



IN THIS ISSUE

SARAH RYAN NAMED 2013 IIE
FELLOW

PAGE 7

MIRAGE LAB MIXES REAL
AND VIRTUAL TO CREATE NEW
RESEARCH OPPORTUNITIES

PAGE 8

THREE IE ALUMNI TAKE
SEPARATE PATHS, FIND
THEMSELVES TOGETHER
IN HUMAN RESOURCES

PAGE 10



IMSE faculty and staff met in August 2013 for a retreat at Iowa State's Reiman Gardens.

Front row (Left to right): Jo Min, Krista Briley, Iris Rivero, Guiping Hu, Lori Bushore, Donna Cerka, Holly Twedt, Alex Rausch, Lizhi Wang. Second row: Rick Stone, Janis Terpenny, Dave Sly, Sigi Olafsson, Jeff Eichorn, Devna Popejoy-Sheriff, Angela Stone, Stephen Vardeman. Third row: Leslie Potter, Doug Gemmill, Kelsey Smyth, Sarah Ryan, Michael Dorneich, Stephen Gilbert, John Jackman, Carolyn Heising, Kevin Brownfield. Fourth row: Matt Frank, Mike Renze, Frank Peters, Paul Componation, Max Morris.

Greetings from IMSE!

Dear IMSE Alumni, Friends and Colleagues –

It is my privilege, indeed my honor, to send greetings and introductions to a newsletter filled with points of pride from this past year.

We continue to grow and flourish on many fronts. Our undergraduate students (now 478!) continue to succeed and be in high demand. Student chapters of IIE and Alpha Pi Mu are very active; indeed, IIE won the Gold Medal Award from the IIE headquarters, the highest honor bestowed to a student chapter. Our graduate programs continue to grow as well, with 69 enrolled in the IE graduate program (MS and Ph.D.), 75 enrolled in the Systems Engineering masters degree program, 5 students now enrolled in our new Engineering Management masters program, 12 students enrolled in the Systems Engineering Certificate Program, and 25 enrolled in the Dual Degree (Executive Masters Program).

We will be welcoming a new faculty member, Caroline Krejci with degrees from Purdue and University of Washington, to the department in January of 2014. With her addition, we will be 22 faculty and 11 staff strong. Our research productivity continues to grow exponentially as well, more than doubling in the last year and a half.

Inside this edition, you will learn about the awards and honors bestowed to faculty, staff, students, student groups, and alumni. For instance, in addition to the IIE student chapter award, Rick Stone won one of the university's highest teaching awards this year, Sarah Ryan was named a fellow of IIE, Devna Popejoy-Sheriff was named College of Engineering's Advisor of the Year, and alumni and NASA engineer Lee Graham credits his diverse skills to his education at Iowa State. You will also read highlights on research pursuits of some of our newest hires, about the Undergraduate Research Assistant program we have implemented, and how the NSF Center for e-Design has expanded and flourished in the last year.

We would be delighted to keep in touch with you and share your successes and news on our web site www.imse.iastate.edu

For those interested in exploring opportunities to give back or to collaborate, please let us know! It would be our delight to work with you.

All the best,

Janis Terpenny
Joseph Walkup Professor and Department Chair

On the cover

Assistant Professor **Rick Stone** discusses human factors and ergonomics research with IE graduate students *Elisee McLaurin, Brandon Moeller, and Peihan Zhong.*

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Evaluating how information is perceived in automated systems

As automated systems are evolving, they are becoming more capable of making substantial decisions. **Michael Dorneich** says allowing the systems to have more responsibility and authority can improve safety and performance because actions are tailored to the particulars of a current situation.

Because of that enormous potential, Dorneich, associate professor of industrial and manufacturing systems engineering, studies how these sophisticated systems and humans interact and how that relationship affects human performance.

"I look at what we call adaptive systems," he says. "With the ability to assess their own situation and take initiative, these systems can do a lot of good in routine circumstances."

But the systems have some major features to address. Dorneich explains that while humans are much better at situational awareness than automated systems, there are times when operators are inundated with so much data that they might not be able to make the best decisions.

"Information automation—a relatively new field that in theory delivers the information an operator would need to know given a certain situation—is adding a new dimension to human factors engineering," he says. "We have to figure out how to study and measure things that are a bit more complex. For instance, we might have to determine how compelling a system is—does the way it looks or shares information foster too much trust?"

Add to that the possibility that these systems may have capabilities that a person might not realize, and Dorneich has an interesting research opportunity on his hands.

He's exploring information automation with the Federal Aviation Administration project "Characterization of Flight Deck Information Automation Issues."

The project will look at different platforms that are saturated with data and information. He will help the FAA develop an understanding of information automation systems and determine what major issues operators could possibly experience.

"Anything in avionics has to be certified very vigorously, but there are other technologies, like flight bags and laptops that also contain information that pilots use," Dorneich says. "With so many new systems that have different levels of reliability and accuracy, the FAA needs to know the right questions to ask when evaluating a new technology for certification."

He's hoping to help develop a negotiated set of metrics that will help the FAA find a means of compliance for new technologies and a way to measure it.

The work requires an understanding of trust—both the risks of over-trust and becoming complacent as well as under-trust and not fully utilizing a technology—and the workload demands that information automation can place on humans.

"We have to look at the impact of automating all the easy, routine tasks and ask ourselves if humans will be able to manage the complex tasks that remain," Dorneich says, adding that automation can sometimes make things more complicated.

"When you are dealing with automated systems, operators might not be fully aware of what the system is doing, and a lot of times that work is being done silently, behind the scenes. If the automation reaches its limit and kicks control back to the operator, the person might not have enough understanding of the situation to immediately recover."

Dorneich will be doing evaluations of information automation this year and is thinking about building a flight simulator for teaching and research in collaboration with the Department of Aerospace Engineering to provide somewhere to further assess his work.

Long term, he wants to take his ideas from theoretical to practical, with the idea that once characterizing and measuring awareness to different types of automation is possible, designers can work these ideas into product development.

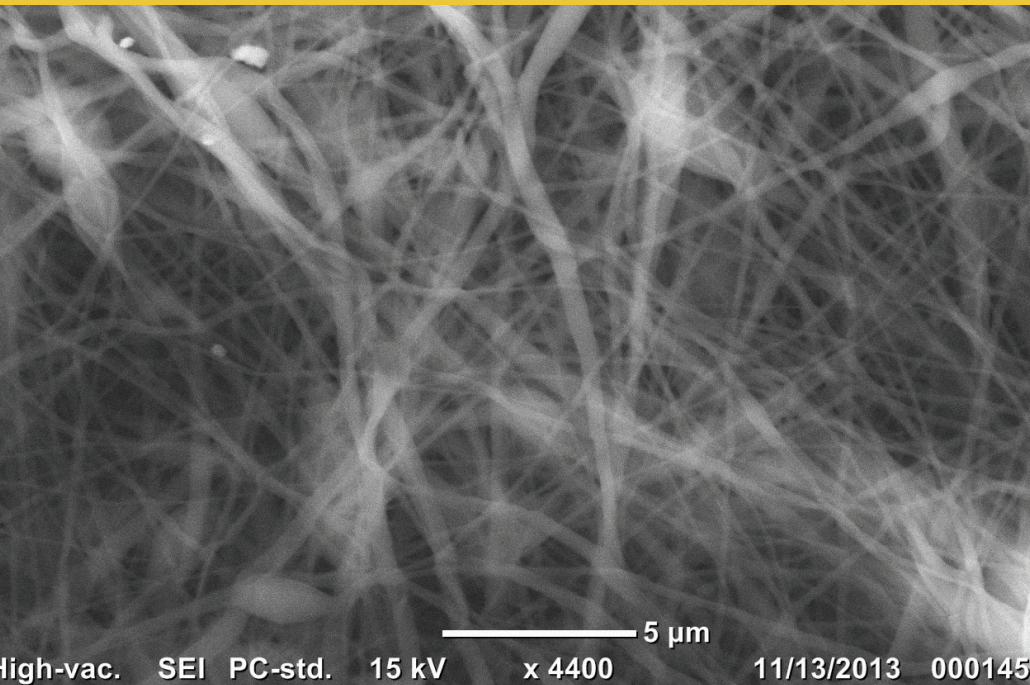
The insight from this type of research could also make products safer by implementing mechanisms that prevent a miscommunication between systems and humans that could cause an accident.

"What we're really trying to do is create automation for computer systems or similar technologies that are tailored to individual needs based on a situation rather than designing something that will fit everyone at all times," he explains. "We want information to be tailored, reactive, and adaptive to increase efficiency and safety. To get there, we need to understand the human factors involved."



Dorneich

Contributed by ECR



A test sample of polymer that Slagle electrospun during her URA experience.

Undergrads gain invaluable research experience through URA program

The IMSE Undergraduate Student Research Assistantship Program offers undergraduate students the opportunity to work directly for and with faculty on current research projects. In Fall 2013, there were 14 students who participated as URAs. Because the faculty have very diverse research interests, students have the chance to gain research experience in a variety of areas of interest.

Iris Rivero led one of the projects during the Fall 2013 semester. **Melissa Slagle**, senior in industrial engineering, worked with Dr. Rivero to study the advances that have been made in the development and commercialization of medical devices for the delivery of local chemotherapy treatment.

Slagle investigated the identification of the types of cancer that are most suitable for these types of devices, available treatment alternatives (local or systemic), determination of their advantages and disadvantages, and manufacturing processes that are used for their fabrication. Based on these findings, a pilot study was designed for the development of prototype medical devices for non-invasive chemotherapy treatment, where manufacturing processes will be identified leading to the fabrication of devices with repeatable characteristics.



Slagle electrospinning in Iris Rivero's iMED lab.

During her time in the lab, Slagle concentrated on getting parameters to carry over into the next step of her research involving silk as a polymer base for an alternative drug delivery system.

Additional examples of URA projects

Paul Compton

This project investigated data from a survey tool that evaluates lean implementations from the employee perspective, to see what parts are working well and what parts need improvement.

Michael Dorneich

This project explored and quantified human factors issues related to the characteristics of information automation (IA) systems on flight decks.

Frank Peters

The goal of this project was to develop a method for recycling rare earth materials from discarded magnets for use in strengthening magnesium alloys.

Sarah Ryan

This project focused on improving the day-ahead scheduling of electric power generating units by accounting for the uncertainty and variability of wind power, as well as demand and generating unit reliability.

Rick Stone

This project provided an opportunity for undergraduates to participate in the testing, design and evaluation of medical technologies used in standard hospital tasks. Another opportunity for undergraduates was to participate in a project that focused on training in the domain of welding through the use of cutting edge Virtual Reality Technologies.

Janis Terpenney

This project focused on understanding and dealing with complexity in products and systems. It built on prior work that looked at product structure and the use of product families and platforms as a means to reduce complexity throughout the design, manufacture and service life of a product.

Stephen Vardeman

The goal of this project was to gain familiarity with the handling of large data sets and their processing for "business analytics" purposes.

Outstanding IE seniors honored with nomination for student marshal

Spring 2013: Jennifer Carda

Enhancing her degree in industrial engineering, Jennifer Carda, of Littleton, Colo., spent countless hours serving both the community and campus as a student. Through her membership in Kappa Alpha Theta, she volunteered at events supporting Court Appointed Special Advocates (CASA), and for blood drives, Veishea's Service Day, and the Engineering Career Fair. Carda was involved in the educational process of her fellow students, working as a peer mentor for the Industrial Engineers are Leaders (IDEAL) freshman learning community and as an undergraduate teaching assistant for IMSE classes. She was also a member of the Alpha Pi Mu Industrial Engineering Honor Society. After graduation, Carda will work as an associate supply chain quality engineer for Ball Aerospace and Technologies Corp. in Boulder, Colo.



Carda

Fall 2013: Melissa Slagle

Building a strong portfolio of professional experience, Melissa Slagle, of Plymouth, Minn., completed four internships with HON Company, Lennox Industries, Hallmark Cards, and Campbell Soup Company, and she will spend the upcoming summer interning with Pepsi-Quaker. Slagle will earn a degree in industrial engineering with an emphasis in manufacturing and ergonomics and a minor in sales engineering. She has received the Campbell Soup Company "You Make a Difference" Award, Alpha Sigma Kappa Women in Technical Studies National Sister of the Year award and ISU Scholarship for Competitive Excellence (ACE). In addition to being a leader in student organizations like Alpha Pi Mu Industrial Engineering Honor Society, she volunteered for community organizations like the Girl Scouts, Misericordia and Horizon House. Slagle was also a blogger for the university's Cyclone Life blog and was an undergraduate research assistant in the iMED Lab. After graduation, she will be pursuing a master's degree in industrial engineering at Iowa State to learn more about advanced manufacturing, ergonomics and food science.



Slagle

Contributed by ECR

Undergraduate student honors and awards

IE seniors join Cardinal Key Honor Society

Three industrial engineering seniors, **Michael Hoefer**, **Ben Jacobson**, and **Thomas McGee**, were three of fifteen students from the College of Engineering who became members of Iowa State's Cardinal Key honor society in 2013. The society is an organization established in 1926 to recognize students, faculty, and staff at the university for their outstanding leadership, service contributions, scholarship achievements, and character.

ISU student chapter for IIE wins Gold Award

IMSE's student chapter of the Institute of Industrial Engineers (IIE) received the 2013 Gold Award for chapter excellence. The Gold Award is the highest student chapter award given by IIE recognizing chapter improvements, progress, and overall achievements. The ISU chapter is one of 64 school chapters receiving the distinction this year.

The ISU IIE student chapter has 237 current members and gives students the chance to network with individuals in the field of industrial engineering through activities and seminars. Founded in 1948, IIE is the premier society dedicated to serving the professional needs of industrial engineers and all individuals involved in improving quality and productivity.



Learning Community Dinner

IMSE faculty, staff and first-year students gathered together in Howe Hall to eat dinner, talk, and participate in a fun "pizza-making" activity where they worked together to find the most efficient process of making pizza boxes.



Systems engineering student invited to present paper at national conference

While studying systems engineering through Engineering Online Learning, Carl Kirpes knew an opportunity to apply his coursework onsite at his job might crop up from time to time.



Kirpes

What he didn't know was that it would earn him third place in the Society for Engineering and Management Systems Student Paper Competition and a chance to present his research at the Institute of Industrial Engineers (IIE) Annual Conference & Expo 2013.

Kirpes (BSME'12, BSIMSE'12) is working on his master's degree

while also serving as the vice president of operations for GENESYS Systems Integrator, a company that specializes in engineering, design-build, and construction.

His paper "Systems engineering application in an engineering design-build firm," looks at the inner-workings of GENESYS from a systematic approach, identifying how departments interact, the boundaries between the units, and the process flow throughout the organization.

"Since the paper was written, we have been using systems engineering approaches to implement processes at GENESYS that allow us to identify the risk relative to the reward on a job, and we developed a system to show how a job will affect the load on resources across departments," Kirpes said.

He adds that the company has also transformed its structure to be more project-staff oriented to help facilitate the different levels of work that occur at the company.

Located in Kansas City, Missouri, Kirpes says being able to study via distance education has been a great way to keep learning and advancing his career.

"Iowa State has added a lot of value to my professional development, and I'm glad I can continue that process through the online learning program," he said. "Taking the knowledge I am gaining and applying it in real-time every single day has been rewarding and beneficial."

Contributed by ECR

Update: National Science Foundation Center for e-Design

The Center for e-Design has had a busy year – they welcomed five new industry and government members, a new academic partner institution, and a new Industrial Advisory Board Chair. The Center saw many successes, awards, and process and marketing improvements, including a redesigned e-Design logo and website. Additionally, construction began on the much anticipated e-Design space in Howe Hall, which will be a collaboration hub for researchers, students, and industry members.

This coming year promises to be an exciting one for the Center with added growth, high impact projects, rising student talent, and more. The Center will welcome a managing director who will work to refine strategic plans, provide direction on large competitive projects, and initiate collaborations that will further increase the value of the Center's research and partnerships.



The Center for e-Design is a National Science Foundation Industry/University Cooperative Research Center. Iowa State University is the lead institution of the multi-university center. Janis Terpenny is the Center Director. For additional information of the Center for e-Design, visit centerforedesign.org.

Graduate student honors

The ISU Graduate college honors PhD students for research and teaching excellence, recognizing the "best of the best" graduating students who have submitted theses and dissertations and outstanding achievement in instruction. Below are the nominees for Spring and Summer 2013.



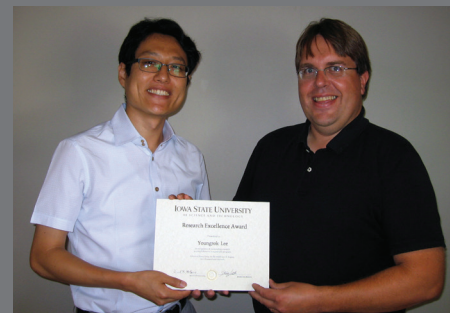
Brandon Moeller

*PhD student for Rick Stone
Spring 2013 Research Excellence
Spring 2013 Teaching Excellence*



Wenbo Shi

*PhD student for Jo Min
Summer 2013 Research Excellence
Summer 2013 Teaching Excellence*



Youngrok Lee

*PhD student for Siggie Olafsson
Summer 2013 Research Excellence*

Sarah Ryan named 2013 IIE Fellow

Sarah Ryan, professor of industrial and manufacturing systems engineering, was recognized as an Institute of Industrial Engineers Fellow at the annual conference, which took place May 18-22 in Puerto Rico this year.

The IIE names up to 20 fellows each year, requiring that their contributions to industrial engineering be recognized on a national scale. Ryan was one of only nine fellows named this year. "It makes you feel good that people appreciate your efforts," she said.

Janis Terpenney, Joseph Walkup Professor and chair of industrial and manufacturing systems engineering, nominated Ryan for the fellowship.

"Being chosen as a Fellow is a sense of recognition by the broader community that the things I've been working on are important and that I've been able to make a contribution," Ryan said.

Ryan has been a member of the IIE for about 25 years, spending time on various committees, boards and local chapters. She was also the director of the Operations Research Division, which is one of the technical divisions of the institute.

As an IIE Fellow, Ryan said her role won't change much because the title doesn't come with formal responsibilities. She will, however, have more of a leadership role in advising the institute in direction and priorities alongside other fellows.



IIE Immediate Past President Douglas R. Rabeneck (left) and IIE President-Elect Dennis Oates presented the IIE Fellow award to Dr. Ryan at the annual IIE conference May 18-22.

Ryan's research deals with energy systems and optimization with uncertainty. Looking at long-term planning, she studies which kinds of capacity to invest in for energy generation, while short-term planning involves day-ahead scheduling of generating units.

"There are always uncertainties associated with demand because a lot of it depends on the weather," Ryan explained.

Wind energy is one of the key elements of Ryan's research. "There is also a lot of uncertainty—especially in Iowa—associated with wind power," she added.

While she's been working with long-term planning off and on for the majority of her career, Ryan only officially began the short-term scheduling project about a year ago, after proposing it a year before that.

She became interested in her line of study during her first job at the University of Pittsburgh after she completed graduate school. She said the area has become even more interesting because of the environmental implications and changes in energy systems.

Research is a large part of Ryan's work, so she spends a lot of time with Ph.D. students, which she feels is part of one of her greatest achievements.

"I think, recently, my biggest accomplishment has been guiding graduate students," she said, "because it is developing individuals to help them learn how to do research and prepare them for professional careers."

Contributed by ECR

Potter receives Presidential Initiative for Interdisciplinary Research award

Leslie Potter, senior lecturer in industrial and manufacturing systems engineering, is part of a project that received an award from the Presidential Initiative for Interdisciplinary Research program created by President Steven Leath.

The project, called "The Language of Writing in STEM Disciplines," was awarded a proof-of-concept grant for up to \$100,000 for one year. Carol A. Chapelle from applied linguistics is the principal investigator on the project. The vision is to create a national center of scholarship for the study of language in academic and professional writing in

science, technology, engineering and mathematics (STEM) disciplines. The center will conduct research on linguistic practices in STEM disciplines, to improve pedagogy of writing in STEM disciplines, and to develop and apply computational methods for analysis and assessment of discipline-specific writing.

The Presidential Initiative for Interdisciplinary Research program was created to support research efforts with the possibility of leading to major advances, discoveries and technologies.



MIRAGE lab is working on a project designed to test whether military training that mixes physical and virtual objects could be more flexible and effective than building a training facility that resembles a few city blocks of Afghanistan. Photo courtesy of the MIRAGE lab.

MIRAGE lab mixes real and virtual to create new research opportunities

Two armed soldiers stand behind a barrier, guarding a checkpoint in the road, watching for trouble.

A white truck turns toward them.

“See what he wants, guys,” says one of the guards.

“Sir, we have a military-aged male jumping out of the truck. He’s going behind that van.”

“Is he armed?”

“No visuals, sir.”

And so goes another training session in MIRAGE, an Iowa State University lab that mixes elements from virtual and real worlds to create unique training and research opportunities. MIRAGE (Mixed Reality Adaptive Generalizable Environment) has been used by researchers since 2010. It’s part of Iowa State’s Virtual Reality Applications Center (VRAC).

The MIRAGE research team is led by **Stephen Gilbert**, associate director of VRAC and assistant professor of industrial and manufacturing systems engineering; Eliot Winer, associate director of VRAC and associate professor of mechanical engineering; and James Oliver, director of VRAC and University Professor of mechanical engineering. All three are also faculty in the human computer interaction graduate program.

The MIRAGE lab’s original project was a study for the U.S. Army Research Laboratory called “Veldt.” Gilbert said the project was designed to test whether military training that mixes physical and virtual objects could be more flexible and effective than, say, building a training facility that resembles a few city blocks of Afghanistan.

“We built MIRAGE as an ideal research lab for mixed reality,” Gilbert said. “It balances the real world with the technology we use in virtual reality.”

The lab’s technology includes:

- a 33-foot by 11-foot screen with six projectors capable of producing 3-D images
- 50-inch television screens that show 3-D images throughout the lab
- 24 infrared optical tracking devices mounted in the ceiling
- a surround-sound audio system
- a control center loaded with computing power, graphics card technology and the capability of connecting with other virtual reality labs
- walls, barriers and other props that can be moved around to create rooms, buildings, alleys or even a war zone checkpoint

“In this lab, we’re very good at integrating hardware from multiple systems and multiple vendors and tying it all together in novel ways,” Winer said.

In the checkpoint scenario, for example, armed guards are stationed behind barriers. The projectors show images of a road with parked cars and moving traffic. And then there’s the unidentified military-aged man jumping out of his truck and hiding behind a van.

The guards crouch behind their barrier and aim their rifles in case there’s trouble.

“It’s engaging your whole body,” Gilbert said. “It’s much more visceral.”

All movements by the soldiers-in-training – even virtual bullets from the fake rifles – are tracked to within a millimeter.

“Now we can go back and collect all this data and say, ‘The reason you made that mistake and got ‘killed’ that time was because you were looking in the wrong direction when this happened,” Oliver said in a video about the Veldt project. “We have a wealth of information we can mine to tune those training scenarios specifically to help.”

While it was originally built to study military training, MIRAGE can also help researchers with many different projects.

Jonathan Kelly, an Iowa State assistant professor of psychology and faculty member in human computer interaction, is using the MIRAGE lab to study how large-scale 3-D imaging can be improved so multiple users can experience the same virtual environment.

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Current technology can produce a good experience for a lead user, but others nearby see stretched, compressed or otherwise distorted images. A building, for example, might look like a parallelogram instead of a rectangle.

Kelly – who studies spatial cognition, or how the brain comprehends distances and navigates from place to place – said his research group will develop and test software solutions to the problem. Researchers have already experimented with software that calculates the average location of every person in a virtual 3-D environment, giving everybody a less distorted view.

Earlier studies have indicated the brain can somehow reduce some of the image distortions. Kelly wants to learn more about the brain's ability to adjust how images are perceived.

Without the MIRAGE lab, "this research would be impossible, really," Kelly said. That's because most other virtual reality labs are much smaller, only allowing viewers to separate by a few feet. In MIRAGE, viewers can be separated by 20 to 30 feet.

Thanks to the lab, "we're just starting to scratch the surface of these studies," Kelly said.

Gilbert is working with other researchers who are considering the MIRAGE lab for studies of violence mediation, promotion of physical fitness and the training of emergency responders. The lab has even been home to VRAC's annual Halloween haunted house organized by students.

Gilbert said part of the lab's effectiveness is the ability to use props and technology to create all kinds of environments. In many ways, it's the same kind of stagecraft that goes into creating a play or movie.

"This lab," he said, "gives you the immersive experience of the real world but the flexibility of a video game."

Contributed by News Service

Faculty and staff honors and awards

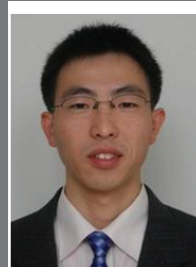


Bushore



Jackman

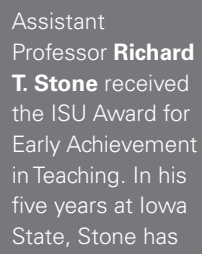
The 25 Year Club honors the loyal service of ISU faculty and staff. **Lori Bushore**, graduate student services, and **John Jackman**, associate professor, became members in 2013 after serving the university for 25 years.



Wang

Lizhi Wang

was promoted to associate professor with tenure.



Stone

Assistant Professor **Richard T. Stone** received the ISU Award for Early Achievement in Teaching. In his five years at Iowa State, Stone has set a high bar. As a colleague wrote: "He is one of the most energetic and enthusiastic teachers you will ever observe. He has developed many interesting approaches to teaching, such as using Mr. Potato Head to demonstrate industrial engineering concepts." Stone does not limit his teaching impact to Iowa State, as he works with middle and high school students as well as Native American students at Six Nations Reservation in Ontario, Canada, to encourage more young people to pursue engineering careers.



Popejoy-Sheriff

Devna Popejoy-Sheriff, academic adviser, was named the College of Engineering Adviser of the Year for 2012-2013. Each year, the Office of the Senior Vice President and Provost selects recipients from each college for their excellent service to students.



The College of Engineering student body voted **Leslie Potter**, senior lecturer, as Faculty Member of the Year. College of Engineering Dean Rajala (*above, right*) presented the award at the Engineering Leadership Banquet in the Howe Hall Atrium. In the words of her nominators, Potter is a dedicated and kind teacher who is easily approachable and always available to her students. Although she is always willing to help, she also pushes her students to learn on their own and solve problems like a real-world engineer and be accountable for their work. With her industry experience and incredible enthusiasm, Potter is an excellent resource for senior students in industrial engineering.



Smyth

ISU's learning communities program recognized faculty and staff who supervised peer mentors in this year's program. **Kelsey Smyth**, academic adviser, was honored as one of the 2012-2013 Exemplary Peer Mentor Supervisors from the College of Engineering.

Three IE alumni take separate paths, find themselves together in human resources

Graduates of the College of Engineering find careers in many parts of the world, but it's not often three from one class take jobs with the same company, start at different locations and travel around the country before settling down in the same human resources department.

That's the story of **Jim McWhirter**, **Steve Bean** and **Mark Biegger**—three 1984 industrial engineering alumni who went to work for Procter & Gamble straight out of college and found themselves transitioning from engineering positions to managing employees at the company's headquarters in Cincinnati, Ohio.

Currently the director of human resources for global employee and labor relations, Jim McWhirter interviewed with the Procter & Gamble plant in Iowa City after college, but he was referred to Green Bay, Wisconsin, to start a job in product supply manufacturing.

Steve Bean began his career with the company in Iowa City as a team manager for Head & Shoulders packing. Today, he works to develop leadership on a national level as the associate director of North America Talent.

Another expert in leadership, Mark Biegger started in the Green Bay plant after college as a team manager for Bounty. His career took him to several plants and overseas before he landed in Cincinnati as the chief human resources officer.

All three graduated together in a class of about 120 industrial engineers. Biegger and Bean had studied together during college, but McWhirter didn't know them at the time.

He met Biegger when they started in Green Bay, and it wasn't until a few years ago that he and Bean were introduced by their wives and then began working just a few desks apart.

"It's kind of amazing that we started off together, we kind of split up and went our separate ways, and now we're very close together again," says McWhirter.

Though each took a different path to their current positions, they all have fond memories of Iowa State and a passion for their jobs. And they agree that Procter & Gamble's strong values are the main reason working with the same company for so long has been easy for them.



(Left to right) Jim McWhirter, Mark Biegger and Steve Bean have worked at Procter & Gamble for close to 30 years after graduating from Iowa State together.

Engineering builds confidence to 'tackle anything' for Jim McWhirter

McWhirter chose to study industrial engineering despite a high school math teacher trying to discourage him from the field. He decided to see how long he could make it and ended up staying and earning his degree.

As a result, he has discovered the countless benefits that come with an engineering degree, including chances for promotion. After his first year, he held several management positions and was associate director of human resources before becoming the director three years ago and recently adding global labor relations to his position.

"Industrial engineering most closely related to the human factor of approaching problems and looking at situations," says McWhirter. "I didn't know at the time that I had an interest in human resources, but I think that drew me to industrial engineering."

McWhirter says being an engineer gave him the confidence to face challenges, starting with his education at Iowa State. Looking back, he says the College of Engineering taught him how to approach and solve problems in a macro sense, which has served him in all aspects of his career.

Procter & Gamble hires most engineers into technical roles, he says, but there are great opportunities to move into other areas of the business—like human resources.

"That's why I'm such a fan of the versatility of an engineering degree," says McWhirter, who has a daughter and wife who are both engineers and a son studying engineering. "I think it goes back to the way ISU teaches us to look at everything."

Currently in a global role at Procter & Gamble, McWhirter has many responsibilities working in Employee and Labor Resources, something he says is both challenging and rewarding.

"One thing that keeps me at Procter & Gamble is that we continue to be able to build our capabilities throughout our careers," he says, "I'm still learning every day, and with everything I learn I realize there's more I don't know."

McWhirter says he uses the thought processes and problem-solving methodology he learned at Iowa State "over and over again" in his career and has been very successful with them.

Steve Bean learns how to work with people through ISU activities

Excelling in math and science, Bean was encouraged to study engineering and chose Iowa State for its well-known program. He didn't know which engineering field he liked until he spoke to juniors and seniors about their current work and future plans, and then it became a clear choice.

"I tended to gravitate more toward the work that industrial engineers did, particularly as it seemed to relate more to people and process improvement work, which were two areas I was interested in," Bean says.

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His interest in working with people led him to the professional development side of human resources, and Bean now directs all leadership development, learning development and talent supply work for Procter & Gamble in North America.

Starting out in a management position, Bean says he's always enjoyed leadership roles. While at Iowa State, he was able to hold leadership positions with his fraternity and other organizations.

Like McWhirter, Bean says the best part of engineering is the array of opportunities it offers. "It's a great variety of things you can get involved in as an engineer," he says. "It's a set of skills and tools that you're given, and the way you can apply those varies significantly."

Many of those skills were learned during college. Bean can think of several lessons from Iowa State that have been beneficial in his professional life, especially working with others.

"How to engage with people, how to get a group of people to share a common vision and work together to develop that vision—I learned a lot of that through the activities I did at Iowa State," says Bean.

Passion for leading gives Mark Biegger early experience for career

Originally from Des Moines, Biegger's career with Procter & Gamble has taken him to Wisconsin, Illinois, Ohio, and even England for a few years before settling down in Cincinnati.

An interest in coordinating and leading activities combined with an aptitude for math and science made industrial engineering seem like the perfect balance for Biegger.

Although he always wanted to study engineering, Biegger had a mind for management, and his first role at Procter & Gamble was more business-oriented and only encouraged that thought.

In 1994, he earned his MBA from Xavier University—10 years after he started working at the company—and quickly moved on to bigger leadership positions.

He says the leadership roles he was able to have at Iowa State, especially in his fraternity and with Dance Marathon, help him now in his career, but adds that without his education he wouldn't have even been considered for the job.

Biegger credits engineering for opening doors and giving him many career opportunities from the very beginning. "It gave me access not only to technical career options but also to a more general career," he says.

Now, at the top of human resources, Biegger oversees 121,000 people located in more than 80 countries. His responsibilities include the intake, development, movement and application of people.

Biegger's passion for his job shows when he explains why he's stayed with the company for nearly 30 years. "Procter & Gamble is more than 175 years old and just a great institution," he says.

A shared path lies ahead

Since they are located in the same building, the three men see one another often, and Bean and McWhirter even live just a few blocks apart. Now they enjoy working together and growing their friendship.

"They've been long and different paths to end up here," says Bean. "It's like we left Iowa State, went on these long journeys and ended up in the same place. Life is funny that way."

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Walkup: “an engineer can do anything”

Iowa State industrial engineering alumnus **Bob Walkup** will tell you, more than once, what he thinks about engineering and engineers.

“Engineers can do anything. It’s that simple,” he says. “That was my father’s motto, and it became mine. I truly believe it.”

Walkup’s father, Joseph Walkup, was the general engineering department head at Iowa State University from 1942 to 1973, and the person for whom the Joseph Walkup Professor of Industrial and Manufacturing Systems Engineering is named.

“His tenure was my entire childhood; he was a young man when he was appointed, and I remember visiting his office on campus as a small boy,” says Walkup.

The Walkup family’s confidence in engineering at Iowa State continues from Joseph’s example. Walkup himself graduated from the university’s industrial engineering program in 1960. His daughter Holly graduated with a degree in industrial engineering in 1983, and his granddaughter Emily is a freshman in engineering this year.

“Iowa State sold itself. It’s where my granddaughter wanted to go, and we’re so very pleased and proud,” says Walkup. “It’s interesting to me that the number of engineering students now is about the total student population of Iowa State when I attended. That’s an amazing amount of growth.”

Walkup credits his father Joseph not only for his confidence that “engineers can do anything,” but also for the discipline and organization it took for him to make it academically.

“When I was in high school, I was a bit of a jock. I was good in football, basketball, and track, and I didn’t think anyone cared about anything else. Boy was I wrong, and my father let me know in no uncertain terms,” says Walkup.

Joseph was so serious about improving his son’s academics that Bob didn’t participate in sports his senior year. It meant giving up basketball the year Ames High School won the state championship (1955).

“It wasn’t as severe as it sounds,” Walkup says. “My family had set these objectives for me, and it was my responsibility to perform. We were all raised that way back then. There was no question that I would follow my parents’ wishes.”

He enrolled in engineering at Iowa State in 1955. Just as in high school, study remained his primary objective.

“I studied. I don’t think I even dated. I never went downtown for a beer. I was either at home or at the library,” he remembers.

He said his father found him “relevant work” when he wasn’t in school, but it was also clear that it was meant to reinforce interest in finishing college.



Above: Dean Sarah Rajala, Emily Walkup (granddaughter of Bob Walkup), Bob Walkup, and Janis Terpenny pose at the Joseph Walkup Professorship Medallion ceremony for Janis Terpenny.



Left: Bob Walkup speaks at the reception about his father and his respect for industrial engineering.

“I worked one summer as a gandy dancer (track maintenance worker) on the Rock Island Railroad. It was hard, hot, tough work,” Walkup reflects. “I came home at the end of the season and told my father, ‘I don’t think I ever want to do that again,’ and his response was, ‘well then, you had better get to work.’”

He returned to classes with more determination than ever, and it’s something he has never regretted.

“I made only one mistake about engineering, and it was something I said when I was still a student,” Walkup says. “I remember telling someone how anxious and impatient I was about graduating and getting out into the working world because all of the really important inventions had already been discovered.”

continued on next page

“What I found throughout my career is that engineering, all of its disciplines, remains a vibrant, fascinating field,” Walkup says.

As he talks about his 35-year career in the aerospace industry, working as an engineer and as an executive for Rockwell International, Fairchild Republic, and Hughes Aircraft Company, it was obvious he needn't have worried about a shortage of problems to solve.

He says his career is an example of the resiliency of industrial engineering.

“I had the President of Fairchild Republic ask if I would like to come out and run its factory. He asked ‘do you know you how to build airplanes?’” Walkup remembers. He didn't.

“But I never said I don't think I can do that job. I always said, ‘I'm going to have to learn some new things fast.’”

In the early 1970s, Walkup worked as an engineer at the at the U.S. satellite tracking station at Pine Gap in central Australia. “It was historic, really, the work we did there. It was instrumental to our government during the Cold War and the SALT II treaty negotiations,” Walkup says.

Engineering also kept him in the know when he served for three-terms as the mayor of Tucson, Ariz. With the city's major economic development programs, including a \$200 million project for modern streetcars, his engineering skills gave him the background necessary to make important decisions.

“It really came to bear in the first time the city was involved in the design of a fairly sophisticated transportation project. It's not something a city of any size gets to do every day,” says Walkup. “But they had a mayor who understood the project from an engineering standpoint. I found myself sitting in the boardroom of Rockwell International, discussing its contract for the propulsion system. A mayor with no engineering background would not have been able to carry that conversation.”

Most recently, the government of South Korea has just appointed Walkup “Korean Honorary Consul” serving the state of Arizona's Korean population as well as Korean interests in the emerging trade, commerce, energy and cultural opportunities in the state.

“What I found throughout my career is that engineering, all of its disciplines, remains a vibrant, fascinating field. I learned something new and exciting every day.”

Walkup says the field has grown and changed since his father's time, but his belief in the strength of engineering remains unchanged.

“I believe everyone should be an engineer,” he adds. “It's an inspirational career, and it allows you to go through life discovering things and solving problems. It applies to almost every discipline, every walk of life. It's essential to society.”

Contributed by ECR

Citizen of the Year: Warren Madden



Madden

Warren Madden has an extensive biography from his 47 years with Iowa State, going all the way back to his time as an undergraduate in industrial engineering. Currently the senior vice president for business and finance at Iowa State, Madden's involvement ranges from campus to community events.

Now he can add the title of Ames Tribune Citizen of the Year to the list. Nominated by a group of friends and colleagues, Betty Horras and ISU Alumni Associate President Jeff Johnson each wrote nomination letters detailing Madden's impressive accomplishments. Both believe he should have been honored long before this award.

In memoriam

Geraldine M. Montag,

emeritus professor of Industrial and Manufacturing Systems Engineering (IMSE) passed away September 16, 2013 in Sun City West, AZ at the age of 86. Dr. Montag received both her M.S. and Ph.D. from Iowa State University in 1963 and 1966 respectively. Originally from Canada, she received her B.A. from the University of Western Ontario, London, Canada.

She began her career at ISU in the mid-60s with Student Health and also was in the Institution Management (Home Economics) Department prior to her joining IMSE in 1967. Her research interests were risk analysis involving the development of

decision theory under weak and strict ranking in the context of incomplete knowledge. Other research interests included life-cycle costing and engineering economy. She served as acting chair in the Fall of 1991 and also became interim department chair from 1993 until 1995. She retired from the university in January of 1996. In retirement, she was active in her church and with an engineering club.

While a professor in IMSE at Iowa State, Dr. Montag received various awards. Among those most significant include the Iowa State University (ISU) Carrie Chapman Catt Award, ISU Regents Faculty Excellence Award, ISU Faculty Excellence in Teaching Award, and a Faculty Citation Award for long and distinguished service. One of her many qualities was she always strived to see that the best interests of the students were served. Family in Canada survive her.



Geraldine M. Montag

2013: A LOOK BACK

Below: IE graduate students and faculty held an IMSE research open house for prospective graduate students on November 15, 2013.



Right: IMSE students were recognized with honors, awards, and scholarships at the Spring 2013 IMSE Awards Banquet in the Howe Hall Atrium.



The International Council on Systems Engineering (INCOSE) Heartland Chapter along with engineers and managers from across Iowa joined with the IMSE department for a Systems Engineering Seminar at Iowa State on April 22, 2013. INCOSE is an international organization formed to develop, nurture, and enhance the interdisciplinary approach and means to enable the realization of successful systems. The Heartland Chapter includes Iowa, Nebraska, and surrounding areas.

Left, top: John Clymer of John R. Clymer and Associates speaks at the INCOSE seminar.

Left, below: Candice Engler from Deere & Company speaks at the INCOSE seminar.

Alpha Pie You!

Alpha Pi Mu held a fundraising raffle event for a chance to smash a pie in the face of some of our more adventurous faculty and staff on November 19, 2013. The fun results are below!



WEPAN president encourages women to pursue engineering

Karen Zunkel's (BSIE'83) career has covered a lot of territory: as a professional in industry, an instructor and a higher education administrator, she has a good sense of the many obstacles females may face in STEM fields.



Zunkel

That's why Zunkel, director of undergraduate programs and academic quality at Iowa State, has devoted much of her career to helping other women find success in engineering.

As part of that goal, she began her term as president of the Women in Engineering ProActive Network, an organization focused on programmatic efforts within institutions or colleges of engineering that aims to support, recruit, and retain females, as well as change the culture within engineering to help women be successful.

In 1983, Zunkel went to work in the telecommunications industry with Western Electric—an AT&T company at the time—in Oklahoma. She started as a product engineer while taking night classes to obtain her master's from the University of Oklahoma.

Zunkel was then transferred back to Iowa as a sales engineer with AT&T. Later, she took a position as an instructor in the College of Engineering, teaching an introductory freshman engineering course and systems engineering course.

Transitioning from teaching to advising, she managed Engineering Student Services for several years. Then, in 2002, Zunkel became the program director for the Program for Women in Science and Engineering and completed her doctorate program. She held that position until this year when she moved to the provost's office full time.

Once she started at Iowa State, Zunkel looked for a way to link her role in higher education and her background in engineering. WEPAN's objectives seemed to align with her own, so she joined the group in 1995, attending a regional conference at Purdue University. In 2000, she became a member, and from 2004 to 2007, served as the membership director.

This July marked the start of her year as president of the organization. As part of a three-year succession model, she previously served as president-elect for a year and will hold the position of past-president starting next July.

WEPAN is comprised of nearly 880 members representing 140 engineering schools, with about 40 members at Iowa State this year. The benefits of this network reach thousands of female engineering students—close to 60 percent on a national level, according to its website.

"It makes a fairly significant impact on women in science and engineering," says Zunkel. "The purpose is to make those connections and help facilitate change within higher education."

Retaining young women in engineering is a major focus of the group. Zunkel says many women who go into the field choose it for altruistic reasons, and when they can't see the direct benefits of their work, they feel as though they're not helping others.

"They have to realize the breadth of opportunity in engineering," says Zunkel. "You're one step removed—you may not be helping them directly, but you have the potential to help thousands of people. It's a great field for females, and we want to show that to as many promising women as we can."

NASA engineer Lee Graham credits Iowa State for diverse skills

For some, having a full-time job and a family along with studying for a master's degree would probably be enough to keep busy. **Lee Graham**, on the other hand, does all that while working at NASA, mentoring at three local high schools and helping with STEM education efforts in various ways—among other things.



Graham

Graham (BSIE'85) had a unique undergraduate experience. He originally intended to graduate in 1979, but he went home to Dunkerton, Iowa, after his junior year in aerospace engineering to help his family.

When he came back to Iowa State in 1982, Graham changed his major to industrial engineering because he had an interest in robotics. Deciding it wasn't the best fit, he says he was fortunate that the head of the department allowed him to essentially create his own curriculum.

Taking classes in aerospace, industrial and mechanical engineering—and now finishing his master's in systems engineering—gave Graham a well-rounded education and skillset. "I realized I like being a generalist," he says. "I don't like being a world-class expert in a narrow field—that's just not for me. I like to be one or two questions deep across all disciplines."

Graham is still developing his varied background, finishing his master's now and hoping to obtain a Ph.D. after his kids graduate.

Graham has worked at NASA for nearly 26 years, in which time he says he's held about 20 different jobs. He is currently a senior research engineer leading a project on robotic exploration, which includes mission plans for exploring the moon, asteroids and Mars.

He says he has been able to do a wide range of interesting things with NASA, including working at the Naval Research Lab in D.C., giving 'go' and 'no-go' calls for the first ten launches after Challenger, and meeting Neil Armstrong. He adds that he's happy to be surrounded by "really great, superb people," even some pretty high-profile names in the industry. Though some people might call him lucky, Graham simply says, "You know, the harder I work, the luckier I get."

Now, after working with several other universities around the country, Graham says he still believes Iowa State prepares its students as well as (and in some cases better than) the biggest universities. In a study he worked on for one of his classes, he said Iowa State came out in the top 10 percent of those offering "the best bang for the buck."

Graham says Iowa State's project-oriented curriculum and emphasis on teamwork were some of the best opportunities he experienced as a student, and he's happy to see the college continue this high standard. "Kids get equipped with the right skillset and tools from the beginning, as opposed to learning from someone who may or may not have the right background," he says. "I think Iowa State really gave me a big boost."

**Department of Industrial & Manufacturing
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