orn in the Ukraine to two engineer parents, Nataliya Batina admits with a smile that she didn’t expect to become an engineer herself. With a master’s degree in mathematics, Batina credits many ISyE faculty members for her career shift to health systems engineering when she came to UW-Madison for a master’s in industrial engineering.

However, after the funding of two research projects she worked on ended, she found herself struggling to continue her pursuit of a PhD. “When you’re not funded,” she says, “that money is all out of pocket.”

Having a family with two children, Batina didn’t have a lot of money available in her pocket. That’s when she applied for the Industrial and Systems Engineering Graduate Support Fellowship. The endowment provides income for fellowships and research assistant funding and, in Batina’s case, will allow her to continue PhD research in which she models how Methicillin-resistant Staphylococcus aureus (MRSA) spreads within nursing home communities.

Batina developed a strong interest in population disease modeling while working on her first research project under the guidance of Professor Oguzhan Alagoz. When she took a long-term care class with Professor Emeritus David Zimmerman, Batina realized she wanted to apply her experience in disease modeling in ways that could help nursing home communities adopt better informed infection control strategies.

Being able to predict the spread of MRSA, a potentially life-threatening bacterial infection commonly found in hospitals and long-term care facilities, is important to the entire healthcare system, not just nursing homes. The strain is particularly dangerous because it is resistant to common antibiotics, which limits treatment options. MRSA has been a leading cause of healthcare-associated infections and is accountable for a significant increase in morbidity and mortality among hospital patients and nursing home residents. Frequent patient transfers between hospitals and nursing homes magnifies the burden of treatment, and subsequent cost, of MSRA in both settings. However, unlike in hospitals, MRSA dynamics in community nursing homes is not well documented.

By studying and modeling the temporal dynamics of diseases, Batina says she enjoys being able to apply her research for such a practical purpose. “The modeling of diseases,” she says, “has a very clear application.” In this case, that clear application is one that could be life-saving.

Batina, who has found her passion in teaching as much as in research, says she is honored to have received a second chance at her education. “Being awarded the Support Endowment Fund is an acknowledgment that your work is important,” she says. “That it is inspiring.”

Where in the world is ISyE Bucky?

In August, the department launched the “Where in the world is ISyE Bucky?” campaign. Since then, the ISyE faculty, staff and students have been taking ISyE Bucky to conferences and seminars everywhere they’ve traveled. Pictures with ISyE Bucky have been posted on the ISyE Facebook page as well as in various display cases in the Mechanical Engineering Building.

Grad support endowment fund enables engineer to help nursing homes

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Laura McLay’s research canvas is massive data—banks of millions of emergency 911 calls, commercial airline flights and ship cargo deliveries—which she uses to tease out the risk factors in these high-stakes endeavors.

As a data challenge, it might seem like searching for the proverbial needle in the haystack, but McLay is quick to clarify her goal: “You actually never find the needle,” she says. “You just make a better haystack.”

McLay, a new associate professor who joined the department in summer 2013, is an expert in operations research, which she defines as “the discipline of applying advanced analytical methods to help make better decisions.” While not yet a household word among academic fields, operations research received a major awareness boost after the September 11 attacks, as an important tool in improving airline screening and security and combating terrorist threats.

McLay works to develop mathematical models to identify how to design risk-based passenger screening methods given that the “haystack” of data can be used as a type of passenger risk assessment tool. “You’re really trying to weed out all of the low-risk events and be able to focus on maybe the 5 percent you really need to worry about,” she says. “A lot of times operations research is exactly the right tool to use, because it answers the question: How do we best utilize limited resources and imperfect data?”

As a (former) professor at Virginia Commonwealth University, McLay found a robust new research target after the 2010 “Snowmageddon,” a storm that dumped more than three feet of snow on parts of the Washington, D.C., region. In the aftermath, there were controversies over poorly managed emergency resources, response times and decisions.

This was a research perfect storm for McLay, who married her longtime work in analysis of emergency response times with data on severe weather. Her analysis of the Snowmageddon response, compared against more typical weather days, revealed important differences that could improve decision-making and prioritizing calls during future weather emergencies.

Emergency responders develop notoriously good instincts in reducing their response times, but McLay hopes her work bolsters those instincts with hard data on managing calls during high-volume or high-risk periods. “When the system is overwhelmed, some kind of triage or priority reclassification makes the most sense, even when it goes against the nature of responding to everything in the same way,” she says. “There is an expectation with public services that on the worst day of your life, like a weather disaster, emergency people will be there for you. The reality is, there are a lot of factors that might not make them available, at least not immediately.”

One of McLay’s primary focus areas for emergency response times is in calls involving cardiac arrest, where literally seconds can make a life-or-death difference to the patient. This happens to have a strong
As the end of the year approaches, I wanted to update you on what has been happening in your department. In the past year, we’ve been fortunate to add two outstanding new faculty members to our department: Associate Professor Laura McLay, an operations researcher who comes to us from a successful early career at Virginia Commonwealth University; and Assistant Professor Kaibo Liu, in manufacturing, who just finished his graduate degree at Georgia Tech.

Our faculty members and graduate students continue to do great things, making it a pleasure to be chair of such a successful department. Most notably, our student chapters of both the Human Factors and Ergonomics Society and the Institute of Industrial Engineers won gold-level awards from their national societies this year, showing the passion our students have for the department.

For some historical perspective, the master’s and PhD degrees in industrial engineering at UW-Madison date from 1966, with the bachelor’s degree coming soon thereafter, in 1968. We have chosen to put our stake in the ground by defining 1966 as the birth of the program, so 2016 will be our 50th anniversary. As promised, you should soon be getting an email survey from us (if you haven’t already) to let us know how you would like to celebrate our anniversary—fall or spring, academic or social, a quick one-day event or a long weekend! We are all really looking forward to the 2016 reunion as a way to reconnect with our alumni, and hope you are looking forward to it also!

One of our major educational initiatives over the past year has been to increase our involvement with online, hands-on, and “hybrid” approaches to education. This requires investment in new software and lab equipment for our courses, as well as classroom refurbishment—for example, from traditional classroom seating to more flexible round or hexagonal tables to facilitate in-class teamwork. Gifts to the department help to support this top priority, as well as providing support for the department’s colloquium series and other community-building events. Scholarship and/or fellowship funds help us recruit and retain the best graduate students. These students, in turn, support the department’s mission of enhancing leading-edge research and education in areas such as healthcare and advanced manufacturing.

I appreciate you taking the time to keep in touch with the department during your busy lives. In addition, we’d like to be able to stay in touch with you via email, so please send us your updated address at recordsupdates@supportuw.org.

We are proud of you—our alumni. After all, the thousands of graduates the department has produced over the years can together accomplish much more, and contribute more to the world’s progress, than a small handful of faculty members.

All the best for a great year in 2014!

Vicki M. Bier, Chair
3270 Mechanical Engr. Bldg.
1513 University Avenue
Madison, WI 53706
Phone: 608/262-2064
Fax: 608/262-8454
bier@ie.engr.wisc.edu

Make a gift to ISyE: go.wisc.edu/supportisye

P.S. Any donor who contributes at least $100 to the department’s discretionary fund in 2014 will receive a plush Bucky Badger as a gift from the department to help show your Badger pride!

weather connection as well, since the highest levels of cardiac arrest occur during periods of heavy snow.

McLay does much of her work in partnership with municipalities since there is so much variation at the local level, such as urban vs. rural settings, or full-time vs. volunteer crews. She is in the process of establishing some of those local connections in Wisconsin this year.

Speaking of connections, McLay has managed to connect operations research to punk rock, in the form of her public interest blog “Punk Rock OR.” Since she does so much work in the public domain, McLay wanted a title that reflected the field’s beneficial aspirations. “And punk is sort of socially aware and wanting to make the world a better place, so it seemed like a good fit,” she says.

In the blog, McLay delves into the seemingly limitless opportunities to apply operations research to daily life, including marathon running, winning the lottery, planning your wedding, predicting NCAA tournament outcomes, or fitting three child seats in a Honda Civic (McLay is a mother of three).

Occasionally her posts will go viral, like the one about stochastic processes. “Actually it was on vampires and stochastic processes,” she adds. McLay has always been struck by the stability of vampire populations in most vampire films, since branching process models would dictate vampires having exponential population growth.

“I find the zombie movies much more mathematically consistent than vampire movies,” she says, and on that front offers a helpful blog post on how to optimally prepare for a zombie apocalypse.

“People like to talk about how some of these mathematical principles apply to everyday life,” McLay says. “It’s a lot of fun and a great way to give back to the field.”

For more, visit “Punk Rock Operations Research”: punkrockor.wordpress.com
Back in the 1950s, most classrooms looked the same: Rows upon rows of students faced a large chalkboard in the front of the room, from where the professor would lecture. More than 60 years later, advances in technology have had little effect on classroom layout; students with laptops still often sit in rows facing professors who lecture in front of whiteboards.

But not in ISyE. Rather, a group of ISyE faculty saw an opportunity to apply their knowledge to the modern classroom, using a blended learning, or “flipped,” classroom model in three ISyE senior design courses. Blended courses take advantage of technology and often consist of a mixture of online lectures and quizzes paired with in-class exercises, discussion and problem-solving. “We conducted some surveys of students and, overall, they really appreciate this blended learning model,” says Professor Raj Veeramani. “Instead of being passive listeners in the classroom, we have students who are actively engaged in discussion, problem solving, active inquiry and the application of the ideas that they’re learning.”

Professors Pascale Carayon and Veeramani and Professor Emeritus Harry Steudel believe senior design courses are a good fit for using a blended learning model. “By the time they get to be a senior, they’ve been introduced to many of the core concepts,” Veeramani says. “So these courses are really centered around honing students’ analytical thinking skills and challenging them to not only formulate solutions, but also evaluate and justify them.”
To “flip” the courses, faculty drew on funding from the college Engineering Beyond Boundaries (EBB) initiative. First, they created online learning modules, which use videos to introduce methods, concepts and ideas. Students can watch the videos at their own pace before they come to class. A corresponding quiz within a module lets instructors assess students’ understanding of the material and review parts, if needed, before moving on.

In class, the faculty use the time for interactive team exercises or workshops, the creation of which is being funded by a 2013-2014 EBB grant. “We take great pride in providing our students with experiential learning in our department,” Veeramani says. “With these workshops, we will help students apply their learning in a classroom setting and prepare them to approach real-world problems with confidence.”

Senior design students work together on open-ended, real-world projects that allow them to creatively approach problem solving from multiple perspectives—and the last piece in the shift to blended learning facilitates that collaboration.

ISyE is in the process of refurbishing multiple classrooms in the Mechanical Engineering Building to better suit the blended learning style. Among those changes is reconfigurable furniture that moves with the students and can change based on student—and instructor—needs.

Carayon, a human factors and ergonomics expert, says the physical environment can affect the learning climate within the room. “The physical set-up speaks a lot to the climate you want to create, and we want a more participatory climate,” she says. “When you have these rows, it’s not a participatory climate. It’s a human factors principle: The physical environment has to be adapted to meet the needs of the users.”

Brennan named one of the 10 influential women in health IT

Fierce Health IT named Lillian S. Moehlman-Bascom Professor Patricia Flatley Brennan one of the 10 influential women in health IT for 2013. Brennan was recognized for her work with Project HealthDesign, a Robert Wood Johnson Foundation national program pushing the growth and evolution of personal health records; her work leading the Wisconsin Technology Enhanced Collaborative Nursing Education, a statewide project to expand and improve informatics in nursing curricula; and her development of ComputerLink and direction of HeartCare as her major health IT contributions.

Kaibo Liu

Assistant Professor Kaibo Liu focuses on system informatics and control (SIAC). Liu’s SIAC research aims to extract raw data effectively and then to analyze and model that data to aid in quality control and to improve performance. By bridging the gap between engineering, advanced statistics and operations research, this approach results in more closely monitored system status, more accurate forecasting of future trends and behaviors, and even better decision-making by aligning decisions with expected conditions. Liu plans to apply his SIAC research to manufacturing, healthcare, energy and service systems.

Liu joined the UW-Madison faculty in fall 2013 after earning his PhD in industrial engineering from the Georgia Institute of Technology. Drawn to UW-Madison because of the diversity of backgrounds within the department, Liu believes his background in SIAC will make him a valuable collaborator with other industrial engineers. Specifically, he feels that his expertise in data mining and statistical methodologies could strengthen manufacturing research groups, and his data-driven approach could improve practical quality engineering research. He says that, given all the companies in Wisconsin, UW-Madison will present him with the opportunity to work on real problems and to validate his results in a real-world setting.

He also looks forward to the opportunity to shape future scientists and engineers. “I will commit myself to the classroom and am prepared to devote my time and efforts to students outside of class,” he says. “I hope that my encouragement and inspiration will help their career development.”

Kaibo Liu
**ALUMS GIVING BACK:**
A Q&A with two members of the ISyE alumi board

**MARK HAYWARD**  
**MSIE ’87**  
Health systems engineering  
Vice Chair, Department of Facilities and Support Services  
Administrator, Center for the Science of Health Care Delivery  
Mayo Clinic

**Why did you choose to study industrial engineering?**
I received my undergraduate math degree from St. Olaf in Northfield, Minnesota. I wasn’t quite sure what I was going to do with my math degree, but my senior year I took an operations research course with a professor who was inspirational, and helped me see the opportunities that operations research might have as a career. That inspiration led me to a master’s degree at UW-Madison to further pursue a career path in operations research and industrial engineering.

**What is your current position, and how do you apply your IE education to your job?**
My primary responsibility right now is as an administrator for the Center for the Science of Health Care Delivery, which is a large, new undertaking at the Mayo Clinic to accelerate our ability to study, design and implement healthcare delivery systems that improve the value of care for patients—in other words, improved outcomes at lower costs.

**What is your fondest memory of your time at UW-Madison?**
I’m a sports enthusiast, so I loved all the sporting events and, of course, the great city of Madison. While I was there, I had excellent colleagues and professors like Dave Gustafson and Dennis Fryback, who was my advisor. They were two superb role models who were inspiring and shared their wealth of experience and insights freely. I fondly remember the students I went through my master’s program with. They were a great group of people. It was a very good time for me.

**JESSICA RANNOW**  
**BSIE ’99**  
Senior Project Manager at eBizNET Solutions Inc.  
Director of Professional Excellence for Society of Women Engineers

**Why did you choose to study industrial engineering?**
I learned about engineering as a junior in high school when I went to business camp and all the CEOs there were either accountants or engineers. I did some research into engineering and I thought, “That sounds pretty cool, it’s like ‘technical business.’”

Actually, when I graduated, I was a consultant first. However, I had interned at Cummins Engine three times, and that reinforced my decision to go into engineering. I was able to be creative and do process improvement. I got to learn about a variety of things.

**What is your current position, and how do you apply your IE education to your job?**
I work for a software company called eBizNET Solutions as a senior project manager. We provide cloud-based warehouse management software integrated on the NetSuite ERP platform.

Most of my career in industrial engineering has been in distribution centers, dealing both in software and in material handling equipment. And, in my current role as a project manager, there’s a lot of process work customizing the software to fit the customer and its processes. So I create process maps and then customize the software to fit what they need.

**What is your fondest memory of your time at UW-Madison?**
I have fond memories of all of my involvement in student organizations. I was president of the Society of Women Engineers, and have great memories of going to conferences and all of the different things we did through SWE. I also was one of the two students who started the
On October 11, 2013, college alumni gathered to celebrate this year’s Engineers’ Day and receive awards for their achievements since graduating. Seven College of Engineering alumni were given this year’s Distinguished Achievement Award in honor of long careers of groundbreaking work in their fields. Among them was ISyE alumna Kris Theiler.

As a vice president of planning and operations support for Walt Disney Parks and Resorts, Kris Theiler works to give industrial engineers a strong voice in the amusement park business.

Theiler’s time at Disney has challenged her to think about such problems as long lines. For instance, she helped drastically change the way park visitors experience lines for rides. Theiler was part of the team that developed Disney Parks’ FastPass system, which lets visitors return for a ride during a specific time slot instead of waiting in a long line.

To address such problems, Disney has to analyze reams of customer behavior and survey data and develop ideas and opportunities to improve the experience. But that’s no more outlandish than the problems Theiler remembers tackling as an undergraduate student in industrial engineering.

“I did time studies on a bartender pouring tap beer; an experimental engineering project with Professor George Box in which my friend Lita Noreen and I managed to build a study around suntanning; and I learned to spin my pen in Linear Programming—a skill that many have asked about,” Theiler says.

After graduating from UW-Madison, Theiler earned an MBA from the University of California-Los Angeles Anderson School of Management. Before joining Disneyland as a business planner, she held industrial engineering positions at ABB Electric, Synergic Resources Corporation, and Magnetek Electric.

Moving up through positions of increasing responsibility at Disney, Theiler has helped to highlight how much engineers have to contribute to the company. “The industrial engineering team at Disney Parks is extremely integrated into the business, well-respected, and called on to provide insight and understanding into issues and problems facing the organization,” she says.

Theiler has been involved in many key projects, including the opening of Disney’s California Adventure, Disneyland’s 50th anniversary celebration, Walt Disney World’s new Fantasyland and the development of Shanghai Disneyland. Still, she is most proud of having advanced the careers of the engineers she has worked with, and having made those engineers an important part of the company’s decision-making. Theiler is a recipient of the Golden Spirit of Disneyland award.

Currently a resident of Long Beach, California, Theiler enjoys running, biking, travel, jewelry making, and spending time with friends. She is a proud aunt of 13 nieces and nephews. Her family also includes parents Carl and Barbara Theiler, and siblings Julie, Connie, Sara, Stacy and Andy.

LeaderShape Institute at UW-Madison in 1997 [LeaderShape is an intense, six-day program that enables students to grow as people and develop as leaders]. Being one of the co-founders is really cool because I know it’s still offered, so there’s a legacy for me at UW-Madison.

How do you hope to contribute on the ISyE board, and to the department?

I hope I can represent the critical needs in healthcare to further expand the use of industrial and systems engineering students and professionals. Healthcare is in a time when it needs these skills more than ever to meet the challenges ahead of us, and more and more healthcare organizations are hiring industrial and systems engineering-trained individuals.

The Mayo Clinic is positioned to be a leader in this and I’ve been fortunate to be part of an Institute of Medicine group that has been a strong proponent for the increased use of industrial and systems engineering skills and tools in healthcare to improve value and efficiency. My hope is to represent this growing need on the ISyE board.

Additionally, I’d like to help assure curriculum is aligned with the skills necessary to be successful in a career in healthcare.

How do you hope to contribute on the ISyE board, and to the department?

I’m one of the more recent alumni on the board, so I hope to provide the perspective of the younger alumni. I’d like to be able to work with the department and the board to create activities to engage alumni with the professors and students, and to have more alumni engagement, in general. And I think distribution and supply chains isn’t an area that traditionally has been represented on the board. I hope to represent that perspective, as well.
The UW-Madison Human Factors and Ergonomics Society student chapter received a gold award for the second consecutive year. The gold-level award is bestowed based on student excellence in multiple categories such as outreach and collaboration. The UW-Madison student chapter is made up mostly of students from industrial and systems engineering. Chapter president Vindhya Venkatraman says one of the things that sets the UW-Madison student chapter apart is the mutually beneficial learning that occurs between the chapter members and the community. “Either on campus or outside of campus,” she says, “we always meet people who are extremely interested in the application of knowledge about human capabilities to the design of technology. I think the fact that there’s such an interested community makes us want to go out more, to talk to people and learn from them.”