MatSE news

Summer 2014

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

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MatSE Alumni News
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Greetings from Urbana

One of the most exciting aspects of materials science and engineering is how quickly the field evolves. In fact, many of the research topics that our department is currently leading the world in barely existed a decade ago: flexible electronics, self-healing materials, coherent diffraction imaging, self-organized microstructures, and nanoparticle drug delivery, to name just a few. Rapid changes in the field are reflected in our philosophy in recruiting faculty. We want faculty that will define the future of the field of materials science and engineering and have the skills and breadth of knowledge to take advantage of the most exciting opportunities as they emerge.

The high churn rate in research topics also requires us to be nimble with instrumentation. Instrumentation for materials research has become increasingly sophisticated—and expensive. New generations of sources and detectors for electrons, x-rays, and optical photons seemingly emerge on an ever-accelerating schedule. A modern analytical electron microscope is capable of determining the composition of a single column of atoms, but also costs in excess of $3M.

Our educational programs evolve on a longer time scale. I think this is appropriate. The underlying core-concepts of our field—e.g., thermodynamics, statistical mechanics, the physics of diffraction and imaging, the mechanics of dislocation interactions, and the quantum description of chemical bonds—do not become obsolete. Engineering practice, the job market for B.S. graduates, and the use of technology in teaching does, of course, change more quickly. The faculty are currently discussing how we can best update our curriculum and teaching methods to maintain the strength of the core subjects while better serving our students and the companies that hire our graduates.

Unfortunately, our infrastructure for teaching and research evolves all too slowly. Thanks to a major gift by Don Hamer, we renovated the Kiln House 20 years ago to create high-quality space for instructional labs that is the envy of departments across the country. Since 1996, we have invested approximately $9M in modernizing 17,000 sq. ft. of space in the venerable Materials Science and Engineering Building (MSEB); this figure includes a $2M renovation for new lab space on the second floor of MSEB that will be completed by the end of the calendar year. We hope to secure additional support from the campus for a potential $3M renovation of 5000 sq. ft. of space on the first floor of MSEB. A consistent trend in MatSE is for research to become increasingly chemical/biological. This requires changes in building infrastructure, e.g., chemical fume hoods and the supporting ventilation systems, that are extremely expensive to retrofit into buildings such as MSEB and the Ceramics Building that date from the early 20th century.

As we embark on changes in curriculum and investments in instrumentation and space, we value the input and support from the entire MatSE community. Our overarching goal is best-in-the world scholarship and education in materials science and education. Feel free to contact me at matse-head@illinois.edu with your thoughts.

Sincerely,

David Cahill
Willett Professor and Head

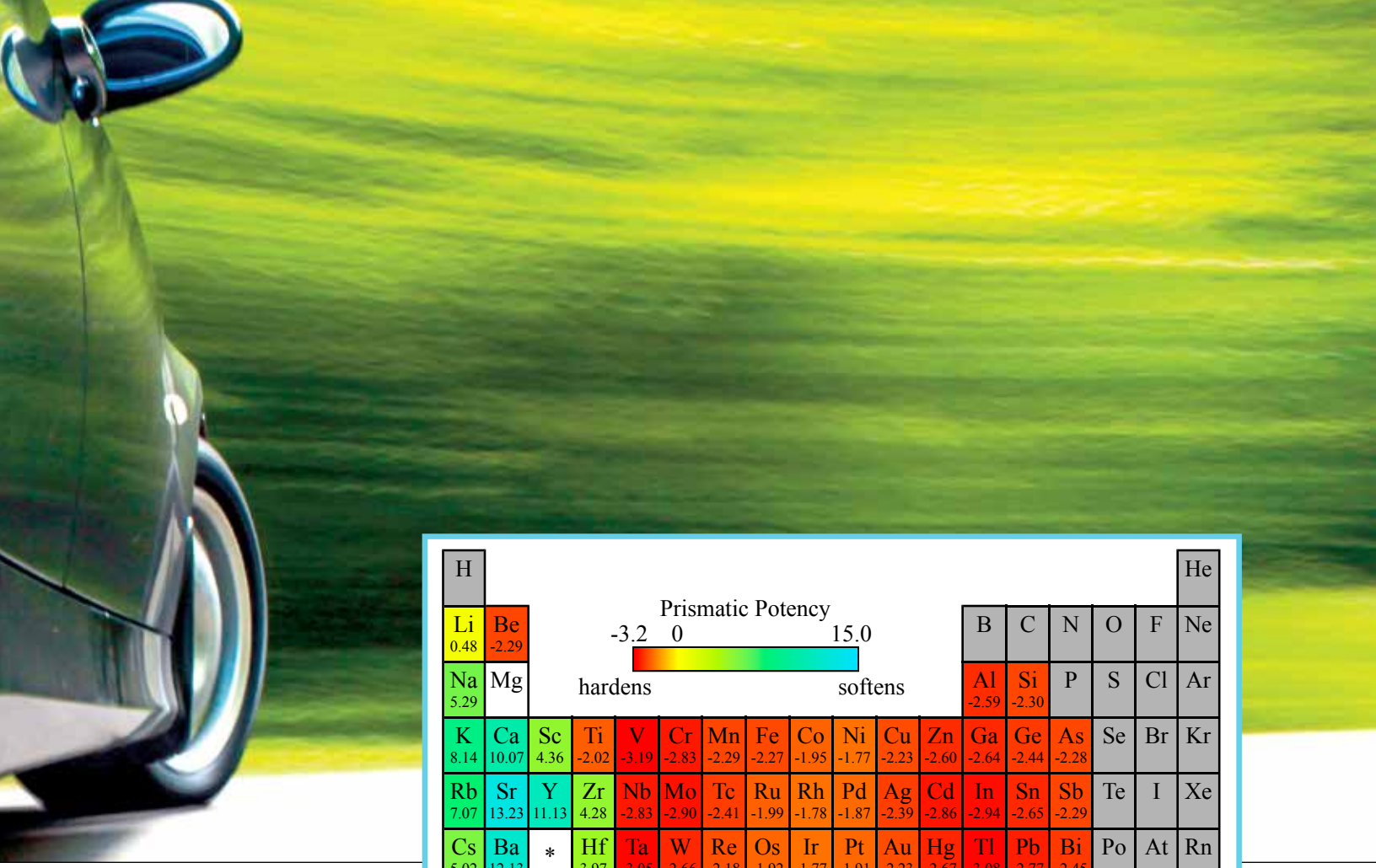
FROM THE ATOMIC SCALE TO MATERIALS APPLICATIONS

Future challenges in energy are ultimately materials challenges; moreover, developing novel properties for new engineering capabilities requires understanding material behavior from bonding length-scales to macroscale, from ultrashort time-scale to multidecade material lifetimes. However, materials engineering is at a crossroads where the timeframe for traditional development of materials is too long to be integrated simultaneously with computationally-driven engineering.

The bottleneck to accelerating the use of new materials with novel properties can be alleviated by developing large databases of relevant material knowledge to use in an engineering modeling framework; this is the grand idea of the Materials Genome Initiative. To build these databases, engineers and scientists need new tools that can seamlessly transition chemically accurate data at the atomic scale up to the appropriate scales for real materials, for Integrated Computational Materials Engineering.

Since 2006, Dallas Trinkle's computational materials research group at the University of Illinois has been developing computational tools that are *accurate* (verified and validated), *efficient, robust,* and *integrated* to apply to problems of the future. His group uses state-of-the-art "first-principles" methods to study defects and transport in alloys and nanoscale systems: magnesium alloys and steels for automotive, titanium alloys for aerospace, zircalloy for nuclear, and fundamental studies of nanohydrides in metals and nanoparticles for catalysis.

Dallas Trinkle's group leads the field of first-principles studies of dislocations, defect interactions, and building models to predict material properties. They were the first to compute dislocation core structures in magnesium, and interactions with solutes



H																	He
Li 0.48	Be -2.29											B	C	N	O	F	Ne
Na 5.29	Mg											Al -2.59	Si -2.30	P	S	Cl	Ar
K 8.14	Ca 10.07	Sc 4.36	Ti -2.02	V -3.19	Cr -2.83	Mn -2.29	Fe -2.27	Co -1.95	Ni -1.77	Cu -2.23	Zn -2.60	Ga -2.64	Ge -2.44	As -2.28	Se	Br	Kr
Rb 7.07	Sr 13.23	Y 11.13	Zr 4.28	Nb -2.83	Mo -2.90	Tc -2.41	Ru -1.99	Rh -1.78	Pd -1.87	Ag -2.39	Cd -2.86	In -2.94	Sn -2.65	Sb -2.29	Te	I	Xe
Cs 5.02	Ba 12.13	*	Hf 3.97	Ta -3.05	W -2.66	Re -2.18	Os -1.92	Ir -1.77	Pt -1.91	Au -2.23	Hg -2.67	Tl -3.08	Pb -2.77	Bi -2.45	Po	At	Rn
*lanthanides	La 14.77	Ce 11.85	Pr 11.31	Nd 12.19	Pm 12.27	Sm 11.95	Eu 11.87	Gd 8.35	Tb 10.86	Dy 10.37	Ho 10.19	Er 9.38	Tm 8.56	Yb 8.63	Lu		

Prismatic Potency
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hardens softens

across the periodic table. From this atomic-scale work, they built *predictive* models for how solutes would improve strength and ductility in magnesium alloys: a fundamental issue that limits magnesium use in automotive applications. The end result is a public database (magnesium.matse.illinois.edu), built from first-principles, that allows users to unpack the source of the data.

The group's research expanded into first-principles predictions of dislocation cores in titanium and palladium and is now involved in a multi-institution ICME project to design—from atomic-scale up to finite-element modeling—new low-cost, high-strength steels for the automotive industry. This DOE-sponsored project led by General Motors is not just developing new materials, but even the *methodology* for how to develop structural materials and integrate into manufacturing.

In the past few years, the research group has branched out to study transport in materials with first-principles. They first started with how hydrogen formed nanohydrides at dislocations in palladium, and now are identifying novel atomic-scale mechanisms for "pipe diffusion"—where hydrogen diffuses several orders-of-magnitude faster along dislocation "pipes"—that are being verified experimentally. They discovered where oxygen resides in titanium crystal, how it diffuses, and then predicted how different solutes could retard or even *accelerate* oxygen diffusion. These results impact the development of titanium alloys for aerospace and nautical applications as well as methods to create titania nanowires.

Working with Pascal Bellon and collaborators at CEA/Saclay, they made the first predictions of how stress changes diffusion coefficients for silicon in nickel, including unusual flow patterns near a dislocation. In the past year, they've begun work on the development of new zircalloys as a nuclear fuel cladding to better tolerate high temperature excursions that can occur during an accident.

Dallas Trinkle's computational group has been supported by NSF, DOE, ONR, General Motors, and Boeing, with computational support from Intel and the University of Illinois.

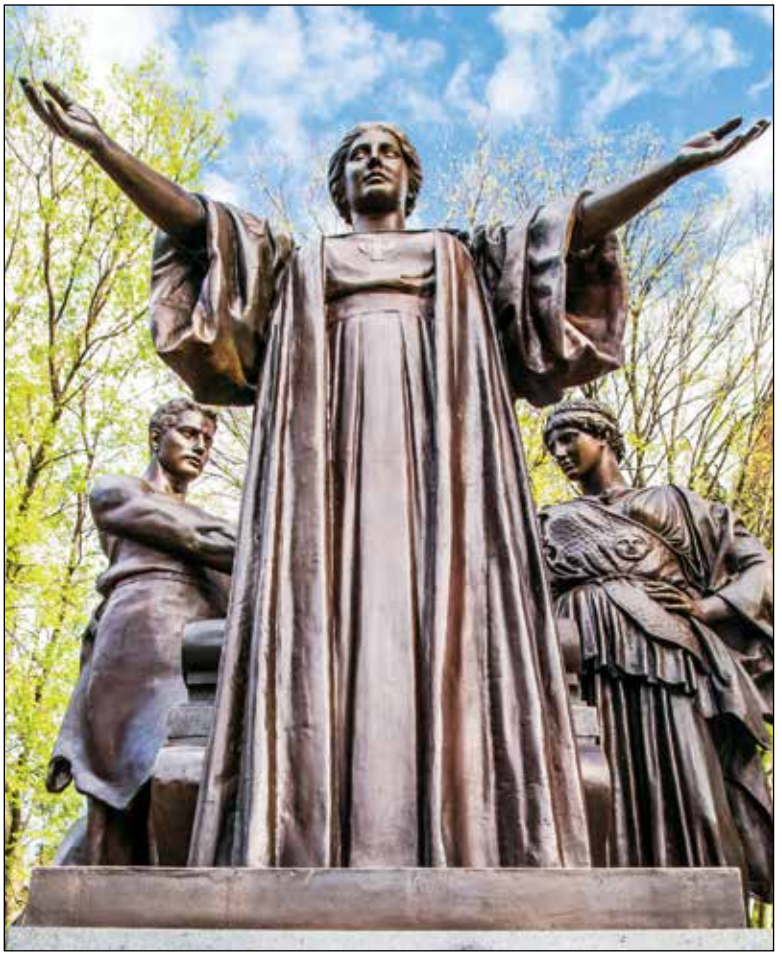
Alma Mater time capsule contains INJECTABLE LED

After a year of restoration work, the Alma Mater sculpture has returned to her base at the corner of Wright and Green streets. To memorialize the occasion of her return, a time capsule was placed into the sculpture's base. The time capsule is made of stainless steel and designed to withstand a century or more of weathering–much better than the glass jar that was used for the previous time capsule.

One of the items in Alma's new time capsule is a tiny injectable LED from John Rogers' research. All of the colleges and institutes on the University of Illinois campus were invited to submit an object for the capsule. Rogers' injectable LED was selected to represent the College of Engineering. Very tiny and light, the injectable LED does not add much weight to the 75-pound time capsule.

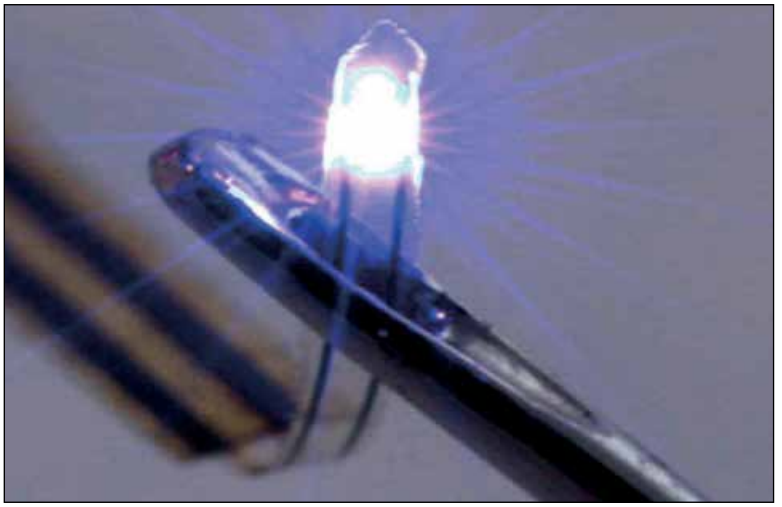
Ultra-miniaturized LEDs injected deep into the brain illuminate the mysteries of neuroscience. The devices are printed onto the tip end of a thin, flexible plastic ribbon—thinner than a human hair and narrower than the eye of a needle—that can be inserted deep into the brain with very little stress to the tissue. The light triggers targeted neurons, providing insight into structure, function, and complex connections within the brain.

Insights into the structure and function of the brain that emerge from studies using the ultra-miniaturized LEDs could have implications for treatment of Alzheimer's, Parkinson's, depression, anxiety, and other neurological disorders. According to John Rogers, this is the first of many examples of injectable semiconductor microdevices that will follow.



The new and improved Alma Mater has returned to campus.

Chancellor Phyllis Wise secures the time capsule.



A thin plastic ribbon printed with advanced electronics is threaded through the eye of an ordinary sewing needle.

To find out how John Rogers' injectable LED works, watch the video: http://www.youtube.com/watch?v=rEAWsokfwmQ

John Rogers

Rogers elected to **American Academy of Arts and Sciences**

John Rogers, Swanlund Chair in the Department of Materials Science and Engineering, has been elected to the American Academy of Arts and Sciences, one of the longest-standing honorary societies in the nation. The induction ceremony will take place in October at the academy's headquarters in Cambridge, Massachusetts.

Rogers' research includes fundamental and applied aspects of nano and molecular scale fabrication as well as materials and patterning techniques for unusual electronic and photonic devices, with an emphasis on bio-integrated and bio-inspired systems. He has published more than 400 papers, and is an inventor on over 80 patents and patent applications, more than 50 of which are licensed or in active use by large companies and startups that he has co-founded.

Rogers and his research teams have pioneered flexible, stretchable electronics, creating pliable products such as cameras with curved retinas, medical monitors in the form of temporary tattoos, a soft sock that can wrap an arrhythmic heart in electronic sensors and LED strips thin enough to be implanted directly into the brain to illuminate neural pathways.

His most notable honors include the 2013 American Ingenuity Award in physical sciences from Smithsonian Magazine, a MacArthur Foundation "Genius Fellowship" (2009), and the Lemelson-MIT Prize (2011). He has been elected to the National Academy of Engineering and is a Fellow of the Institute for Electrical and Electronics Engineers, the American Physical Society, the Materials Research Society and the American Association for the Advancement of Science.

John Rogers is Director of the F. Seitz Materials Research Laboratory at the University of Illinois.

Ferguson receives **CAREER Award**

Andy Ferguson has received a National Science Foundation (NSF) CAREER Award for his proposal, "Teaching Machines to Design Self-Assembling Materials."

The award supports his theoretical and computational research program to design microscopic building blocks with the ability to spontaneously self-organize into materials with desirable properties. This way of making materials is known as "bottom-up self-assembly," as opposed to more familiar "top-down" manufacturing.

"Imagine if we could one day design molecules with just the right shape and properties so that shaking them in a flask spontaneously self-assembled a solar cell," explained Ferguson.

"In this work, we will combine ideas from the fields of thermodynamics and machine learning (sometimes known as artificial intelligence) to establish a new tool to allow computers to learn both what structures can be formed by a particular building block, and how they assemble. We will then flip this problem to use our tool to help reverse-engineer building blocks to assemble custom materials."

Ferguson will apply the tools to the design of three useful biological materials: 1) micron-sized particles possessing directional sticky patches that assemble polyhedral clusters to hold and deliver small molecules, 2) short peptides that assemble networks to template the synthesis of silica nanotubes for drug delivery, clean-up of heavy metal pollutants, and catalysis of chemical reactions, and 3) longer peptides that assemble into nanometer sized rods that can kill antibiotic resistant bacteria such as the MRSA "superbug."

The award also supports an integrated research and education program in which the scientific results from this work will enrich and enhance undergraduate and graduate classes and high school outreach activities. Ferguson will design and teach a new class providing hands-on experience in the computational materials modeling, analysis, and design.

The NSF Faculty Early Career Development (CAREER) initiative selects the nation's best young university faculty in a highly competitive annual program. These teacher-scholars are recognized for their extraordinary promise to integrate research and education in the nation's universities and to make lifelong contributions to their disciplines.

Andy Ferguson

Sottos receives DRUCKER EMINENT FACULTY AWARD

Engineering Dean Andreas Cangellaris and Nancy Sottos.

A pioneer in the area of self-healing materials, **Nancy Sottos** has received the Tau Beta Pi Daniel C. Drucker Eminent Faculty Award from the College of Engineering. The award is given to a faculty member who has received "national or international acclaim for dedication to academic excellence through teaching and research and who has made exemplary contributions to the understanding of his or her field."

Sottos, Donald Biggar Willett Professor, has earned broad recognition and acclaim for her work on self-healing materials. This work was initiated in collaboration with Scott White, a professor of Aerospace Engineering. The defining concept was the development of a way to fabricate a material so that once damaged as a result of mechanical stress overload, a process was activated spontaneously that would repair the structural damage to the material, all without further intervention.

Sottos is affiliated with Autonomic Materials, a company focused on self-healing material technologies. Led by White, the goal of the company is to transfer the results of innovative scientific research on self-healing strategies at the University of Illinois to the global market. The company was launched in 2007 within the EnterpriseWorks business incubator facility located in Champaign.

She is working with colleagues in the Chemistry Department to identify and experimentally characterize synthetic molecules that have the capacity to emit light in the visible range when subjected to stress in excess of a material specific level. Her research group also pursues research in advanced composites, thin film devices, and microelectronic packaging.

Her work was recognized in 2007 by *Scientific American* for "outstanding technical leadership," in 2009 by NASA for development of a particular self-healing material, and in 2011 by the Society for Experimental Mechanics with the Lazan Award for "distinguished technical contributions in experimental mechanics." In 2011, she received the Frocht Award for "experimental mechanics educator of the year" from the Society for Experimental Mechanics. Sottos is a Fellow of the Society for Experimental Mechanics and the Society of Engineering Science. She is the inventor or co-inventor on twelve patents either issued or pending.

For more information on self-healing materials, watch "Without a Scratch: Self-Healing Materials," a Bitesize Science video produced by the American Chemical Society: http://www.bytesizescience.com/index.cfm/2012/6/6/Without-a-scratch-Selfhealing-materials

REGENERATING PLASTIC grows back after damage

-University of Illinois News Bureau

Looking at a smooth sheet of plastic in one University of Illinois laboratory, no one would guess that an impact had recently blasted a hole through it.

Illinois researchers have developed materials that not only heal, but regenerate. Until now, self-repairing materials could only bond tiny microscopic cracks. The new regenerating materials fill in large cracks and holes by regrowing material.

Led by professor Scott White, the research team comprises professors Jeffrey S. Moore and Nancy Sottos and graduate students Brett Krull, Windy Santa Cruz and Ryan Gergely. They report their work in the May 9 issue of the journal Science.

"We have demonstrated repair of a nonliving, synthetic materials system in a way that is reminiscent of repair-by-regrowth as seen in some living systems," said Moore, a professor of chemistry.

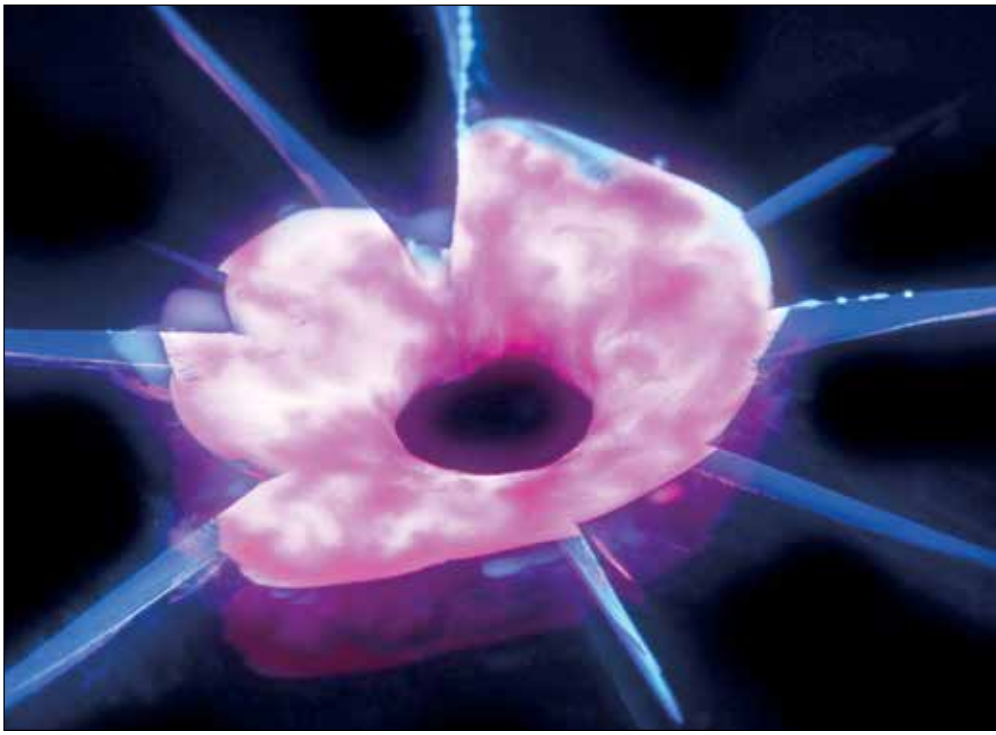
Such self-repair capabilities would be a boon not only for commercial goods – imagine a mangled car bumper that repairs itself within minutes of an accident – but also for parts and products that are difficult to replace or repair, such as those used in aerospace applications.

The regenerating capabilities build on the team's previous work in developing vascular materials. Using specially formulated fibers that disintegrate, the researchers can create materials with networks of capillaries inspired by biological circulatory systems.

"Vascular delivery lets us deliver a large volume of healing agents – which, in turn, enables restoration of large damage zones," said Sottos, a professor of materials science and engineering. "The vascular approach also enables multiple restorations if the material is damaged more than once."

For regenerating materials, two adjoining, parallel capillaries are filled with regenerative chemicals that flow out when damage occurs. The two liquids mix to form a gel, which spans the gap caused by damage, filling in cracks and holes. Then the gel hardens into a strong polymer, restoring the plastic's mechanical strength.

"We have to battle a lot of extrinsic factors for regeneration, including gravity," said study leader White, a professor of aerospace engineering. "The reactive liquids we use form a gel fairly quickly, so that as it's released it starts to harden immediately. If it didn't, the liquids would just pour out of the damaged area and you'd essentially bleed out. Because it forms a gel, it supports and retains the fluids. Since it's not a structural material yet, we can continue the regrowth process by pumping more fluid into the hole."



The team demonstrated their regenerating system on the two biggest classes of commercial plastics: thermoplastics and thermosets. The researchers can tune the chemical reactions to control the speed of the gel formation or the speed of the hardening, depending on the kind of damage. For example, a bullet impact might cause a radiating series of cracks as well as a central hole, so the gel reaction could be slowed to allow the chemicals to seep into the cracks before hardening.

The researchers envision commercial plastics and polymers with vascular networks filled with regenerative agents ready to be deployed whenever damage occurs, much like biological healing. Their previous work established ease of manufacturing, so now they are working to optimize the regenerative chemical systems for different types of materials.

"For the first time, we've shown that you can regenerate lost material in a structural polymer. That's the kicker here," White said, "Prior to this work, if you cut off a piece of material, it's gone. Now we've shown that the material can actually regrow."

Moore, Sottos and White also are affiliated with the Beckman Institute for Advanced Science and Technology at the U. of I. The Air Force Office of Scientific Research supported this work.

Jim Zuo

Moonsub Shim

Jim Zuo was named a 2013 Fellow of the American Physical Society "for major contributions to the development of electron nanodiffraction and coherent diffraction for quantitative atomic structural analysis, and to their applications in fundamental understanding of nanoscale structural physics in solids, solid interfaces and surfaces."

John Rogers has been elected to the National Academy of Inventors class of 2013. This honor is given to "academic inventors who have demonstrated a highly prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society." Rogers also received an American Ingenuity Award from Smithsonian Magazine.

Jianjun Cheng has been appointed an Associate of the Center for Advanced Study at the University of Illinois. The Center for Advanced Study brings together scholars from diverse disciplines and backgrounds and encourages and rewards excellence in all areas of academic inquiry.

Moonsub Shim received the Dean's Award for Excellence in Research from the College of Engineering. Shim was one of four associate professors in the College to receive the award.

Steve Granick, Angus Rockett, John Rogers, Ken Schweizer, and **Matt Sherburne** were selected as Engineering Council Outstanding Advisors.

Andre Schleife is a Research Team Leader of the European Theoretical Spectroscopy Facility.

Michael Ashby, Royal Society Research Professor at the University of Cambridge, gave the Howard K. Birnbaum Memorial Lecture on March 17. He talked to students and faculty about the importance of industrial design in engineering. Howard Birnbaum's widow, Freda, attended the lecture.

Kilian receives NIH Grant for Stem Cell Research

Kris Killian

Kris Kilian, assistant professor of Materials Science and Engineering, has been awarded a 2-year grant from the National Institutes of Health in the amount of $400,302 for his project, "Deconstructing the cues in the mesenchymal stem cell microenvironment that promote secretion of pro-angiogenic molecules."

"An exciting new therapy for cardiovascular diseases involves the delivery of a patient's mesenchymal stem cells—which can be isolated from bone marrow or fat—to damaged heart tissue," Kilian explained. "It is believed that implanted mesenchymal stem cells secrete molecules that promote a healing response; however, the mechanism is unknown and there is significant variability in the success of the treatment."

In this project, the Kilian group will systematically explore the biophysical and biochemical factors that direct mesenchymal stem cell secretion in order to design new stem cell-based materials for cardiovascular therapy.

"It's terrific to have our research validated by the NIH," Kilian said. "The receipt of this grant allows us to continue exploring this important area, which has great potential in the battle against heart disease."

Kilian's research at Illinois is centered on the development of materials for stem cell and tissue engineering research. A primary effort is the design of surfaces that mimic the structure and composition of the cell and tissue microenvironment towards revealing the physical, chemical and biological cues that guide cell fate. The materials and systems developed in his group will serve as novel tools for fundamental biological research and for the fabrication of clinically relevant biomaterials.

Kilian joined MatSE in August 2011 after completing a National Institutes of Health postdoctoral fellowship at the University of Chicago. He received his B.S. and M.S. degrees in Chemistry from the University of Washington in 1999 and 2003, respectively, and his Ph.D. in Chemistry from the University of New South Wales, Australia, in 2007.

MISS POSSIBLE: INSPIRING GIRLS TO DREAM BIG

Much has been reported about the need to close the STEM gender gap and encourage girls to consider careers in science and engineering. Two engineering students at the University of Illinois, Janna Eaves and Supriya Hobbs, are working to close the gender gap in a unique way. They have started a company, Miss Possible, which will produce dolls based on historical figures like Marie Curie, a two-time Nobel Prize winner who discovered the elements polonium and radium, to educate and inspire girls to go into science. The dolls will be created to resemble these historic women as 10 year-olds, to make them more relatable. Plus, the dolls will come with special extras like an educational app, so that girls can learn more about the figure the doll represents.

Eaves, a junior in Materials Science and Engineering, and Hobbs, a senior in Chemical Engineering, came up with the idea in January 2013 and used it in the Cozad New Venture Competition, where they finished among the top eight finalists in a field of 80 competitors. Miss Possible was also one of three finalists in the 2014 Innovation Celebration Awards. Below is an interview with Eaves and Hobbs about their background and plans for Miss Possible.

Supriya Hobbs and Janna Eaves

Were you interested in science as a girl?

Eaves: I always thought science was cool as a kid, but I preferred to engage in creative arts: writing, singing, dancing, etc. I was obviously better at science than singing, but it wasn't as glamorous or comfortably girly.

Hobbs: I've been interested in science as long as I can remember. My dad worked for a pharmaceutical company when I was growing up, and I clearly remember Bring Your Kids to Work Day being a highlight every year. We got to see all sorts of cool science demonstrations and activities, and that probably had a big influence on my interest in science from a young age.

What made you decide to go into engineering?

Eaves: I always knew that whatever career I was going to pursue, I wanted to contribute to the world in some significant way. Despite both of my parents being engineers, it never even occurred to me to try it until I was halfway through my senior year of high school, and halfway through my college applications. I was interested in sustainability and environmental causes, so I had been applying to biology. But at some point I realized I didn't just want to study how to make the world better ... I wanted to go out and do it. Luckily, I found my passion in engineering before it was too late.

Hobbs: I decided to go into engineering because I wanted to do something good for the world. I had originally aspired to be a doctor. Then, in high school, I saw what I thought was the distinction between science and engineering: scientists search for a solution to a problem and engineers design one. I was drawn to the idea of deliberately designing something that could have a big impact in the world and had always loved chemistry, so I decided to study Chemical Engineering.

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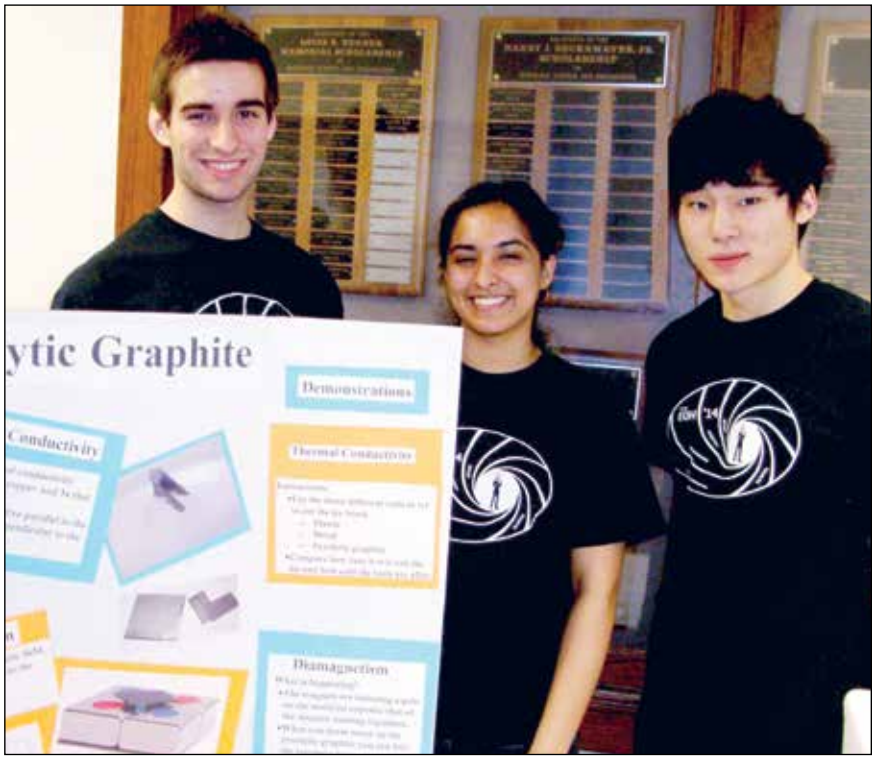
FRESHMEN EXHIBIT introduces visitors to thermal conductivity

The MatSE exhibit "Thermal Conductivity" won first place among freshmen exhibits at the 2014 Engineering Open House. Freshmen team members included Connor Bailey (Team Leader), Cullen Glasgow, Jai Karnik, Jaerin Kim, Deepa Kote, Samantha Tatar, and Axel Zwissler. Freshmen enrolled in MSE 182 in the fall semester are divided into groups to work on EOH projects. For MSE 183 in the spring semester, the teams work on their projects and present at EOH. In the interview below, Connor Bailey talks about his first EOH experience.

Tell me about your team's EOH exhibit.

Our exhibit used sheets of pyrolytic graphite to demonstrate the property of thermal conductivity. We had visitors hold a sheet of pyrolytic graphite and cut ice using the heat of their hand. Because it has such good thermal properties, the heat of their hand moved efficiently and quickly enough through the material to melt the ice in a concentrated location and essentially cut it. Visitors were skeptical at first, seeing just sheets of black "stuff" and some ice, but when they tried it everybody was amazed. They could feel their hand get cold as heat left! Soon they all asked questions. We taught them about what thermal conductivity is, why pyrolytic graphite has such good thermal conductivity (relating it to the structure), and explaining how it is different from normal pencil graphite. We also demonstrated its diamagnetic properties by levitating it above strong magnets.



Connor Bailey, Deepa Kote, and Jaerin Kim

Did you know your team members at the start of your project?

Our team members didn't really know each other at the beginning of the project in MSE 182, but I think by the end we knew each other better. We worked well as a team and got our job done, getting better acquainted along the way.

What is something you learned about thermal conductivity?

I had never heard of pyrolytic graphite before this project, even though it's one of the most thermally conductive known materials! It's also anisotropic. The fact that there are materials that can move heat that efficiently from one place to another, so much so that you can melt ice with your hand without directly touching the ice itself, is what I think was the coolest part.

How would you rate your first EOH experience?

I thought my first EOH experience was great! I'd never been to one before, so I had no idea what to expect. I was blown away by how many cool exhibits there were and presenting one myself was a blast. My favorite part was interacting with all the visitors and children and getting them interested in Materials Science and Engineering in general.

How do you like MatSE so far?

I love MatSE! How can one not? Great faculty, great atmosphere (not too big, not too small), and so many opportunities. It's starting to be fun to explain to everybody what MatSE is, it's like a well-kept secret to the general public.

Crushing the competition

The Material Advantage Compression Competition took place this spring using the 3-million-pound press in Talbot Lab. The University of Illinois chapter of Material Advantage came up with the idea of holding a unique design competition and invited students from other Material Advantage chapters to participate. The challenge was for each team to produce a sample that will fail as close to 2.5 million pounds without going over 2.5 million pounds.

Successful semester for MA

- Meher Bharucha

Material Advantage (MA) at Illinois had a busy semester filled with lots of fun events. The spring semester was kicked off with an intern panel, which showcased some of MA's seniors and their diverse intern experiences. We hosted alumni from Clorox to give a tech talk, participated in a kickball tournament with Pinnacle AIS, and hosted our semi-annual department feedback session. Elections were held in April and we had a grilling party to celebrate our outgoing and incoming board. To receive regular updates from MA, please like us on Facebook at www.facebook.com/IllinoisMA. If you are visiting campus and would like to get in touch with us, please feel free to contact Meher Bharucha, MA President, at bharuch2@illinois.edu.

Testing the sample in Talbot Lab

KNIGHT OF ST. PATRICK

MatSE senior Stephanie Nemec was selected for the Knights of St. Patrick Class of 2014. She served as president of the Material Advantage chapter at the University of Illinois for the 2013-2014 academic year. Nemec was an Engineering Learning Assistant (ELA) for ENG 100 and did undergraduate research in the area of biomaterials.

Become a **Visionary**

The Engineering Visionary Scholarship Initiative will raise a $100 million endowment to bring the nation's best students to Engineering at Illinois by making college more affordable. This investment will give a vibrant new generation of engineers the skills they need to improve our world in ways we can only imagine.

Department of Materials Science & Engineering Fund

Yes, I want to support MatSE with my gift of. ❒ $1,000 ❒ $500 ❒ $250 ❒ $100 ❒ Other:_____

❒ This gift is also from _____ Relationship:_____

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❒ Ceramic Engineering [7-75740]
❒ Jim Nelson Scholarship Fund [7-72833]
❒ Phil Geil Scholarship Fund [7-75866]
❒ Marvin Wayman Memorial Fund [7-73939]
❒ Other: _____

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ILLINOIS INNOVATION Prize Winner

Canan Dagdeviren and John Rogers

Canan Dagdeviren, a Ph.D. student who is pioneering technology that will lead to self-powering pacemakers, has received the $20,000 Illinois Innovation Prize. The Innovation Award is given to "one student who stands out as a passionate innovator and entrepreneur, who is working with world-changing technology and is seen as a role model for others."

"I developed a new class of biocompatible piezoelectric mechanical energy harvesters that are soft and flexible, with low bending stiffness, allowing them to conform to and laminate on the heart as well as on other soft tissues," Dagdeviren explained. "These devices are first of its kind polymer-based flexible nano-generators that convert mechanical energy from internal organ movements into an electric energy to power medical devices."

This technology could extend the battery life of implanted medical devices or even eliminate the need of battery replacement that altogether would spare patients from repeated operations and the risk of surgical complications. Dagdeviren noted that another potential application of this technology is in powering the health monitors/sensors worn on the skin and commercial electronic devices.

Dagdeviren obtained her bachelor's degree in Physics Engineering from Hacettepe University, in Ankara, Turkey, and was awarded a full scholarship to pursue her master's in Materials Science and Engineering at Sabanci University in Istanbul. A Fulbright scholar, she is pursuing her Ph.D. in MatSE under John Rogers' supervision.

Her honors include the Racheff-Intel Award for Outstanding Graduate Research, MRS Grad Student Silver Award, Turkish American Scientists and Scholars Association (TASSA) Young Scholar Award, and Maria Pia Gratton International Award.

After graduating from the University of Illinois this summer, Dagdeviren will join the Robert Langer research group at MIT as a postdoctoral researcher.

FELLOWSHIP AWARDED for medical imaging research


Wawrzyniec Dobrucki (Bioengineering), Qian Yin, and Jianjun Cheng

Qian Yin, Ph.D. student in Jianjun Cheng's research group, was awarded the Nadine Barrie Smith Memorial Fellowship from the Beckman Institute.

"My research is applying polymer chemistry to develop a novel translational polymeric nanoparticle system that can successfully evade nonspecific uptake in vivo, and facilitate targeted cancer diagnosis and therapy," Yin said. Following graduation from the University of Illinois, Yin wants to become a professor/scientist and use her research in the development of targeted imaging and therapeutic agents to improve the management of cancer.

Yin received her bachelor's degree in Chemistry from the University of Science and Technology of China. Her honors include the Racheff-Intel Award for Outstanding Graduate Research, 3M Graduate Fellow Award, and Midwest Cancer Nanotechnology Training Center Fellowship.

GRAD STUDENT NOTES

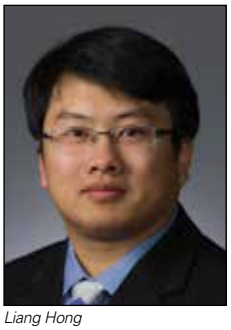
The MatSE at Illinois graduate program is ranked #2 in the nation by the U.S. News & World Report in its 2015 edition of the Best Grad Schools.

Chunjie Zhang, Ph.D. student in the Paul Braun group, won the Materials Research Society Graduate Student Gold Award for his paper, "Hydrogel Sensor Materials for Continuous Glucose Monitoring." **James Pikul**, co-advised by Paul Braun and Bill King (MechSE), received a Gold Award for his paper, "High Power Primary Lithium Ion Micro Batteries." There were more than 260 students nominated for this award, with about 30 finalists and 9 winners.

Kaitlin Tyler, Ph.D. student in the Paul Braun group, and **Jichuan Zhang,** Ph.D. student in the Taekjip Ha group (Physics), have been selected to receive the Mavis Future Faculty Fellowship from the College of Engineering.

New MatSE ALUMNI BOARD MEMBERS


Meena Banasiak


Liang Hong


Andrew Powell


Stephanie Rinne


Kyle Wilcoxen

Meena Banasiak (BS MatSE '06) is a Senior Quality Engineer for General Mills, Inc. She is a Certified Quality Engineer through the American Society for Quality. She currently serves as the Quality and Regulatory Operations Lab Manager at the West Chicago, IL, manufacturing facility, overseeing a team of 13 technicians. Banasiak previously held multiple quality engineering positions with increasing responsibility at the Belvidere, IL, plant, during which she qualified the facility to receive additional regulatory certification, drove a 48% reduction in consumer complaints, and was a key contributor in recovering over $900,000 in raw materials losses in 2 years' time. She has been named a Leader in Excellence by the General Mills Diversity Network and was also selected as one of just 7 employees worldwide to represent the "Face of Food Safety" in a series of educational videos. She also actively volunteers to support local United Way charities and the Northern Illinois Food Bank.

Liang Hong (PhD MatSE '07) is a Lead R&D Manager in Elastomers, Electrical and Telecommunications Business at the Dow Chemical Company. He joined Dow in 2007 in Core R&D. He has led a variety of technical programs to support multiple businesses within Dow, including Dow Construction Chemicals, Dow Pharma and Food Solutions, Dow Oil and Gas and Dow Coating Materials, etc. In 2011, Hong assumed the project manager role to lead a Global R&D program to develop High Performance OLED Materials for Dow Electronic Materials business. In 2012, he accepted additional responsibility to lead the mechanical dispersion group with oversight of a variety of programs focusing on technology development and commercialization of novel dispersions prepared by Dow's Bluewave Technology. In 2014, Liang assumed the current role to lead the Power technology R&D group within the Elastomers, Electrical and Telecommunications Business. Liang received his B.S. in Chemistry from Peking University, Beijing, China. He has published 13 peer-reviewed journal articles (>600 citations) and has 14 patents/patent applications.

Michael Pollard (BS Met '97, MS MatSE '98) is a Senior Engineering Specialist in the Advanced Materials Technology Group of Caterpillar Inc. in Peoria, IL. He has worked there for 16 years in various functions including development of new materials for high temperature engine applications as well as directing research and failure analysis of various engine components. He currently holds 10 patents for new alloys and engine components, and was a recipient of the R&D 100 award in 2003 for development of a new stainless steel for advanced diesel exhaust and after-treatment components. Pollard has been a member of ASM International, holding many committee chairmanships including Chairman of the Peoria Chapter in 2009-2010. He is also a member of AFS and TMS.

Andrew (Andy) Powell (BS MatSE '01) is a Principal Engineer at GE Aviation focusing on mechanical behavior of metallic, CMC and PMC materials. He has held previous roles at GE Aviation in Rotor Materials Application Engineering focusing on melting, forging and finish part definition for rotating nickel and iron engine components and Failure Analysis. His work at GE Aviation has involved alloy development and new test development where he holds two patents. He currently is the GE Aviation lead recruiter for all engineering disciplines at the University of Illinois, a position he has held for the past 7 years. Powell graduated from the GE Aviation Edison Engineering Development Program through which he obtained a M.S. in Material Science and Engineering from the University of Cincinnati in 2004.

Stephanie Rinne (PhD MatSE '06) is a Senior Engineer at Owens Corning. She recently graduated from the Owens Corning Science and Technology Development Program where she received a broad experience rotating through Roofing & Asphalt, Carbon Enhanced Reinforcements, and a new Insulation platform development. She is currently working in Roofing & Asphalt in new product development. Prior to this she completed a post-doc at the Beckman Institute and her Ph.D. in MatSE working with Prof. Paul Braun. The focus of her research was 3D waveguiding of near-IR light in complete photonic bandgap materials.

Kyle Wilcoxen (BS MatSE '06) is an Associate Brand Manager for ACH Food Companies, Inc. He recently made a transition into Marketing after finishing his MBA at Loyola University Chicago's Quinlan School of Business. His new areas of responsibility include P&L management and the strategic development of new products. He previously spent 8 years with The Clorox Company working in Research and Development as a Scientist/Engineer. The majority of his work in R&D focused on blown film extrusion and solid-state deformation of thermoplastic films. He was the co-inventor of Glad® "Stronger with Less Plastic" drawstring trash bags, received Clorox's "Patent of the Year" award for his business contributions, and was recognized by Consumer Reports as creating one of the Best Trash Bags in the market today. He holds 20 US patents and has 16 US patent applications pending. His areas of expertise are in full-product lifecycle development, consumer research, Intellectual Property strategy development, and statistical modeling.

Happily ever after MATSE COUPLES

While it's common for MatSE students to bond in the junior lab course or in professors' research groups, sometimes it can turn into something more lasting. Here are stories of alumni who met when they were students, got married, and "the rest of the story."

Lance (MS Met '73, PhD Met '76) and Patricia (MS Met '76) Labun

Lance Labun met Patricia Birnbaum in June 1974. He was starting his 5th year as a grad student working for Prof. Ted Rowland, and she was a new grad student. "Prof. Rowland sent Patricia over to my lab in the MRL to ask about my research topic," Lance explained. "She had already spoken with several other grad students, but apparently I was first to ask about how she was adjusting to C-U and had she found a place to live. Having lived in C-U for four years sharing apartments and then a house with other Metallurgy and Mining Engineering grad students, I was able to help her out. And of course the fact that I owned a car was a big help because she was able to shop away from campus and buy more than one bag in each trip."

Lance was one of the first students working on polymers. Prof. Rowland's research area was applying nuclear magnetic resonance (NMR) to study diffusion in metals. "I do not now recall the reason, but we decided to look at a sample of rubber, because hydrogen atoms gave a very strong signal," Lance explained. Later he would use NMR to look at the chain motion in polymers. He received his Ph.D. in September 1976 and took a job with GE in Cleveland, OH.

"In the four years that I was at the U of I prior to Patricia arriving, there were no woman graduate students," Lance said. Patricia had a fellowship and received her coursework M.S. She then began working in electron microscopy with Prof. Hamish Fraser. "When I left for Cleveland, Patricia sat down with Prof. Fraser and they prepared a plan for her to finish her Ph.D. in 2 years. After approximately 1.5 years, it became clear that progress was not being made with sufficient speed to finish in two years," Lance explained. "We decided that Patricia would end her studies, move to Cleveland, and we would marry." They were married in July 1978.

Lance worked at GE for 11 years. He was a senior materials engineer in the division that manufactured light bulb components, wires, bases, and various plastic parts. After moving to Cleveland, Patricia found work as an electron microscopist at Republic Steel Research Laboratory. She completed her Ph.D. at Case Western Reserve University and was a post-doc at Oxford University and Case Western.

"While she was on the post-doc, we had our son," Lance said. "For a few months, she was able to keep working while he slept quite contentedly in the nice, dark microscopy lab."

The couple moved to Arizona so that Patricia could run an industrial liaison program for the microscopy center at Arizona State University. Lance stayed home as a full-time father. After two years, Lance found a position in a small aerospace company focused on helicopter crashworthiness, and Patricia stayed at home with their son. Patricia became the science coordinator at their son's elementary school and held that position for nearly 20 years. Lance just recently returned to contract work.

The couple will celebrate their 36th anniversary in July. Through the years they have stayed in touch with fellow grad students Randy Tustison (MS Met '72, PhD Met '76), Tony Polak (MS Met '71, PhD Met '77), and Bob Shull (MS Met '73, PhD Met '76).

They attend classical music concerts, which they started doing at Krannert Center when they were students. Patricia does various forms of needlework, and Lance enjoys photography and woodworking. "I do not do autocrossing or road rallying any longer as I did in C-U, but my daily driver is a Miata," Lance added.

Their son, Lance A., earned a B.S. in Physics and Math from Dartmouth and Ph.D. in Physics from the University of Arizona.

MatSE Couples continued

Dave (PhD Met '78) and Marisa (MS Met '78) Lohse

Dave and Marisa Lohse met when they were both graduate students in polymers. Dave joined the department in 1974, and Marisa transferred from the Chemistry Department into Metallurgy and Mining Engineering in August 1977.

Dave worked with Prof. Richard Gaylord on polymer theory and did his Ph.D. thesis on calculating how the number of configurations of a polymer chain is reduced when confined to be near or between fixed surfaces. This had applications in the properties of semi-crystalline polymers, block copolymers, rubber elasticity, and the surface properties of polymers. Marisa's M.S. thesis was done under Prof. Richard Wool. She used NMR to study the molecular origins of the mechanical properties of hard-elastic polypropylene.

They were married in the Grace Lutheran Church in Champaign in September 1978, right after graduating. "We have many great memories of the many students, staff, and faculty in the department who were able to share that special day with us," Dave said.

Dave accepted an NRC-NSF postdoctoral appointment at the National Bureau of Standards (now National Institute of Standards and Technology) in Gaithersburg, MD. "Since we had just married, Marisa also looked for work in the DC area, and became involved in the then-new field of searching and developing databases, in particular for the toxic effects of chemicals," Dave said. "In both of our cases, the skills we acquired in these two years in Maryland helped expand what we had learned at MatSE in ways that were crucial for the rest of our careers."

Dave joined Exxon (later Exxon Mobil) after his postdoc, working on a number of areas of polymer physics. Most of his 31 years with Exxon Mobil were at the Corporate Strategic Research labs in New Jersey, applying basic polymer physics to a number of applications. Since retiring from Exxon Mobil, Dave has continued his scientific career with some consulting as well as serving as a divisional councilor in the American Chemical Society.

After spending a year developing new vinyl flooring materials for Congoleum, Marisa worked for 28 years for Union Carbide, including the last five years of her career when Carbide was part of Dow Chemical. There she applied her skills in searching to polymers and other areas of chemistry, especially in the development and protection of intellectual property.

"Upon retirement we moved to the Upper East Side of New York City. We greatly enjoy the cultural delights of the Big Apple, as well as many opportunities for travel," Dave added. The couple visited campus last September for their 35th anniversary.

Geoff (MS Cer '84) and Mary Lou (BS Cer '84) Morris

Mary Lou and Geoff Morris met in the Ceramics Building in December 1982.

"I was a new grad student and she was an undergrad who was assigned to clean a piece of equipment in my lab," Geoff said. "I had done my undergrad work at Georgia Tech and really didn't know my way around campus yet. I didn't know where the Quad or student union was or anything. I asked Mary Lou some questions about where things were located, and I think she thought I was a little slow or something."

After graduation, Geoff accepted a job with the 3M Dental Products Department (now 3M ESPE).

When Prof. Clif Bergeron heard that Geoff had an offer but Mary Lou did not, he contacted Dr. Hal Sowman at 3M. The result was an offer for Mary Lou to work in the 3M Abrasive Systems Division.

"I think 3M Abrasives got the better deal," Dave added. "Mary Lou went on to help invent one of 3M's Cubitron brand synthetic minerals which has been an extremely successful technology platform."

They were married in Decatur, IL, on September 14, 1985, about one year after they both started at 3M.

Geoff and Mary Lou continue to work at 3M and will reach the 30 year milestone this year.

Mary Lou works in the 3M Industrial Minerals Division, and Geoff recently returned to working for 3M ESPE Dental Products.

They have two children. Their oldest daughter is a biochemist and works on soybeans for Monsanto at one of their research stations in Minnesota. Their son is working on his Chemical Engineering degree at the University of Minnesota.

Mary Lou and Geoff love to exercise, bike and hike. Mary Lou also loves her dogs. They have fond memories of taking Ballroom Dance with Ms. D.

They keep in touch with former classmates who are employed at 3M—Kent Budd (BS Cer '81, MS Cer '83, PhD Cer '86), Phil (BS Cer '82, MS Cer '84, PhD Cer '88) and Maggie (BS Cer '86, MS Cer '88) Martin, Dave Wilson (BS Cer '82, MS Cer '84)—and Medtronic, as well as with Mary Lou's roommates.

"We are both very thankful for the education we received at Illinois," Geoff said. "It has served as an unbelievably strong foundation for our successful careers at 3M."

Dave and Janice Eddington (both, BS MatSE '00)

Janice and Dave Eddington lived near each other and walked to classes together at the U of I. "We became friends and bonded over the rigorous junior year course schedule," Dave said. Janice agreed that the junior year course load accelerated their relationship but added, "It was the first day of MatSE 207 and I recall walking into the lab and making eye contact with him… I remember a smile, a twinkle in his eye, and a goofy grin." Both were students in the polymers area of concentration.

Dave went to graduate school in biomedical engineering at the University of Wisconsin-Madison. He and Janice were married on August 4, 2002, at the Allen Centennial Gardens in Madison.

Dave is an Associate Professor of Bioengineering at the University of Illinois, Chicago, and serves as the Director of Graduate Studies for his department. His research lab works on developing microfluidic solutions for medicine and biology. In his free time, he enjoys mountain biking, bicycle touring, and war board games.

"After stints at UW-Madison's Synchrotron Radiation Center (before children) and Argonne National Lab (after children), I am most happy as a stay at home mom to our three girls (ages 9, 7, and 5)," Janice said. Janice coaches girls' high school soccer in the spring and stays active playing soccer in a couple of women's leagues year-round and biking with Dave.

They keep in touch with former MatSE classmates. "I am still good friends with Keith Dvorkin (BS MatSE '00) and see him weekly where we go mountain biking one weekend morning before our little children wake up, and we play war-games usually one evening a week," Dave said. "Facebook has made it easier to keep in touch with former classmates," Janice added.

Mark and Grete Veliz (both, BS MatSE '02)

Mark and Grete Veliz didn't really get to know each other until the senior year when they were lab partners in the metallurgy lab.

"Soon after graduation, we began a new adventure in Ohio," Mark said. Mark had accepted a job offer with GE Aircraft Engines (now Aviation) in Cincinnati, and Grete accepted an offer with Universal Technology Corp. near Dayton. They got married in 2004 in Cincinnati.

Mark is employed as a senior engineer at Caterpillar in Peoria, IL. He has been there since 2007 and works on new material development with a focus on engine components. "At Caterpillar I get to work with many great Illinois MatSE alumni, including Katy (Gordon) MacGregor (BS MatSE '02), Aaron Amstutz (BS MatSE '96, MS MatSE '98), Nan Yang (PhD MatSE '03), and Mike Pollard (BS Met '97, MS MatSE '98)."

Mark and Grete have five children: Maria (8), Norah (6), Elena (4), Adam (3), and Lucas (1). Their family enjoys hiking, riding bikes and just being outdoors.

"Mark and the kids enjoy camping, but I stay home with the baby," Grete said. The children are homeschooled. "This past school year I taught 1st and 2nd grade and preschool. I also like reading, knitting, sewing and baking. Mark coaches t-ball and is always building or fixing something."

Yau-Ru Chen and Tim Patz (both, BS MatSE '03)

Yau-Ru Chen and Tim Patz were classmates but didn't really get to know each other until their senior year, when they were both in the biomaterials area of concentration. They started dating their last semester in spring 2003.

After graduation, both went to graduate school. Tim went to Georgia Tech for his M.S. in bioengineering. After he finished his master's, Tim moved to Irvine, CA, to work for Edwards LifeSciences. He earned his MBA at UC Irvine while continuing to work full-time for Edwards. Tim is the Director of Marketing for the Asia Pacific region of Edwards Lifesciences.

Yau-Ru went to the University of California-Berkeley for optometry school and now owns her own optometry practice in beautiful Newport Beach, CA.

"We got married Labor Day weekend 2007 after I finished optometry school," Yau-Ru said. "We picked Las Vegas and had a great time with our friends and family!" They stay in touch with Amul Tevar (BS MatSE '03) who helped to set them up.

The couple is expecting the birth of their first child, "a baby boy to be named Ryder," in June.

They love to travel and have visited over 20 different countries. Not surprisingly, they are huge fans of Travel Channel and Anthony Bourdain. They hope to continue their travels after the baby arrives.

Matt and Megan Seebeck (both, BS MatSE '10)

Towards the end of their junior year, Matt and Megan were in the Ceramics computer lab with other MatSE students when Megan mentioned she was staying on campus for summer school and asked if anyone else was going to be on campus for the summer.

"I said that I was (even though I didn't have any plans at that point and didn't have any work or classes lined up). I thought this was my best chance to get closer to Megan, so I was determined to figure something out," Matt said. "I asked around for undergraduate research opportunities and was fortunate enough to get a lab position working for Professor Zuo. Megan and I started to hang out shortly after the summer began and soon enough we were dating." They took a road trip to Colorado that summer, which is where they now call home.

Matt and Megan got married on October 14, 2011, in Naperville, IL. Several of their MatSE friends have gotten married over the past few years, and Matt and Megan try to meet up with everyone when they travel to Chicago for the holidays.

Megan was in the ceramics area of concentration, and Matt was in polymers. They decided to look for jobs together and agreed that whoever got a job first, the other one would follow. Megan got an offer from the U.S. Air Force Academy in Colorado Springs, CO, where she works as a Materials Science Engineer. Matt ended up working in retail for several months before securing a position with Qualtek Manufacturing as a Metallurgist. "I would say that limiting our search was difficult at the time, but it all worked out for the best in the end and I don't regret that decision," Matt added.

They have a son named Landon who was born in January 2013, and they are expecting their second child in October 2014.

They enjoy being outdoors and love hiking. Matt is also heavily involved with the Ultimate Frisbee community in Colorado Springs. "It is something Megan and I enjoy doing and has helped us to make a lot of new friends here," Matt said.

In Memoriam

William Muhlstadt (BS Cer '62, MS Cer '68), 75, of St. Petersburg, FL, died September 6, 2013. He received his MBA from the University of Pittsburgh. He was a Captain in the US Army having served during the Vietnam War. He was retired from Anchor Glass Container Corporation. He was a member of St. Raphael's Catholic Church in St. Petersburg. He loved cribbage and football and spending time with his family. He is survived by his wife of 52 years, Karen, five children, twelve grandchildren, and four great grandchildren.

Robert Cowan (BS Cer '54, MS Cer '55), 81, of Los Alamos, NM, died January 29, 2014. After graduation, he worked for Westinghouse in the Naval Laboratory in Pittsburgh, PA. He moved to Los Alamos in 1957 and spent the remainder of his career at the Los Alamos National Laboratory, initially in the ceramics group. He was active in the community with New Mexico Search and Rescue and Los Alamos Amateur Radio Club (W5PDO). He was known to his ham radio friends as "K5QIN." He is survived by his two children, five grandchildren, and seven great-grandchildren.

Ronald Larson

Ronald Larson (BS Met '58), 78, of Tinley Park, IL, died March 19, 2014. He retired as President of Chicago Magnesium Casting Co. He was a longtime member of Kiwanis Club of Tinley Park and a member of Faith United Presbyterian Church in Tinley Park. He was a dedicated Little League coach in Country Club Hills when his boys were young. He was a longtime supporter of the Department of Materials Science and Engineering at the University of Illinois and served on the MatSE Senior Advisory Committee for almost 20 years. His wife Pamla preceded him in death. He is survived by his three sons and six grandchildren.

Howard Friedman (BS Met '55), 81, of Skokie, IL died February 6, 2014. He was Founder and former President of Fotofabrication Corporation, a company specializing in photo-chemical machining-a process to manufacture thin metal parts using photography and chemistry. He was a loyal alumnus of the University of Illinois and served on the boards of the U of I Alumni Association, MatSE Alumni Board (including a term as President), and MatSE Senior Advisory Committee. He received the College of Engineering Alumni Award for Distinguished Service in 1996. Survivors include his wife of 58 years, Kay, three children, and four grandchildren.

Miss Possible, continued

How is the business coming along and when do you hope the product to be on the market?

The News-Gazette article (March 9, 2014) got Miss Possible a lot of valuable attention through social media, which was huge for us. Many people reached out, asking how and when they could buy dolls.

That kind of product validation really drove us to start moving fast. We performed more and more customer interviews, which led us to change the product slightly. Now, instead of access to an online world where users can play games, each doll comes with an app that serves as a virtual storybook/activity book. It will guide the user through the character's story, and also include some hands-on activities that can be done with materials in your own home. For example, the Marie Curie doll would come with an app that features her life story and some chemistry and physics activities. Bessie Coleman would come with activities that teach the user about pressure and drag and lift. The idea is to inspire girls to achieve and help them build confidence in their abilities to do so.

We are now focusing on product development and working on a Kickstarter video. Our Kickstarter campaign will hopefully be opened this summer, so keep an eye out! If the campaign is successful, we will raise enough money to go into production. The product should be on the market this fall!

Who should alumni contact if they are interested in ordering a doll?

We are maintaining a list of people interested in following our development. They can contact us directly at info@bemisspossible.com, or sign up for email updates at http://bemisspossible.com/contact.html.

CLASS Notes

Bob Anderson (BS Met '51) took MatSE Department Head David Cahill for a ride in his Bob Hope custom Chrysler golf cart when Cahill visited Pearland, TX, in November.

Bob Luetje (BS Met '59) and his wife, Karen, held an Illini event at their Fox Run retirement community in Novi, MI. Karen (BS Recreation '58) organized the dinner, decorating the table with Illini mementos. The group shared Illini memories and sang from a song sheet copied from an old football program. "Neighboring tables were envious (we think) of the fun we were having," Bob reported.

Gerhard Persson (MS Met '61) has completed a 50-page photobook with pictures and memories from the 1960-1961 academic year he spent in Illinois. Included in the book is a photo of Charlie Wert and Marvin Wayman preparing for a car trip to St. Louis.

John Hebeisen (BS Met '66) and **Sam Williams** (BS Met '65) correctly identified former classmates and professors from the flashback photo printed in the summer 2013 issue of the MatSE Alumni News. The labeled photo of the 1964 Mineral Industries Society is online at http://www.matse.illinois.edu/downloads/alumni_news/1964MISociety.pdf. Hebeisen was the president of the society in the year this photo was taken. He retired in 2006 after working on hot isostatic processing (HIP) for 25 years. Initially the company he was with was IMT, part of National Forge, but was later bought by Bodycote Plc. By the time of his retirement, he was President of the U.S. HIP Group for Bodycote. Hebeisen and his wife live in a house on Lake Winnipesaukee in Moultonborough, NH.

Phil Funk (BS Met '69) and his wife, Patti, visited the U of I campus in February. It was his first trip back to campus since he graduated. He retired on February 1 from the Electric Materials Company, where he worked in copper alloys the past 17 years. Phil and Patti live in North East, PA, and have two children and three grandchildren who live close by.

Harvey Andersen (BS Met '78) worked for Intel from 1988 to 2005 and recognized some of the people on the back page of the last alumni newsletter. He said of Marvin Wayman, "Students would sometimes call him 'Marvinsite' because of all of his research on martensite." Andersen's son is studying Molecular and Cellular Biology at the U of I. "When I was a student, tuition was $550 a semester," he lamented.

Tom (BS Met '79) and **Patricia** (BS Met '79, MS Met '86) **Miller** were inadvertently left off the list of benefactors in the honor roll which appeared in the last issue of the MatSE Alumni News. *Editor's Note: Thank you for your generous support of MatSE!*

Thomas White (BS Met '81) became Chairman, President and CEO of Sargent & Lundy on January 1, 2014. He joined the firm in 1985 and has been an owner since 2000.

Karla Carichner (BS Cer '87) is a semi-retired consultant. She worked in several executive positions, including Vice President of Operations at three different companies. This past spring semester, she taught Industrial and Manufacturing Engineering at Cal Poly State University.

Farshid Adibi-Rizi (PhD Met '93) visited campus with his family on June 20. His son, Arya, is a sophomore and daughter, Nicki, is a senior. He works in IP licensing for Intel in Santa Clara, CA.

Zhiyong Ma (PhD MatSE '94) has been promoted to Vice President of the Technology and Manufacturing Group at Intel. After graduation, he briefly worked for Digital Equipment Corporation before joining Intel in 1995.

Ganpati Ramanath (PhD MatSE '97) has been named the John Tod Horton '52 Professor of Materials Engineering at Rensselaer Polytechnic Institute. He is recognized as a pre-eminent researcher and scholar in the fields of nanostructured materials and interfaces for materials discover and design for applications in energy, electronics, and heat management. He has published over 150 papers and has 8 patents.

John Voyles (BS MatSE '97, MS MatSE '03) is Plant Engineering Manager for Armorline Corporation in Indian Land, SC.

Ashley Predith (BS MatSE '99) recently started a new position with the Office of Science & Technology Policy (OSTP) at the White House.

Chris Caspers (BS MatSE '00) was recently promoted to Value Stream Manager at Federal-Mogul Corporation in the Columbus, OH, area. He and his wife have two children, ages 1 and 3.

Nerissa Draeger (PhD MatSE '00) is Senior Engineering Manager for Lam Research Corporation in San Jose, CA.

David Honecker (BS MatSE '01) and his wife, Sharon, celebrated the birth of their second child, Emily on January 5.

Nate Mohler (BS MatSE '01) is Executive Director of the Concrete Polishing Association of America. The position is based in Farmington Hills, Michigan, where he gets to proudly display his Orange and Blue in Wolverine country.

Pankaj Sarin (PhD MatSE '02) and his wife, Manisha, welcomed the birth of their daughter, Anika, on October 3, 2013. Sarin is an assistant professor in the School of Materials Science and Engineering at Oklahoma State University.

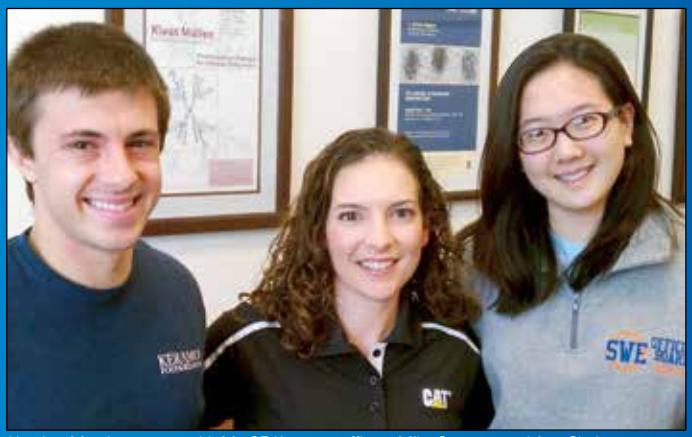
Heather Mercier (BS MatSE '03) visited campus in April to talk about Caterpillar and meet with undergraduates. She has been with Caterpillar since graduating from the U of I. Mercier received her 6Sigma Black Belt certification in 2009 and her MBA in 2011 from DePaul University in Chicago. She lives with her husband and two daughters in Geneva, IL.

Donald Boone (BS Met '57, MS Met '59, PhD Met '62), Amand Pirson, Charlie Wert, Marvin Wayman, and James Cost (MS Met '59, PhD Met '62) prepare for a road trip in 1961.

Emily Honecker

Anika Sarin

David Cahill and Bob Anderson



Heather Mercier, center, with MatSE Keramos officers Mike Sarantos and Ann Choi

Patti and Phil Funk

Karen Luetje at the Illini event in Fox Run

Arya, Farshid, Manya, and Nicki Adibi-Rizi

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WELCOME new alumni!

MatSE graduates and their families were invited to our annual graduation lunch on May 18 at the Illini Union. This spring, MatSE welcomed 82 B.S. graduates, 13 M.S. graduates, and 11 Ph.D.'s. We look forward to printing the accomplishments of our new alumni in future issues of our newsletter.