

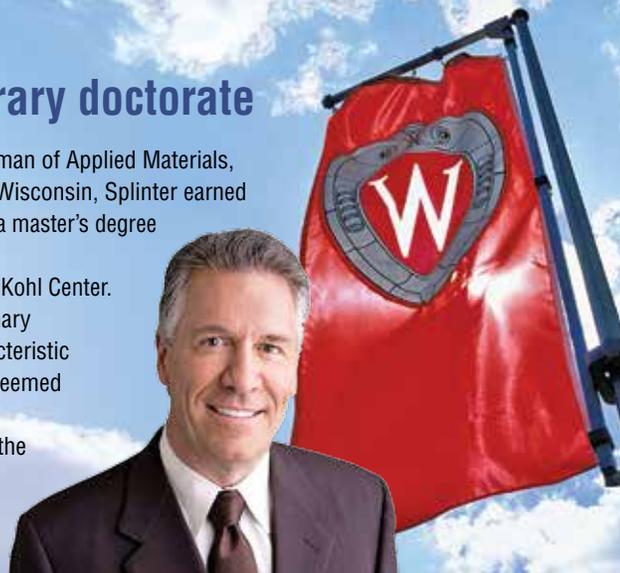


## ECE alumnus Mike Splinter awarded honorary doctorate

**M**ike Splinter, a highly influential veteran of the semiconductor industry and chairman of Applied Materials, received an honorary doctorate from UW-Madison in May. A native of Horicon, Wisconsin, Splinter earned his UW-Madison bachelor's degree in electrical and computer engineering in 1972 and a master's degree in electrical and computer engineering in 1974.

Splinter received the honorary degree at a commencement ceremony May 15 at the Kohl Center. Honorary degrees from UW-Madison recognize individuals with careers of extraordinary accomplishment. The Committee on Honorary Degrees looks to sustained and characteristic activity as its warrant: uncommonly meritorious activity exhibiting values that are esteemed by a great university.

During Splinter's time at Intel Corporation in Silicon Valley, that company became the epicenter of microchip technology. *(Continued on page 7)*



## Internship puts junior at intersection of engineering and policy



**F**or UW-Madison junior Derek Burling, the problem-solving mentality that drives all engineering finds a natural extension in the world of public

policy. An electrical and computer engineering major, Burling has become more and more interested in renewable energy, and holds an IEEE Power and Energy Society Scholarship. Burling drew further inspiration from

Professor Giri Venkataramanan, spending part of last summer working with Venkataramanan on the microgrid in Engineering Hall. "I like renewables a lot, and implementing them is a little more difficult than anything else, so the political side really intrigues me," Burling says.

He'll get to explore just that in summer 2015, when he heads to Washington, D.C., for a 10-week stint with the ASTM International Washington Internship for

Students of Engineering (WISE) program. Through the lens of the global standards organization, Burling and his fellow WISE interns will learn about the legislative and regulatory processes and how engineers can contribute to them, all while pursuing specific policy-related research projects.

"The idea of working with public policy and policymakers is very intriguing to me," Burling says. "I could see myself eventually working with organizations that kind of talk with engineers and policymakers."

In applying for the internship, Burling had to write two essays: one on why public policy should matter to engineers, and one proposing a research project for the internship. Burling's idea, which he'll get to enact this summer, is to study the implementation of renewable energy in emerging economies

across South America, Africa, and Asia.

With the right balance of policy and engineering, Burling says, renewables could enable the

developing world to minimize pollution and maximize efficiency without missing out on opportunities for economic growth.

"I think the earlier you put in these renewable systems, the easier it'll be down the road," he says. "I hope the research I do can be referred to and utilized in future policymaking actions, and foreign policies in regards to renewables, and change the lives of many for the better."

Burling currently is studying abroad in Madrid, Spain, taking engineering classes in Spanish at La Universidad Pontificia Comillas de Madrid. Experiencing new languages and cultures has further encouraged him to take a broader view of the role engineers play in society.

"As I've been going through my UW experience, I've gained a bigger-picture mentality, and I think this mentality combined with an engineering background really is important when you talk about public policy," he says.

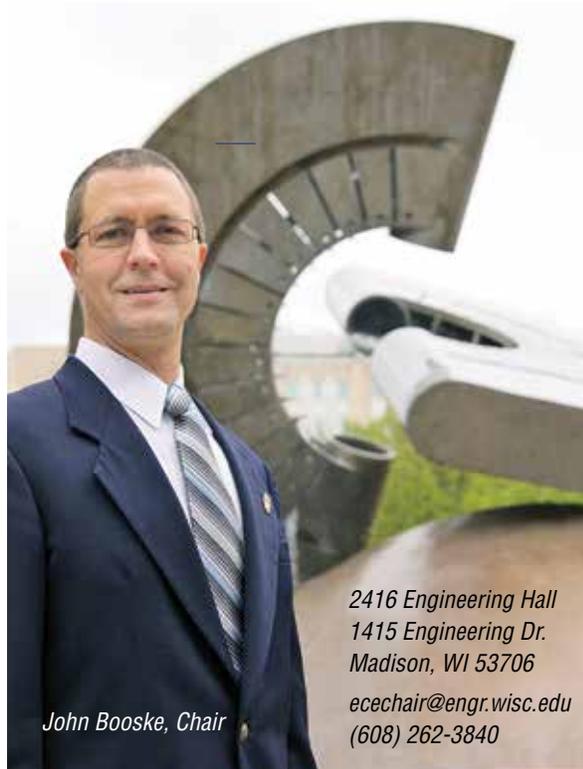
**A panel of experts from other universities and industry recently completed a comprehensive evaluation of our department—your department—on how we are doing in research, personnel (faculty, staff and students), instructional quality, reputation and identity, and operations and resources. In preparation for that evaluation, I had to research every aspect of our department and write up the results in a thorough report (100 pages of data and analysis!).**

What did that experience teach me? It taught me what you and I already knew: that we are an exceptional department! The campus and engineering professional societies recognize this with a persistent stream of honors for our faculty. The National Academy of Engineering recently inducted another of our great faculty members, Grainger Professor of Power Electronics and Electrical Machines Thomas M. Jahns, into its ranks, while the National Science Foundation honored another of our new faculty, Assistant Professor Daniel Ludois, with a prestigious CAREER Award. Meanwhile, in the last 10 years the number of our faculty honored with named professorships has increased *threefold* (from 4 to 11).

Our students and alumni likewise distinguish themselves on campus and on the national stage. This newsletter tells the story of Derek Burling, already a multi-year recipient of the IEEE Power and Energy Scholarship, who has been accepted into the highly selective ASTM International Washington Internship for Students of Engineering, where he will prepare for a future leadership role in electrical engineering policy development.

Two other people you'll read about in this newsletter came here because our department is known as one of the world's best for computer design and architecture research. Kevin Lepak and Edward Tashjian decided to pursue graduate degrees with us so they could go out into industry and design the world's most sophisticated computer processors for "big data" server centers, or the most secure computer chips for our mobile phones, respectively.

Of course, to attract and serve exceptional students requires exceptional faculty. Again, recognition from within UW-Madison and across the profession points to our excellence, both in education and research. Lynn H. Matthias Professor Barry Van Veen



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recently became the latest in a long line of ECE faculty to receive UW-Madison's highest honor for exceptional teaching: the Chancellor's Distinguished Teaching Award. His efforts and those of many of our faculty lead the nation in using blended and flipped instruction and active learning in core, required ECE courses, giving every student a chance to thrive and succeed. Our college, campus and industrial partners are investing in 21<sup>st</sup>-century classroom renovations that maximize the effectiveness for these innovative teaching approaches and serve as a model for many

other top universities. Our faculty compete for and win more research funding from industry and government (per faculty member) than most other of the top ECE departments. Their research is respected and highly cited. We credit the quality of our research ideas, in part, to the creative energy nurtured within one of the most gender-diverse ECE faculty in the country (almost 20 percent women).

How is all of this possible? As I have said before, the answer is with dedicated, exceptional faculty and students, supportive and visionary College of Engineering leadership, and the consistently generous support of our loyal

alumni and corporate sponsors. Without your continued support we would be hampered in hiring and retaining our world-class faculty and attracting the best and brightest students. In short, your gifts are critical to sustaining the exceptional value of *your* department's brand. The brand that says a UW-Madison ECE degree means *exceptional world-class engineering leadership*. Today and forever.

ON WISCONSIN!

*John Booske, Duane H. and Dorothy M. Bluemke Professor and Chair*

## ENDOWED PROFESSORSHIPS

**Investing in faculty excellence is a college priority—and one way we can attract and reward star faculty is through endowed professorships. Currently, approximately one-quarter of our engineering faculty members hold a professorship or chair—and our goal is to greatly increase the number of endowed professorships for both junior and senior hires.**

**A gift to the university will enable us to realize that goal: Alumni John and Tashia Morgridge made a landmark \$100 million gift to UW-Madison in support of faculty excellence—and that gift provides a dollar-for-dollar match to other donors who make a gift to endow a professorship (\$1 million), a chair (\$2 million) or a distinguished chair (\$3 million).**

**To make a gift for an endowed professorship, contact  
Betsy Burns, Director of Development,  
(608) 712-9376 or [betsy.burns@supportuw.org](mailto:betsy.burns@supportuw.org)**

As the semiconductor industry strives to make smaller and more compact products, it is becoming increasingly important to understand the physical laws that apply on a very small scale. This crucial intersection of electronics, quantum mechanics, and computing is where Professor Irena Knezevic focuses her research. Knezevic explores the physics of how heat, electrical charge, and light travel in the nanoscale environments of computing and laser technology, and how those physics impact a device as a whole.

Knezevic has been honored with a 2015

## Irena Knezevic receives Romnes Faculty Fellowship

Romnes Faculty Fellowship. As part of the fellowship, which honors and supports promising young faculty at UW-Madison, Knezevic will receive an unrestricted \$50,000 award for research, funded by the Wisconsin Alumni Research Foundation, that will help her research group pursue new directions in computing and laser technology.

Recent projects in Knezevic's group have included developing mathematical modeling tools intended to help laser makers get the most out of the quantum mechanics at work in the technology. "A small segment of the whole laser requires quantum mechanics to describe, and the rest of it is classical. We're looking at how the laser works as a whole system, how the quantum-mechanics part couples with the entire structure," Knezevic says.

Knezevic says the Romnes Fellowship funding might help her group convert the code of the laser-modeling work into more accessible tools for industry and other researchers. The funding will also bolster Knezevic's efforts to contribute to a greater understanding of

how near-field electromagnetic radiation interacts with nanoscale systems and how highly disordered, or rough, nanostructures conduct heat.

"This fellowship will help us explore the exciting connection between thermal transport at the nanoscale and quantum chaotic physics in general," Knezevic says.



## Supporting ECE's evolution

As an undergraduate in the early 1980s, Mark Brandemuehl really got excited about earning a UW-Madison electrical and computer engineering degree when he discovered the department's strong semiconductor manufacturing program.

After earning his bachelor's degree in 1983, Brandemuehl went on to spend more than 25 years in the semiconductor industry, serving in various engineering, manufacturing, and sales roles at companies like Standard Microsystems, KLA-Tencor, Tyecin Systems, and FormFactor.

In 2005, he embarked on another chapter of his career by joining the online real-estate search company Movoto, where he now serves as chief operating officer. In this role, Brandemuehl finds it's often crucial to be the one person in the room who understands how to design an experiment—and more broadly, how to apply an engineer's problem-solving mindset.

"What's interesting to me about the Internet space is that it kind of goes back to my roots in some ways, in that you're dealing with experimental data and statistics and trying to figure out what's going on with large data sets," Brandemuehl says. "Consumer behavior is very widely varied, so trying to figure out how to hit the sweet spot where you're going to satisfy enough consumers to get them to use your product and be excited about your product, that's very challenging and interesting."

Studying under faculty like the late professor Henry Guckel, who pioneered the UW-Madison semiconductor manufacturing program, gave Brandemuehl a foundation that has inspired him to make annual gifts to the ECE department since 1985. He also benefitted from courses that taught him writing and presenting skills, and notes that that exposure to the workings of industry is also vital to a good engineering education.

"I wasn't the guy who invented the micro-processor, but I worked in an industry that has transformed the world over the past 30 years, and I'm proud of that," he says. "I'd like to see more engineers have the opportunity to do that."

One reason that Brandemuehl contributes to the department's discretionary funds is that he trusts UW-Madison to give future ECE students a similarly strong foundation, and to adapt in order to serve that mission.

"They're good stewards of the money I give," he says. "I'm pretty excited about the innovations in education methodologies that the ECE department is pursuing."

And as much as Brandemuehl values his own UW-Madison experience—calling his education "a screaming bargain"—he also knows it's vital to support the continuing improvement of the excellent engineering programs.

"I think engineering is important to society, and I don't think we can spend too much money on engineering education," he says. "Most of the major problems in the world are going to be impacted in some way by engineers."



As the computing field builds programs and machines to take on ever more demanding workloads, Jing Li sees an imbalance developing. “Today, if you look at big data research, the emphasis is all in the software domain, but hardware is ultimately the foundation,” Li says.

Li, who joined the UW-Madison Department of Electrical and Computer Engineering in winter 2105 as an assistant professor, wants to close that gap by questioning the physical and structural principles at the heart of computer hardware. Li prides herself on building actual prototypes to prove her concepts in novel computer architecture, an approach she developed at the IBM T.J. Watson Research Center, where she spent five years as a research staff member after earning her PhD at Purdue University in 2009. This experience proved Li’s strengths in tackling problems across the realms of computer architecture, in particular memory and storage, and gave her a passion for developing computing technologies that will make a difference in people’s everyday lives.

“I always tell people I got my second PhD at IBM,” Li says. “In school, I used to work a lot on simulation and modeling. Working in industry, I got exposed to seeing how we can push new ideas into production.”

Each step in Li’s career has also demonstrated her tenacity in two countries where women are under-represented in science and engineering. While growing up in China, Li discovered she liked mathematics, physics and chemistry, so even as a child she felt herself going counter to the social norm. “My parents always encouraged me, but in China, people’s opinions were that as a girl, you were better off learning art or music,” Li says.

But she went on to earn her bachelor’s degree in electrical engineering at Shanghai Jiao Tong University in 2004, then headed to grad school at Purdue. She has joined a department that is among the nation’s leaders in employing female faculty—18 percent of tenured or tenure-track ECE faculty at UW-Madison are women. Senior ECE faculty including Philip Dunham Reed Professor Susan Hagness and Professor Amy Wendt also are leaders in outreach programs that encourage female pre-college students to become interested in science and engineering.

Li’s formidable track record at Purdue and IBM includes her successful demonstration in 2013 of the world’s first heterogeneous chip for associative computing using emerging nonvolatile memory technology—one that can perform efficient in-memory computing—for example, real-time pattern recognition, essentially blurring the boundary between two activities that are separate in today’s computer architecture paradigm. Her research work on emerging nonvolatile memories including PCM and STT RAM earned her special recognition from the *IEEE Journal of Solid State Circuits* and *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*.

As she begins her research work at UW-Madison, Li will focus on building on that very first prototype, in hopes of achieving a fundamental breakthrough in attaining increased computing power, energy efficiency and flexibility that a computer hardware would ever offer. “That first step was a technology test vehicle. Beyond that there are a lot of challenges that haven’t been addressed to truly turn this exciting concept into reality,” Li says.

Though Li has returned to academia in search of more wide-ranging and collaborative research, working at IBM gave her crucial perspective on the ever-evolving challenges of computing and the integrated approaches required to meet them. IBM has also donated lab equipment that will allow Li to continue to test prototypes here on campus. That concrete testing capacity will be vital for Li, because she looks at these challenges from both a top-down perspective—encompassing a computing system as a whole—and a bottom-up one—opportunities to upend

the physical sciences that form the basis of computing. “We have many different directions to explore now, in terms of spintronics, carbon-based devices, flexible electronics, photonics, bio-devices, and so on,” Li says. “It’s not just silicon anymore.”

And to neglect the hardware picture, Li says, would be to neglect some profound obstacles. The very nature of the data and processes computers need to handle is constantly changing, which means hardware needs to become more adaptable. “The workload is very dynamic,” Li says. “It’s very hard to predict, two years from today, what will happen.”

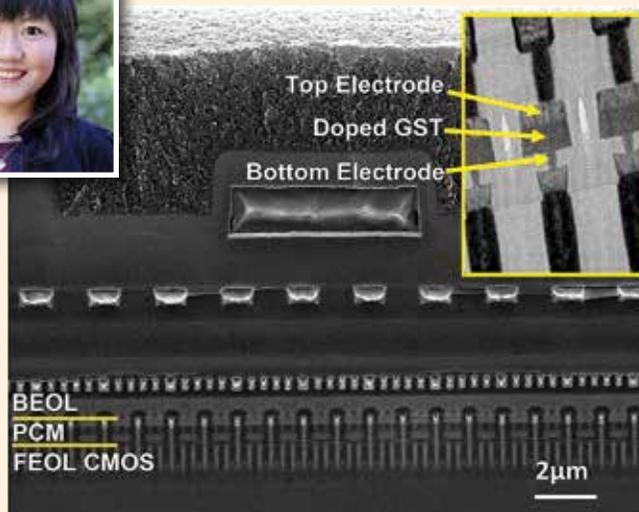
Li believes improvements in future computer systems will be made through collaborative software and hardware innovations, rather than just through the traditional technology advances driven by Moore’s Law. Her goal in research is to develop innovative techniques that can transform today’s software-hardware hierarchy, not just drop-in replacements.

Li also realizes that transforming the computing field will require a deeply collaborative environment.

As she interviewed for faculty positions, Li found herself drawn to UW-Madison because of its breadth and a culture that encourages researchers to work across departmental and disciplinary boundaries. She points to the long-running history of collaboration between faculty in the College of Engineering and their counterparts in the computer sciences department (which is part of the College of Letters & Science), and to the diversity within the ECE department itself, especially researchers who work with flexible electronics, photonics and microelectromechanical systems. Li also hopes to collaborate with applied physics researchers across UW-Madison. Outside of work, Li also enjoys hiking and exploring new restaurants and cultures—so naturally she’s excited to be living as well as working in Madison.

“All the faculty here are very supportive, and we don’t have barriers across departments,” Li says. “We have a pretty balanced program here—every area is strong, and I have a lot of collaborative opportunities. And we have very good students. I feel like I have everything I need.”

## JING LI: Championing hardware in a big-data world



A diagram of one of the innovative computer chips Li is developing.

As an undergraduate at Cornell University, Mikhail Kats initially wanted to focus on computer science, but soon found himself drawn to the realm of applied physics, particularly optics and photonics. He pursued undergraduate research in a Cornell semiconductor optoelectronics group, kicking off an academic career that has embraced a broad range of interests but always found powerful connections between micro- or nano-scale technology and the physics of light.

"I enjoy the science of light, because optics and photonics penetrate every area of science and engineering," Kats says. "It's exciting that the same physical laws that have been around for 150 years can describe a tremendous range of phenomena today."

After earning his Cornell bachelor's degree in engineering physics, Kats joined the applied physics department at Harvard University, where he completed his PhD in 2014. Following a transitional period of postdoctoral work, he joined the UW-Madison Department of Electrical and Computer Engineering in winter 2015 as an assistant professor. Kats was born in St. Petersburg, Russia, but his family moved to Kansas when he was 9 years old, so he considers his move to Madison a homecoming to the Midwest.

One major focus of Kats' research is translating the concept of metamaterials into the more manageable, application-friendly form of metasurfaces. "If you look at the practical applications, optical metamaterials have not spawned an awful lot of new technology," Kats says.

Metamaterials—essentially artificial materials engineered to have specific properties—are problematic in optics because it's difficult to make three-dimensional nano- and micro-scale structures that manipulate light without absorbing too much of it. As a way around this "lossy" quality, Kats has proposed making more or less two-dimensional layers which can manipulate light without it having to pass through a large volume of lossy material. He points out that two-dimensional structures, in addition to being less lossy, are easier to fabricate. "We're now able to create surfaces that can bend and reshape light in arbitrary ways," he says.

Kats and his Harvard collaborators announced a breakthrough in this area in the journal *Science*, just as Kats was settling in at UW-Madison in February 2015. The paper described the invention of a metasurface that serves as a completely flat, ultra-thin lens. Whereas previous flat lenses were unable to handle multiple different wavelengths of light without creating distortion, the Harvard team's metasurface incorporates tiny antennas that keep several wavelengths of light in sync, instead of scattering them in different directions.

Moving forward, Kats wants to push metasurfaces to be able to handle a broader range of wavelengths, and build on metasurfaces' potential to adjust and reconfigure in response to changing optical conditions. Kats sees huge opportunities for these small, powerful optical components in applications like consumer electronics and spectroscopy, and notes that photonic components are beginning to be incorporated into computers, presenting another possible application area for his work.

While Kats treats optical loss as an obstacle in some aspects of his research, he has seized on it as a possible advantage on another front. In an area known as "thin film interference," he has discovered that layers of lossy material just a handful atoms thick can absorb as much as 70 or 80 percent of incident light within a certain wavelength range. Kats demonstrates this with a photo of several flat pieces of gold coated with thin layers of germanium. Each piece has just a tiny bit more germanium on it than the last, but as the germanium coating goes from seven nanometers to 11 to 15, the colors of the surfaces change dramatically, from pink to violet to blue. "This is pretty crazy, because a nanometer film of germanium is about two atoms thick, so you can essentially see atomic layer differences with your naked eye," Kats says.

Such thin layers, with such dramatic effects on the behavior of light, could eventually be

designed to absorb between 85 and 100 percent of the visible light that hits them, Kats says. Light-absorbing power like this could have applications in solar energy. "You can start thinking about reducing the thickness of solar cells by a factor of 100" Kats says, adding that it could drastically reduce the cost and weight of solar installations.

The power of certain materials to absorb light also plays into Kats' growing interest in the reverse process: thermal emission. Any object at a temperature above absolute zero gives off thermal radiation over a range of wavelengths, with hotter objects emitting more. For example, infrared light given off via thermal emission is what infrared cameras sense. Kats has designed optical structures using vanadium dioxide, a phase change material, which give off less thermal radiation as they are heated and thus appear cooler on infrared cameras. Kats believes that this property could lead to useful applications ranging from infrared camouflage to passive temperature regulation for satellites and rooftops.

"I have given several seminars where the audience members were incredulous when presented with this striking effect," Kats says. "I want to be emphatic that it doesn't violate the laws of thermodynamics, but it's a way to sidestep the general principle that hotter objects emit more light."

Kats says he seeks inspiration by experimenting with newly developed or newly understood materials, and by plugging different wavelengths of light into optical concepts he's already familiar with. That spirit of getting out of one's own comfort zone is part of what attracted Kats to UW-Madison.

"I really like big research universities," Kats says. "I think it's enormously valuable to be at a big place where you can find an expert in any field, a wide variety of students, and equipment of every sort, because you never know precisely where your research will take you."

Within the ECE department itself, Kats sees a faculty that's already well-versed in combining engineering with applied physics, from longer-established professors to new hires like Assistant Professor Zongfu Yu, who shares Kats' deep interest in optics.

"I think UW-Madison has a big opportunity to build a critical mass of researchers working on nanophotonics," Kats says. "It's an exciting time to be here."



## Bridging applied physics and engineering

## A hands-on education in hardware security



As an undergraduate at UW-Madison, Edward Tashjian began working with Associate Professor Azadeh Davoodi, whose research group tackles an array of problems surrounding integrated circuit design and manufacture. Tashjian earned his bachelor's degree in electrical and computer engineering in 2013, and stayed on as a graduate student with some support from a Wisconsin Distinguished Graduate Fellowship.

As he pursues his master's degree, Tashjian is working with Davoodi to create a sort of screening process to detect malicious tampering in the chip manufacturing process. "You're a company that designs circuits, but unless you're an Intel or a Samsung, you have to send it off

to a foundry to be manufactured," Tashjian says. "The concern is that someone might be putting additional hardware into your design that can circumvent your security. What we're asking is, given a manufactured circuit, can we reverse-engineer it and find any hardware that differs from the original design?"

The research ties in well with the interest he developed in computer security as an undergraduate. His first internship was in a software-level security positions at CUNA Mutual Group in Madison. He went on to do a co-op at IBM, where he worked on hardware validation on a storage-controller chip, and then at Samsung, where he worked on verification for a chip the company designed for its mobile phones.

All these experiences have given Tashjian a chance to experience and learn about hardware security from a variety of angles. After he completes his graduate work, he hopes to continue working on security issues in an industry setting. He's looking forward to the challenges this fast-evolving area will present.

"One of the reasons I like hardware security is that it's still growing and there's not as much of an established discipline as there is in other areas," Tashjian says. "It's a lot to investigate."



*Here's a chance to show your Badger engineering pride: We're excited to announce our online store, where you can purchase College of Engineering gifts and apparel. Check out our selection today at [store.engr.wisc.edu](http://store.engr.wisc.edu)!*

## Honoring Wisconsin's legacy in computing

When Stevens Point native Kevin Lepak first came to UW-Madison in the 1990s as an undergraduate, he found an ideal environment for training versatile computer engineers.

"The thing that stood out to me was how many world-renowned faculty there are in that specific area between ECE and the computer science department," says Lepak, who earned his bachelor's degree in 1999, his master's in 2000, and his PhD in 2003, all from the UW-Madison ECE department. "Wisconsin is known in both industry and academia for having one of the best computer-architecture graduate programs anywhere in the world, and that's why I decided to stay for an advanced degree."

In his current role as a fellow on the memory system architecture team at computer-solutions company AMD in Austin, Texas, Lepak says he relies on the depth and breadth that his UW-Madison experience gave him. "Both the master's and PhD programs force you to

learn good critical thinking and presentation skills," he says. "It isn't just, 'This is what's written in a book and I can recite it so I'm educated.' It's, 'How do you take what other folks have done and apply it in a different context and solve a different problem?'"

That's especially crucial given the variety of problems Lepak currently works on across the spectrum of CPU design, memory subsystem architecture, and system design. "It really covers aspects of the whole chip," he says. "I work on processor designs that are focused on the server market and how to make them optimized in terms of performance and power."

These issues tie back to Lepak's PhD work under Philip Dunham Reed Professor Mikko Lipasti. Lepak's resulting thesis focused on how to exploit value locality in a chip to optimize its performance. "It was fun at times and it was very hard work at times, but that's what makes it rewarding," he says. "The faculty were great, very approachable and willing to



help people learn, and at the same time they were masters in their field."

Though Lepak's interest in computers and programming dates back to his

childhood, he credits the value of his UW-Madison education with preparing him for a career in the constantly and rapidly evolving world of computer architecture, and he wants to spread the benefits. Lepak recently began donating to the College of Engineering annual fund, to help the next generation of students benefit from great computer-architecture training and encourage a climate of cross-disciplinary research.

"I benefitted in all these ways and was lucky enough to be funded on research assistantships and fellowships, so it's appropriate for me to try to help the department help other people," he says.

# Wendt honored at college's 2015 faculty/staff appreciation celebration

**P**rofessor Amy Wendt is a relentless forward thinker and socially conscious engineer, dedicated to serving the community through vision and effort. The College of Engineering honored Wendt's efforts to advance women in engineering by presenting her with the Equity and Diversity Award at a faculty and staff appreciation event on April 21.

Wendt was only the third female faculty member (now there are seven) hired in the Department of Electrical and Computer Engineering. She has held numerous leadership roles in her effort to engage young students in science, technology, engineering and math, and support the advancement of women in engineering. "For over a decade, I have observed how Dr. Wendt has been a champion for women in the college, at all levels," says Jennifer Sheridan, executive and research director of the Women in Science & Engineering Leadership Institute (WISELI) at UW-Madison.

Wendt has served as co-director of WISELI, working with the institute since 2002 to facilitate a number of workshops that promote women in engineering.

She helped create and implement two WISELI grant programs: Celebrating Women in Science and Engineering and Vilas Life Cycle Professorship, which promote visibility, recruitment and retention of women in science and engineering. She also is a founding member of the administering committee of the Denice D. Denton Memorial Fund, which brings speakers to campus in an effort to promote women's leadership in STEM fields.

Additionally, Wendt has participated in and led a number of off-campus initiatives that speak to the extent of her dedication to the College of Engineering, women engineers and the community as a whole. She has engaged in a number of efforts to reach out to a younger audience of future engineers. Serving as a role model for young women, Wendt designed activities that would attract the K-12 audience to engineering concepts. From 2010 to 2015, she worked with middle school teachers to improve pre-existing curriculum,



Amy Wendt

designing "modules" that would help students develop a more positive outlook on the field of engineering.

In addition to her assiduous efforts to promote an innovative engineering education for K-12 students, she also works to ensure the benefits of faculty within the university system. In 2015, Wendt was elected to the

UW-Madison University Committee, which reviews issues concerning faculty governance. Among other issues, this leadership position has allowed Wendt to advocate for improved parental leave benefits for all faculty throughout the university.

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## Mike Splinter *(Continued from p.1)*

In 2003, Splinter became CEO of Applied Materials, and in 2009 became chairman of the board. As CEO, he identified solar energy—particularly photovoltaic cells—as an area rich with opportunity. The Semiconductor Industry Association credits him with transforming the production of these cells from a "boutique industry to a meaningful source of renewable energy power to the world."

Community service is a critical element in his professional and personal philosophies. This commitment has taken many forms—for example, fighting hunger through supporting area food banks, launching a program to invest in struggling local schools, and working with the Clinton Global Initiative to electrify villages in rural India.

He has always acknowledged his debt to UW-Madison as an active alumnus in the San Francisco Bay area and more recently as a member of the board of directors for the UW Foundation.

"Splinter has a rare reputation for displaying leadership and technical acumen in equal measure," says John Booske, Duane H. and Dorothy M. Bluemke and Vilas Distinguished Achievement Professor and Chair of the Department of Electrical and Computer Engineering. "Throughout his career, he's stayed in touch with technical intricacies and advances, applying that knowledge to formidable problems in computing, energy and education."

**College celebrates dedication of Plexus Collaboratory**

The ECE department and Plexus Corp. of Neenah, Wisconsin, recently celebrated the opening of the Plexus Collaboratory, an exciting new space that embodies the department's commitment to educational innovation. The Plexus Collaboratory's 92 workstations provide students and instructors with tremendous opportunities for hands-on learning and deeper development of the interpersonal skills so crucial for successful engineering careers.

**View a video about the space: [go.wisc.edu/collaboratory](http://go.wisc.edu/collaboratory)**



## Save the dates!

Each year, the College of Engineering hosts several alumni events around the country. Save the date for an event near you—and if you'd like us to add you to the invitation list for a specific event, please contact Stephanie Longseth, (608) 265-3496 or slongseth@wisc.edu.

**January 13**—Houston, TX

**February 18**—Bonita Springs, FL

**March 26**—San Francisco, CA

**May 21**—Seattle, WA

**June 26**—Chicago, IL

**July 16**—Fox Valley, WI

**August 20**—Twin Cities, MN

**September 15**—Milwaukee, WI

**October 4**—Washington, D.C.

**October 16**—Madison (*Engineers' Day*)

**TBA**—San Diego, CA



**College of Engineering**  
UNIVERSITY OF WISCONSIN-MADISON

Department of Electrical & Computer Engineering  
1415 Engineering Dr.  
Madison, WI 53706



## Booske receives Vilas Distinguished Achievement Professorship

Duane H. and Dorothy M. Bluemke Professor and Chair of Electrical and Computer Engineering John Booske has been appointed a Vilas Distinguished Achievement Professor, one of the highest honors UW-Madison conveys upon its faculty. The award aims to honor and support UW-Madison professors with extraordinary track records in research, teaching, and/or service. Each recipient is provided with \$75,000 in flexible funds over five years to support his or her research efforts.

Booske focuses his research activities on finding new sources and applications of high-frequency electromagnetic radiation. Booske joined the UW-Madison faculty in 1990, served as director of the Materials Science Program from 2001 to 2005 and has served as chair of the department of electrical and computer engineering since 2009. Booske earned his PhD in nuclear engineering from the University of Michigan in

1985, after which he served in several research capacities in fusion, plasma and high-power microwave source research at the University of Maryland.

Booske says the Vilas Professorship will help support, among other research activities, his work on vacuum electronics. "There are very few resources contributed to this area anymore, yet we still have a critical reliance on it in our civil and military infrastructure," Booske says, pointing to the roles vacuum electronics play in satellite communications, radar, and military personnel protection technologies.

Booske's other long-established research areas include collaborating with Philip Dunham Reed Professor of Electrical and Computer Engineering Susan Hagness on using electromagnetic-field technology to remove tumors and diseased cells in a more precise, less invasive manner.

Emerging interests for Booske and his collaborators include new materials for medical device development and evaluation, and work that combines novel optics with metamaterials. Beyond research, Booske hopes the professorship will support his widely recognized leadership in educational innovation. "I continue to look for opportunities to enable and facilitate the department and UW-Madison's move toward active learning techniques and enabling successful learning for all students," he says.

### Thank you for your continued support of the UW-Madison Department of Electrical and Computer Engineering.

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