

# Green Grow the Buildings



The rush to sustainable construction



PURDUE CONSTRUCTION ENGINEERING AND MANAGEMENT

# ENGINEERING IMPACT

SUMMER 2008

**CEM Spirit**  
A new industry expo

**Strange Days Indeed**  
Alum weighs in on the  
future of construction

**A Professor's Philosophy**  
Finding each student's  
strength



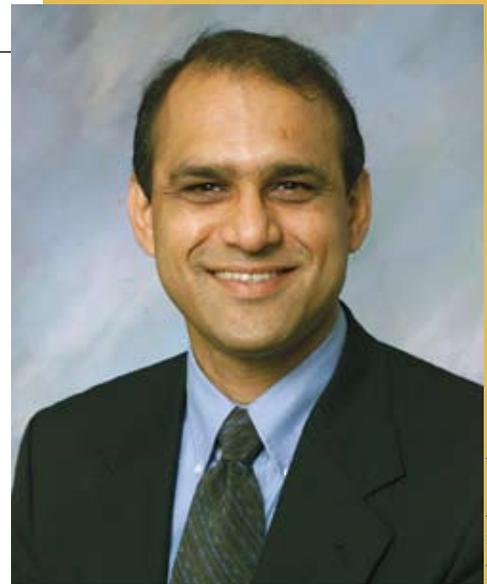
## On My Mind

I would like to welcome all our readers to the premiere issue of *Construction Engineering and Management Impact*. As the title suggests, we want to feature stories that are making a mark. With entrepreneurship as our overall theme, it was no small task to narrow down the list of our outstanding alumni who have ventured out on their own. You'll find a few of their success stories here. Likewise, there's much to be excited about on campus. From our industry expos, to our hard-working students (with an accent on "work" and student internships), to the inspirational faculty seeking to get the best out of these young people, I certainly feel like we're building on big ideas within the Division of Construction Engineering and Management (CEM).

And whether you're a student, an alumnus, faculty, staff, or just a friend of CEM, this is your magazine, too. I hope you'll get a chance to read and enjoy it.

**Makarand Hastak**

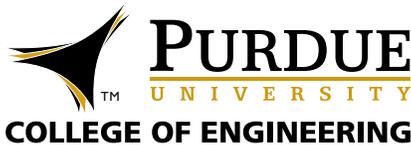
Professor and Head of Construction Engineering and Management



John Underwood

## Tell Us What You Think

Share your Purdue memories, react to a story, or let us know your thoughts about a particular issue. Write to us at [peimpact@purdue.edu](mailto:peimpact@purdue.edu). In doing so, you grant us permission to publish your letter in part or in whole in an upcoming issue. We reserve the right to edit letters for length and clarity.



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John Underwood

Construction industry professionals gathered for a dinner and reception and had a chance to meet informally at the inaugural Spirit of Construction Engineering at Purdue expo last February.

## Infusing the CEM Spirit

An inaugural industry expo connects students with construction industry companies.

The Division of Construction Engineering and Management (CEM), battling 1,000 in its job placement of students since its late 1970s inception, is not content to rest on its past success. Instead, as evidenced by last February's first-ever industry expo known as the Spirit of Construction Engineering at Purdue, the folks within CEM are hoping to establish even greater connections between students and the construction industry.

Some 30 sponsor companies and more than 125 students participated in an event that Deanna McMillan, director of construction internships and continuing lecturer, says was not a "typical career fair." With no resumes exchanged, students were given a chance to meet with construction companies in a very informal setting to understand the career prospects in this industry. On hand to shake hands and answer questions were representatives from regional, national, and even some global companies who hire CEM students for internships and full-time positions, McMillan says. Many of the professionals—Purdue CEM alums themselves—shared stories about their undergraduate days and early work experiences with young men and women who aspire to do the same.

Three groups of students participated in the expo: first-year engineering students; students committed to the CEM program and about to embark on their first of three required summer internships; and returning students who've already begun internship programs. The expo was also attended by some high school students still considering options at Purdue. "High school students from around 'the region' and as far away as Wisconsin came to learn about the benefits of a construction engineering career," McMillan says.

McMillan stresses the idea of "engineering and management" when talking to high school kids and their parents about the CEM program and the career it offers.

And while it's impossible to improve upon 100 percent, the internship program will only benefit from future industry collaborations. This year's expo, to be held on December 4, 2008, in the Ross-Ade Pavilion, promises to be an even greater event. There engineering students will be introduced to the major players in the construction industry at the local, regional, and national levels.



## Awards

On February 27, 2008, Daniel Halpin, Professor Emeritus and retired Bowen Head of the Division of Construction Engineering and Management, received a 2008 Distinguished Alumnus Award from the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign.

On April 19, 2008, Phillip Dunston, an associate professor of construction engineering and management, received a faculty award from the College of Engineering. Nominated by Dulcy Abraham, a professor of construction engineering and management, Dunston accepted the Leadership Award for "fostering the recruitment, retention, and success of a diverse community in the College of Engineering and at Purdue." For more on Dunston and his unique research, see page 7. ■

**William Meiners**

To catch the spirit of the next CEM expo, contact Nettie Haab at (765) 494-2244, or [nhaab@purdue.edu](mailto:nhaab@purdue.edu).

# Building Sustainable Success

By capitalizing on Leadership in Energy and Environmental Design technologies, a CEM couple founded a green startup in Colorado.

By Gina Vozenilek

They love the mountains, the great outdoors, construction engineering, and each other. So when Courtney and Ozzie France graduated from Purdue's Construction Engineering Management (CEM) program in 2002, they headed west to Colorado to start their new life together. Both took jobs with traditional general contractor firms. They liked the work and the "high-energy" people they found in Colorado. And in no time

Courtney France (BSCem '02), on the Colorado slopes below with her husband and business partner Ozzie France (BSCem '02), found her "green" building thumb by managing the construction of the General Services Administration Federal Department of Transportation (above) in Lakewood, Colorado. Low-emitting materials were used throughout the building's interior, and the landscape design fostered irrigation water savings.

Photos courtesy of France Sustainable Solutions



at all—less than five years after leaving college—they found themselves with a business all their own called France Sustainable Solutions. The firm provides consulting services for all aspects of the green building process.

### Campus Beginnings

The Frances look back to their days at Purdue and see the beginnings of the fast-track path they are on now. One of their classes was CE 425, in which the duo teamed up with a few other students to mock-design a school building during their senior year. This was before “green” was an adjective in common parlance, at a time when the extra effort required for things like implementing recycling systems and ensuring good indoor air quality raised eyebrows, or at least left many scratching their heads. Why bother?

Undaunted, the team nicknamed themselves “Green Corp.” They joked about keeping the concept alive after they got out of school and into the real world. Something about that practical design exercise stuck with them. Perhaps it was the classroom experience translated to a real visit to the construction site, where Brookview Elementary School was taking real shape on the horizon. The Frances saw that their green ideas could grow. “Sustainability was something we knew we had to carry on throughout our careers,” Courtney says.

Purdue’s hands-on approach sets up its graduates well for their careers. The CEM program that produces success stories like the Frances is not new to Purdue. It’s been around since 1976 and can boast 100 percent job placement for its graduates over the past 20 years. Professor and division head Makarand (Mark) Hastak attributes some of that success to the strong partnership with the construction industry and a curriculum that prepares students to work in this service industry. “We strongly believe that students should not only understand the engineering and management concepts but also the needs of their clients,” he says.

Besides the senior course that so inspired the Frances, Hastak points out that Purdue’s CEM program requires its students to complete three 12-week internships. That means every summer starting after freshman year, Purdue CEM students are busy gaining on-the-job training. “A powerful partnership exists between our program, faculty,



The green roof of the Environmental Protection Agency’s Region 8 Headquarters in Denver, Colorado, provides a classic example of a sustainable building. LEED gold certified, the building includes a photovoltaic system and optimal day lighting and views.

students, and sponsoring companies,” Hastak says.

Students know who the sponsoring companies are and what kind of work they do. Currently more than 55 such companies participate. Students’ interests are matched with companies’ needs, and long-term relationships begin. Each year, the job description for the intern changes a little to help round out the student’s exposure. “They emerge from the experience knowing what will be expected of them in the real world,” says Hastak.

The Frances certainly appreciated this experience. “Internships give you a head start,” Courtney says. “Having done internships, you gain higher levels of confidence and experience.” Ozzie concurs, adding that required internships expose students to more real-world angles of their future careers. “The corporate environment benefits interns by showing them the business world in which they will interact,” he says.

And that’s a world in which they are interacting at a higher level, and sooner, than the Frances predicted they would. “Before we left Purdue, we talked with our architect buddies, our electrician friends, our colleagues in structural engineering, and made up a nebulous plan for starting a company 20 years down the road,” they recall. “But five years out of college?” Courtney laughs.

“We have lived our lives together very much willing and ready to act on an opportunity,” explain the entrepreneurs. “We felt there was an opportunity [in our local industry], in that there was no one who could talk to everyone, from the owner/developers right down to the trades, like we could, utilizing our construction and engineering experiences.”

continued on next page

### Eco-preneurial Impact

“My degree enabled me to think about all of the facets of construction. Not just concrete and rebar, but energy and power as well,” says Ralph Parrott (BSCEM ’91), president of Houston-based Alternative Power Solutions LLC. His company provides alternative energy solutions to the commercial, institutional, and residential markets in Texas and Louisiana. Their services include design, professional engineering, installation, supply, inspection, and maintenance.

Experts in solar electric power generation, solar thermal heating, and wind power, Parrott and his company are poised to have an impact on the evolving energy profile of the nation. “My future plans are to build some of the many alternative energy plants that our nation will need to secure our energy future. Purdue was a great place to spawn my eco-preneurial success,” Parrott says. ■ **G.V.**



### Environmental Niche

From their earliest teamwork at Purdue, the Frances have developed their interest in environmental responsibility into a marketable niche. “The question used to be, ‘Why go green?’” says Courtney. “Now the question is ‘What is the cost of not going green?’” France Sustainable Solutions consults with businesses that are increasingly looking to the promise of green, asking what the payback will be.

For instance, designing spaces with natural sunlight not only saves energy costs, but offers a return on investment in the form of higher test scores for students, higher productivity for workers, and higher sales for retailers. “There is a huge need and demand for the kind of support we provide,” Courtney says. She and Ozzie not only consult with construction clientele on projects, but they also conduct Leadership in Energy and Environmental Design™ (LEED) training, the industry-leading process that documents and validates sustainable building design and construction practices.

Now the Frances face new challenges in the interest of sustainability. How can they sustain their own ability to keep up with the business, which is growing by leaps and bounds? Without advertising or even a Web site, France

Sustainable Solutions has generated so much business and interest that the Frances find themselves turning down three to six proposals per week. It’s a good problem for this young couple to have. “We are overwhelmed,” Courtney says, admitting that they are considering hiring one or two more experienced people to join the firm. “After all, we came to Colorado to go camping and skiing,” she laughs.

On the wall of their office Ozzie has posted a United States map. For every client they serve, they put a pin on the map and tie a string from there back to Denver. They call it their “Web of Influence,” and it is a point of pride for the pair. “We work hard for our company, because we constantly get to have a positive influence on each project, designer, constructor, and tradesman we work with,” Ozzie explains. “All of this culminates to benefit the most important person of a project, the end-user. Each person touched walks away from the project with a tool bag of sustainable practices they can take to the next project, and to the project after that. It makes us feel good to think about the exponential nature—our clients telling their clients—we can contribute to the sustainability movement.” The map may soon need to be replaced, though, with a map of the world. ■

## check it out



## Money Matters

Established by the Kasler Family Foundation, this scholarship helps out-of-state students achieve their CEM dreams.

Anyone engaged in the battle of the budget knows just how hard it can be to finance an education these days. And for Israel Lopez, a senior in construction engineering and management, a well-timed scholarship can be a real lifesaver. Not to mention the chance to leave school relatively debt free. Lopez is the most recent recipient of the Kasler Scholarship, a \$10,000 award established to ease the financial pain of an out-of-state student with good grades.

With a current 3.98 grade point average, Lopez, an Illinois native, earned the Kasler Scholarship by excelling in the classroom. “The scholarship has definitely helped me cover the costs of my education,” says Lopez who worked three summer internships for Turner Construction in Chicago. “It’s



Israel Lopez, a CEM senior, on his internship site for Turner Construction in Chicago.

a huge help to receive scholarships like these as it allows me to focus on my education rather than the expense of it.”

If you’re interested in establishing a scholarship or learning more about gift-giving opportunities within the CEM program, contact Madonna Wilson, director of development, at wilson47@purdue.edu, or (765) 494-6490. ■ **W.M.**



# On Building the Future

Safety, sustainability, and shared informational tools will spur innovations in the construction industry.

*Who shall doubt the secret hid  
Under Cheops' pyramid  
Was that the contractor did  
Cheops out of several millions.*  
—Rudyard Kipling

All of us who are builders would like to think that we have grown in stature, professionalism, and image, in the 100-plus years since Mr. Kipling penned “A General Summary.” The fact is, however, that we still have a way to go. When times are good, builders are too busy to innovate. When times are bad, builders are too poor to innovate. So what shall we who lead building companies in the 21st century say in response to these charges?

There is great news for those entering the building profession today. It is not business as usual! We are standing at the conjunction of three forces that will change the way we build forever; and we, as builders, are better positioned to embrace those changes than ever before in history.

It is now accepted that safety is non-negotiable. No amount of explaining can excuse the fact that the way we make a living has allowed human beings to be injured, maimed, and killed. We have come to realize that worker preparation, work planning, awareness, and commitment are the foundation of safe plans of action. The great news for the building industry is that this environmental change will draw more effective workers into the industry; and just as important, this shared commitment will forge a closer bond between workers and management. In the future the role of compliance will be quite simply to get those who will not embrace safety out of the game.

After centuries of waste, the widespread realization that society as a whole must become more sustainable is driving builders toward a new understanding of the flexibility of traditional materials, and toward adoption of new materials, means, and methods. Again, there is no choice; those who do not innovate will not be allowed to compete. The customers and communities we serve will require us to make an overt commitment to sustainability.

Powerful information sharing tools—most notably BIM—will shed a bright light upon the inefficiencies within our supply chains. Unfair risk transfer, purposeful misinformation, and brute force management techniques will be replaced by transparency, collaboration, and shared purpose. Every project participant will become directly connected to the customer’s business plan purpose, and every participant will be empowered to add value.

How soon will all this change take place? Faster than our comfort level, but not as fast as our customers would like. The fact is, however, that these are the easy changes, so we need to get about the business of embracing our future. The



Photo courtesy of Messer Construction Company

**Peter Strange, Chairman and CEO, Messer Construction Company**

true challenges for the building business lie in two realities.

First, it is impossible to be a high-end builder in a community where people don’t want to invest. The reality is that we must build more than just buildings. We must build vibrant communities where every citizen has the opportunity and the incentive to create value. Economic inclusion must become a strategic issue, not a customer accommodation.

Second, in the future service businesses will be expected to reflect internally the demographics of the communities that we serve. Diversity, with all its complexity and potential rewards, must become the norm rather than an initiative. We must create models that work for all the participants. Black, white, Asian, female, male, young, and old must feel welcomed and supported by our companies and by our industry.

So the good news indeed is that it will not be business as usual. The building profession today has a place for all of the energy, insight, creativity, and diversity that you can bring to the game. ■ **Peter Strange Chairman and CEO of Messer Construction Company, member of Purdue’s CEM Advisory Committee**



Messer employees and their families participate in a Cincinnati March of Dimes fundraiser.



## Paving the Way to Success

This Chicago entrepreneur discovered a winning combination—a Purdue education and a positive working environment.

**B**igane Paving Company takes pride in its dedicated employees. “We have a lot of multiple generations working for us. That’s the sign of a good family business,” says Anne Bigane Wilson (BSCem ’79, MSCE ’81), president of the Chicago company.

One of Purdue’s first graduates in construction engineering and management, Wilson applies her education and experience to running the fourth-generation firm she and sister Sheila took over in 1987 upon their father’s death. Founded in 1907 by their great-grandfather, the company initially operated in retail coal and oil sales, and last October marked its 100th anniversary. Today it ranks as a commercial and industrial paving leader, particularly in city streets.

Purdue gave Wilson a strong foundation for her entrepreneurial pursuits. “It provided a great preparation,” she says. “I found the internship program to be a great opportunity toward helping me focus my education to meet my career choices.” She describes her CEM classmates as a “close-knit group” who—thanks to being the program’s first class—enjoyed getting to know their professors on a more personal level. Upon completing the program, she stayed on at Purdue to pursue her master’s degree in civil engineering.

Leading a company of 120 people, Wilson believes effective leadership lies in treating employees well and creating a positive environment. “It needs to be someplace people enjoy going to work,” she says, a setting that cultivates team members who become invested in the company.

Take a tour around the Windy City, and you’ll find evidence of Bigane Paving’s achievements. Years ago Mayor Richard Daley shared his vision of bringing “green” back to the city, and the company has played a key role in the resulting streetscape projects (including work at the entrance to Lincoln Park Zoo). These urban beautifying initiatives combine decorative paving, trees, and other visual aesthetics that emphasize the distinct personalities of Chicago’s neighborhoods and communities.

The company has also tackled expansion work for the McCormick Place convention center as well as the University of Illinois at Chicago. Last fall the group celebrated a crowning achievement, paving the North Avenue Bridge over the Chicago River by applying unique asphalt designs when the weather became too cold for latex overlay.



John Underwood

Anne Bigane Wilson (BSCem ’79, MSCE ’81).

Today a growing number of women work in Wilson’s field, and they’re assuming larger roles on project sites and in design work. “It’s an evolution,” she notes, adding that future engineers should always embrace trying something new. “There’s no tradeoff for experience,” Wilson says, whether someone gains it through classes, internships, or volunteerism. Plus, she says, one should be willing to learn at any stage of life and not shy away from asking questions of professors, mentors, bosses, or colleagues.

Wilson lives in Evergreen Park with her husband, Jim (BSCE ’69), and remains active with her alma mater. She serves on the advisory committee for Purdue CEM and has participated several years in the MentorNet e-mentoring program, offering insight and encouragement to current students as they pursue their engineering futures. She recently received Purdue’s Civil Engineering Alumni Achievement Award in honor of her professional success. ■ **Matt Schnepf**



## Anchored Down on High

Finding the personal fall arrest system: anchorage/anchorage connector.

**an-chor-age** \ˈaŋ-k(ə)-rij\ *noun* **1 a::b::2::3:A** personal fall arrest system consists of three components: anchorage/anchorage connector, full-body harness, and connecting device (shock-absorbing lanyards, self-retracting lifelines, etc.). An anchorage, commonly referred to as a tie-off point, may be an I-beam, column, rebar, scaffolding, or other structural member. Unless the

anchorage is a structural member of the building, it may be necessary to have a structural engineer determine that the proposed anchorage is of sufficient strength.

An anchorage connector is used to join the lanyard/connecting device to the anchorage. Many different types of anchorage connectors are available, and more come onto the market regularly. Some types of anchorage con-

cur. Whenever possible, the anchorage should be at the worker’s shoulder

## A Simple Philosophy

Phillip Dunston believes that everyone has a unique gift to offer the world. Having found his own, he is working to help others find theirs.

John Underwood



Phillip Dunston, associate professor of both construction engineering and management and civil engineering.

Phillip Dunston has a simple philosophy: Find your individual strengths and what you are distinctively good at and apply it to the work you do. This philosophy has led Dunston to Purdue where he serves as an associate professor of both CEM and civil engineering conducting cutting-edge research and mentoring young people.

Dunston has clearly picked a profession that plays to his own strengths. In 2002 he received the National Science Foundation (NSF) CAREER Award. "This was a great honor," says Dunston. "It means that the people in your field judge the contribution you are interested in making is worthy of being supported."

This research involves virtual reality applications for construction planning and management. "People on the construction site have a challenging job," explains Dunston. "They are taking two-dimensional plans and trying to visualize mentally how it should look in

reality. Some people are very good at that, and then there is a segment of the workforce that is not. I want to help this mix of people work together effectively."

To explain his research, Dunston uses an example from the "Terminator" movies. "When the bad guy arrives looking for clothing and goes around measuring people to see who is the right size, the digital information that appears on screen that helps it function in a real environment is a good example of my work in augmented reality," he says.

Translated to the construction site, engineers who are operating in reality would be able to make more effective decisions in that environment through information that is computer generated.

"One of my main goals," explains Dunston, "is to deliver digital content, but also be able to register it in terms of being accurately placed in three-dimensional space."

The ways in which this information would be displayed is flexible, although, with the right technologies, Dunston hopes this would mean functioning with their hands free. However, he is quick to point out that he is neither a computer scientist nor a computer engineer,

instead working from the perspective of a potential user.

"I am more concerned with the human factors involved," says Dunston. "Assuming all the technological hurdles are overcome, how can this technology be harnessed or how can consistency be designed in such a way to augment human performance?"

This means Dunston is kept busy as his work demands interdisciplinary input from computer science and engineering, as well as the psychological sciences. However, he still makes time to help with the Science Bound Program, which reaches out to middle-school students in Indiana who are interested in the STEM areas: science, technology, engineering, and math. Through this program, students are encouraged to complete high school with the promise of a full Purdue scholarship upon graduation.

Dunston serves as a STEM mentor, helping young students understand what a career in engineering is all about. "I try to encourage young people to think about what their true leanings are and not just pursue something simply because it looks interesting or is lucrative," he says. "I want them to understand that if they pursue a career in engineering they will be making a contribution to people's quality of life."

Beyond the young people Dunston helps throughout Indiana, he has a few young ones at home he gives plenty of attention to. He and his wife, Candace, an electrical engineer, have five children: Jonathan (13), Kayla (12), Azaria (6), and Nadra (5), Keziah (newborn).

When asked if he hopes his children might follow in his and his wife's engineering footsteps he laughs and replies, "Harking back to my philosophy, I want them to find what they're uniquely gifted for." ■ **Kristen Senior**

nects currently available include cross arm straps, beam anchors ("beamer"), D-Bolts, hook anchors, horizontal lifelines, and chokers. Anchorage connects may be permanently or temporarily installed, depending upon what is needed. The configuration and material of the anchorage connector will vary depending on the work being performed.

Anchorage and anchorage connectors must be easily accessible, capable of supporting 5,000 pounds of force per worker, and be located high enough for a worker to avoid contact with a lower level should a fall oc-



Photo courtesy of DPR, Inc.

A worker equipped with a proper harness.



This colorful collage consists of work by MSE Professor R. Edwin García. It is actually two superimposed simulations of the nucleation and growth process of an undercooled Nickel melt. The background shows periodic tapestry of Ni nuclei during the initial stages of the solidification process. The superimposed structure in the center corresponds to a single solidified Ni-dendrite. The coloring embodies the degree of crystallinity and the orientation of each nuclei. Simulations were performed by Michael Waters (BSMSE 2008). García's work is featured in the current issue of *MSE Impact*.

