

Sustaining resources for the future

Shrinking resources mean environmental consciousness is necessary for everyone, especially engineers. No longer can we design products simply to make them work—products must be made with the environment in mind, as well as the customer.

IMSE Associate Professors **Sarah Ryan** and **Jo Min**, along with five PhD students, are working toward sustainable engineering solutions, with a four-year initiative to study how they might stretch limited resources. "If we don't stop using up resources at the rate we're using them now," says Ryan, "we're going to run out."

Ryan feels that either we can stay the course we're on and eventually be forced to make drastic changes to our living standards when resources are exhausted, or we can make smaller, more tolerable changes now to stretch those resources.

Engineers, she says, should place more emphasis on product design and the manufacturing process, as opposed to cleaning up after a product has gone to market.

"We need to think about using different materials and ways to reduce waste," she explains.

Rather than using a resource to make and sell products to customers with little thought about their environmental impact, engineers must instead design products with the end result in mind. They need to ask themselves what happens to these products—computers, for example—when customers finish with them. Do they just throw the old computers out? Probably not, since finding a landfill that will accept a CRT is next to impossible anymore.

Recycling products such as old computers might sound like a logical solution, but that has been anything but easy so far. Few companies recycle old computers, and those that do charge fees that most in the U.S. are unwilling to pay. "In Europe," Ryan notes, "there are increasing regulations that say the manufacturer has to take such items back and dispose of them in an environmentally responsible manner."

Ryan suggests that instead of waiting for government regulation, more U.S. companies should adopt voluntary strategies for environmental sustainability. The companies who are doing that already, she says, are finding a competitive advantage in the global marketplace.

In line with the changing marketplace, Ryan adds, universities are doing a better job of training engineering students to recognize the importance of sustainable engineering for our future. "Our students must be aware of the environmental issues and constraints," Ryan says, "and we have to take those constraints seriously."

Ryan is confident, however, that engineers are up to the challenge. After all, she notes, the essence of engineering lies in solving problems under constraints.



IMSE Associate Professor Sarah Ryan and Chris Hendrickson

Lecture series speakers

Chris Hendrickson, co-director of the Green Design Institute and head of the Department of Civil and Environmental Engineering at Carnegie Mellon University, spoke at Iowa State on March 29 as part of the Joseph K. Walkup Distinguished Lecture Series in Industrial Engineering.

continued on page 3

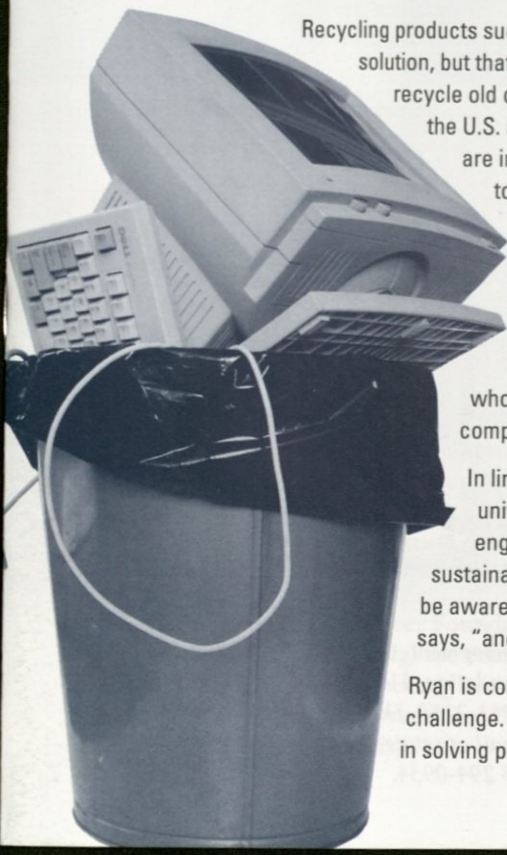
IMSE raising money for endowed chair

Iowa State University wants to establish itself as a leader in sustainable engineering, an emerging field critical to the health of our planet. To do that, IMSE is raising at least \$1.5 million to fund the Joseph K. Walkup Chair for Sustainable Engineering. Walkup led the industrial engineering department at Iowa State from 1942 to 1973.

"He developed a model of industrial engineering education that combined the hard sciences with the business and commercial aspects of engineering," says **Rudy Herrmann (BSIE'73)**, retired president and CEO of Dover Resources and a catalyst in the fund-raising effort.

Because the chair will provide students and faculty with expertise not currently available at Iowa State and work with industry leaders to integrate key concepts into the

continued on page 2



PACE Awards

Two IMSE alumni were honored during halftime of last fall's homecoming game with Professional Achievement Citation in Engineering (PACE) awards. PACE winners are recognized for superior technical or professional accomplishments.

RAJ NATHAN

Raj Nathan (MS'77, PhD'81) is senior vice president and general manager of Sybase, Inc. Sybase is the sixth-largest infrastructure software company in the world with more than 5,000 employees in 100 countries. Sybase

develops products for creating software applications that are used extensively by financial services companies, health care providers, and the federal government.

ROBERT E. WALKUP

Currently mayor of Tucson, Arizona, **Robert E. Walkup (BS'60)** has worked as an engineer and executive for Rockwell International, Fairchild Republic, and Hughes Aircraft Company, where he helped bring more

than 6,000 high-tech, high-paying jobs to Tucson. Walkup has also served as chair of the Greater Tucson Economic Council and helped to write the Greater Tucson Strategic Economic Plan.

Iowa State students find partners in Scotland

IMSE students taking Production Systems (IE 341) last fall teamed with students from the Department of Design, Manufacture and Engineering Management at the University of Strathclyde in Glasgow, Scotland, to deploy a hypothetical global supply chain for a tasty product called haggis, consisting of mutton and oatmeal.

There were 26 combined teams, with two students from Iowa State and two students from Strathclyde, and each team was responsible for solving various parts of the supply-chain puzzle. Emphasis was placed on team organization and management. To ensure one person wasn't dominating a team, students were required to track group activities and record contributions made by each team member. **Jo Min**, one of the Iowa State faculty members involved, says that was a great way to make sure everybody was doing something positive and substantial on the project.

"The teams will have to be bilingual in either Spanish or Chinese, which will mean much more collaboration for the teams."

—Jo Min

Students used two different Internet-based collaboration platforms to communicate. One of these, Engineering Learning Portal (ELP), is a constructive input/output delivery system developed by IMSE faculty member **John Jackman**. The other system, Lau Lima, is a popular communication tool in many European countries.

Response to the project was overwhelmingly positive from an Iowa State point of view. IE majors were asked to fill out an anonymous, voluntary survey after the project was complete, and more than half of the respondents rated the project as very good or excellent—exactly what the professors spearheading the project were hoping for.

Iowa State plans to continue similar projects in the future, starting next fall with the Monterrey Institute of Technology in Mexico and Taiwan National University of Science and

Technology. Min says Iowa State students will be challenged even more next year. "The teams will have to be bilingual in either Spanish or Chinese," Min explains, "which will mean much more collaboration for the teams." And, Min adds, since industries are becoming more global every day, projects like these are extremely important in order to make students comfortable working with people from different cultures.

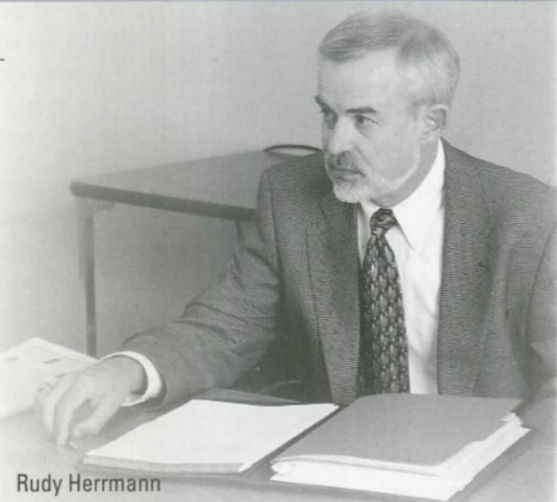
IMSE raising money for endowed chair

continued from page 1

engineering curriculum, recruiting a candidate with national or international experience in the field is a top priority. And even though sustainable engineering will be based in IMSE, collaboration with other departments and colleges will increase the expertise in the field throughout the university.

Herrmann says that practicing sustainable engineering is essential for the continued development of a global society. "We have to become more effective in utilizing the resources around us, and we have to be more thoughtful about understanding the environmental impact of our resource consumption patterns," he warns.

For more information on making an investment for the endowed chair, contact Sallie-Grace Tate, Senior Director of



Rudy Herrmann

Development, College of Engineering, ISU Foundation, 116 Marston Hall, Ames, Iowa 50011-2150. She can also be reached through e-mail at sgtate@iastate.edu or by phone at 515 294-0934.

A step ahead with cooperative employment



Morgan Gottschalk isn't bothered at all that it's going to take an extra year to finish school. Quite the opposite, in fact, because the extra year has meant an opportunity for the industrial engineering major from Eden Prairie, Minnesota, to work in cooperative employment at Lennox Manufacturing in Marshalltown. "This was significant for my education," Gottschalk says, "because it's vital to have that hands-on experience."

Gottschalk worked at Lennox during the fall semester of 2003 and then returned to campus for spring classes. She was right back at Lennox afterward, spending the next nine months finishing her cooperative employment obligations. With 12 to 15 credits this summer plus a full load of classes next fall, Gottschalk will graduate in December.

Gottschalk is already noticing how much the co-op has raised her stock as a potential employee. Reaction to her resume at the Career Fair this year was much different than last year, with recruiters telling her that twelve months of solid work experience puts her well ahead of most of her peers seeking jobs after graduation.

Serving in a materials management/inventory control position at Lennox meant Gottschalk was responsible for ensuring that hundreds of parts were being sent to the correct locations in the plant. She was also involved with numerous continuous-improvement projects. "Lennox gave me a lot of responsibility, which was challenging, but in a good way," Gottschalk says. "I didn't necessarily have experience with some of the things that I was responsible for, so I had to work at figuring out how to handle those situations. That taught me a lot."

"This was significant for my education because it's vital to have that hands-on experience."

—Morgan Gottschalk

USP Conference

In conjunction with Noaber Foundation and BeehiveFund, the IMSE department has scheduled the University Synergy Program International Conference (USP 2005) for September 20–23 at the Hotel at Gateway Center in Ames. This year's theme is The Web-Enabled Enterprise; Tools and Techniques for Leveraging the Internet in Today's Economy.

Raj Nathan, senior vice president and general manager of Sybase, Inc., Dublin, California, and **Jan Baan**, CEO of Cordys in the Netherlands, will speak at this year's conference. Nathan leads the technology research for Sybase, while Baan launched his Web services company in 2004 to create enterprise-class composite application frameworks.

This year's sponsors, the Noaber Foundation (noaber.com) and BeehiveFund (beehivefund.org) are committed to providing support for creating and dispersing knowledge and for collaborative high-tech opportunities. The USP Conference Web site is www.ucs.iastate.edu/usp.

Distinguished lecture series

continued from page 1

Hendrickson's presentation was an overview of research at Carnegie Mellon and included a presentation on power tool product takeback and redesign. He also introduced an economic input-output life cycle assessment software tool at the seminar.

Jane Ammons, associate dean of engineering for faculty affairs at Georgia Tech, spoke about sustainable engineering at Iowa State last November as part of the series.

Ammons' discourse revolved around reverse production systems that support the recovery, processing, and resale of materials and subcomponents when a product's life cycle ends. The design of such systems, she said, is crucial for sustainability. Ammons, who has a PhD from Georgia Tech, also noted that more than 350,000 people work in recycling and remanufacturing worldwide, generating revenues of around \$53 billion each year.

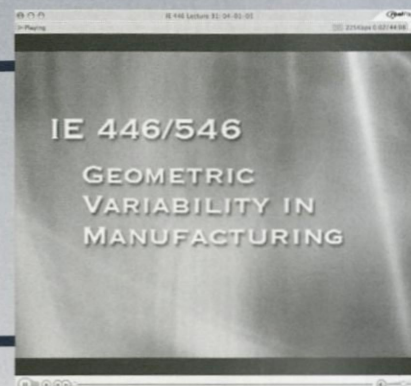
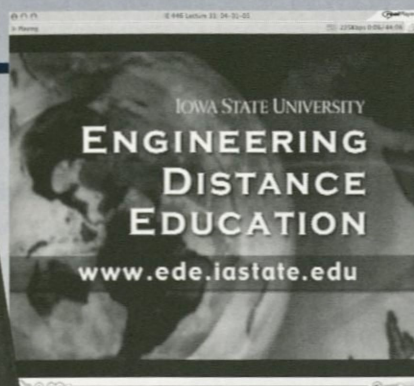


Student organization wins gold

Iowa State's chapter of the Institute of Industrial Engineers (IIE) has won a gold award in the Chapter Recognition Program for its improvement and progress in membership, as well as participation in meetings and outreach.

According to **Frank Peters**, faculty advisor and associate professor in IMSE, chapter membership increased from 46 to 82 in 2004.

To improve outreach, members started a tutoring program with the Ames Middle School in 2004, attending after-school study sessions every Tuesday and Thursday. The chapter also increased the number and broadened the scope of their meetings, inviting company representatives from the area to give presentations. In addition, the group was involved in more industry events to promote interaction between students and professionals working in the field of industrial engineering.



Distance education

Getting to class has never been easier—at least for students in Iowa State's engineering distance education program. Since all it takes is an Internet connection with the ability to view streaming video or a computer with a CD-ROM and RealPlayer, distance education students can go to class at almost any time from almost anywhere.

IMSE offers about 25 classes each year through distance education with nearly 200 students enrolled annually. The College of Engineering offers more than 80 courses, most of them graduate level, with almost 800 students involved in the program. Sixty percent of those students are from other states and countries and have included soldiers stationed in Korea and Saudi Arabia, as well as people from the United Kingdom. Most of the others are working for Iowa companies and completing an advanced degree.

Many students taking advantage of distance education have already earned undergraduate degrees and been in the workforce for several years. What they've learned, however, is that in order to advance in their careers, a master's degree is necessary. But, since dropping out of the working world and enrolling in school full time is not an option for many, this program provides a much-needed alternative, giving off-campus students the ability to study at their own pace and view lectures on their own schedule.

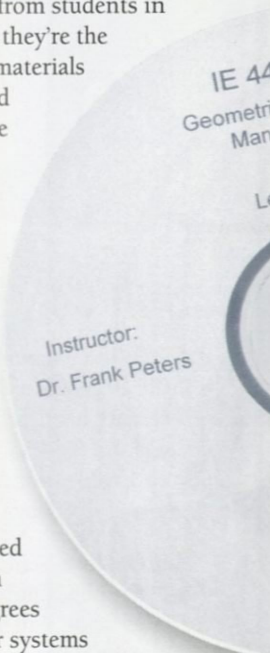
"It's flexible and convenient," notes **Pam Shill**, engineering distance education's administrative specialist. "Students can access lectures at two o'clock in the morning if they want."

Shill adds that watching a class live and interacting in real time with instant messaging is possible but seldom

happens, since most students are working when class is in session.

Associate Professor **Frank Peters** was somewhat apprehensive about teaching this way at first, but now he prefers distance education classes. He's been especially pleased with the interaction from students and how much they give back to the class. Peters says he's continually learning from students in the program because they're the ones using the class materials at work every day and often furnish valuable insight. Distance education, he says, also provides instructors more ways to present material. "I have the smart board, the white board, and overhead cameras to show examples in greater detail," Peters offers.

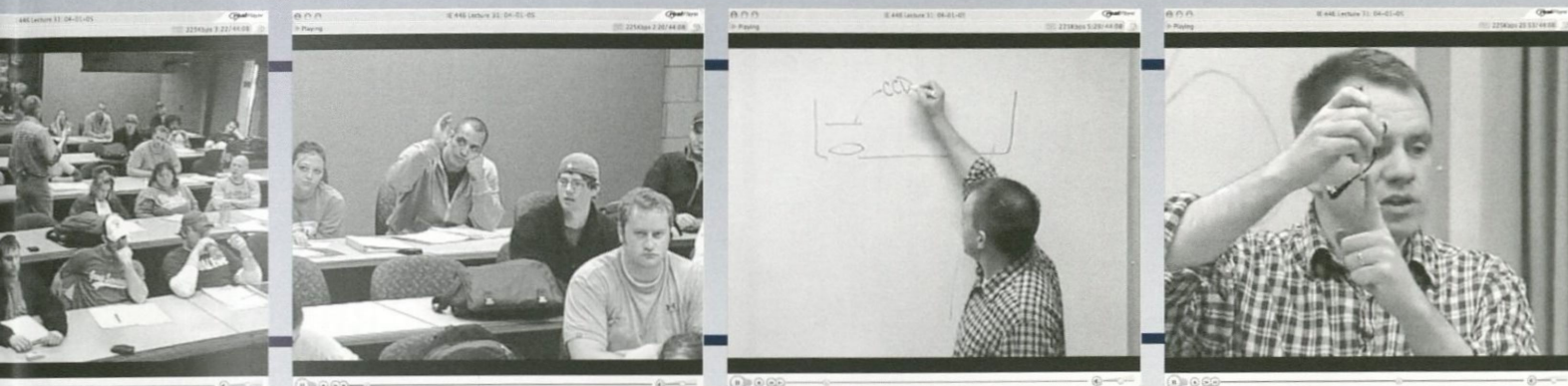
IMSE students enrolled in distance education can earn master's degrees in either industrial or systems engineering. Each program requires thirty credit hours for completion, and students are typically allowed to transfer up to six hours of non-Iowa State graduate credit into their degree program. A thesis option is available, but most off-campus students choose the non-thesis route.



RS 11/10/12
IMSE

Newsletter

2006-2007



gaining popularity

Each student has the ability to design a program that best fits his or her needs, with a typical schedule consisting of one class per semester, allowing a student to complete the master's program in five years. The only time distance education students are required to be on campus is to complete the final oral exam at the end of the graduate program.

Since distance education courses use the same standards as on-campus courses, students are assured of receiving the highest academic quality. The degree earned through distance education is just as valuable as the on-campus

degree, Shill stresses, adding that academic integrity is paramount, considering students in the program don't have someone watching over them as in

a classroom setting. There haven't been any problems, though, because the off-campus students tend to be more focused. "This requires more self-discipline," says **Jo Min**, an associate professor in IMSE.

Sigurdur Olafsson, another IMSE associate professor, agrees with Min. "In my experience, these students have been very motivated," Olafsson says. "It seems like when you have more work to do in less time, you are more organized, and I think that's the case with the off-campus students."

Students in the program are required to select a proctor to oversee the testing process, another way to ensure integrity. Most of the time, Shill says, companies support professional development, so a human resources department employee offers to serve in that role. "What we do," she explains, "is send a test to the proctor, and the proctor will give the exam according to our directions, then send the test back to us." It's a process that has worked with very few problems.

Regardless of their location, all students pay in-state tuition. Students are, however, assessed a delivery fee, which runs \$180 per credit for the on-line video stream or \$250 per credit for lectures on CD. "It does cost a little bit more," Shill says, "but for the convenience, it's well worth it."

The program isn't just for those who are looking for a master's degree, either. Graduate certificates are available in several disciplines, including systems engineering, an area in which IMSE plays an important role. "Some of our students are professionals who want to get more information on a topic because they're applying it directly to their career," Shill explains, "or they just want to brush up on a topic that we offer."

For more information about a master's degree in industrial engineering or systems engineering through distance education, visit www.ede.iastate.edu/ or contact John Jackman at jkj@iastate.edu.



Even on-campus students reap benefits of distance education

It's not just off-campus students reaping the benefits of engineering distance education. IMSE Associate Professor **Frank Peters**, who teaches distance education classes, is surprised at the number of on-campus students who review lectures later.

"They go to class, but they still go back and look at the lecture online to catch something they missed or to review something," Peters says.

Because overhead cameras are used, he adds, students can see examples at different angles and up close, which isn't possible in a classroom setting. And since every lecture is available on the Iowa State server until a semester ends, students can review them at their convenience.

According to Peters, the video stream can also be a tremendous help for students who have a legitimate reason to miss class. Last semester, he notes, a student absent for medical reasons watched several lectures online and performed well when he returned for a test.



Alumni Days

In above photo (left to right) Bob Day, GenEng'49 (Clive, IA); Don Bice, GenEng'49 (Wayzata, MN); Matt Frank, assistant professor, IMSE; Dick Bauerle, GenEng'53 (Ottumwa, IA); and Jim Jacobson, GenEng'54 (Athens, GA) pose for a picture in the rapid manufacturing and prototyping laboratory during last year's Alumni Days celebration. Alumni Days this year will be held May 19-20.

Industrial Assessment Center great learning tool for IMSE students

Iowa State's Industrial Assessment Center helps IMSE students get unbeatable hands-on experience. At the same time, qualified small- and medium-sized manufacturers in Iowa looking to implement energy conservation and efficiency measures into their operations receive no-cost assessments of their plants, often leading to significant cost savings.

Funded by the U.S. Department of Energy, the program uses teams of graduate and undergraduate students from different engineering disciplines to collect data and study plant operations. Teams—usually made up of one faculty member, one or two graduate students, and four undergraduate students—spend an entire day touring a facility with a designated guide who answers questions and explains the plant's activities and procedures. After collecting and analyzing data, the teams make recommendations to companies that will help enhance productivity, while reducing the amount of energy the company uses and the waste it produces.

The assessments are a great learning tool, says IMSE Associate Professor **Frank Peters**, who is in his first year spearheading the group. "It helps us prepare engineers who are energy

aware," he says, "so when they're making process changes or equipment decisions down the line, they'll be aware of energy concerns as well."

Iowa State started the program in 1991 and since then has worked with more than 350 manufacturers throughout Iowa, using 120 students in the process. Teams have been introduced to a wide range of industries, including food processing, textiles, lumber, and printing.

"Being exposed to so many different manufacturing systems has been a great experience for the students," Peters says.

This year's IMSE group—**Kelsey Hedge, Eric Kamm, JoHannah 'Johnny' Tripp-Rieks,** and **Justin Walker**—will undertake about 25 assessments.

Combining engineering with an MBA

Beginning next fall, the College of Engineering and College of Business at Iowa State are teaming up to offer a new degree program that will give students the option of earning a BS in engineering and an MBA at the same time.

The combined program will reduce by one year the time normally required to earn both degrees. Students will take a slightly accelerated program through the first six semesters to complete general education requirements. Over the final four semesters, engineering requirements will be integrated with MBA courses.

Dave Sly holds a PhD in industrial engineering as well as an MBA and believes in the program. Sly, who teaches classes in both colleges, feels that engineering students seeking positions in management must have a solid business foundation.

"The MBA is an important degree to have," Sly says, "because it's imperative to understand the business aspects of technology. In today's environment, a lot of decisions made about technology are business related."

The program is open to students majoring in computer, electrical, or industrial engineering. Students entering the program must have strong academic records and meet the other requirements for admission into Iowa State's MBA program.

For more information, call Devna Popejoy-Sheriff at 515 294-1603 or send an e-mail to devna@iastate.edu.

100th Birthday Celebration

Jean Hempstead, who taught at Iowa State in the 1930s and 40s, then again from 1961 to 1973, celebrated his 100th birthday on August 6, 2004. Hempstead (far right), who lives in Ames, was named mayor for the day on his birthday.



IMSE Scholarship Recipients

Central Iowa Chapter of IIE	Justena Lillard
College of Engineering	Darren Bolger Kristin Fitzsimmons Jennifer Gumm Lindsay Johnson Justena Lillard Paula Madgett Matthew Marek Joseph Petrzalka Bret Plocher Abby Siemek Beth Takemoto Katelyn Verhoef
David C. Lovell Presidential	Natalie Schlesselman
David C. Moll Scholarship In Engineering	Tasha Brown
Deere Foundation	Spencer Geisler
Don Grant Incentive	Carissa Overstreet
Dorothy Avery Clark & Maurice R. Clark	Michael Rickers
Engineer's Week	Brian Adrianse Breeann Force Jay Messerly Brenden Root Stephanie Stall JoHannah Tripp-Rieks Maryellen Upton Michael Youngblut
George W. Catt	Carolyn Worth
Geraldine M. Montag Scholar	Theresa Kelly Thomas Miller
Guy Morrison	Gentrie Gallagher
Harry Oakley Price	Carolyn Worth
Hempstead-Walkup	Deanna Ralston Justin Walker
IMSE General	Gentrie Gallagher
John Deere Foundation for Women In Engineering	Kelsey Hedge
Keith L. & Helen F. McRoberts Health Care	Bradley Jensen
Kenneth R. Nimmo Memorial	Marie Rohwer
Marion & Andrew Pontius	Jacob Oakland
Pella Corporation/SWE	Stephanie Smith
Rockwell Women's	Abby Siemek
Roderick Seward, Flossie Ratcliffe & Helen M. Galloway	Sarah Campbell Megan Law Stephan Zalesky
Stanley Howe/Pella Corporation	Morgan Gottschalk
Walt Lyons Memorial	Jennifer Shadle
Webster Manufacturing	Ryan Wede

Recent IMSE honors and awards

Senior ERD Machinist **Kevin Brownfield** was recognized for 25 years of service at Iowa State.

Matt Frank received the Best Paper Award: Institute of Industrial Engineers, IE Research Conference Paper, Manufacturing and Design Division.

Matt Frank and **Frank Peters** were recognized at the annual Student Scholars and Leaders Recognition Ceremony for helping IE students obtain outstanding leadership and scholarship accomplishments.

Frank Peters was named Engineers Week Outstanding Professor 2004.

Jo Min and **Doug Gemmill** received Engineering Student Council Leadership Awards for faculty.

Patrick Patterson was elected regional vice president of the Institute of Industrial Engineers.

Sarah Ryan is president-elect of the Operations Research Division of the Institute of Industrial Engineers.

Steve Vardeman, statistics and IMSE professor, was awarded the title of University Professor. Vardeman has had a broad impact on campus through teaching and service.



Industrial Engineering Design Award Winners

Fall 2004 winners (above left): Justin Gilroy, Meagan McCullough, Monica Kroh

Spring 2004 winners (above right): Yusuf Putra, Molly McNertney, Phil Hummel

Teaching Excellence



IMSE Lecturer **Leslie Potter** presents graduate student **Mario Lukito** (right) with the Iowa State University Teaching Excellence Award. Lukito was cited for his exceptional teaching and mentoring skills.



Gokcer "Mike" Daricilar (right) earned the Teaching Excellence Award in April for greatly exceeding the department's expectations. Assistant Professor **Matt Frank** presented the award.

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