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IMSE*news*

Department of Industrial and Manufacturing Systems Engineering

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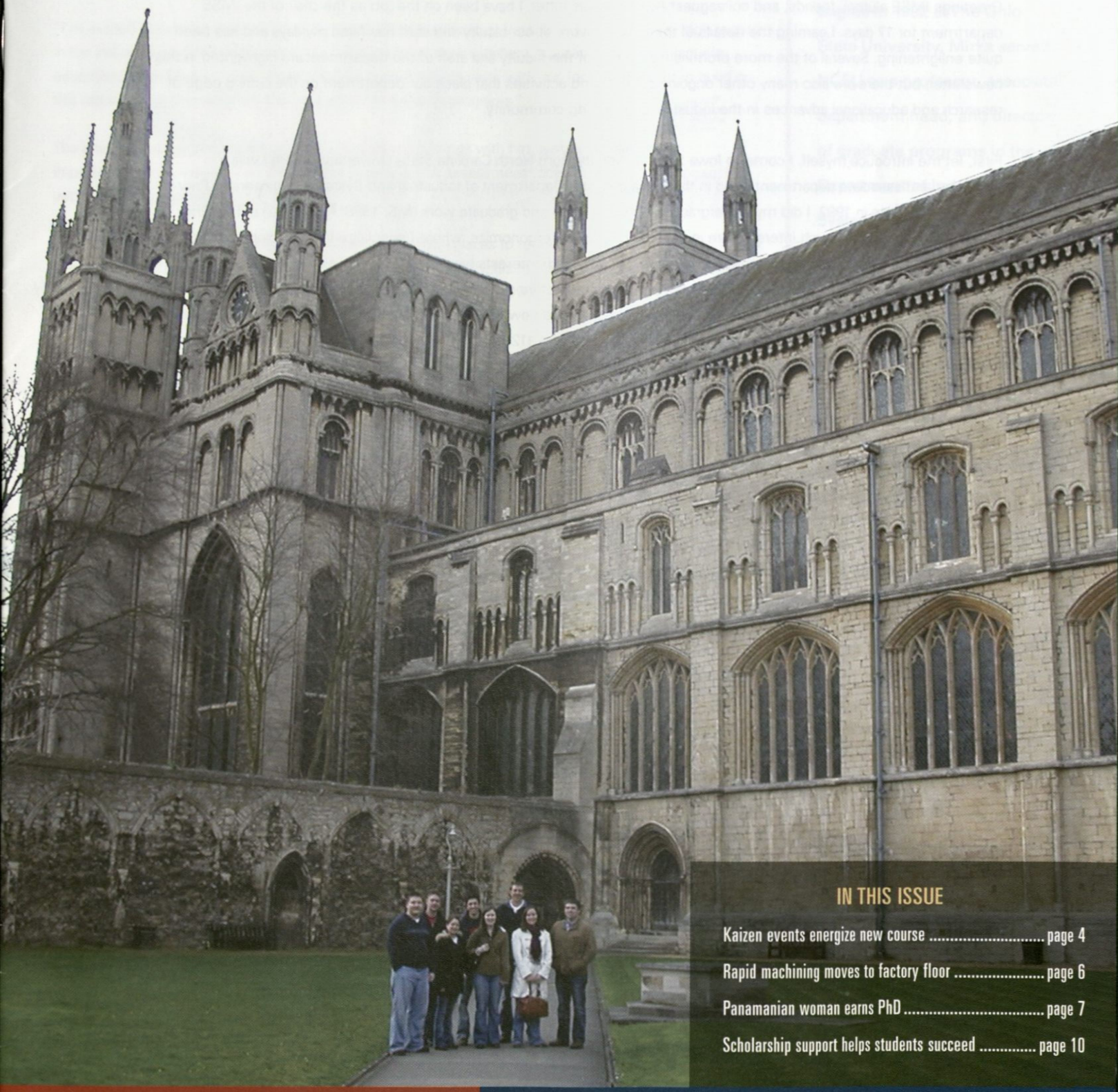

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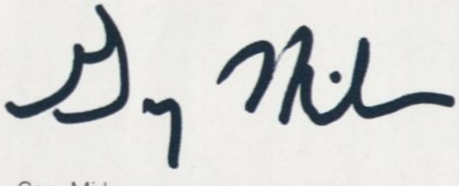
Letter from the Chair

Greetings IMSE alumni, friends, and colleagues! As I write this letter, I have been on the job as the chair of the IMSE department for 17 days. Learning the details of the ongoing work of our faculty and staff has filled my days and has been quite enlightening. Several of the more prominent activities of the faculty and staff of the department are highlighted in this newsletter, but there are also many other ongoing projects and activities that place our department on the cutting edge of research and educational advances in the industrial engineering community.

First, let me introduce myself. I come to Iowa State University from North Carolina State University, where I was a professor and associate department head in the Edward P. Fitts Department of Industrial and Systems Engineering. Prior to joining NC State in 1992, I did my undergraduate (BSISE, 1986) and graduate work (MS, 1988; PhD, 1992) at The Ohio State University. My research interests are in the area of physical ergonomics, where I specialize in spine biomechanics and ergonomic intervention effectiveness research. These research interests have taken me into a variety of work environments, such as construction, agriculture, furniture manufacturing, and, most recently, commercial crab fishing. I look forward to the opportunity to learn more about Iowa industries and how I might find a place to "apply my trade." I come to Ames with my wife, Jami, and my daughters, Taylor (13) and Blair (12). We have enjoyed our first few weeks in Ames, particularly the pace of life and the friendliness of the people.

I would like to take a moment to communicate my vision for the department. I begin by noting that the Department of Industrial and Manufacturing Systems Engineering at Iowa State University enjoys a strong reputation in the industrial engineering community for the quality of its undergraduate program and the well-trained students that it produces. It is my vision that we can enhance this reputation by strengthening the scholarship of the graduate research program and by expanding our distance education initiatives. My short-term approach to achieving this vision is twofold. First, I will spend time over the coming months learning more about the strengths and challenges within the department and working with the faculty to develop a strategic plan to make the best use of our current resources. Second, I will work to grow the available resources by cultivating supportive industrial relationships, seeking greater alumni support for our programs, and emphasizing the need for increased levels of sponsored research. While my personal strengths lie in the sponsored research aspects of this resource model, I look forward to the challenge of learning how to work with our industrial and alumni partners.

In conclusion, I would like to say that I welcome your thoughts on ways the department can be improved, and I look forward to the opportunity to work with you to advance the Department of Industrial and Manufacturing Systems Engineering at Iowa State University.



Gary Mirka

On the cover:

Students participating in a spring break kaizen event in England were not just there for the scenery—although the scenery at Cathedral Church in Peterborough was spectacular.

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Ergonomics research drives new department chair

With an extensive background in biomechanics and the practical application of workplace solutions to physically demanding jobs, **Gary Mirka** is ready for some heavy lifting of his own.

Mirka became the new chair of IMSE on July 1 with the challenge of nothing less than to "help IMSE achieve its potential as one of the leading departments of its kind in the country," according to College of Engineering Dean **Mark J. Kushner**. Mirka replaces **Sarah Ryan**, IMSE associate professor, who had served as interim chair.

"I'm excited about this position because the IMSE department at Iowa State is held in very high regard in the industrial engineering community, particularly for their excellent reputation in undergraduate education," says Mirka. "I look forward to the opportunity to work with the faculty and staff to build on this reputation and strengthen the graduate and research programs."

The articulate, engaging expert in physical ergonomics brings with him a strong belief in the importance of his research, an assortment of unique risk assessment tools, and an ongoing project with a geographical twist.

"I'm interested in understanding how we can design workplaces to reduce the risk of injury to the people who have to function there," Mirka says. Specifically, his focus is on musculoskeletal injuries to the back, shoulder, and wrist that may occur in industries such as construction, furniture manufacturing, and agriculture.

Mirka's research interests range from basic science—"trying to understand how the body works and how it becomes injured"—to applied, in which he focuses on "developing solutions for particularly hazardous jobs and documenting improvements," Mirka says.

The tools of his research include a lumbar motion monitor (a device used to measure the three-dimensional motions of the lumbar spine) and a customized lumbar dynamometer, both of which Mirka helped to develop and patent as a graduate student. He also employs complex mathematical models to help him determine the biomechanical stresses in the muscles and joints of a worker.

Commercial crab fishing is the focus of Mirka's current research, which adds an interesting wrinkle to his recent move. Transferring his equipment from North Carolina to Iowa was simply a matter of logistics, but there's a notable lack of seacoast in the Midwest.

Fortunately, Mirka and his team have already conducted most of the groundwork through interviews with crab fishermen and long sessions of video analysis, although he will need his sea legs eventually.

"We're looking at the stresses of working on a boat and the prevention of injuries to the musculoskeletal system," Mirka says. "I'll be spending a lot of time on the boat once we develop some interventions and put them into place."

Even in the heavily regulated and codified world of labor-intensive industry, Mirka sees plenty of room for additional ergonomics research.

"The dose-response relationship for musculoskeletal injuries is not as well established as it is for areas such as exposure to hazardous chemicals or high noise levels, for example," Mirka says. "There's a lot of inter-individual variability in how workers respond to the work tasks that they must perform.

"But what we do know is that we are able to reduce the stresses placed on the bodies of industrial workers through the use of well-engineered designs that recognize the capabilities and limitations of the human body. This, ultimately, will reduce the numbers of injuries in these jobs. This is our goal."

Gary Mirka

A faculty member at North Carolina State University since earning his doctoral degree in 1992 at The Ohio State University, Mirka served NCSU as a professor, associate department head, and director of graduate programs in the Department of Industrial and Systems Engineering. He has authored/co-authored more than 50 archival journal articles, 3 book chapters, and more than 75 conference papers and proceedings. He is active in several professional societies related to his work in ergonomics and biomechanics and has received honors for his teaching and research, including the prestigious Volvo Award for Low Back Pain Research.

Mirka's interest in biomechanics has its roots in sports performance: he was a shot put and discus thrower while an undergraduate at Ohio State. Today, he competes in Highland games, which includes events such as the caber toss, the hammer throw, and throwing heavy weights for distance and height.

Kaizen events energize new course

An engineering education is so full of variety and experience that no single course could offer it all. But one new IMSE course comes awfully close.

Two courses, actually. *Lean Manufacturing Production Systems* (IE422X) and its international counterpart (IE421X) bring a full range of engineering elements to a single semester. From theory in the classroom to hands-on application on a production line—with some travel as part of the mix—they offer lessons that make lasting impressions.

But there's more. The courses are open to sophomores through seniors, creating a dynamic exchange of outlooks and perspectives that is energized by the team teaching of Associate Professor **Frank Peters**, Associate Professor **Jo Min**, and lecturer **Leslie Potter**.

The courses were offered for the first time in their full three-credit form in spring 2007, launching what is hoped will become a mainstay in the IMSE curriculum.

Putting kaizen into the curriculum

Although "lean manufacturing" is the operative phrase, kaizen is the underlying principle for these courses. The concept, Min explains, has its roots in Japan and Toyota's continuous improvement process, through which workers and managers generate up to half a million new ideas each year to improve productivity.

The approach became a standard adopted worldwide, under various names and with local influences, so it's no surprise that when IMSE sought a way to strengthen its curriculum, an improvement process would be the inspiration. Peters, Min, and Potter just happened to share in that vision.

"We thought kaizen was a tool we could use in class in order to give the students the knowledge we thought they should have when they graduated," Potter says. "The nature of the kaizen process appealed to us because students would not only help determine what to do on a production line but would also see improvements right away."

As Min puts it, "Traditional classroom learning has its place, especially with fundamental theoretical discipline. But when it comes to engineering, which is quite applied in nature, it should be balanced with something that is tangible—something that should be in the portfolio of the student."

On the line in Iowa and England

A key part of the kaizen experience involves immersion in production-line work, which for the students meant that spring break would not be five days at the beach, figuratively or literally. Instead, they would participate in continuous improvement events and be expected to produce immediate results.

A group of three students chose the domestic option and went to the John Deere Waterloo Works in Iowa. Twelve others traveled to Caterpillar operations in England, with four going to the plant in Peterlee and eight to the Perkins Engines facility in Peterborough.

At Peterlee, working at a plant that manufactures articulated trucks of 30- to 40-ton capacity for off-road construction and mining, the students were supervised by Peters. Each day, Monday through Thursday, they rode to the plant in a van, arriving at 7:30 a.m., and they worked until 5 or 6 p.m.

"They were doing the same work as the Caterpillar employees," Peters explains. "All of their work was making improvements to a production area."

Specifically, the students tracked operator movement within work areas in order to find efficiencies, changed the storage of inventory, adjusted the layout of a parts area, redesigned a fixture, and improved safety.

They also proved themselves to a reasonably skeptical host.

"The dynamics were amazing," says Peters. "The students were working with operators, engineers, and management, who all were thinking, 'Who are these kids from the U.S. and what do they know?' So the students had to develop a rapport and credibility with them during the first day or two in order to get things accomplished on the third and fourth days."

By Friday, the students were making presentations to each of the three shifts and to key managers at the plant. The presentations covered what the students found, what they accomplished, how the plant would benefit, and a 30-day list of items to be worked on.

"Caterpillar was going to undergo this process anyway, but they said that some of the ideas they got wouldn't have occurred if we hadn't been there," says Peters. "They said that the students were really driving the enthusiasm of the team."

Students on the Engine Block Line Team at Perkins Engines present a daily report to other students and managers.

The entire Iowa State contingent at Peterborough, England, poses with personnel and facilitators from Perkins Engines.

The students at Peterborough, supervised by Potter, addressed poor material presentation and reduced cycle times on a production line that was on the verge of a major increase in demand.

"They were so professional," says Potter. "It was rewarding as an instructor to see the company being wowed by the students. We can't take the credit for how amazing the students were, and they were amazing."

At the John Deere plant, Min witnessed a mutual exchange of benefits as his students worked a week of shifts on the factory floor.

"The impact was twofold," Min says. "First, instead of just looking at pictures in a textbook, students were able to experience the whole manufacturing process—an experience I think they will retain much longer. Second, the Deere factory learned what our students are capable of, and they probably have a much better understanding of our curriculum."

Success—with minor improvements, of course

What began as a conversation with the department's industrial advisory council about curriculum enhancement has evolved into an experience worthy of publication. The three faculty co-authored a paper focusing on the kaizen aspect that was presented by Potter to the June 2007 American Society for Engineering Education conference. It sets up a future paper that will cover IE421/IE422 in detail.

"Kaizen was a dramatic way to provide an example," Potter explains. "It was the most rewarding laboratory experience that you could ask for. Students came up to us even part way through the course to say that this was the course that was really tying it together for them."

Peters supports that assessment, citing everything from the cross-pollination of ideas in a class of sophomores through seniors to the intense doses of continuous improvement and international experience.

"We were quite happy with how it went," Peters says. "There are a few things to change—we'd be hypocrites if we didn't improve it—but it was quite successful."

Kaizen students

These students participated in the spring break kaizen events:

John Deere—Waterloo, Iowa
Bethany Lintin
Molly McDermott
Kristopher Watts

Caterpillar—Peterlee, England
Scott Oberbroeckling
Joseph Petrzelka
Ignacio Viteri
Christian Zalesky

Caterpillar—Peterborough, England
Brad Bishop
Jay Messerly
Megan Morrissey
Teresa Reiss
Ashlie Salkeld
Christopher Sweem
Justin Wilkinson
Benjamin Young

"IE421X used the knowledge gained in the other industrial engineering courses and applied it to a real manufacturing setting. It was a great opportunity to work with other IE students and professors to get a better understanding of lean manufacturing principles. The class became a very close group of friends because we shared some great experiences."

—Megan Morrissey

"Probably the greatest benefit was seeing how theory actually applies. The challenges we faced out there were different than what we had read about in books. And when we ran into frustrations, we found ways to work around the challenges. In the end, we reduced assembly time and improved quality."

—Christian Zalesky

Rapid machining moves from lab to factory floor

Looking to replace a part in that 1967 John Deere tractor? **Matt Frank** may have just what you need.

The IMSE assistant professor doesn't operate a parts store, but he has developed a machine that is the equivalent of one. His rapid machining cell has come online at the John Deere facility in Waterloo, Iowa, and the world of spare parts may never be the same again.

The machine being used at Deere culminates a long process of refining equipment, techniques, and software that were developed in Frank's Rapid Manufacturing and Prototyping Laboratory on the Iowa State University campus. But it also represents just the beginning of what Frank thinks is possible through such an approach.

Frank's lab received funding from Deere in 2006 to develop a rapid machining center for its service parts operations. "It's a push-button system," he explains, "so they're going to have a machine on the factory floor that replicates what we can do in the lab."

Just what can the machine do?

"They're going to use it for those one-of-a-kind or very rare parts that somebody asks for maybe once a year," Frank says. In the past, Deere would either have to manufacture a single part or stockpile many of them for years—both being expensive options. "Now they can put a piece of a cast iron bar in the machine, download a file of the tractor part, and make it on the spot."

It's an option that Frank hopes will become standard practice. "We hope to get them to make the decision that once they need a certain part only once a month, they stop making that part using traditional methods."

Rapid machining operates on the principles of mathematics and geometry, offering mechanical and software substitutes for the highly skilled eye and instincts of a machinist.

"We're trying to do this with a machine blindly," says Frank, "so we use a set of computer algorithms that analyze the geometry and determine mathematically what we should do. And we have to do it in a way that guarantees that the machine will never have a catastrophic failure, so we have to make some conservative assumptions."

The machine has proven itself with a variety of tasks—from a set of chain links to a human femur—and while using a wide range of materials, including titanium, aluminum, ceramic, plastic, wood, steel, cast iron, and some acrylics. (And an artificial bone material called Trabecular Metal. See "In Brief" on page 9.)

The next challenge is to make the machine faster by reducing processing time. Frank's team has a new six-month contract from Deere to refine the method.

"The first machine is functional and it makes accurate parts, but it's not running as fast as we want it to," Frank says. "That's the funny thing about what I do in rapid machining—the process itself is very slow."

What's actually rapid, he explains, is all the engineering time saved because no one needs to figure out tools, speeds, and setup orientations.

"We think we can cut 50 percent, maybe up to 80 percent, of the processing time," he says. "Now that we have the machine functional, we want to make it more efficient."

Graduate student Chris Hunt works in the Rapid Manufacturing and Prototyping Laboratory, where equipment, techniques, and software are refined.

Zoila Yadira Guerra de Castillo becomes first Panamanian woman to earn PhD in engineering

While growing up in Panama, **Zoila Yadira Guerra de Castillo** developed a love for the beauty of her tropical homeland. But she also learned to appreciate that Panama was home to one of the great engineering projects in history.

Both influences guided the course of her life.

Today Guerra de Castillo is back in her beloved homeland after having made some history of her own: she is the first Panamanian woman ever to earn a PhD in engineering. Accomplishing this feat took her from Central America to the middle of America, where she studied industrial and manufacturing systems engineering at Iowa State.

"I love Iowa State, and I'm so proud to say that's where I got my PhD," she says.

But how did the girl from Panama become *Doctora* Guerra de Castillo?

"When I was a child I realized that the marvels of this world—the pyramids of Egypt, the Great Wall of China, and even the Panama Canal—were made by engineers," Guerra de Castillo recalls.

Such a realization came naturally for someone with a strong aptitude for mathematics. By the age of 15, Guerra de Castillo's ability had already begun to distinguish her. "Then one of my teachers said I should be an engineer so I could use both my intelligence and creativity."

The suggestion may have seemed logical, but for Guerra de Castillo to choose such a path would defy convention, particularly for someone of her generation. In the mid-1970s, she became one of only three women enrolled in the first-year engineering program at the Technological University of Panama. There were 40 men in that same class.

Guerra de Castillo withstood the rigors of engineering study and the pressures of being such a visible minority to earn bachelor's and master's degrees in industrial engineering. Her unconventional choice had resulted in success. So she made another.

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Ryan explores industrial ecology with AT&T grant

Sarah Ryan sees a way to connect information technology to the environment, and her vision has some high-profile support.

The AT&T Foundation, the corporate philanthropy organization of AT&T Inc., awarded Iowa State University a $25,000 environmental research grant in the spring and designated Ryan as an AT&T Faculty Fellow in Industrial Ecology. She was one of only three academic researchers selected to receive funding from the 2006 competitive grants program.

Ryan, an associate professor, was awarded the fellowship for her proposal "The Value of Improved Product Condition Information to Product-Based Service Providers." Her research will demonstrate how information can be substituted for the materials and energy otherwise consumed unnecessarily in the traditional supply chain. The fellowship funds research being conducted during 2007.

"This is a great opportunity to show how the use of information technology can benefit the environment," Ryan says. "Our mathematical and computer models can show companies how to save valuable resources by using less material and energy. Not only do they use less but also reduce the amount of material that goes to landfills."

Industrial ecology changes the usual course of the industrial process, in which resources typically move through the system to become waste. The new approach is to redirect wastes to become inputs. One way that manufacturers can close the loop on durable goods is to "servicize"—that is, offer services supported by their products rather than transferring ownership to customers. That way, they can optimize the products' environmental performance throughout their lifecycles and reuse components extensively. But the practice creates the need for better visibility of the condition of equipment in the field.

Ryan's role is to help industry monitor the performance of large equipment, such as earth movers and gas turbines, in order to schedule maintenance or replacement only as needed. If parts are replaced at just the right time, then equipment operates more efficiently and its lifespan is extended. With this approach, fewer pieces of equipment need to be manufactured, thus using fewer resources and resulting in less waste.

Not only industry will benefit from Ryan's work. When teaching IE305, *Engineering Economy*, she will incorporate aspects of the servicizing business model as an alternative on par with equipment leasing. This new project also addresses the tradeoff between investment and operating costs, which is a prominent theme in the course.

Commitment to others brings recognition

When **Brad Bishop** talks about lean manufacturing, he sounds like an engineer who truly cares about his field. When he talks about people, he sounds like a leader.

Bishop's commitment to academics and to leadership activities earned him the 2007 Wallace E. Barron All-University Senior Award. Bishop was one of three engineering students to be named a recipient of the award by the Iowa State University Alumni Association. Only five students won the award university-wide.

"I've always had a passion for bringing people together and organizing people's thoughts," Bishop says, citing his first forays into leadership as a high school student in Fairfield. At Iowa State, two of his more prominent roles have been as president of the Student Alumni Leadership Council and chairman of the Iowa State Student Foundation.

Bishop found an academic home for his interests not long after beginning his college career.

"When I came to Iowa State, my original thought was that I would major in business and engineering," he says, "but what I found was that industrial engineering essentially combines those into one degree program. That's pretty much what I was looking for."

In particular, Bishop's experiences with the metal castings research team of Associate Professor **Frank Peters** proved to be pivotal. Hands-on experiences at manufacturing plants in Wisconsin and Louisiana led to a published journal article and a career path.

"If I had to pick something that made the biggest impact on me," says Bishop, "the undergraduate research opportunity would probably be it."

Bishop parlayed that experience into an ongoing internship with Caterpillar, Inc. There, he has applied his knowledge of lean manufacturing, which emphasizes order and efficiency.

"Technology is great, but if you don't have solid basic processes, then the technology isn't as efficient as it could be," he says. "In 99 percent of manufacturing, those processes can be improved. Lots of opportunity, as we like to say."

For Bishop, though, the opportunity is more than just a matter of technical applications.

"I want to wake up every day being part of a career where I'm interacting with a lot of different people," he says. "I want to love my job, and I want people around me to love their jobs, too."

That commitment to others has characterized Bishop's ongoing and extensive involvement in activities on and off campus. From mentoring elementary students to guiding an award-winning student leadership council, Bishop has consistently given of himself while at Iowa State.

In particular, Bishop forged a close connection with the Iowa State University Foundation. During the fall 2006 semester, he worked a full-time internship there as the holder of the Robert and Jean Watson Advancement Fellowship. His mentor was **Rich Bundy**, assistant vice president for development.

"Brad is an exceptionally responsible and focused young man," Bundy says, citing Bishop's "deep love for Iowa State University.

"He's an approachable, nice person," Bundy says, "and you sense that when you're around him. And, as is typical of so many students at Iowa State, he's got that great Midwestern work ethic."

Guerra de Castillo earns PhD *continued from page 7*

The student became an instructor, teaching operational research, statistics, and marketing at the university. But she still wasn't finished. While happy with her work at the university, Guerra de Castillo knew she wanted to continue her education. She also knew that she would have to leave Panama in order to do so.

Guerra de Castillo turned her focus to finding an engineering college in the United States. After gathering as much information as she could about the hundreds of available programs, she chose Iowa State.

"I found that Iowa State is one of the best state universities with a strong program in engineering," she says. "Especially industrial engineering."

After graduating with her PhD in August 2006, Guerra de Castillo returned to Panama, not only to continue her teaching but also to embark on yet another trailblazing path.

As Guerra de Castillo notes, Panama is a logistics paradox. It is the site of one of the most efficient ports in the world and also serves as a Latin American airport hub, but there is a void in industrial engineering research.

"We have the know-how of logistics operations, but research is our handicap," she says. "Knowledge is a competitive edge in today's world, so we can become a more competitive country by developing knowledge in one of our strengths—logistics."

Her intent is to develop a logistics research center. The goal is ambitious, but even as she pursues it, Guerra de Castillo knows that she has already set the foundation in place.

"Many young women from my high school, and my neighbor's daughters, and other young women from my church decided to study engineering because of me," Guerra de Castillo says. "I want to be a good example to my students and to all women in Panama. I want to show them they can reach as high as they want."

In Brief

Rankings place IMSE in top 25

In its latest graduate and professional school rankings report, *U.S. News and World Report* magazine ranked the IMSE graduate program 15th among public universities and 23rd among all doctoral-granting institutions.

The magazine continues to have the Iowa State University College of Engineering ranked among the top 25 public engineering colleges in the country. The latest graduate rankings, online at **www.usnews.com**, indicate that Iowa State's engineering program ranks 24th among all public universities and 45th among 199 schools granting doctoral degrees.

Six individual Iowa State engineering departments besides IMSE were also ranked on the magazine's top 25 lists for excellence in graduate programs, with only aerospace engineering ranked as highly as IMSE.

"We are pleased that a number of Iowa State's graduate programs in engineering, education, and the sciences are being recognized for their quality," Graduate College Dean **David Holger** says. "It is the goal of Iowa State's strategic plan to improve the rigor, challenge, and international reputation of the programs."

Frank's invention on patent track

Assistant Professor **Matt Frank** has filed an invention disclosure for his method of machining metallic foams—a method that could have a significant impact in the medical field. The process, which involves rapid machining technology, would be used to custom-shape artificial bone implants using Trabecular Metal. Patients would benefit because the implants could be machined based on information from CT or MRI scans; today, many prostheses or fixation plates must be shaped and ground to fit the person.

The invention disclosure is an early step in the patent process. The next steps are for the university to evaluate the invention itself, as well as its marketability.

IMSE contributes to 'Best Paper'

The Engineering Economy Division of the American Society of Engineering Education awarded the Best Paper Award to "Student Selection of Information Relevant to Solving Ill-Structured Engineering Economic Decision Problems." The authors were Associate Professor **Sarah Ryan**, Associate Professor **John Jackman**, post-doc **Rahul Marathe**, graduate students **Pavlo Antonenko** and **Piyamart Kumsaikaew**, Associate Professor **Dale Niederhauser** (Center for Technology Learning and Teaching), and Associate Professor **Craig Ogilvie** (physics and astronomy). Ryan presented the paper and received the award at the ASEE annual conference in June.

Team to study student problem solving

A multidisciplinary team of faculty that includes IMSE's **Sarah Ryan** and **John Jackman** will study new methods for improving students' problem formulation skills. It is well established that correct problem formulation is a critical step (and usually the most challenging for students) in the problem-solving process. The Problem Solving Learning Portal will be used to test and assess the effectiveness of scaffolding techniques.

Heising serves in ADVANCE program

IMSE Professor **Carolyn Heising** is a College of Engineering representative for the ISU ADVANCE program, for which Iowa State received a five-year, $3.3-million grant from the National Science Foundation. The grant's purpose is to increase the representation and advancement of women in academic science and engineering careers.

Interim Vice President for Academic Affairs and Provost **Susan Carlson** is the principal investigator for ISU ADVANCE. Heising and other co-principal investigators represent four Iowa State colleges: agriculture, engineering, human sciences, and liberal arts and sciences.

Heising was appointed the chair of the national Society of Women Engineers (SWE) Women in Academia committee in July 2006 for a two-year term. She chaired a panel at the October 2006 national SWE conference in Kansas City titled "Secrets of Success in Academia" with College of Engineering Dean **Mark J. Kushner**. Heising also co-chaired a panel on diversity in the nuclear power industry at the national American Nuclear Society meeting in November 2006.

Olafsson's book set for publication

Associate Professor **Sigurdur Olafsson's** new book, "Nested Partitions Optimization: Methodology and Applications," co-authored with **Leyuan Shi**, is scheduled to be published in September 2007 by Springer. The book describes a novel approach for solving complex large-scale discrete optimization problems that arise in applications such as scheduling, logistics, supply chain design, data mining, and health care.

Scholarship support helps students succeed

Thanks to the scholarship support **Stephanie Stall** received, the 2007 industrial engineering graduate did not have to juggle classes with a work schedule.

Jennifer Gumm, a senior in industrial engineering, has used scholarships to keep her student loans to a minimum. The extra help is especially important now that she has started IMSE's concurrent MBA program, extending her education by three semesters.

Alumni are an important source of student scholarships, and one in particular made a difference in the lives of Stall and Gumm. **N. A. "Bert" Lamberti**, a 1943 Iowa State engineering alum, set up the N. A. "Bert" and Joan Lamberti Scholarship in 2005 to benefit students majoring in industrial and manufacturing systems engineering, with preference given to students from his hometown of Ankeny, Iowa.

"Education has always been near and dear to Bert's heart," says his wife, Joan Lamberti. "He really wants young people to get a good start on their education, and scholarships help them do that. Of the many things he has supported, I can't think of anything more worthy than education."

The scholarship comes with no small amount of prestige. In recognition of his distinguished career, Lamberti received the 1992 Iowa State University Professional Achievement Citation in Engineering. Lamberti, who holds an MBA and PhD from the University of Southern California, held a variety of positions, including executive vice president of operations for Universal American Corporation. In 1975, he started Lamberti Industries Inc., serving as chairman and CEO until his retirement in 1992.

The first Lamberti Scholarship was awarded to Stall in 2006–2007.

Stall, who grew up on a farm near Huxley, Iowa, chose engineering because she liked to take things apart and put them back together, and because she was good at math and science. She came to Iowa State as an undeclared engineering major, but soon chose industrial engineering. "It was the best fit for me," she explains. "It is people oriented and has business components but also gave me the opportunity to go into manufacturing."

This past June, Stall started her career as logistics and initiative leader for oral rinse at Procter & Gamble in Iowa City and is pleased she does not have school loans to pay. "Scholarships helped me pay for half or more of my expenses," she says, "and my two internships with Procter & Gamble paid for the rest."

Not working while in school also gave her time for activities such as involvement with the executive branch of the Iowa State University Government of the Student Body. Stall, who served as logistics director, worked with the Ames City Transit Board and a number of university committees. "This position exposed me to a lot of facets of the university, especially from the business side," she says.

Gumm, who is from Ankeny, received the Lamberti Scholarship for 2007–2008. She chose industrial engineering because of the personal aspects of working with people on the manufacturing floor and the wide range of career opportunities. Her interest in the business side of industry, especially human resources, led to her decision to earn an MBA as well.

Internships are helping Gumm explore career possibilities. So far, she has worked for General Electric in Burlington, Iowa, and Hormel in Austin, Minnesota. "I have gained experience doing what industrial engineers do in the real world," Gumm says. "At Hormel, for example, my main project focused on ergonomics—how to improve a work station so anybody could come off the floor and do the task."

Gumm plans to have two more internships before her December 2009 graduation. "Each one helps me get a better idea of what I want to do for my career," she says.

Inducted last spring into Alpha Pi Mu, the industrial engineering honor society, Gumm has received scholarships throughout her college career. "I am paying for my own college with scholarships and loans," she says. "The Lamberti Scholarship helps a lot because my tuition is going up now that I am starting graduate classes."

When she is not in class or on an internship, Gumm has been involved in such things as the Iowa State marching band and concert band. This fall she is a member of the publicity committee for Engineers Week. Activities are planned September 16–22 to help bring attention to engineering as a field of study and promote interaction between students and faculty, staff, alumni, and the community.

IMSE department facts

- Undergraduate enrollment, 280; graduate enrollment, 55.
- Offers BS, MS, and PhD in industrial engineering; also home for MEng in systems engineering.
- Five undergraduate focus areas include engineering management, manufacturing, operations research, enterprise computing, and ergonomics.
- Research focus areas include advanced manufacturing, applied operations research, ergonomics, and information engineering.
- Over 200 alumni are active or retired CEOs, presidents, or vice presidents of leading firms in industries such as energy, manufacturing, transportation, and information services.

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Opportunities to support IMSE

A number of major gift options have been created to allow gifts that support the activities of the IMSE department to carry the name of the donor. Listed below are a number of these endowment gift options.

Named Department Chair: A named department chair endowment fund provides a flexible resource for a department chair to meet the special needs and opportunities in his or her department ($2,000,000).

Named Faculty Chair: A faculty chair is an honor bestowed by the university on an outstanding member of the faculty, consistent with the University's Policy for Endowed Chairs and Professorships ($1,500,000).

Named Professorship: A named professorship recognizes distinguished faculty ($500,000).

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These prestigious positions carry the name of the donor; for example:
George Smith Department Chair in Industrial and Manufacturing Systems Engineering or
Mary Smith Faculty Fellowship in Industrial and Manufacturing Systems Engineering

Opportunities for named scholarships and graduate fellowships also exist. They include the following:

Named Graduate Fellowships can be established to support graduate students by making the cost of higher education attainable and allowing the department to attract high-quality graduate students who stimulate opportunities for learning and discovery. They may carry the name of the donor or someone the donor wishes to honor ($150,000).

Named Endowed Scholarships can be established to support undergraduate students. They may carry the name of the donor or someone the donor wishes to honor ($25,000).

Naming of the IMSE department is also an option. If you are interested in learning more about this and other giving options, please contact Carla Wiedmier at the Iowa State University Foundation at 866 419-6768 or wiedmier@iastate.edu.

We sincerely thank all who have supported the important work of the Department of Industrial and Manufacturing Systems Engineering.