not. We had to take a step back and look at why.”

The problem wasn’t a lack of freshmen coming into Purdue’s College of Engineering. “As one of the premier schools in the country and world, a Purdue engineering degree is highly sought,” says Mitch Warren, senior associate director in the Office of Admissions. There were 1,744 freshman engineering majors enrolled in fall 2006, and 1,601 for fall 2007, representing 23.2 percent of the entire beginning freshman class of 6,888. The university admits new engineering students as a group into First-Year Engineering, and then the students declare a specific engineering major as sophomores.

For Banks, that was the window of opportunity. As the new school head in August 2006—and in typical engineering fashion—Banks was eager to learn more about the problem and find solutions. “Purdue civil engineers are known to be the best, and we want to make sure we are producing more of the best,” she says.

One of her key steps was to hire Bryan Hubbard, as the first director of industrial relations in Civil Engineering responsible for student recruiting, internships, job placement, and industry partnerships. Their team effort began with listening and information-gathering.

“We wanted to know what was happening in our students’ thinking during that first year. We learned that we had to overcome perceptions about civil engineering and show the students the varied careers, possibilities, and opportunities,” Hubbard says.

“There is no other field of engineering that has a greater impact on the quality of life across the country and world,” says Banks, a civil engineer with specialty in wastewater treatment. “Building bridges and roads is just one facet, yet that was the major perception,” she says.

continued on next page
The Wide World of Civil Engineering

Specialties within the School of Civil Engineering include construction, environmental, geomatics, geotechnical, hydraulic and hydrologic, materials, structural, and transportation. The opportunities are endless, and Hubbard takes a two-pronged approach to get that message to freshmen. “I talk about careers in civil engineering and how interesting they are, then I back it up with opportunities for internships, even in the freshman year,” he says.

The school introduced the Freshman Showcase, with more than 120 companies on-hand to talk with freshmen about careers (see story on page 18). Banks emphasizes to students that civil engineering is full of action and tangible projects. “Civil engineers are visionary, big-picture people who want to get out and physically experience their projects,” she says. “That’s an important aspect for our graduates and our faculty. We went into this discipline so we could so.”

The job market in civil engineering is booming, contrasted with the profession as a whole. In Engineering, Inc. magazine, the American Council of Engineering Companies last winter noted the shortage of engineers overall due to fewer students majoring in engineering, and those with engineering degrees choosing other professions. And because of post-9/11 restrictions, there’s a backlog of applicants for H1-B visas for international employees with a bachelor’s degree or equivalent experience. One of the noted areas of growth, however, was in civil engineering. Starting salaries average $50,000, with industry standard bonus and incentive programs as projects are completed, says Hubbard.

In the short term, says Banks, the many retirements in the industry are contributing to the demand. A long-term factor is the great need for infrastructure, both new and retooled, due to aging. “In the next 20 years, 86 percent of the world’s population will live in urban areas. People are moving to cities around the globe, and there must be housing, transportation, roads, water, healthcare facilities—basic infrastructure for an acceptable quality of life.”

“No question there’s a need for more civil engineers,” says Patricia Spence (BSCE ’78), vice president and water services office leader, at HNTB Corporation’s Indianapolis location, a part of the company’s Great Lakes Division. “Competition for students coming out of school is very high.”

Robert Holden (BSCE ’90, MSCE ’92, PhD ’99), senior project manager at HNTB Corporation, says their company is consistently active in Purdue’s Professional Practice Program (formerly the co-op program) and participates in the annual job fair. “We have intentionally maintained a presence at Purdue,” says Holden, who has experienced first-hand the value of a Purdue civil engineering degree. “When you compare yourselves to your peers from other universities, there’s no question that Purdue has earned its high national ranking. You can tell a difference in your education, and it’s something to take pride in.”

The firm also is reaching out to high school students in Indianapolis to introduce them to careers in civil engineering through mentoring and career days, particularly in disadvantaged schools. “From a community affairs standpoint, it’s the right thing to do,” Spence says.

The Minnesota bridge collapse in August of this year tragically highlighted the need for infrastructure funding and improvements—and civil engineers to design and lead solutions. “It seems like it takes a disaster to get people’s attention,” RQAW’s O’Connor says. “There have been numerous reports, studies, and groups putting out information for years warning of our serious national infrastructure problems. The sad part is that it took a tragedy to get someone to listen.”

The infrastructure report card issued by the American Society of Civil Engineers (ASCE) has been highlighting the problem for several years. The United States has flunked in many of the areas; because of the Minnesota bridge tragedy, lawmakers are finally taking notice. “If you were a child, this would not be the kind of report card to bring home to your parents,” says Banks.

Most of the infrastructure in the country is 30-100 years old, depending on what it is, Holden adds. “And for all the bridge-related infrastructure that’s aging, there’s an equal amount of water and sewer and more invisible infrastructure that’s in the same situation,” he says.

The advantage of the civil engineering profession is the constant market and continuous job stream, Banks says. “Our students are getting multiple job offers each and we have companies beating down our doors trying to identify potential employees.”

The Purdue Civil Engineering Student Advisory Council sponsors an annual job fair, and the participation numbers are telling. Five years ago, there were 12 companies participating. This past September, 128 companies sent representatives who interacted with more than 450 students who attended. Engineering companies from around the country and the world actively seek Purdue civil engineering graduates.

“Purdue is very highly regarded in terms of recruiting engineers,” says O’Connor, whose firm will have as many as five co-op students rotating through on a regular basis. “These students have been very productive for us,” he says.
Bright Student Outlooks

A new online database in civil engineering assists both students and companies in finding one another for internships and jobs. There are more than 500 industry subscribers to the site, Hubbard says.

The school is also reaching out to younger students with new summer programs for high school and underrepresented students to show them the exciting possibilities of civil engineering. Hubbard also works with the ACE Mentor Program of America, Inc., a national industry program designed to get students interested in architecture, construction, and engineering. Students visit firms, gain industry experience, and receive scholarships.

Jessica Davis, a senior from Danville, Indiana, graduated in December with several attractive job offers. “There are so many types of civil engineering, I knew I would find my interest,” she says. Her emphasis is geotechnical engineering, and she’s already interned with two companies: HNTB Corporation in Indianapolis working on transportation projects; and on a dam in Atlanta and at the McCook Reservoir in Chicago, both with Nicholson Construction Company, a Cuddy, Pennsylvania-based firm. Her experience, combined with her leadership and involvement with the ASCE student chapter, has prepared her well for a career beyond Purdue.

Woodruff’s future is equally bright. “I want to do something that’s sustainable, making sure life can go on in a healthy manner,” he says. He’s already had substantive co-op experience with Exxon Mobil and General Electric and has been part of the Ambassador Leadership Class in Civil Engineering, interacting with alumni and community members.

The experience of students like Davis and Woodruff has helped dispel misperceptions and present the positive career outlook to freshmen. Banks went even further to ensure that new majors were receiving the best possible experience within the school by providing professional and nurturing advising and mentoring for students. Most importantly, Banks evaluated the classroom experience and assigned experienced faculty to teach freshman and sophomore courses. Last year, civil engineering professor Jason Weiss revamped the “Engineering 103” course for freshmen interested in civil engineering, providing a more real-world environment using innovative teaching tools (see sidebar on page 10.)

The result of this deliberate campaign has been a staggering increase in enrollment for civil engineering majors, who came into the discipline as sophomores, from 76 in fall 2006 to 157 in fall 2007 to an expected 225 in fall 2008. Banks said her goal is to have 200 students for each class. “It’s a great success story, certainly due to the hard work of many individuals, and I’m very proud of the school for taking this on,” she says.
In the future, Banks wants to turn her attention to attracting more women and minority students into civil engineering. “First we must have a positive perception of our major, then look at our diversity efforts to address issues of balance and opportunity,” she says.

“We truly want our students to succeed,” Banks says. “They’re good students, and we want them here in civil engineering.”

Hubbard sees the continuum of their efforts. “A lot of people talk about degrees. I like to talk about careers, and I think you could characterize our recruitment program that way,” he says. “The degree is a step toward a career, and industry is the best way to connect what you do with that degree when you leave campus.”

At Purdue, as around the nation, there’s never been a better time to be a civil engineer. ■ Amy Page Christiansen

Overhauling “Engineering 103”

As part of the initiative to recruit more current students into civil engineering, every aspect of the freshman interaction with the school was examined, including the classroom. “We recognize the importance of teaching success, and how strongly it relates to student success,” says Kathy Banks, Bowen Engineering Head of Civil Engineering. “We decided to revamp ‘Engineering 103’ (Introduction to Careers in Civil Engineering) as it was a forum to communicate to freshmen the exciting field of civil engineering.”

Banks turned over the challenge to Jason Weiss, professor and associate head, who infused the instruction with a hands-on look at the civil engineering profession.

After its first run last fall, the students responded with a resounding A+ for Weiss and the new course. “His student evaluations averaged 4.99 out of 5.0,” says Banks. “It was an outstanding success.”

Weiss is quick to point out this success is due to the many colleagues who were involved in teaching and demonstrating various aspects of civil engineering to the freshmen throughout the semester. What’s important about the results, he says, is that they begin to demonstrate a key problem in engineering education.

“Nationally many students start out to be engineers, and about 50 percent finish,” he says. “The concern is: Do we really give students a full picture of what engineering is about? They come in ready to be engineers and may not see how it all fits together,” he says.

The new “Engineering 103” is designed to address this concern in three key ways:
• Show how core courses such as math, chemistry, and physics are an essential foundation for civil engineers and not just “weed-out” courses, says Weiss.
• Communicate that civil engineering touches everyone’s lives in important ways. Many things common today—power generation, cross-country transportation—were little more than ideas a century ago, he says. “What we’re trying to do is show that civil engineers change how people live.” For example, a case study of the Hoover Dam illustrates why it was built, the sociological impact, and the importance of that project to drainage in California.
• Emphasize that civil engineers must have a multidisciplinary knowledge base to understand the scale and impact of the projects they’re working on. Again, the Hoover Dam brought together not only drainage and construction, but also political and sociological elements in terms of planning, funding and impact.

The course enrollment is about 120 freshmen and is taught in an interactive style with plenty of physical demonstrations to provide hands-on understanding. Matt Wilson (BSCE ’06) was key in helping to build large-scale models to demonstrate different concepts in the course. “He was on loan to help different professors build and test models,” Weiss said. Wilson also tested many of the demonstrations with smaller groups of prospective students over the summer prior to the debut of the new course, giving 30 or 40 different talks to high school students.

Other civil engineering professors shared their expertise with the freshmen:
• Rob Connor, assistant professor, spoke about the collapse of a railroad viaduct using a large-scale model of the train, viaduct, and wind to show that wind could bring down a railroad and is just as important to consider as gravity loads and corrosion.
• Inez Hua, professor and interim head of environmental and ecological engineering, taught about the environmental impact of civil engineering around the world, particularly pollution migrating over the ocean and impacting Western coasts.
• Fred Mannering, professor and associate director of research for the Center for Advancement of Transportation Safety, spoke about traffic safety, giving examples on reaction times and braking.
• Doug Sutton, emeritus professor of structural engineering, shared his personal story about why he decided to become a civil engineer. “It’s very good for the students to hear these kinds of perspectives and get a longer-term view of the profession,” Weiss says.

While Weiss was teaching, he also was learning from the students and making adjustments along the way. “Different lectures excited different students. We did polling with a remote control system so students could communicate their feedback about which lectures they preferred,” Weiss says. ■ A.P.C.
Broadening Educational Horizons

Traveling to a place he had never even heard of, a civil engineering student has “the time of his life” in an internship abroad.

For a kid from Lebanon, Indiana, the summer job might as well have taken place in Beirut, Lebanon. At least that’s how it began to feel to Ben Hosinski once he flew past London, through Moscow, and he became increasingly aware that he was an American abroad. But the summer internship in Dushanbe, Tajikistan, proved to be just the ticket for the worldwide education he was seeking.

Hosinski, a civil engineering student who borders on the junior/senior class and plans to graduate in December 2008, was able to set sail for his overseas internship because of a unique collaboration involving the School of Civil Engineering, the College of Engineering’s Global Engineering Program, and the International Association for the Exchange of Students for Technical Experience (IAESTE). IAESTE, a virtual clearinghouse for internships, sends Americans abroad for work experiences and brings international students to the States for internships—both industrial and academic. For example, Purdue’s SURF, or Summer Undergraduate Research Fellowships program, went global this year by hosting international students and introducing them to a wide array of research projects.

Through IAESTE, Hosinski signed up for a three-month internship with another acronym organization, ACTED, or the Agency for Technical Cooperation and Development. ACTED is an apolitical relief agency created in Afghanistan with projects dating back to 1993 in Kabul, where relief efforts sought to help populations affected by more than 15 years of conflict. By the mid- to late-1990s, the organization expanded into neighboring countries, then into Central Africa, Central America, and elsewhere. Today ACTED is at work in 20 countries on some 150 projects a year, providing emergency relief, food security, health promotion, economic development, education and training, micro-finance, and more.

Once on the ground in Tajikistan, it was baptism by fire for Hosinski. In addition to putting up with the oppressive heat, Hosinski found himself needing to do things he hadn’t anticipated. Flexibility was strongly encouraged. “The trickiest part was getting used to communicating with people without being able to speak the language,” he says. Other than the local staff who spoke it, English, too, was a long way from home. Though he did meet a guy who looked and spoke like Borat.

On the engineering front, Hosinski was pitching in with the knowledge and skill sets he’s been picking up in classrooms and labs at Purdue. “We worked in the area of water and sanitation,” he says, “delivering clean water to people who didn’t have it, rehabilitating and digging wells, and installing hand pumps.”

His group also provided legal information to farmers, encouraging better farming practices. They worked on drainage rehabilitations and irrigation canals. They did some research on alternative fuels, using biogas, vegetation, and cow manure as cooking and heating gas. Through a healthcare promotion, they distributed preventative information materials throughout various villages.

But did he enjoy it? “It was one of the best times of my life,” says Hosinski, who encourages other students to take up any opportunity to study and work abroad. “I had never left North America.”

Now with his first international experience a “great success” behind him, Hosinski is hoping to travel more. “I wouldn’t mind working with another non-government agency,” he says. “Or maybe teaching English abroad.”

As far as an educational boost, the internship solidified many concepts touched upon in class, and, more importantly, opened the young man up to a wide world of possibilities.
Go West, Young Professionals

Civil Engineering spouses find their tenure tracks crossing paths in the same department.

Five years ago a new PhD student walked into her office in the Civil Engineering Building for the first time and met her match. Literally, Mazdak Arabi, a second year doctoral student at Purdue, would be Sybil Sharvelle’s office mate for only a week before he was moved downstairs to a new space, but it was long enough for the two to make a connection even more profound than their mutual love for civil engineering.

Arabi and Sharvelle began dating within a few weeks, and after a few months they found themselves contemplating a future together. Just how would they cobble together twin careers in civil engineering—and academic civil engineering at that? “We understood that by getting married we would have to deal with that challenge,” admits Sharvelle. Undaunted, they tied the knot in August 2003, less than a year after that first fateful office encounter.

After he earned his PhD in 2005, Arabi was able to stay on in a postdoctoral position at Purdue while Sharvelle finished her degree. Eventually the time came to apply for permanent positions, together. “We sent out our applications independently,” Sharvelle says, “because we didn’t want to bias the process.” Both engineers felt it was important to be invited to interviews on their own merits. After visiting three or four universities each, the couple was looking at several joint offers. The top two contenders in the end were North Carolina State University and Colorado State University.

That’s when the compromising commenced. “North Carolina was recruiting Mazdak really heavily. He was in high demand there, and they worked hard to get him,” notes Sharvelle. But Colorado was equally set on Sharvelle. With both programs offering tenure track positions to both spouses, says Sharvelle, “we had to make a very hard decision between two good offers.”

Ultimately, “Colorado just felt right” to both spouses. Husband and wife were impressed with the people and the department in Fort Collins. Both can see a career path there that satisfies them individually. Sharvelle’s focus is on biological waste processing to clean up environmental contaminants, and her husband is working to optimize water resources management. And then there’s the place itself.

Although the consideration of geography had basically been abandoned in the initial equation of finding two jobs in one department, both Arabi and Sharvelle feel lucky to have landed in their new home in the mountains. For Sharvelle, Colorado had been the setting for seven years of undergraduate and masters work at University of Colorado at Boulder, and she has a ready network of friends nearby. As for Arabi, Fort Collins’ elevation and semiarid landscape puts him in mind of his homeland of Tehran, Iran.

There was at least one small bump in the road to the West. The engineers have an 18-month-old daughter, Sybil (by Sharvelle family tradition, the first-born daughter is named after her mother), who was less than happy with the preponderance of new stimuli: new house, new daycare, and Mommy and Daddy busily settling into new jobs. Plus, Sharvelle left behind her parents in Lafayette, whom she misses just as her daughter does. “My biggest concern about the move was Sybil’s adjustment, frankly,” says Sharvelle, “but after a couple of weeks, she’s doing great.”

Perhaps the best long-term solution would be to plan on sending young Sybil back home to Indiana when it comes time for her to study—what else?—civil engineering at Purdue.

Gina P. Vozenilek
Bringing the Outside In

For three award-winning professors, out-of-the-classroom pursuits translate to richer experiences for undergrads.

Civil Engineering professors (left to right) Michael Kreger, Fred Mannering, and Jason Weiss possess decidedly different classroom philosophies. Kreger, the recent recipient of the Roy E. and Myrna Wansik Award for best teacher of Civil Engineering core undergraduate courses, approaches structural engineering from the perspective of behavior—once you understand why things behave the way they do, then you can design them to behave the way you’d like. Mannering, on the other hand, who took home the Harold Munson Award for best teacher of any Civil Engineering courses, emphasizes student engagement. That’s one reason he uses an Xbox 360 motorcycle racing game (MotoGP 07) to point out concepts of highway design in his “Transportation Engineering” course (another is that he races motorcycles himself). And while Weiss, winner of the Ross Judson Buck Memorial Award for best undergraduate counselor, echoes Professor Mannering’s focus on engaging students, he’s more likely to toss a handful of treats to participating students than plug in MotoGP 07.

But aside from the fact that all three professors were selected by their students as superlative faculty members, they share something else in common: the belief that their own academic pursuits outside of the classroom both inform and inspire many of their students. While some critics may claim that research distracts professors from the needs of undergraduates, these three prove quite the opposite, in three quite different ways.

When he’s not teaching or holding office hours, Kreger spends a lot of his time developing the latest code documents used in structure designs, work that ties directly back into his classroom lectures. “I can tell students that here’s what we’re doing in today’s code, and that’s what’s going to be on the exam,” he says. “But in three years when you’re out in practice, here’s what you might be up against based on how things are progressing. I find that the most curious students—the students who really could go on to be leaders in the field—are very interested in knowing not just what’s applicable now, but how and why that’s changing.”

Mannering, meanwhile, has the advantage of using his own textbook—Principles of Highway Engineering and Traffic Analysis. He updates the book, currently working on its fourth edition, according to how his classes respond to the lectures based on it. “How you observe your class learning from the textbook really influences the way you revise the next edition,” he says.

He even added a co-author, Scott Washburn of the University of Florida, a former student whom he taught with the first edition of his book. “I think that really shows the evolution of how teaching passes from one generation to the next,” Mannering says. “It’s quite satisfying and pretty neat. Across the country there doesn’t seem to be a lot of attention paid to textbooks, but I think there should be. It’s been a very satisfying element of my teaching career.”

For Weiss, the opportunity to get undergraduates involved in research excites him. He says several students each semester approach him about how to further explore some topics they’re particularly interested in, like concrete that absorbs sound or smog-adsorbing concrete. And he always encourages their curiosity. “Undergraduate research is fundamentally different than graduate-level research, but in a lot of ways it’s no less important,” Weiss says. “What undergraduates get out of it is a first-hand account of how the research process unfolds, how an engineer thinks, and how professors and students work together to refine ideas. Most of them won’t go on to pursue exactly what I’m studying, but the tools they pick up along the way will stick with them for a long time.”

Perhaps Weiss sums it up best for all three professors when he says that exposing students to materials gleaned outside of the classroom “gives them a fundamentally different experience than taking an exam or writing a lab report; you can see the spark it gives them to keep pursuing their own goals in engineering.”

Patrick Kelly
Encouraging Undergraduate Excellence

Civil Engineering’s new director of academic programs brings a teaching passion to his administrative position.

New in the job, but not new to Purdue, is Timothy Whalen, named director of academic programs for the School of Civil Engineering in August 2007. For the experienced academician, this counseling role will present new challenges, but ones he’s embracing wholeheartedly.

Whalen is responsible for the day-to-day operations of the academic side of the school. He will assist with advising students (numbering 574 undergraduates) and watch over course enrollments. He’ll also help with issues that deal with students’ progress as they work toward their degrees. That’s something he already knows about having taught at Purdue for the past 10 years.

“Teaching has always been something I’ve been able to do fairly well,” says Whalen. Even as early as high school. He shares a story his mother likes to tell of his days at Springfield High School in Illinois.

“When my high school math teacher was absent, he’d leave a note for the substitute to have me teach the course,” he laughs.

And did he actually get up in front of his peers and teach? “Sometimes,” he adds with a smile.

Following high school, he attended the University of Illinois at Urbana-Champaign where he earned his bachelor’s and master’s degrees in theoretical and applied mechanics. Whalen then earned his doctorate degree at Cornell University before returning to Urbana-Champaign as a visiting lecturer/postdoctoral associate position in the Department of Aeronautical and Astronautical Engineering.

In July 1995, he moved to the National Institute of Standards and Technology where he worked as a postdoctoral research associate in the Structures Group of the Building and Fire Research Laboratory.

It was there that Whalen found his niche. “It (civil engineering) is just something I’ve always been interested in,” he says. “It’s complex enough to be intellectually challenging while also being relevant to society.”

In 1997, Whalen arrived at Purdue to teach structural engineering in the School of Civil Engineering. The opportunity to teach is what attracted him to Purdue.

“It’s a nationally known program with a widely known and respected faculty,” says Whalen on his decision to move back to the Midwest. He also had his hand in research in the areas of wind engineering and structural mechanics, dynamics, and control.

So after 10 years of teaching and research, why did he make the move out of the classroom? “It was an opportunity to do something different that would have a fairly significant impact on the school,” he says. And although still new in the job, he does have some goals.

He wants to see the program grow and is specifically "interested to see the undergraduate levels back up," says Whalen. And although he plans no major changes in the academic program, he does intend to maintain the level of quality the program has historically had.

Whalen also sees an opportunity to educate undergraduate students to be more aware of the need for education beyond the undergraduate degree.

“The industry has ideas on what a professional in civil engineering should know,” says Whalen. “Undergraduate education isn’t enough. Whether through a master’s degree or online education, students should be obtaining more education after they obtain their bachelor’s degrees.”

While his new administrative duties will be his primary role, Whalen hopes to carve out some time to continue his research—and maybe hang a photo or two in his new home on campus.

Sharon L. Martin
New Civil Engineering Interiors

Renovations call for a dedication and a celebration.

Two interior spots within the Civil Engineering Building just got a lot nicer, thanks to two very generous gifts. Purdue civil engineering students can now study and relax in a remodeled commons area before heading off to learn in an overhauled lecture hall, recently rendered high-tech and state of the art. Kiewit, a construction, engineering, and mining company that has been in business since 1884, donated money for the lecture hall that now has their company name. And Margaret Wood, widow of Leonard Wood, a civil engineering professor who began teaching at Purdue in 1956, made the lead gift for the Civil Engineering Commons.

Kiewit Lecture Hall Dedication

The Kiewit Lecture Hall, dedicated on November 8, 2007, was attended by Jim Rowings (BSCE ’75, MSCE ’79, PhD ’82) and Tom Shelby (BCT ’81) of Kiewit, along with dozens from Purdue who will make use of the renovated classroom. Jason Weiss, for one, an award-winning professor of civil engineering (see story on page 14), is particularly excited about the interactive capabilities of the revamped lecture hall. “This enables us to provide students not only the foundation behind the science that they’re using, but also to show them how they can link this together to tie field operations in with computer simulations.”

Weiss offers up the example of a lecture he might give on how concrete can develop cracks while drying. “I can have several different things going at the same time—a movie from a field or a lab experiment that shows the actual slab drying. Of course we speed up time to show the cracking. We can also run simulations, which give students a full-blown computer simulation of what’s happening in that particular case. You can’t quite teach everything that’s in the entire computer simulation, but you can show them the main equations and how they influence the long-term performance.”

Kiewit is no stranger to Purdue. The company boasts 46 Boilermaker graduates working in 14 different business units in a wide variety of geographical locations and on all types of projects. “For us, the Kiewit Lecture Hall is a reflection of the strong relationship that has been built with Purdue and its graduates,” says Shelby, senior vice president of Kiewit Corporation. “As an alumnus, I’m naturally biased. But it’s widely recognized among my peers at Kiewit that Purdue has one of the nation’s finest civil engineering and construction management programs, and an internship program that is second to none.”
A Memorial Commons

The Homecoming celebration that coincided with the opening of the Leonard E. and Margaret R. Wood Commons was also a celebration of the life and work of Wood, the professor who taught in the School of Civil Engineering for 37 years before officially “retiring” in 1993. He was never far from campus, however, bicycling over through all types of weather to volunteer as coordinator of the Cooperative Education Program in Civil Engineering. He served in that position up until his death in 2004.

Wood’s geological interest, which first began when he started teaching and developing classes in gem mineralogy, is reflected in the commons area. His enthusiasm for gems, minerals, and rocks also inspired him in the making of bolos, rings, and other types of jewelry. Many of the specimens Wood found in his travels, both abroad and within the United States, will be displayed on a rotating basis.

“My husband dedicated his life to teaching and touched so many lives,” says Margaret Wood. “He was not just a teacher. He was also a mentor, confidant, counselor, friend, and he did everything with a splash of good humor. He remained in close contact with many of his former students long after they left Purdue and turned to him for his advice.”

Rowings from Kiewit, coincidentally, is one of Wood’s former students, and he remembers his former professor fondly. “Leonard began to shape our Purdue loyalties when we were students and continued to show how one can give back to the institutions that shape a career for years after graduation,” says Rowings, vice president of Kiewit University.

And while today’s students will not have the pleasure of learning from Leonard Wood himself, they can learn something of his legacy, generosity, and a life dedicated to education.” ■ W.M.
Firm handshakes, good eye contact, and smart questions were all part of the Civil Engineering Showcase in the Purdue Armory last September.

**Capitalizing on the Industry Buzz**

With dire infrastructure needs and a business building boom, both companies and students turn out in droves at a civil engineering September job fair.

Whichever way you spin it—because of an influx of civil engineering retirements, a pressing need to overhaul the current infrastructure, or simply many businesses looking to build—students can look forward to a bright future in the field of civil engineering.

And late last September, when industry figured they really should be back at school, 130 companies participated in the Civil Engineering Showcase held in the Purdue Armory.

In addition to more than 400 current civil engineering students, more than 350 first-year engineering students (with civil engineering squarely on their radars) turned out for the meet-and-greet event. “There were very few of our students who didn’t get over to the job fair,” says Bryan Hubbard, director of industrial relations. “Sometimes students see the news and think the industry is not strong because the residential markets are going down. But with infrastructure building increasing, it’s a very strong market.”

These back pages contain some of the people who hope to reconnect at the start of career paths in the field of civil engineering. If you’re an employer wanting to get involved with the showcase in the coming years, contact Hubbard at (765) 494-2241, or bhubbard@purdue.edu. Companies can also generate an account on the Industry Opportunities Web site (engineering.purdue.edu/CE/Academics/Industry/IndustryOpps) to post information about their firm and to search the resume database. ■ W.M.
This is an image of a quantum dot produced by a simulation using the nanoHUB, a Web site created by the Purdue-based Network for Computational Nanotechnology. NanoHUB is used by more than 3,000 national and international researchers and educators each month. This image shows the computed second excited electron state of a quantum dot nanodevice in which electrons resonate and emit pure bright light. Quantum dots are the basis of the new, energy-efficient, long-lasting, ultrabright light-emitting diodes (LEDs) that are becoming widely used in highway traffic signals.