A sabbatical can offer an opportunity for university faculty to embark on new avenues of research. That was the case recently for Associate Professor Douglas Wiegmann. His semester-long break from his regular department responsibilities allowed him to learn more about an area he had been hoping to pursue.

“My work has generally been designing interventions to improve healthcare, which then could be implemented,” he says. “I really haven’t spent much time or effort in my research looking at the actual implementation of those interventions as they’re integrated into the real-world systems.”

One unique feature of his sabbatical was that it enabled him to spend a few weeks in Singapore as a visiting scholar—something that would have been difficult to do if Wiegmann were teaching that semester.

Singapore’s Ministry of Health invited Wiegmann to participate in a collaborative process for sharing knowledge about healthcare, and the ideas and discussions gave him an opportunity to explore the island’s healthcare delivery process.

He noticed that within the Singapore healthcare system, the overarching issue is not as much what to do, but how to do it.

His time in Singapore also gave him an understanding of the major differences in healthcare improvement implementation across cultures. He observed that the hospitals there had developed an innovative system that allows them to treat many people in a very short period of time.

“Singapore is a small island, but there are a lot of people in need of healthcare, and there are less than a dozen major hospitals on the island,” he says. “They’re treating thousands of people a day and getting them through the system safely, efficiently and effectively. That’s pretty amazing.”

Though he was only in Singapore for a few weeks, his experience brought new insight into the process of implementation in other countries, and how people in academia can help. “There are various issues with getting interventions to work, from making them fit the process providers are dealing with, to making them fit the culture they’re dealing in, as well as the physical setting,” Wiegmann says. “They also have to negotiate the social and political barriers associated with change.”

Now, as a new direction in his research, Wiegmann plans to study how programs and interventions can be designed to take into account various barriers to and facilitators in the process for implementing improvements in healthcare settings. “Understanding the complexity of the implementation process was eye-opening for me, and it really helped change the direction where I’m taking my research in the next five years or so,” he says.

Wiegmann also used his sabbatical to publish “Understanding why quality initiatives succeed or fail” in the journal *Annals of Surgery*, and submit a grant application titled “Overcoming organizational barriers to survivorship care plan implementation.”

Professor Jingshan Li helps to build industry partnerships that enable engineering students to gain hands-on professional skills while making businesses more efficient and productive.

For Li, the rewards are considerable. He’s often on hand when students make that critical nexus between theoretical concepts and their application in real-world settings. “In the classroom, we learn how to develop models, solve equations and evaluate performance,” says Li, whose work involves developing analytical solutions for productivity and quality improvement. “That is all very valuable for students, but then to apply those concepts in practical situations helps both the students and the company.” (Continued on back page)
As the year ends, I like to reflect on the many things the Department of Industrial and Systems Engineering has accomplished with your support. In the last year, we recruited two junior faculty members who are at the cutting edge in their fields (health systems and sustainable logistics). We maintained our ranking as a top-10 department, comparing favorably to much larger departments at other schools. We enhanced the Emerson Electric Professorship with a generous gift from an alum, and (most importantly) we graduated an outstanding group of undergraduate and graduate students, many of whom received national or campus-level awards and recognition! Our faculty also gained national and international recognition by making great advances in their research. 2016 is gearing up to be an even more exciting year for our department! In particular, we will be celebrating our 50th anniversary with an alumni reunion on June 3-4, 2016, and hope to see many of you there. So, mark your calendars and get ready for a special weekend in honor of the department’s golden anniversary. Reunion activities will include a “birthday bash” at Capital Brewery, cutting-edge presentations and lab tours on the engineering campus, trolley tours of the university, lunch with Bucky Badger, and a banquet at the Wisconsin Institutes for Discovery.

To find out more about the reunion, please go to www.reunion.ie.wisc.edu; online registration will begin in February. I hope to see you there so we can celebrate the multitude of unique ways in which all of you are making the world smarter.

Sincerely,

Vicki Bier, Chair
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Carayon contributes to national report on healthcare errors

Procter & Gamble Bascom Professor in Total Quality Pascale Carayon was a member of the Committee on Diagnostic Error in Health Care, convened by the U.S. Institute of Medicine to study diagnostic errors in healthcare. The committee’s findings, which build on the institute’s efforts to improve the overall state of healthcare in the country, were released in a report that outlines recommendations for improving diagnosis in healthcare.

The report, and its supporting materials, note that diagnostic errors can persist throughout healthcare settings and harm unacceptably large numbers of patients—and making improvements in the diagnostic process is both possible and a public health imperative.

An expert in human factors and systems engineering in healthcare and patient safety, Carayon contributed to the report in several ways, including outlining the importance of the work system in which the diagnostic process occurs. Some of the recommendations in the report include facilitating teamwork in the diagnostic process, ensuring health information technologies support the diagnostic process, and establishing a work system and culture that support and improve the diagnostic process.

Authors of the report emphasize improving diagnosis via collaboration and a widespread commitment to change on the part of stakeholders ranging from healthcare professionals to patients to policymakers. “Without a dedicated focus on improving diagnosis, diagnostic errors will likely worsen as the delivery of health care and the diagnostic process continue to increase in complexity,” the authors note.

Historic matching gift yields new professorships

Announced in Nov. 2014, a $100 million gift from UW-Madison alumni John and Tashia Morgridge provided a 1-to-1 match for any other donor making a gift to endow a professorship, chair or distinguished chair. Among the 13 new professorships created under the match were the Thomas and Suzanne Werner Chair in the College of Engineering and the Raymond R. Holton Chair in the College of Engineering. Tom Werner earned his bachelor’s degree in industrial engineering in 1982, while John Holton earned his master’s degree from the department in 1975. In addition, Theodore Anususinha (BSIE ‘85) enhanced the Emerson Electric Quality & Productivity Professorship in the department.

Professorships provide faculty members with flexible funds that support efforts such as the groundwork of bold new research ventures, and educational innovation—activities not supported by conventional research grants. These crucial resources enable faculty members to make a bigger impact on their academic fields, their communities and the students they serve.

Professorships also send a message that UW-Madison is a place where current and prospective faculty can thrive—and the matching effort drew attention to the importance of recognizing and retaining existing faculty and continuing to attract the best new faculty hires. “These gifts represent a crucial investment for an institution that relies on outstanding thinkers, educators and researchers,” says Dean Ian Robertson. “To provide the greatest value to our students and the people of Wisconsin, the College of Engineering needs to maintain a competitive edge in recruiting and retaining faculty.”
In fall 2015, more than 100 students, staff and faculty gathered from around campus to hear an inspirational talk given by Patrick D. Quirk (IE ‘79), the 2015 Department of Industrial & Systems Engineering Distinguished Achievement Award winner. Quirk, a visionary leader in high-tech software industry who has served in executive management and CEO positions for more than 30 years, spoke about what it takes to build a successful career, how to look for a good employer, and how to determine what employers are looking for.

For Quirk, industrial engineering provides the flexibility to do anything. “What’s great about industrial engineering is how versatile it is—as an IE you get to manage all the other engineers,” he said.

To view the talk, visit the ISyE colloquium recordings website: www.engr.wisc.edu/isye/isye-colloquium-recordings.html.

For more information on the College of Engineering Distinguished Achievement Award: go.wisc.edu/more-quirk

Outreach program expands knowledge for healthcare professionals

Nearly 50 healthcare professionals came to Madison from around the world in July 2015 to participate in the week-long Systems Engineering Initiative for Patient Safety (SEIPS) short course on human factors engineering and patient safety organized by Pascale Carayon, the Procter & Gamble Bascom Professor in Total Quality, and her team from the Center for Quality and Productivity Improvement (CQPI). SEIPS is a multidisciplinary initiative applying human factors and systems engineering approaches to promote patient safety.

Delivering high-performance healthcare in a way that ensures that patients—especially older adults—get well and stay well, is at the center of Assistant Professor Nicole Werner’s research.

Werner, who earned her PhD in human factors and applied cognition at George Mason University, focuses on improving care transitions for elderly patients from the hospital to home or skilled nursing care.

Werner believes that transitions across health systems may factor into rising concerns about frequent hospital readmissions for older patients with conditions such as heart disease or chronic obstructive pulmonary disease. Her goal is to identify challenges patients face after their discharge and to develop interventions that improve the process and the outcome.

MORE: go.wisc.edu/more-werner

Where others see hopelessly foundering logistics, Assistant Professor Xin Wang sees the possibility of creating sustainable and resilient systems in areas as disparate as developing biofuels and keeping cities operating when disaster strikes—and he brings an interdisciplinary approach to solving these large-scale problems.

Wang, who earned his PhD in civil and environmental engineering from the University of Illinois, has developed mathematical models that can help solve issues in complex systems that involve competition, reliability and interdependence.

Wang is using his models to evaluate the impacts of a disaster in an effort to help the government enhance preparedness and reliability of key urban systems. Inherent in his research is a depth of knowledge in logistics systems and supply chain management—key components in advanced manufacturing, one of the areas of the college’s Grainger Institute for Engineering, of which he is an affiliate.

MORE: go.wisc.edu/more-wang

DVO and Magic Dirt, two companies founded and run by UW-Madison ISyE alum Steve Dvorak, received the 2015 American Biogas Council Awards at the American Biogas Council’s (ABC) annual awards program. ABC recognizes high-achieving companies in the biogas industry serving as an example to others on the scale of innovation, technology collaboration and complexity.

More: www.prweb.com/releases/2015/10/prweb13036597.htm
The other team worked in the body shop, identified bottlenecks and blockages in the production system and made a variety of recommendations for improvement that could generate a 28 percent increase in throughput. The students presented their findings to plant managers and engineers at the end of the class. That presentation came after a classroom run-through, and provided students an up-close view of presenting information in a professional setting.

"Most found it much easier to present in class," Li says. "Presenting in the plant is a different challenge, because you are talking to people who have a detailed knowledge of how the plant is working."

Students react well to learning in a real-life environment, exercising their ideas and putting their knowledge to work, Li says. "It's so good for students," he says. "I could simply teach the material and give a final exam, and they would memorize equations, but they may not remember. But if they go through the process, visit the plant, collect the data, work on developing and validating models, and develop ideas, they will remember."

After the class, Li and each student received certificates from the plant and United Auto Workers Locals 1268 and 1761 recognizing their outstanding performance on the projects. The plant is also exploring implementing the recommendations presented by the student teams.

Li said next spring’s class will also work at the Belvidere Assembly and Stamping Plant, marking three years of the collaboration. "Some students told me that this was the first time they could apply the knowledge they learned and see the benefit that comes from it," Li says.

$20 million grant powers game-changing internet access effort

A global effort to create a new computer ecosystem that is easily accessible to people with disabilities, senior citizens and others with special needs is set to become reality through a $20 million federal grant. The project will help make it so that whenever a person encounters something with a digital interface—a computer, webpage, TV, thermostat—the interface on the device or webpage instantly and automatically changes into a form that the person can understand and use," says Professor Gregg Vanderheiden.

Users could carry a card or a ring or USB flash drive with a special key on it. The key cues the devices to instantly access the users’ needs and preferences—such as simplified interfaces, large type, audio aids, captions, high-contrast screens and other features.

Simplified interfaces could make computers and other devices vastly more understandable. The plan includes a wide spectrum of digital devices—from thermostats, to public ticket kiosks, to future home appliances.

Partnerships (Continued from front page)

Li’s spring-semester class—Production Systems Engineering—has taken students into businesses such as Harley-Davidson, Oshkosh Truck, University of Wisconsin Hospital and Clinics and Kraft Foods to help solve production problems.

Recently, his class worked with the Fiat Chrysler Automobiles Group at its Belvidere Assembly and Stamping Plant in Illinois. The students—both graduate students and undergraduate seniors—split up to examine nagging issues in the paint shop and the body shop.

The idea was to improve throughput—the number of vehicles that move through the production system—and eliminate bottlenecks in the production process. Those efficiencies can translate not only to learning for the students, but profit for the company.

The students made several visits to the plant during the semester and used company-provided data to analyze the production systems and make recommendations under Li’s mentorship.

The team that evaluated the paint shop looked at a production line making Jeeps and Dodge Darts, in an effort to determine how to make it run more efficiently.

The study determined that throughput could be improved by up to 13 percent by reducing variation in manual operations and by introducing initial buffers in the production line before deciding which line the Jeeps should be sent to.