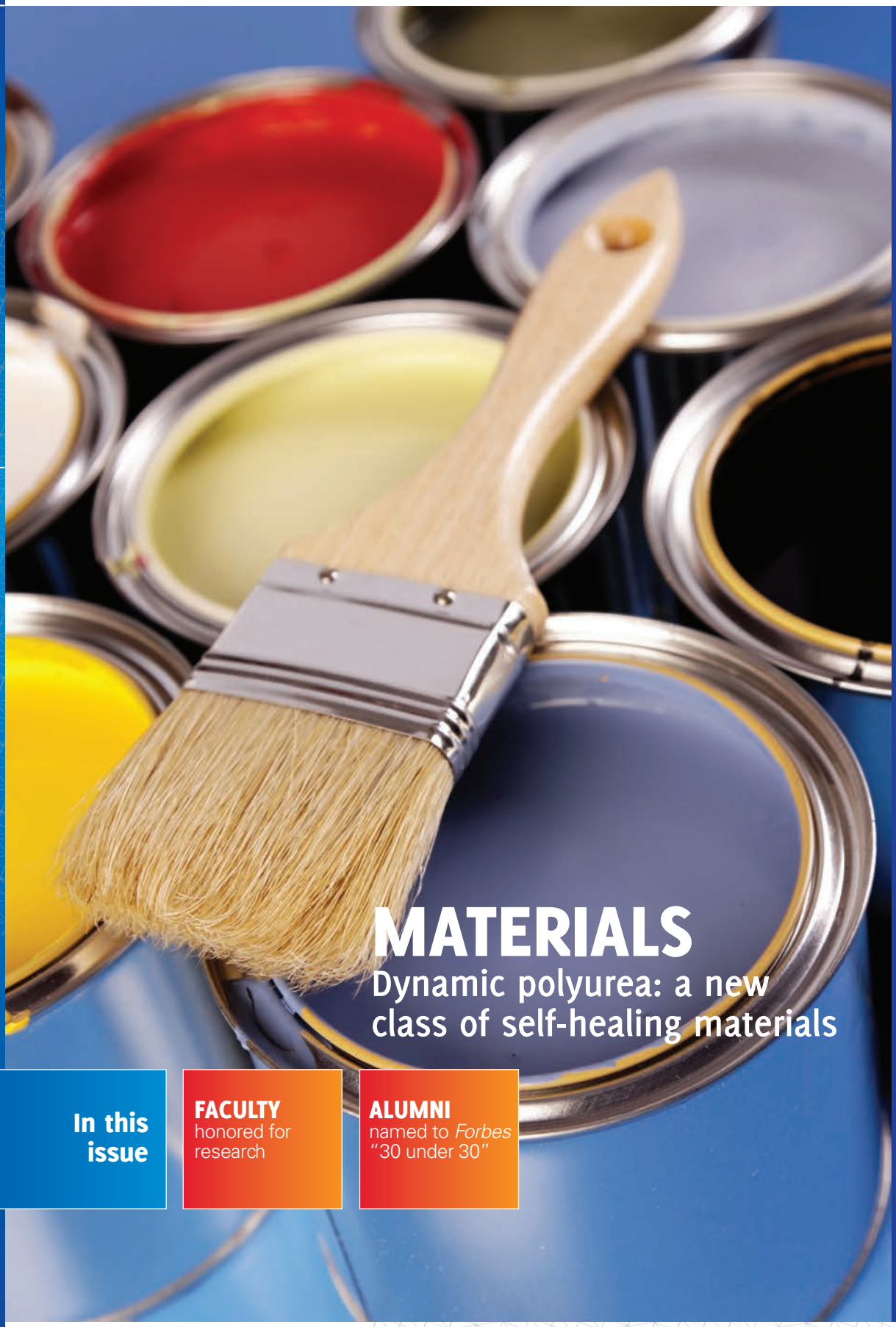
MatSE news

Summer 2015



MATERIALS

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MATERIALS SCIENCE AND ENGINEERING | College of Engineering | University of Illinois at Urbana-Champaign

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named to *Forbes* "30 under 30"

MATSE ALUMNI NEWS

Department of Materials Science and Engineering

David Cahill
Department Head

Cindy Brya
MatSE Alumni News Editor

Letters, comments and newsletter submissions

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Greetings from Urbana

We know that the MatSE faculty are the best researchers and educators in the world, and it is gratifying when we get evidence that our colleagues across the country agree with us. Last month, two MatSE faculty, Prof. John Rogers and Emeritus Prof. Steve Granick, were elected to the National Academy of Sciences, one of the highest recognitions of scientific achievement in the world. John joined the MatSE faculty in 2003 and has been on a steep trajectory ever since. His work on the integration of flexible electronics in medicine has been groundbreaking and will be a cornerstone of research in the new engineering-based medical school on the Urbana campus that was recently approved by the University of Illinois Board of Trustees. Steve retired from the MatSE faculty in January after a 30-year career at Illinois and is now the director of the Center for Soft and Living Matter at the Institute for Basic Science in Ulsan, South Korea. His election to the national academy recognizes his leadership in the field of soft materials. His recent work on emergent structure and dynamics in "Janus particles," colloids with asymmetric chemical or physical properties, has been hugely influential in the scientific community and is creating great excitement for potential technologies based on his ideas.

Assistant Prof. Daniel Shoemaker received the Department of Energy Early Career Award for his work on materials discovery. The DOE-EC is one of the most selective of the early career grant programs with a success rate of only 7 percent. The funding level is also one of the highest – $750,000 spread out over five years – an extraordinary level of support in this time of flat federal funding for academic research. The DOE-EC award is terrific acknowledgement of the significance of Daniel's research agenda and his potential to become a defining leader of the field of materials science and engineering over the coming decades.

Prof. Jianjun (JJ) Chen has been selected as a fellow of two major societies: the American Institute for Medical and Biological Engineering (AIMBE) and the Division of Polymer Chemistry (POLY) of the American Chemical Society. Selection as a Fellow of POLY is particularly exclusive with only 0.1 percent of the membership awarded fellowship in any one year.

We are devoted to supporting the excellence of faculty scholarship in MatSE in all that we do. We recognize the need to provide our faculty and students with the best possible facilities and financial support needed to carry out their work and attract the world's best students to our research programs. Fellowships for graduate students are a critical part of this support. This newsletter introduces Erin Kirby, our new director of advancement and major gift officer, who is helping us deliver our message to our amazingly supportive network of alumni. We are working to build on a major gift from Don Hamer that helps us recruit top students by providing supplemental fellowships to incoming PhD students. Growth of our endowments for fellowships will enable us to provide continuing multi-year support and impact a larger number of students and faculty research programs.

Sincerely,

David Cahill
Willett Professor and Head

SELF-HEALING AND HYDROLYZABLE POLYMERS

COULD LEAD TO CLEANER FUTURE

Thanks to new materials being developed in the Jianjun Cheng group, removable paint and self-healing plastics soon could be household products. In addition, the new hydrolyzable (transient) polymers could one day be used in environmentally friendly plastics and packaging materials.

Professor Jianjun Cheng, graduate student Hanze Ying and postdoctoral researcher Yanfeng Zhang published their work on self-healing polymers in the journal *Nature Communications*.

"The key advantages of using this material are that the healing process is catalyst-free and low-temperature and can happen multiple times," Cheng said. "These are very nice materials for internal cracks repairs. This can heal the crack before it causes major problems by propagating."

The new study focused on elastic materials made of polyurea, one of the most widely used classes of polymers in consumer goods such as paints, coatings, elastics and plastics. However, the researchers slightly tweaked the conventional polyurea structure to make the backbone more 'crowded' – the reason why the new chemical structure was named as 'hindered' urea bond (HUB). This modification can make the bonds between the molecules more dynamic so that they can more easily pull apart and stick back together – the key for healing.

After the polymer is cut or torn, the researchers press the two pieces back together and let the sample sit for about a day to heal – no extra chemicals or catalysts required. The materials can heal at room temperature, but the process can be sped up by curing at slightly higher temperatures (37 degrees Celsius, or about body temperature). The polymer bonds back together on the molecular level nearly as strongly as before it was cut. In fact, tests found that some healed samples, stretched to their limits, tore in a new place rather than the healed spot, evidence that the samples had healed completely.

"We just buy commercial materials and mix them together, no fancy controls or special apparatus," said Cheng. "It's a very simple, low-cost, inexpensive process. Anybody can do this on any scale."

The researchers are exploring how dynamic polyurea could bolster different applications. For example, they could fine-tune the mixture so that a polyurethane coating or paint could be removable.

A new aspect Cheng and his colleagues have found about the new HUB materials is that they can degrade by water over a specified time period.

"Polymers with transient stability in aqueous solution, also known as hydrolyzable polymers, have been applied in many biomedical applications, such as in the design of drug delivery systems, scaffolds

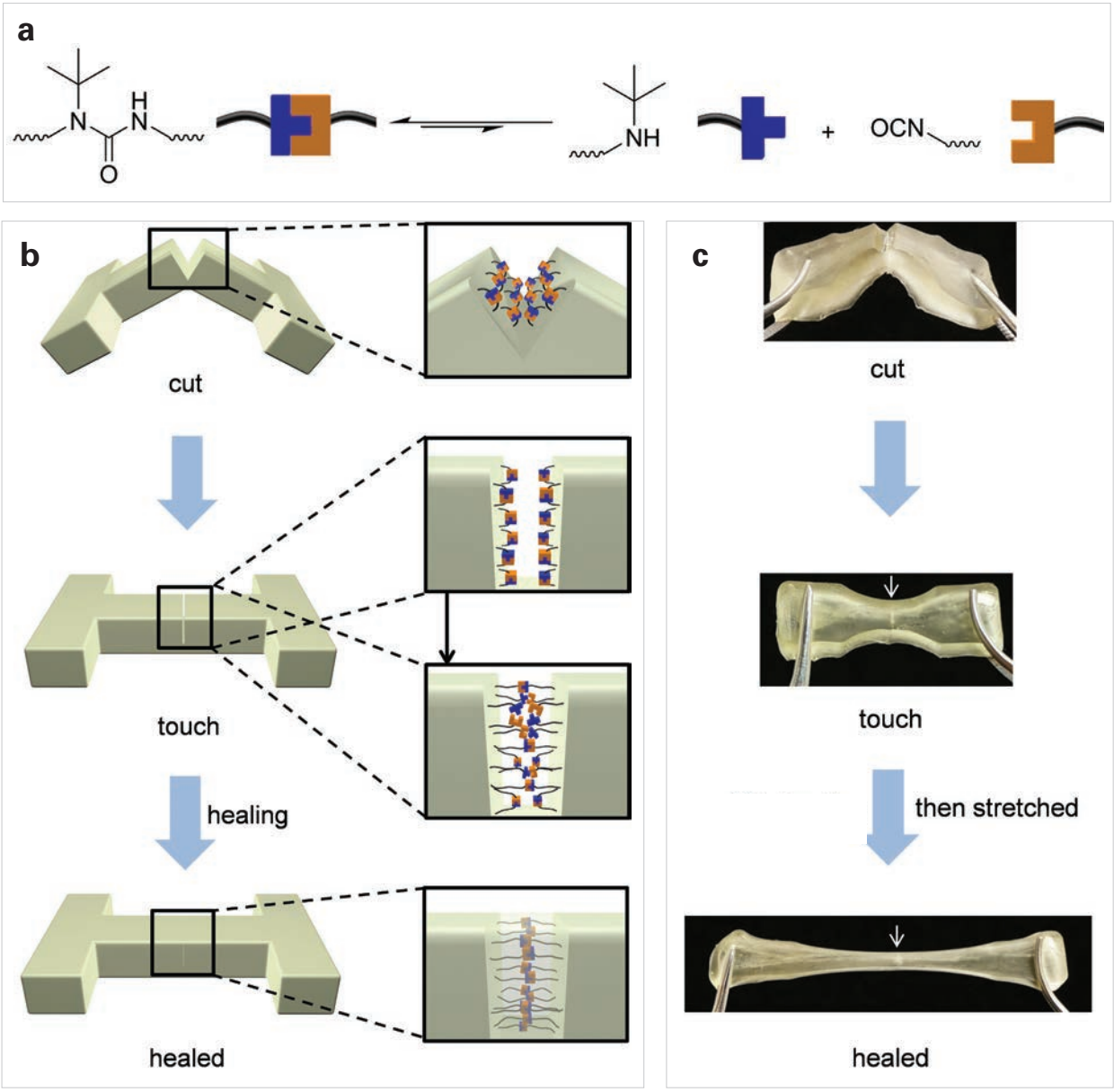


Illustration of the self healing process of HUB-based self-healing materials. *(a) Reversible dissociation-association of HUB bond; (b) The bond exchanges at the interface enable the healing of the cut; (c) The bond exchanges at the interface enable the healing of the cut.*

for tissue regeneration, surgical sutures, and transient medical devices and implants," explained Cheng.

"While conventional polyurea are very stable against hydrolysis, HUB materials can be completely hydrolyzed within a few days," Cheng added. "Since 'hindrance' is the cause of the bond destabilization, the hydrolysis kinetics of HUB materials can be easily tuned as needed for a specific application. They can potentially be environmentally friendly green and sustainable materials as well."

According to the researchers, the new HUB materials potentially have great advantages over many other hydrolyzable polymers. HUB materials can be made with inexpensive chemical precursors in ambient conditions via simple and clean chemistry with no catalyst or by-products, making it possible for end-users to control the copolymer recipe for specific use without the need of complicated synthesis apparatus.

The Cheng group's research on hydrolyzable polymers was published in the *Journal of the American Chemical Society.*

- University of Illinois News Bureau and Engineering Communications

Faculty **Achievements**

Rogers and Granick elected to NAS

John Rogers and Steve Granick have been elected to the National Academy of Sciences, one of the highest honors that a scientist can receive. The National Academy of Sciences (NAS) is a private, non-profit society of distinguished scholars. Established in 1863, the NAS is charged with providing independent, objective advice to the nation on matters related to science and technology. Scientists are elected by their peers to membership in the NAS for outstanding contributions to research.

John Rogers

Steve Granick

John Rogers is a pioneer of flexible, stretchable and transient electronics. He combines soft, stretchable materials with microscale and nanoscale electronic components to create classes of devices with a wide range of practical applications from medicine to sensing to solar energy. Rogers has been awarded a MacArthur Fellowship (2009), a Lemelson-MIT Prize (2011) and the Smithsonian American Ingenuity Award (2013). In December 2014, Yahoo! put John Rogers on its list of "8 Scientists who are changing the world," along with such notables as Stephen Hawking. He is a fellow of the American Association for the Advancement of Science, the American Physical Society, the Institute for Electrical and Electronics Engineers, the Materials Research Society and the National Academy of Engineering.

Steve Granick, professor emeritus, is an expert in the chemistry and physics of colloids and polymers. His work focuses on soft materials, working across disciplines to explore imaging, assembly, behavior and interactions of molecules in living cells and specially designed colloidal particles. His work has broad applications in medicine, biology, chemistry and manufacturing. He is a fellow of the American Physical Society and received the APS Polymer Physics Prize (2009). He retired from the University of Illinois in 2014 and founded the Center for Soft and Living Matter in the Korean IBS (Institute for Basic Science).

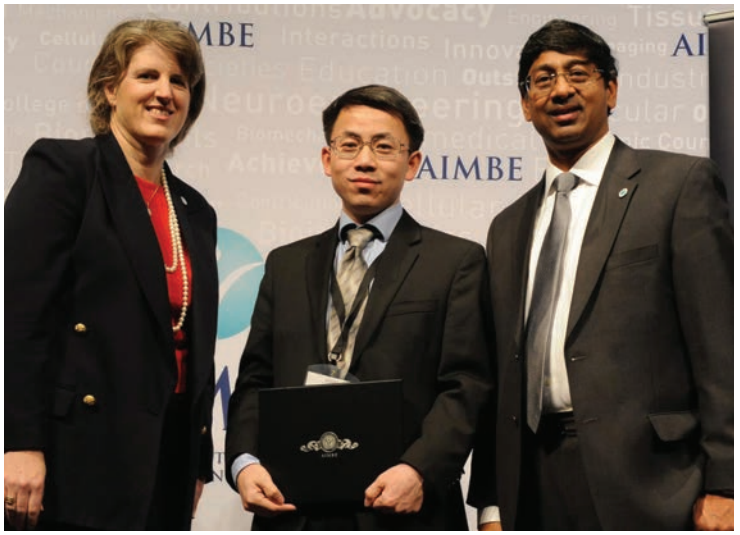
Cheng inducted into AIMBE College of Fellows

Jianjun Cheng has been inducted into the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows "for outstanding contribution to the development of polymeric biomaterials and translational nanomedicine." The College of Fellows is comprised of the top 2 percent of medical and biological engineers in the country.

Since 1991, AIMBE Fellows have helped revolutionize medicine and related fields in order to enhance and extend the lives of people all over the world. They have also successfully advocated for public policies that have enabled researchers and business-makers to further the interests of engineers, teachers, scientists, clinical practitioners, and ultimately, patients.

Cheng received a BS degree in chemistry from Nankai University, China, a MS degree in chemistry from Southern Illinois University, Carbondale, and a PhD degree in materials science from the University of California, Santa Barbara. He was a senior scientist at Insert Therapeutics, Inc., from 2001 to 2004 and a postdoctoral fellow at MIT from 2004 to 2005. He joined the MatSE faculty at Illinois in 2005.

He has been named to the list of Teachers Ranked as Excellent by Their Students at Illinois five times, and was named a Willett Faculty Scholar by the College of Engineering in 2013. Cheng is the recipient of a Prostate Cancer Foundation Competitive Award (2007), a NSF Career Award (2008), a Xerox Award for Faculty Research (2010) and a National Institute of Health Director's New Innovator Award (2010).



Jennifer West (Chair, College of Fellows), Jianjun Cheng, Ravi Bellamkonda (AIMBE President)

A formal induction ceremony was held during AIMBE's 2015 Annual Meeting at the National Academy of Sciences Great Hall in Washington, DC, in March.

Trinkle named a Willett Scholar

Dallas Trinkle

Dallas Trinkle is one of 10 faculty members in the College of Engineering who were named Donald Biggar Willett Scholars for 2015. The recognition is targeted for faculty members who, at a relatively early stage in their careers, are excelling in their contributions to the University of Illinois.

Trinkle joined the MatSE faculty in 2006. He uses simulation to understand atomic and quantum properties of defects and electronic and mechanical behavior of materials. Defects play a crucial role in material properties, and predicting defect properties at atomic length scales is a challenging area of computational research. Improving and controlling mechanical behavior of structural metals is key to improving energy efficiency through weight reduction (automotive and aerospace) or increasing operational temperatures (turbines for aerospace and energy production).

He has been recognized with an NSF CAREER Award (2009), the AIME Robert Lansing Hardy Award (2014), the Xerox Award for Faculty Research from the College of Engineering (2011) and the 3M Untenured Faculty Research Award (2008-2010).

Cahill receives Touloukian Award

David Cahill

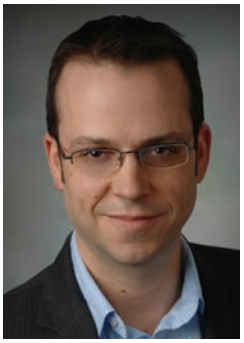
David Cahill received the 2015 Yeram S. Touloukian Award from the American Society of Mechanical Engineers (ASME). His award is "for sustained, pioneering contributions to heat conduction metrology including the 3-omega and optical pump-probe methods, which are pervasive in laboratories worldwide; and for landmark contributions on the minimum and ultralow thermal conductivity of solids."

The Touloukian Award is given every three years in recognition of outstanding technical contributions in the field of thermophysical properties. It is named for Yeram Touloukian, a Purdue University professor who was world-renowned for his work in thermophysics. Cahill was presented with the award during the 19th Symposium on Thermophysical Properties in Boulder, CO, where he gave the plenary talk, "Ultrafast heat transfer in nanoscale materials."

Cahill received his BS in engineering physics from Ohio State University and his PhD in physics from Cornell University in 1989. His doctoral work concerned lattice vibrations of disordered solids. Before joining the faculty at Illinois, he worked at IBM Watson Research Center where he conducted research on metal-semiconductor interfaces.

His current research program focuses on developing a microscopic understanding of thermal transport at the nanoscale; the development of new methods of materials processing and analysis using ultrafast optical techniques; and advancing fundamental understanding of interfaces between materials and water. He has over 250 publications. He is a Fellow of the Materials Research Society (2012), American Physical Society (2005) and American Vacuum Society (1998).

Kilian receives NSF CAREER Award



Kris Kilian

A new technique being developed by Kris Kilian could revolutionize medicine by enabling a patient's own cells to be reverted back and modified to correct mutations and regenerate injured tissues. Kilian recently received a National Science Foundation CAREER Award for this work and for his initiative in educating students about stem cell engineering.

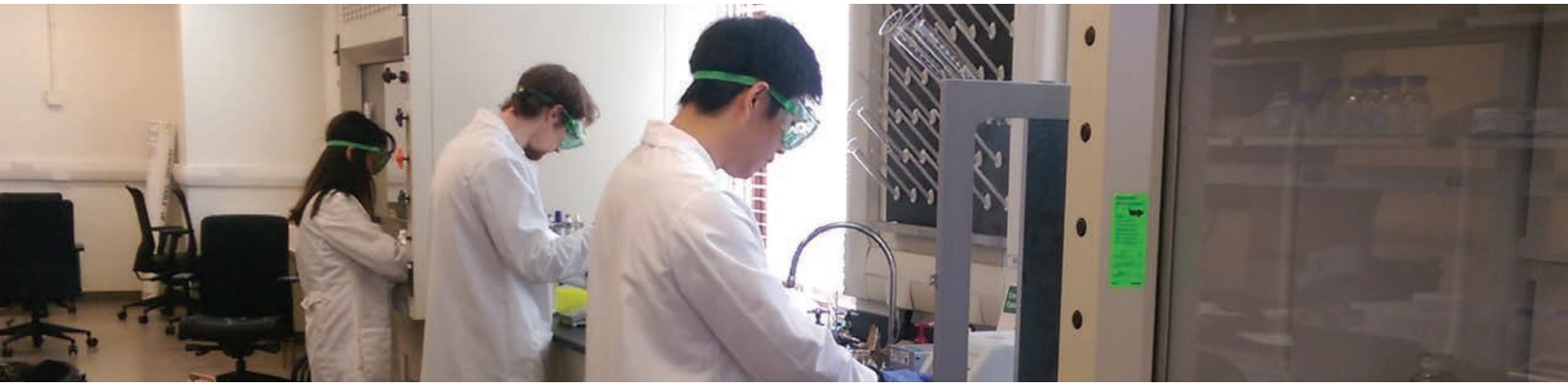
In cell biology, pluripotency refers to a stem cell that has the potential to differentiate into any of the three germ layers: endoderm, mesoderm or ectoderm. Human cells have been shown to revert to a primitive 'embryonic-like' pluripotent state when only four genes are forced "on" using genetic techniques. This discovery earned John Gurdon and Shinya Yamanaka the 2012 Nobel Prize in Physiology or Medicine.

"However, the process in which cells reprogram is not well-defined or understood, is very inefficient, and takes considerable time," Kilian explained.

Kilian is using designer cell culture materials to study how cells revert to pluripotency in order to develop a system that can quickly and efficiently reprogram a patient's cells. "The combination of approaches employed is expected to dramatically reduce reprogramming time, increase efficiency and reduce the need for exogenous factors such as lentivirus," Kilian added.

The emerging view of how materials influence cellular reprogramming that is supported by Kilian's research will be integrated into education and outreach activities through a new Stem Cell Engineering Training Institute (SCETI). In this institute, laboratory videos will be developed for use in a summer camp for high school girls - Girls Adventures in Mathematics Engineering and Science (GAMES) - and to supplement the curriculum of the senior undergraduate course in biomaterials.

Kilian worked at Rosetta Inpharmatics/Merck & Co. in the Methods Development group from 2000 to 2004 before travelling to Sydney, Australia, to do his PhD at the University of New South Wales. His doctoral and postdoctoral research involved the development of materials for biotechnology and medicine. He joined the MatSE faculty in 2011 as an assistant professor.

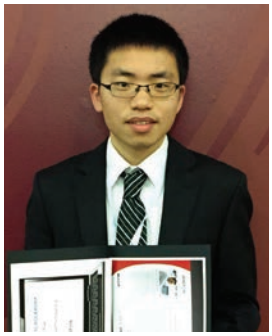


NEW LABORATORY FOR BIOMATERIALS RESEARCH

Renovations to the 212 suite in the Materials Science and Engineering Building were completed in February at a cost of $2 M. The new 212 suite, with around 2,500 square feet of laboratory space, is being shared by professors Kris Kilian and Cecilia Leal, biomaterials faculty in the MatSE Department.

Kilian's research involves the study of biological materials that guide cell decision making, and his group will design materials that can influence stem cell differentiation and tissue engineering in the laboratory for regenerative therapies. Leal's research aims to understand how the assembly and interactions of biomaterials impart biologic function in order to develop new therapeutic biomimetic materials. Both the Leal and Kilian labs have complementary interests in biomaterials design for aiding human health, which will be a large part of the activities in the shared space.

MatSE grad named to "Fifty for the Future"



Hanze Ying

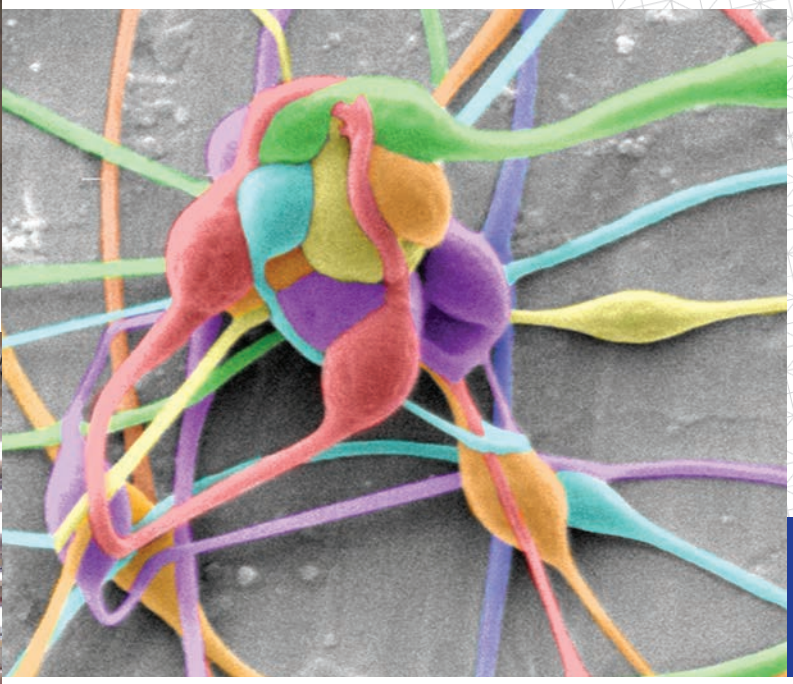
Hanze Ying, PhD student in the Jianjun Cheng group, was honored as a 2015 Illinois Technology Foundation "Fifty for the Future" Awardee.

Ying has developed a new type of polymers named "dynamic polyurea" as self-healing and hydrolysable materials. While other self-healing material systems have focused on solid, strong materials, Ying and his fellow researchers are using softer elastic materials made of polyurea, one of the most widely used classes of polymers in consumer goods such as paints, coatings, elastics and plastics. The hydrolysable polymers could be useful for drug delivery, tissue engineering, controlled release and other applications in which polymer breakdown in aqueous solution is desirable.

Hanze Ying received his BS degree in chemistry from Peking University in 2011. He has four publications and five patents. In addition to this latest honor, he has received a 3M Graduate Fellowship and conference travel grant at Illinois. His other research interests include polymer synthesis, organic electronics and biomaterials.

The Illinois Technology Foundation (ITF) is a not-for-profit organization dedicated to fueling the technology workforce in Illinois. "Fifty for the Future" mobilizes academia and industry to support students across Illinois universities who aspire to greatness in the field of technology.

Watch a video of Hanze Ying demonstrating self-healing polymers:
youtube.com/watch?v=1i3yoK0C9Ag



SEM image of electrospun core-shell fibers containing self-healing agents deposited on steel.

Thu Doan

Andy Long

MatSE grads recognized at MRS Fall Meeting

MatSE graduate students demonstrated their skill and creativity at the MRS Fall Meeting in Boston. Thu Doan, PhD student in the Nancy Sottos group, won first place in the "Science as Art" contest for her SEM image of electrospun core-shell fibers containing self-healing agents deposited on steel. Andy Long, PhD student in the Andy Ferguson group, placed third in the Materials Hackathon and won the Outstanding Student Presenter Award for Symposium SS (Informatics and Genomics for Materials Development) for his talk "Accelerated Sampling of Self-Assembly Systems Using Machine Learning."

Thu Doan's winning artwork is related to her research developing new protective coatings for steel using electrospinning, a method where high voltage is used to turn solutions (liquids) into fibers (solids). Doan explained that the fibers have a solid polymer shell that is used to contain a liquid core material. When the material gets damaged, the shell breaks to release the liquid core material which reacts with the liquid from other fibers to fill in cracks from damage. The liquid then hardens into a new solid material to repair scratches in coatings. By repairing these scratches, the coating prevents the underlying material (metals) from corrosion and further damage.

Doan inherited her artistic ability from her parents who were both artists in Vietnam. "They made ivory sculptures and paintings," Doan said. As an undergraduate at the University of New Mexico, Doan majored in chemistry and biology. She also worked at Sandia National Laboratories. "We had a lot of gloveboxes," Doan explained, "so to easily differentiate them, we named them after comics/cartoons/book characters. I painted Harry Potter, Batman and Superman on my gloveboxes."

At Illinois, Doan is working on her PhD and MBA. "I'm learning a lot from both programs, and I've met many interesting people," she said.

The Hackathon at MRS was a perfect fit for Andy Long. "I have had several ideas kicking around for a while now and this event gave me the opportunity (really the excuse) to dive headfirst into one and see what was possible," Long said. At the Hackathon, he and his partner, Ioan Magdau from The University of Edinburgh, designed and built a working computer code for materials machine learning in just 24 hours.

Long came to the University of Illinois after receiving his BS and MS degrees in materials science and engineering from Carnegie Mellon University. He said the unique opportunity to work for then-new professor Andy Ferguson on an open-ended problem in the computational design of self-assembly systems weighed heavily in his decision to come to Illinois for graduate study.

"From an early point in my undergraduate career, I realized that computer science has a great deal to offer the field of materials science, and I've been interested in finding new and unique ways to marry these two disciplines," Long said. "My research with Andy has perfectly fit that goal, providing me the chance to investigate how we might leverage machine learning techniques to better understand, and ultimately design, systems that undergo self-assembly with an eventual application toward developing design principles for the formation of antimicrobial nanostructures."

Long plans to pursue an academic career following his PhD and said that working with Andy Ferguson has given him the added bonus of seeing a new group form from the ground up.

MatSE at Illinois took first place in the Hackathon too—Prof. Andre Schleife was on the winning team designing code for 3D mobile phone visualization for crystals.

Spotlight on **Undergraduate Research**

TARA CULLERTON

Where are you from?
Batavia, IL

When do you plan to graduate?
May 2016

What do you like about MatSE?
As a department, I love that MatSE gives you a small school feel while still being within a huge university. You have the opportunity to become very close with your classmates through class, homework groups and lab groups because it is a relatively small major. As a field, I love that MatSE prepares you to really do anything you want with your degree. It is such a well-rounded discipline that lends itself to numerous industries. Materials are really the core basis of all engineering.

Describe your undergraduate research.
I have worked as an undergrad research assistant for about a year in the Paul Braun group. I have been working on infilling porous silicon structures with polymers for various applications. The first project that I worked on was to be used as an inversion template for high performance optical materials. Using porous silicon allows us to control the index of refraction of the structure based on the level of porosity. Polymers tested for the optical materials included polymethyl methacrylate (PMMA) and polystyrene. Currently I am working on infilling with a biopolymer to be used in bioreabsorbable devices. I am studying the mechanical properties of the silicon biopolymer composite as well as dissolution kinetics.

What are your plans after you finish your bachelor's degree?
After I finish my BS, I plan to go into industry. I will be interning at Clorox doing product and process development for Glad this summer and plan to continue working in the consumer products industry.

GABE VELARDE

Where are you from?
Round Lake, IL

When do you plan to graduate?
May 2016

What do you like about MatSE?
The MatSE curriculum allows you to become an immensely diverse engineer, capable of working within any engineering field.

Describe your undergraduate research.
I have worked in the Lane Martin group (freshmen-sophomore year) and am now in the Kevin Kim group within the Electrical and Computer Engineering Department. Mainly my focus has been on the fabrication and characterization of thin-film multiferroics and electronic devices for power sustainability applications. Currently I am studying how specific material systems may be implemented for the optimization of high energy electron mobility transistors (HEMTs). Namely, via consideration of thin film thickness, composition and deposition order, these devices may be tuned for higher switching and power capabilities.

What are your plans after you finish your bachelor's degree?
I will be pursuing a master's in either material science and engineering or electrical and computer engineering after graduation. Additionally, after obtaining a position within industry, I aim to complete my MBA. I am interested in business because it allows me to make more informative and dynamic engineering decisions within my field of electronic materials.

READY, SET, SPIKE!

MatSE faculty and graduate students took on the undergraduates in a volleyball game, a popular item at the annual Student-Faculty Auction. Students paid money to play against their professors, with the proceeds going to the student organization Material Advantage. After the game, the players relaxed over lunch at a campustown restaurant.

Welcome to MatSE

Erin Kirby

Erin Kirby has joined the MatSE Department as Associate Director of Advancement. A third generation Illinois alumna, Kirby was born and raised in Champaign. She holds a bachelor's degree in business journalism from Miami University (Oxford, Ohio), and a master's in higher education administration from the University of Illinois. In the summer of 2008, Kirby was the recipient of a Reuss Fellowship, providing her with the opportunity to work for the University of Illinois Foundation on special projects. She specialized that summer on gift planning and major gifts. In May 2009, Kirby joined the Department of Physics at Illinois as Assistant Director of Advancement, with primary responsibility of major gifts for Physics. Three years later, she added Industrial and Enterprise Systems Engineering to her portfolio and began working with both Physics and ISE, managing their comprehensive advancement efforts. Her current major gift portfolio includes Physics, MatSE and the Department of Nuclear, Plasma, and Radiological Engineering (NPRE).

"I am honored by the opportunity to help Materials Science and Engineering at Illinois promote its successes to the broader alumni base throughout the country," Kirby said. "I look forward to meeting many of you as we jointly work to advance the mission of this world-renowned department."

"A bucketful of thanks to the professor who believed in my abilities on the days that I didn't."
- Winnie Yang, pictured with Prof. Angus Rockett

Department of Materials Science & Engineering Fund

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LETTER FROM THE PRESIDENT

Alumni,

This spring I had the privilege of starting my term as president of the University of Illinois MatSE Alumni Board. I begin my new position with the advantage of having had such role models as Sheryl Tipton, Jim Burk and Dave Teter, who served as the past three board presidents. I welcome Kyle Wilcoxen as vice president of the board and chair of the membership committee. The board enjoyed a productive meeting April 17, following on the heels of the annual MatSE Student and Alumni Awards Banquet which, once again this year, served as an inspiring evening dedicated to the excellence of our students past and present.

I enjoy that the semi-annual alumni board meetings bring me back to campus, where the years melt away when I walk through the Materials Science and Engineering and Ceramics buildings. The buildings have been modernized (with some renovations still remaining), and I am excited to see the transformation of the labs and classrooms. I encourage you to make a visit to campus to experience that nostalgia and see the incredible progress; financial help with these projects is always welcome. The alumni board regularly encourages new membership. If you are interested in serving on the board and traveling to campus for spring and fall meetings, please contact Cindy Brya (brya@illinois.edu) or me (britt.turkot@intel.com).

Warm regards,

Britt Turkot
(BS Met '90, MS Met '92, PhD MatSE '96)
Senior Principal Engineer and
Engineering Group Leader
Intel Corporation

MatSE Alumni Board

NEW BOARD MEMBERS

Greg Ruschau

GREG RUSCHAU

(BS Cer '85)

Greg Ruschau is a Senior Technical Professional Advisor in the area of corrosion control for ExxonMobil Development Company. He has been the primary Materials Engineer on several major ExxonMobil international projects, including the Adriatic LNG terminal in offshore Italy, the Banyu Urip onshore oilfield in Indonesia, and the Odoptu Stage 2 onshore development in Sakhalin Island, Russia. Previously, he spent seven years with ARCO Oil and Gas Company, and eight years with Det Norske Veritas. Ruschau is a NACE Certified Coating Inspector, has more than 30 technical publications, and holds four patents. He is an active member and group chair in NACE International, the International Association of Oil and Gas Producers, and has been a project manager for PRCI. Ruschau received his PhD in solid state science from Penn State University in 1991.

Matt Frey

MATT FREY

(BS Cer '92, PhD MatSE '96)

Matt Frey is a Staff Scientist in the Corporate Research Materials Laboratory of 3M Company, where he began work immediately following studies at the University of Illinois. His research and commercialization activities have been directed primarily toward high refractive index glass-ceramic microspheres for pavement markings, durable electrolytes for PEM fuel cells, and transparent conductors for electronics. The resulting materials and processes are protected by 48 issued U.S. patents to date. In his role as a technical group leader, Frey also advises newer researchers advancing electrical, magnetic and optical materials for communications, consumer electronics and energy markets. His corporate responsibilities have included evaluation of outside technologies for investment, acquisition or joint development.

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Matt Frey (BS Cer '92, PhD MatSE '96), 3M
Liang Hong (PhD MatSE '07) Dow Chemical
David Moore (BS Met '89) Unified Engineering, Inc.
Michael Pollard (BS Met '97, MS MatSE '98) Caterpillar
Andrew Powell (BS MatSE '01) GE Aviation
Stephanie Rinne (PhD MatSE '06) Owens Corning
Greg Ruschau (BS Cer '85) ExxonMobil
Howard Savage (BS Met '84, MS Met '88, PhD Met '91) Cummins
Robert Schwartz (PhD Cer '89) University of Missouri System
Britt Turkot (BS Met '90, MS Met '92, PhD MatSE '96) Intel Corporation
Kyle Wilcoxen (BS MatSE '06) ACH Food Companies, Inc.

Ex-Officio

James Burk (BS Met '73, MS Met '74, PhD Met '78) B.P. Exploration
Ray Capek (BS Cer '58, MS Cer '59, PhD Cer '61) Candescent – retired
Charles Connors (BS Cer '60) Magneco Metrel Incorporated
Russ Duttweiler (BS Met '60) R&D Consulting
Martin Kopchak (BS Met '73, MS Met '76) Caterpillar
Ken Kuna (BS Cer '68, MS Cer '69) University of Detroit Mercy – retired
Keith Meyer (BS Met '80) Boeing
Doug Ruhmann (BS Met '64) Boeing – retired
David Teter (BS Met '90, PhD Met '96) Los Alamos National Lab
Sheryl Tipton (BS Met '80) Caterpillar – retired

Call for Nominations

Do you know an alumnus who would be a candidate for a MatSE alumni award? If so, please contact Cindy Brya at (217) 333-8312, brya@illinois.edu. The MatSE Alumni Board will vote on alumni awards at its fall meeting on September 18. **Please help us recognize our outstanding alumni!**

"30 Under 30" list includes two MatSE alumni

Canan Dagdeviren

Brett Walker

Two MatSE alumni made *Forbes*' list of "30 Under 30" for 2015: Canan Dagdeviren (Science) and Brett Walker (Manufacturing & Industry). For its fourth annual celebration, the publication selected "600 game changers, movers, and makers in 20 fields—all under the age of 30."

As a graduate student in the John Rogers group, Canan Dagdeviren (PhD MatSE '14) created a new class of biocompatible piezoelectric mechanical energy harvesters that are soft and flexible, to allow them to conform and laminate on soft tissues such as the heart and lungs. These first of its kind nano-generators convert mechanical energy from internal organ movements into electric energy to power medical devices such as cardiac pacemakers. Dagdeviren won the $20,000 Illinois Innovation Prize in 2014 for her work.

Last year Dagdeviren was named innovator of the year among the winners of the "Innovators Under 35 Turkey" by *MIT Technology Review*. "Innovators Under 35 Turkey" promotes young, creative and bold Turkish innovators with technology-based projects that have the potential to shape the future. Dagdeviren is now a postdoctoral associate in the Robert Langer group at MIT, where she is fabricating a novel multi-functional probe for local delivery of electrical and chemical stimulation in the brain to detect behavioral changes in Parkinson's disease, anxiety and mood disorders.

Brett Walker (PhD MatSE '13) co-founded Electroninks, a start-up based on the commercialization of novel conductive inks for printed electronics. Their product, called Circuit Scribe, is a roller-ball pen filled with conductive circuit ink, allowing people to literally draw an electrical circuit onto a piece of paper. Electroninks has also created a number of interactive modules and kits suitable for individual or classroom use.

Walker's work on reactive silver inks has been recognized with 2nd place in the National Collegiate Inventors Competition in Washington, D.C., as well as named one of nine materials that will change the future of manufacturing by *Scientific American*. Electroninks started at the University of Illinois Research Park but has since moved to its own facility in Austin, TX. Find out more about the company at electroninks.com.

Class **Notes**

Tom Nielsen (BS Cer '59) attended the Keramos Centennial banquet on the University of Illinois campus in February.

John Yoshimura (BS Cer '83) has been appointed as Chief Operating Officer of the law firm McDermott Will & Emery. He is responsible for overseeing the firm's business, financial and administrative operations in line with McDermott's overall global strategy. He joined McDermott from A.T. Kearney, one of the world's largest management consulting firms, where he worked since 1987, most recently as Global Chief Operating Officer and Member of its Board of Directors.

Geoffrey Morris, PE (MS CerE '84) has been inducted into Georgia Tech's Academy of Distinguished Engineering Alumni. He is currently a Scientific Affairs Manager for 3M ESPE Dental. He and his wife, **Mary Lou** (BS CerE '84), who is an Advanced Research Specialist in 3M's Industrial Mineral Products Division, reside in White Bear Lake, MN.

Jennifer Lewis (BS Cer '86) was named one of the "100 Leading Global Thinkers" by the magazine Foreign Policy. She was included in "The Innovators" category for being on the cutting edge of creating new "ink" materials that will revolutionize the functionality of 3-D prints.

Jeff Grabowski (BS Cer '96) is Manager of Applications and Product Commercialization for QuesTek Innovations LLC.

Paul Luebbers (BS Cer '95, MS MatSE '98) attended Engineering Open House on the U of I campus in March. He is the CEO/Chief Technology Officer of Lumec Control Products in Dunlap, IL. The company is focused on the design, development and commercialization of new technologies to solve industrial process control problems.

Paul Luebbers

Kristen (Holverson) Tutlis (BS MatSE '01) gave birth to a son, Finn Michael Tutlis, on July 16. She is a Process Yield Engineer at IBM in Vermont.

Tami (Vogel) Vize (BS MatSE '01) welcomed her son, Ethan Michael Vize, on October 6, 2014. She is Failure Analysis Engineering Manager at IBM.

Abby (Ebbing) Klamer (BS MatSE '01) gave birth to a son, Elliott Joseph Klamer, on January 26. She is Quality Systems & Process Improvement Manager at Presto Products Company in Appleton, WI.

Yong Lim Foo (PhD MatSE '03) is Director of the Centre for Learning Environment and Assessment Development (CoLEAD) at the Singapore Institute of Technology.

Jeremy Hahn (BS MatSE '03) is Lead Design and Certification Engineer for Jet Parts Engineering and an adjunct professor at Seattle University.

Lindsay Schubel (BS MatSE '05) is now the Research and Development Manager for Holland Manufacturing Corporation in South Holland, IL.

Katharine (Pfenning) Nickell (MS MatSE '05) presented a seminar to MatSE students on April 27. A Senior Packaging Engineer at Kraft, Nickell talked to students about how materials engineering is used in the food industry.

Katharine Nickell

Angela Gonzales (BS MatSE '07) is Associate Brand Manager-Innovation for Big Heart Pet Brands in San Francisco, CA.

Tracey Brommer (BS MatSE '08) is a consultant at PA Consulting Group in Cambridge, MA. She earned her PhD in Materials Science and Engineering from MIT in 2012.

Alumnus makes a business out of quantum dots

Hunter McDaniel (PhD MatSE '11) has launched UbiQD, LLC, a quantum dot manufacturing business located in the New Mexico Consortium's Los Alamos laboratory. Quantum dots are semiconductor nanocrystals that absorb light across a broad spectrum and emit light with a narrow spectrum. UbiQD, LLC produces quantum dots so efficiently and inexpensively that they will soon become ubiquitous (thus the company name).

Displays like televisions and tablets use quantum dots composed of toxic materials. UbiQD, LLC manufactures quantum dots that avoid heavy metals and are believed to be nontoxic. The company is currently working with research-scale customers and collaborators to tailor materials for specific applications including solar windows, solid-state lighting, luminescent plastics and paint.

"I use the skills/techniques that I learned from Dr. Shim nearly every day at my new company. He is the one who got me interested and involved with quantum dots in the first place."

Find out more about the company at: www.UbiQD.com

OBITUARIES

Robert W. Klann (BS Met '48) died December 1, 2014, at Hope Creek Care Center, East Moline, IL. Klann served in the U.S. Army Infantry in the European Theater and received the Bronze Star, Purple Heart and Combat Infantry Badge. He worked at the Deere & Co. Technical Center for 31 years, retiring in 1980. He was a life member of the American Society for Metals. He loved flowers and working in his garden. He is survived by his wife of 62 years, Shirley; three children and five grandchildren.

Michael Biegalski (BS Cer '98) died December 20, 2014, as the result of a mountain bike accident in Oak Ridge, TN. He had been a research scientist at the Oak Ridge National Laboratory's Center for Nanophase Materials Sciences since 2008 and worked at the lab from 2006 to 2008 as a postdoctoral research associate. He received his PhD in materials science and engineering from Pennsylvania State University in 2006. He had more than 45 articles published in refereed journals and received several awards for his work in materials science. He was a member of the Tennessee Bicycle Racing Association. Biegalski is survived by his wife, Amy, and daughters, Katia Michel and Anya Micaela.

James Michael (Mike) Rigsbee passed away on January 8, 2015. He graduated from North Carolina State University in 1974 with a PhD in metallurgical engineering. He completed a post doctorate at Michigan Tech, worked for Republic Steel in Cleveland, taught at University of Illinois at Urbana-Champaign, served as Department Head at the University of Alabama at Birmingham, and returned to NCSU in 1998 as Department Head and Professor of Material Science and Engineering. He is survived by his wife of 47 years, Donna Wilson Rigsbee, two daughters and four grandsons.

Sherman Brown passed away March 27, 2015. He received his PhD in chemical engineering from the University of Utah. He worked at University of Utah, Jet Propulsion Lab, Thiokol, Rocketdyne and NASA. In 1968, he became a professor of materials science and engineering at the University of Illinois in Urbana-Champaign where he taught for 29 years. He loved teaching and working with the faculty and students. He published and presented many papers worldwide based on his research in ceramics and glass. He was a member of the Church of Jesus Christ of Latter-day Saints and served a full-time mission to the Central States Mission. He is survived by his wife, Kathryn, four daughters, grandchildren and great-grandchildren.

Richard Wool passed away on March 24, 2015. He received his PhD in materials science and engineering from the University of Utah in 1974. After teaching at the University of New York and the University of Colorado, he and his wife, Deborah, moved to the University of Illinois, where they lived for 18 years and started a family with their three daughters Sorcha, Meghan and Breeda. In 1995, the family moved to Delaware, and Wool taught as a professor of chemical engineering at the University of Delaware until his passing. Some of his professional accomplishments include winning the Presidential Green Chemistry Challenge Award plus being elected Fellow of both the Royal Society of Chemistry and the American Physical Society. He published over 150 papers and two books and held 4 patents.

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Speed Networking

Thursday, SEPTEMBER 17, 6 P.M.

Students enjoy learning about the many ways they can use their MatSE degree. This spring MSE 441 (Metals Processing) learned about steel-making on a plant trip to Nucor Steel in Crawfordsville, IN. The MatSE Department would like to provide more opportunities for students to find out what they can do with their degree. MatSE alumni are invited to participate in a speed networking event with students on Thursday, September 17, at 6:00 p.m. on the first floor of the Materials Science and Engineering Building. At the event, alumni will talk to students about their companies and career path. Alumni will move from table to table after a designated time, so they can speak to as many students as possible. If you would like to participate, or if your company would like to host food for the event or provide giveaways for the students, contact Cindy Brya, Coordinator of Alumni Relations and Development at brya@illinois.edu, (217) 333-8312. The deadline to register is September 3.

CONNECT with MatSE!

Join us on Facebook, Twitter, and LinkedIn. The MatSE at Illinois LinkedIn group is a networking group for alumni and students of the Department of Materials Science and Engineering at the University of Illinois. Stay in touch with your classmates and find out the latest department happenings.