



# Lights, Camera, Construction

Spotlighting the arts within engineering

PURDUE CONSTRUCTION ENGINEERING AND MANAGEMENT

# ENGINEERING **IMPACT**

FALL 2010

## **What About Bob?**

Bowen Engineering's  
big thinker

## **Jurassic Halt**

Museum build's  
underground  
discovery

## **CEM**

### **Extracurricular**

Our singer, painter,  
and photographer



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**Movie Magic**

Though the building business may not be related to the business of Hollywood (even remotely), we have tried to have some fun with movie references and puns throughout this publication. Siskel and Ebert need not be notified.

**CEM alums honored, promoted**



Maibach

**Ryan Maibach** (BSCNE '96) was named Detroit's 2010 Outstanding Young Engineer of the Year. As director of specialty contracting for Barton Malow Co., Maibach oversees all the strategic planning and operations management for the company's concrete, interior and rigging divisions.

**Brian Acton** (BSCEM '84) has been named president and chief operating officer of BMW Constructors, Inc. With offices in the Midwest, BMW is a major general industrial construction company engaging in multimillion dollar capital projects, in-plant maintenance and turnarounds.



Acton



## Coming Attractions

### Paperless class designed for more efficient, economic delivery

If time is money and money is time, then students taking next spring's "Design of Temporary Structures" class should maximize both through this paperless course. Lecture notes, tests, quizzes, and homework will all be delivered electronically in the Web-based course which went "green" half a dozen years ago.



**No Paper Chase:** Bob McCulloch, here in front of such a structure on campus, designed a paperless class entitled the "Design of Temporary Structures." (Photo by Vincent Walter)

Bob McCulloch, research scientist and CEM continuing lecturer, designed and delivered the class in this format in 2004.

"It is an efficient and productive way to deliver a course," he says.

"Students have the electronic lecture notes to upload when they arrive at class. They simply add their comments to them. We can cover a lot more material with this method."

It's a design-based course consisting of numerous design problems, McCulloch says. Students use tablets to show their calculations and solutions. McCulloch designed and developed the content as well, so there's no textbook. He grades tests and quizzes and distributes them electronically, completing the paperless cycle.

Beyond the environmental green benefits, McCulloch says, is productivity improvement. "We talk about how to cut cost in higher education. In any organization, you cut cost by being more productive," he says. "I think we've demonstrated that with this approach we can improve productivity at the basic interface between students and the instructor."

What's more, McCulloch says, once the content is in digital form, it can be "recycled" for continuing or professional education. ■ **William Meiners**



### CEM Impact online

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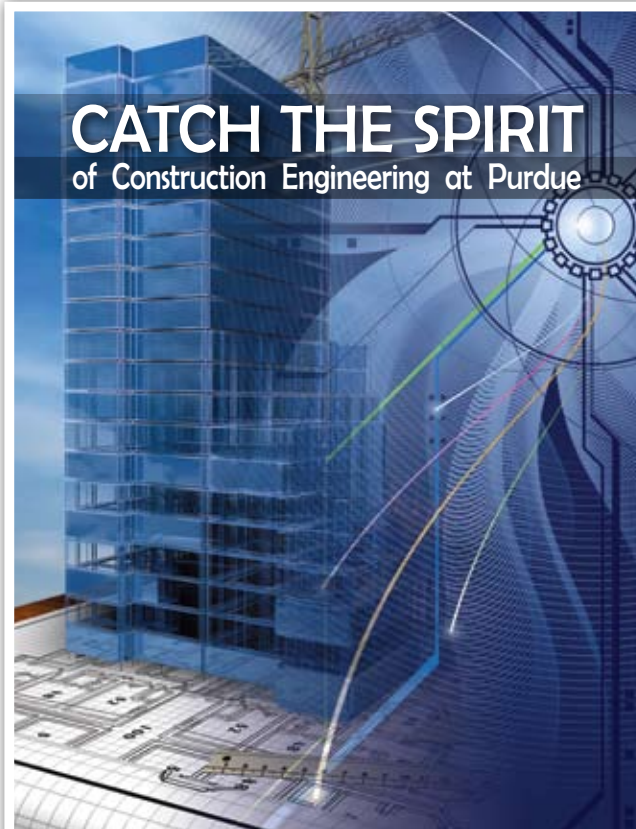
 [www.engineering.purdue.edu/CEM/people/alumni](http://www.engineering.purdue.edu/CEM/people/alumni)



**Expos Past:** Since 2008, the Spirit of Construction Engineering Expo at Purdue has provided much more than meet and greet opportunities for students and company representatives.

## December's CEM Expo

On Dec. 2, 2010, for the third straight year, the Spirit of Construction Engineering Expo will bring industry representatives to campus for the chance to meet members of the industry's future. The company reps connect with many first-year engineering students with the opportunity to talk to them about both short and long-term needs. Students gain a greater perspective on the various careers in construction, while sowing the seeds for summer internship possibilities.



**INDUSTRY EXPO 2010**  
Thursday, December 2

Illustration by Greg Simmons

FAA



With the intent of doing good work, construction industry guru builds big, gives much.

By William Meiners  
Photo by Andrew Hancock



**Lots of folks** borrow phrases from entertainment fields — sports, movies and the like — to describe aspects of their own work.

Bob Bowen, chairman and CEO of Bowen Engineering, has been known to call a successful construction project a grand slam. It's no hyperbole. His company has won six AGC (Associated General Contractors) Build America Awards, also known as the Oscar of the construction industry.

Two projects close to Purdue, including the \$57 million Lafayette Waste Water Treatment Plant Addition (2004) and the 120-tower Windmill Farm in Brookston (2010), earned two of those Oscar-like accolades for the firm. For Bowen (BSCE '62, HDR '07), it's the culmination of a long career of "working with people and taking care of people," says the engineer who has no intentions of easing into any golden years. "I'm 70 years old and I don't want to leave."

Perhaps it's all part of a "go big or stay home" philosophy that has kept Bowen on the cutting edge of the construction business all these years. He and his wife even provided their money and names to Purdue for one of the biggest engineering labs in the world. The Robert L. and Terry L. Bowen High-Scale Performance Civil



**Symphonic Support:** The Bowens enjoy, and support, the Indianapolis Symphony Orchestra, the Indianapolis Ballet, and the Fine Arts Society.



**Oscar Winner:** Bowen Engineering earned an AGC Build America Award, the industry's Oscar equivalent, for the 2004 Lafayette Waste Water Treatment Plant Addition.

Engineering Laboratory is an \$11 million facility helping to make bridges and buildings safer, more durable and earthquake-resistant. And his support of arts and education is equally large.

#### **Patron: Arts and Education**

For some, the creative arts may not align with technical disciplines like construction engineering. But for Bowen, the arts and engineering converge in a better way of doing business. By building a successful engineering business, Bowen has also become a first-class patron of the arts. The Bowens have enjoyed, and supported, the Indianapolis Symphony Orchestra, the Indianapolis Ballet and the Fine Arts Society.

He knows the benefits of enhancing an engineering background with an appreciation for the arts. "You can't just be an engineer," Bowen says. "You need communication skills, and we need to teach engineering students about life beyond numbers and science. You just need a broad perspective. The broader you see life and the world, the better you communicate."

Whether he's taking clients to the symphony, or sending a group of kids from the Big Brothers/Big Sisters program to a Colts game, Bowen also knows the satisfaction of giving back. Alongside his arts patronage is a passion for education. The Bowen

Foundation, established 15 years ago, provides scholarships to minority students in Indianapolis to help them pursue an education past high school. Some 300 students have received more than \$750,000 in scholarships. In 2009, Bowen was inducted into the Indianapolis Public Schools (IPS) Hall of Fame.

Science Bound, founded in 2002 with then Purdue President Martin Jischke, again raised the bar on the Bowen family philanthropy. The program mentors IPS students from the eighth grade through high school, encouraging them to pursue careers in science and technical fields. In 2005, the Bowens received the Outstanding Philanthropist Award from the chapter of the Association of Fundraising Professionals for their generous support of education.

#### **Philosophy: Good Works**

Bowen's philanthropic philosophy has long played into his style of business management. "We've been in business for 43 years and have always had good values. I learned values from the Lyles family in California," he says of his early job at W.M. Lyles Construction in Fresno.

"You need to have a genuine concern for other people," Bowen says. "One thing I wanted to make sure is that my employees loved their jobs and loved working for Bowen Engineering. I knew if they did, we'd have a good chance of being successful."

That outlook isn't surprising to anyone who knows Bowen. "That positive attitude toward life is the key," says Mark Hastak, CEM head who has known Bowen since his own PhD days at Purdue. "He has really shown that to his employees."

The good news continues for Bowen Engineering, even as the founder hands over the keys to his son, Doug Bowen, a 1993 Purdue Krannert graduate. "A lot has changed in the last five years," Bowen says.



“My son has 130 graduate engineers working for him. In the past, an emphasis on high values was our core business strength. Now, we’ve changed the culture. It’s a culture about caring for people. And business is just skyrocketing.”

It’s not just politeness inside company headquarters in Indianapolis, where there’s even a “compliment a day club.” The can-do, positive attitude is promoted through all the project sites throughout the nation. “A problem with another contractor can become a food fight,” Bowen says. “At Bowen Engineering, the problem gets solved.”

### **Purdue: Through and Through**

Bowen says those problems wouldn’t get solved, nor would Bowen Engineering even exist, without Purdue. “Our whole senior cabinet is Purdue grads,” says Bowen, who has long employed Boilermakers.

“We’ve been engaged with CEM from its beginning,” says Bowen. “We’ve had interns from the program every year except one.”

Bowen Engineering also boasts some 75 Purdue graduates in its current ranks, about one-third construction engineering and management grads, one-third civil engineers, and one-third from building construction management.

He gives much of his own time back to Purdue, as well. “Bob has talked to my classes and several other classes on a number of occasions,” Hastak recalls. “He always brings in examples from his own organization.”

Within those classroom exchanges, Hastak says, it’s Bowen’s ability to share professional practice stories, alongside managerial challenges that most excite the students who plan on managing construction sites down the road (see sidebar).

And of all the professional honors and awards he’s received over the years, Bowen says he’s proudest of the honorary doctorate bestowed on him by the university in 2007. “Being a doctor at Purdue is beyond anything I’ve ever dreamed of,” he says, “I even have the title on my business card.” ■

## **Leading by Example**

Renowned for its focus on experiential learning, the CEM program is now enhancing the classroom experience. How? By bringing in seasoned industry veterans such as Victor Gervais, continuing lecturer and advisor, and Bowen Engineering’s founder to teach classes.

Bob Bowen is the first to step up to the plate, or lectern, as the inaugural Donn E. Hancher Distinguished Fellow. His fall 2010 class, “Leadership & Advanced Project Management,” focuses on both the technical challenges of the construction industry and the managerial decisions needed to keep a project moving forward.

“Donn Hancher got all three of his degrees (BSCE ’66, MSCE ’68, PhD ’72) from civil engineering at Purdue,” says Mark Hastak, head of CEM. “He was one of the founding members of our program and served as a faculty member here for 16 years. He was also very passionate about the success of CEM.”

Talk of the teaching fellowship began when some of Hancher’s former students, including Cliff Schexnayder (PhD ’80), Jeff Russell, P.E. (MSCE ’86, PhD ’88), and Anne Bigane Wilson (BSCEM ’79, MSCE ’81), set up an endowment in his honor. Bowen, chairman of the endowment committee and a major contributor to the fund, is teaching the class as a volunteer.

“We’re using the Harvard case method of study,” says Bowen, who also earned a certificate from the Harvard Business School in 1994. “I’ve talked with people at Harvard, MIT, and Stanford, and students are focusing on industry case studies. It should be a grand slam.”

A grand slam, Bowen believes, partly because of his lineup of other classroom speakers. Throughout the semester, he’s bringing several



**Pro Bono Fellow:** Shown here in the second week of classes of the fall semester, Bob Bowen is to step up to the lectern as the inaugural Donn E. Hancher Distinguished Fellow.

construction industry colleagues, including his first boss, Bill Brown, from W.M. Lyles Construction Co., and his own son, Doug Bowen, now president and CEO at Bowen Engineering. All share stories about leadership challenges.

“We’ve been looking to involve more industry practitioners in the classroom,” Hastak says. “In the past, we’ve handled the experiential learning predominately through internships. Bringing the experience of someone like Bob Bowen to a classroom setting offers an additional level.”

The Hancher fellowship will be a renewable, three- to five-year teaching appointment. The idea is to find someone retired, or even semi-retired in Bowen’s case, to share experience and knowledge with future leaders.

Hancher’s impact on construction engineering and management field is unmatched, Hastak says. He advised more than 15 PhD students at Purdue, Texas A&M, and Kentucky, contributed to more than 100 scholarly publications, and led more than \$3.5 million in funded research in the transportation area.

Anyone interested in contributing to the Hancher endowment can contact Madonna Wilson, development director for construction engineering and management, at 765-494-6490 or wilson47@purdue.edu.

# Road Warrior

A professor's push for safer highway construction and better resource management



**Safety Guru:** With the support of hard-working civil engineering students behind her (left to right: Vanessa Valentin, Ali Mostafavi, and Kasey Faust), Dulcy Abraham is passionate about making construction practices safer. (Photo by Andrew Hancock)

Each year, more than 1,000 people are killed and more than 40,000 are injured in highway work zones in the U.S. That's 40,000 injured — about the size of the Purdue student body in West Lafayette. Dulcy Abraham thinks those stats can be curbed.

Abraham, professor of civil engineering and construction engineering and management, is completing a five-year project funded by the National Institute for Occupational Safety and Health (NIOSH)/Centers for Disease Control to understand what factors contribute to the safety of workers at risk in nighttime highway construction and maintenance zones.

"Nighttime highway construction work is becoming very common in the U.S. as most of the nation's highway system needs repair and rehabilitation," Abraham says. "Our research analyzes the impact of lighting, speed control, traffic control, and personal protective equipment on the safety of the workers in such

zones in order to develop and implement cost-effective safety strategies."

At a NIOSH research workshop in fall 2009, Abraham presented a training tool for workers, complete with interactive online quizzes. Along with civil engineering graduate students Joseph Louis, Ali Mostafavi, and Vanessa Valentin, Abraham is also developing a decision support system for highway construction planners. It will include a computer interface with searchable topics. Additionally, Abraham

is designing a three-lecture course module.

Abraham is also looking at roadway inspection strategies. Too little inspection and the performance of the roadway may be compromised. Too much inspection becomes unsustainable in terms of personnel, time and funding.

Roadway inspectors train for the job via a mentorship model, but as the cadre of expert inspectors approaches retirement age, the industry faces the loss of expertise on how to achieve that balance.

Abraham says they're trying to capture the "insider knowledge" of the older inspectors with many years of industry experience. To this end, she's deployed a questionnaire to gather perspectives and insights.

## Water Woes

Abraham is not always concentrating on the road; she also thinks about water. The Westlands Water District

in Southern California is the target for her next project on resource management, where Abraham is taking a system-of-systems approach.

"How do you get all the stakeholders together to agree on water allocation and access issues?" asks Abraham.

Kasey Faust, a graduate student in civil engineering, works with Abraham to predict the current water system's sustainability. Downstream they hope to determine the ideal organizational structure for the water infrastructure system. They also aim to predict the system's response to new policy, technology and other potential changes to the overall water system.

The California Westlands Water District shares similarities with the West Bank in Palestine, where Abraham traveled in May 2010 with four students as part of a global design team. The group studied a water resource management scenario where problems are magnified because of scarce water and the current ineffective water allocation and pricing models.

"Political and social issues on how water is distributed are different in the West Bank," says Abraham, "but we were able to glean some similarities to the California project."

The global design team also visited a refugee camp in Amman, Jordan, where they discovered cultural differences in resource management. Gray water harvesting, for example, is a less palatable concept there. Abraham is interested in applying research in cities abroad to the project back home. She is looking for ways to "cross-fertilize" creative solutions to problems that many different communities share. ■ **Gina Vozenilek**

# Site at the Museum

Unique challenges from art museum's job site inspire CEM grad

Pat Cox (BSCNE '10) broke onto the art scene during his summer internships with Matt Construction Co. There, he worked on the high-profile Los Angeles County Museum of Art (LACMA) Transformation project.

Phase 1 saw the demolition of a massive parking structure to make room for a stunning new three-story showcase for modern art, the Broad Contemporary Art Museum (BCAM). Designed by award-winning French architect Renzo Piano, the museum required artful construction engineering management as well.

"Because it is an art museum, it needed to be very physically appealing," Cox says. "It must look artistically pleasing, and it was designed with art in mind."

The architect equipped the 72,000-square-foot gallery with a dramatic external covered escalator that transports visitors up out of a landscaped green space to a third-floor entrance. Each floor of the building is roughly 20 feet in height. Cox says this is both aesthetically pleasing and practical; the tall ceilings allow for large doors that can accommodate large pieces of artwork. Similarly, a freight elevator in the building's center was built to withstand substantial loads, far in excess of those imposed by regular freight.

The top of the BCAM is essentially one giant skylight. A system of remotely operated solar shades suspended from an intricate metal framework diffuses the harsh California sun. The effect is a striking saw-tooth profile for the roof and a pleasant experience of even natural



**Matted:** Pat Cox (BSCNE '10) turned his internship experience into full-time employment at the Matt Construction Co.

lighting for art patrons inside. But the artistic concept was not easy to implement.

"You can design and engineer on paper, but when it goes up, things here and there get tweaked," Cox says. "It was a huge challenge."

An even bigger challenge was years in the making — tens of thousands of years. During the demolition phase of the site, located near the famed La Brea Tar Pits, excavation teams uncovered a nearly complete woolly mammoth skeleton and several other prehistoric fossils. All work stopped, the area was taped off, and equipped specialists delicately removed earth inches at a time.

"The schedule was pretty badly impacted for several weeks," Cox recalls. "But we were able to flex how we were working and catch up in the end."

Cox and his team accomplished this by digging out all around the fossil areas and building special crates around and under the bones. Then they used cranes to haul the crates out of the job site, onto semis and off to research facilities, where the valuable remains were properly excavated.

The art of communication became one of the lasting lessons of the LACMA project for Cox. Many voices needed to be heard on the project; the engineers, the architect, the museum's art director, and even community leaders had interests in its progress.

"Ideas in heads or on paper had to be distributed down to the brick-and-mortar-guys doing the building to make it reality," Cox says. "I would have never learned this in a classroom. It takes experience."

Cox, who graduated last spring, is extending that experience with Matt Construction in California as a full-time employee. ■ **Gina Vozenilek**



**Mammoth Disruption:** Construction screeched to a halt with the discovery of a nearly complete woolly mammoth skeleton and several other prehistoric fossils.

# THREE EASY PIECES

Trio of CEM students connect the dots between the arts and construction engineering



**Ba-Na-Na:** Jim Giberson (far right) is part of this singing foursome renowned for oldies from Elvis to Jerry Lee, from Bobby Darin to the Drifters. (Photo courtesy of Purdue Musical Organizations)

Most CEM students will tell anyone who asks that they're drawn to the field for a variety of reasons. To solve engineering problems with their hands. To work in the great outdoors. And simply to build something — to see a construction project through to its completion.

But don't let the stereotype fool you; these are also creative pursuits. What innovative ways can overcome a building obstacle on a particular project? How can we best manage our time around any inhospitable weather? And how can the construction of this building help make the most of its eventual form and function?

Purdue students bring that creativity to their construction projects. For many, other creative pursuits not only become central to their lives, they also enhance their field experiences. Alongside the accomplishments of rising to classroom, internship and

research challenges are students dedicated to creative, artistic pursuits. To follow: a singer, a painter, and a photographer, all making those connections between the arts and engineering.

## Singing Engineer

Jim Giberson, a construction engineering and management senior who will graduate in December 2010, is not only pursuing the arts at a high level, he's helping manage the team. Giberson, a Purdue Varsity Glee Club manager, works closely with the club's director and communicates all that information to more than 50 fellow singers.

"Singing and performing have always been a part of my life," says Giberson, who followed his sister to Purdue from their home in Steep Falls, Maine.

His sister, Kate Giberson Byers, who ended up with a degree in dietetics and nutrition, encouraged Giberson to try out for the glee club. He auditioned in his "Day on Campus" before his freshman year and has been singing with the group ever since. With between 50 and 60 road performances each year (from gigs in the Crystal Cathedral outside Los Angeles to performances in South Africa), Giberson had to get creative just to keep up with his coursework.

The connections between construction engineering and management practices and the glee club, however, are crystal clear to Giberson. "Definitely in interactions and being able to work as a team in a vocal performance setting," he says. "You have to trust the guys to the left and right of you."

He also has developed leadership skills as both a club leader and a representative of Purdue in their worldwide travels. These traits should serve him well in the construction field. Last summer, he spent his second internship with Thieneman Construction,



**Acrylic Creation:** Hilary Schaadt puts acrylic paint to canvas for still lifes, flowers, even scenes from movies she likes.



working on water treatment plant facilities in northwest Indiana. Upon graduation, he hopes to land in the Chicago area, where he can begin a management career in construction engineering and keep singing opportunities within his range.

### Painting Passions

A California native, Hilary Schaadt (BSCNE '10) spent three summer internships at Kiewit Construction back home in the Golden State. It seemed a no-brainer to accept a full-time job there after graduation last spring. Drawn to Purdue's unique construction engineering and management program, Schaadt, in spite of the demands of the major, continued to put paint to canvas — a creative habit she found satisfying after taking some art classes in high school.

"I work mostly with acrylic paint on canvas," says Schaadt, of Sunnyvale, Calif., "but I also do some chalk work and water colors."

With still lifes, flowers, even scenes from movies she likes, Schaadt finds her art to be a soothing outlet away from the day-to-day demands of engineering. "If I'm able to paint what I'm feeling, I just feel very calmed," she says.

But do those creative visions ever stir within her engineering work? How would one complement the other? "We've had to do work in Auto CAD programs," Schaadt recalls. "I've used my artistic abilities to come up with creative solutions on getting pipe into certain directions."

With California calling her home to the working world, Schaadt plans to keep her painting pursuits in the foreground. A summer trip to France, with the arts all around, gave her a closer look at some of the European classics. She also had the chance to do some painting in her travels.



**Monkey Barred:** Abhijeet Deshmukh keeps his eye and camera ready for photo opportunities. The monkey he captured here looks to be doing time.

"Once I get settled into my job, I hope to take some more art classes to help improve my drawing and painting skills," says Schaadt.

### Detailed Eye

Abhijeet Deshmukh (MSCE '10) is pursuing a PhD degree in civil engineering. Working with Mark Hastak, head of CEM, Deshmukh has a broad focus on disaster risk reduction. A side focus, however, which he describes as a "pricey passion," often finds him looking through the lens of an SLR camera.

Nature and landscapes appear most in Deshmukh's photographs, but he also likes sports and black and white photography. If his camera isn't with him, it's usually nearby in case the possibility of that perfect photo ever presents itself. He describes one such chance near the entrance to Schleman Hall, where the sunlight was dripping through two different-colored blooming flowers. "One was pinkish white and the other was off-white,"

he says. "And then you had this yellow light coming out from the door. I thought it was the perfect picture, but the moment I came back with my camera, the light had changed."

Still, he keeps his eyes peeled for images worth capturing. And sometimes the moment presents itself in his research. "I think both fields merge at some point," says Deshmukh, whose master's work explored the social and economic impact on communities and industries due to flood damage. "My research involves a lot of photography. It's not just clicking pictures, but getting photos with information and some meaning."

And given light, angles, and all the stars aligned, an artistic photo may even emerge from a tragic flood scene. For Deshmukh, who looks to a possible career of making a difference in the field of disaster relief at a nonprofit agency, the camera will stay close by, with his eye ever ready for the perfect time to stop, focus and shoot. ■ **William Meiners**

# I AM A MAKER.

I THINK WORK SHOULD BE ABOUT MAKING THINGS WORK.  
BETTER. FASTER. SMALLER. SMARTER. SO I BUILD BRIDGES  
BETWEEN WHAT'S KNOWN AND WHAT'S NOT. I TINKER. I TOIL.  
I WRITE POETICALLY IN AN ABUNDANCE OF LANGUAGES  
(INCLUDING CODE). I HACK. I DISSECT. I HAVE AN INSATIABLE  
DESIRE TO UN-COMPLICATE THE COMPLICATED. I AM  
EASILY INSPIRED. I BELIEVE THAT JUST BECAUSE IT HASN'T  
BEEN THOUGHT OF DOESN'T MEAN IT WON'T BE. POTENTIAL IS  
MY THRILL RIDE. IMAGINATION IS MY MOST-USED TOOL.  
I AM A MAKER. AND I AM WHAT MOVES THE WORLD FORWARD.

**WE ARE PURDUE.**

**MAKERS,  
ALL.**