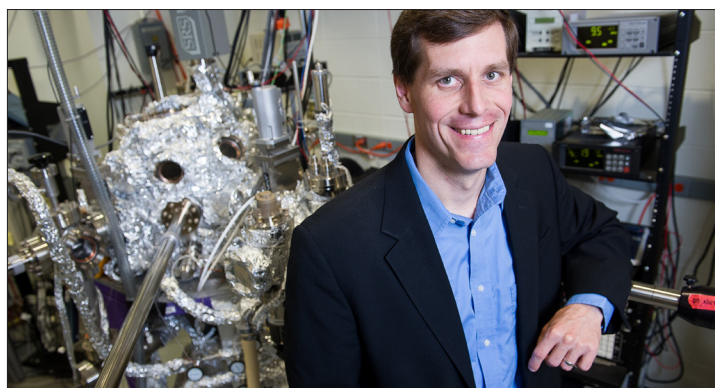


# Materials Science and Engineering

ROBERT R. MCCORMICK SCHOOL OF ENGINEERING AND APPLIED SCIENCE | NORTHWESTERN UNIVERSITY **SPRING 2015**

## Mark Hersam Named MacArthur Fellow

**DEDICATED TEACHER AND VERSATILE RESEARCHER PUSHES MATERIALS AND MINDS FORWARD**



Mark Hersam

**M**ark C. Hersam, a materials engineer who teaches the innovators of tomorrow and works across scientific boundaries to create new materials for use in electronics, solar cells and batteries, was named a 2014 MacArthur Fellow, an honor bestowed with a \$625,000 “no conditions” award.

A versatile and highly productive experimentalist, Hersam is developing novel nanomaterials for use in information technology, biotechnology, energy, such as solar cells and batteries, and flexible electronics for personalized health monitoring—the kind that can be integrated into clothing, not just strapped on your wrist.

The phone call from the John D. and Catherine T. MacArthur Foundation delivering the very good news was so out of the blue that Hersam initially thought it was a joke. “Then I went into shock, and,

I think, to some extent I remain in shock,” said Hersam, who received the call in his Cook Hall office. “As time has gone on, I’ve appreciated, of course, that it’s a great honor and, more importantly, a great opportunity.”

A dedicated and popular teacher, Hersam is the Bette and Neison Harris Chair in Teaching Excellence and professor of materials science and engineering.

He was one of the new MacArthur Fellows recognized in September by the MacArthur Foundation for “extraordinary originality and dedication in their creative pursuits and a marked capacity for self-direction.”

“I am very grateful and thankful to the MacArthur Foundation, to current and previous members of my research group and to my colleagues and collaborators over the years,” Hersam said. “Scientific research is a team effort.”

“Research exposes students to difficult unsolved problems, forcing them to be creative. I want them to come up with truly new ideas, not just regurgitate established concepts.” *Mark Hersam*

Hersam views his principal job as that of an educator—a role in which he can have more impact on unsolved problems by harnessing the minds of hundreds of young scientists and engineers. “I love to teach in the classroom, but I also believe that scientific research is a vehicle for teaching,” Hersam said. “Research exposes students to difficult unsolved problems, forcing them to be creative. I want them to come up with truly new ideas, not just regurgitate established concepts.”

Taking an interdisciplinary approach that draws on techniques from materials science, physics, engineering and chemistry, Hersam has established himself as a leading experimentalist in the area of hybrid organic-inorganic materials, with a focus on the study of the electrical and optical properties of carbon and related nanomaterials. Hersam and his research lab have been working primarily with carbon nanotubes and graphene, but the support of the

*continued on page 3*

## \$92 Million Gift for Regenerative Medicine Research

**THE GIFT FROM LOUIS SIMPSON AND KIMBERLY QUERREY SETS NEW CAMPAIGN RECORD**

Northwestern University Trustee and alumnus Louis A. Simpson and his spouse Kimberly K. Querrey have made an additional \$92 million gift to Northwestern University in support of the University’s biomedical research programs.

The latest gift comes just a year after the couple made a \$25 million gift to Northwestern to endow the Louis A. Simpson and Kimberly K. Querrey Institute for BioNanotechnology in Medicine

(SQI). SQI is conducting some of the world’s most innovative, interdisciplinary research in applying nanotechnology to regenerative medicine. These gifts, along with the couple’s earlier gifts, bring their total contributions to We Will. The Campaign for Northwestern to \$117.8 million. This represents the largest amount given by a single donor to the campaign.

*continued on page 3*

# Letter from the Chair



Mike Bedzyk

**D**ear friends: Our annual alumni and awards celebration — Wednesday, May 20 — is fast approaching and, as you can see in this edition of our newsletter, we have much to celebrate. Our faculty, students, and alumni have been recognized

“Most Powerful Women Engineers in the World.” Duran is the conflict minerals program manager and supply chain director at Intel.

One of our most memorable events this past year was the visit by Nobel Laureate Dan Shechtman, this year’s Cohen Lecturer. In

“The importance of this multidisciplinary approach has progressed to the point where even President Obama refers to ‘materials science’ in his speeches from the White House.” *Mike Bedzyk*

with many honors and prestigious awards this past year. Among the faculty, Mark Hersam was named a MacArthur Fellow. Among our graduate students, many received prestigious NSF and NDSEG fellowships. One of our undergraduates, senior Edward Pang, was named a Churchill Scholar and will study at Cambridge in the coming year.

Many of our alumni also have been recognized for their contributions to the field. In particular this year’s two career achievement alumni awardees, Anil Virkar and Grace Wang (profiled on page 5), have made great strides in their entrepreneurial and academic efforts. And *Business Insider* recently named Carolyn Duran (PhD ’98) as second on their list of

addition to a talk about his discovery of quasi crystals, he delivered an interesting public lecture about creating startup companies. (Read about his visit on page 8.)

Training the next generation of entrepreneurs has been a recent departmental theme and is in line with our strategy to develop the Energy Materials Lab, with help from Mary (BS ’98) and Ethan Meister and Boris Vuchic (PhD ’95). On page 6 you can read about our students’ success and wide-spread media attention for their inventions. An example from the faculty side is Ramille Shah’s 3D printing of biomaterials for tissue engineering.

This school year, we also celebrate three new faculty members joining our department: Sossina Haile, Jeff Snyder, and James Rondinelli. Sossina and Jeff are featured on page 3. James, who appeared in the previous edition of our newsletter, is featured in an article on page 4.

The 2014-15 academic year marks the 60th anniversary of Morris Fine’s arrival from Bell Labs to chair the newly formed Department of Metallurgy, nucleated with professors Don Whitmore, Jack Frankel, and John Brittain, and shortly after, Jack Kauffman and Tony Kelly. Notably, Professor Fine’s offer letter mentioned “materials science” and within a few short years, in 1958, the department name was formally changed to the Department of Materials Science. The importance of this multidisciplinary approach has progressed to the point where even the President Barack Obama refers to “materials science” in his speeches from the White House. By the way, Morrie Fine recently

celebrated his 97th birthday and still comes into the lab on a regular basis. Truly amazing! The inclusiveness engendered at the onset of our field has made it very natural to incorporate each newly discovered materials system and allowed us to grow into new areas, such as biomaterials, nanomaterials systems, and composites.

In closing I would like to thank all those who have contributed to the Johannes and Julia Randall Weertman Graduate Fellowship fund, which has reached \$600,000, with the first Weertman graduate fellowship going to MSE PhD candidate Deep Jariwala. Also, thank you to all who have contributed to the Charles Chiou memorial fund and to the department at-large. These gifts, which we use to leverage university and McCormick funds, help our department initiate new directions that support our research and educational missions.

Mike Bedzyk  
*Chair, Department of Materials Science and Engineering*

## Upcoming Events

### WEDNESDAY, MAY 20

#### Hilliard Symposium

Northwestern University Transportation Center  
600 Foster Street, Evanston  
Registration at 8:30 a.m.

Keynote at 11:00 a.m. Featuring keynote speaker Jinliu “Grace” Wang (PhD ’01), deputy assistant director of the Directorate of Engineering at the National Science Foundation.

### WEDNESDAY, MAY 20

#### Annual Alumni Celebration Banquet

Hilton Orrington  
1710 Orrington Avenue, Evanston  
5:30 p.m.

Honoring Career Achievement Recipients Anil V. Virkar and Jinliu “Grace” Wang (see profiles, page 5)

For more information, or to register, please contact Molli Connell at 847-491-3533 or mbconnell@northwestern.edu.

# Department Welcomes Two New Faculty

SOSSINA HAILE AND G. JEFFREY SNYDER JOIN NORTHWESTERN

The Department of Materials Science and Engineering is excited to welcome two new faculty members: Sossina Haile and G. Jeffrey Snyder, both from the California Institute of Technology.



Sossina Haile

“There are three things that bring me to Northwestern: people, people, and people.”

Sossina Haile

Haile joins as the Walter P. Murphy Professor of Materials Science and Engineering and professor of applied physics, and Snyder joins as a professor of materials science and engineering.

“There are three things that bring me to Northwestern: people, people, and people,” Haile said. “I am absolutely delighted at the innumerable collaboration possibilities that seem to pop up around every corner. Add to that the phenomenal facilities, and it’s a winning recipe.”

“With Northwestern’s world-class faculty and facilities, it’s easy to explore new ideas and techniques,” Snyder added.

“The collaborative environment makes science more exciting.”

Haile’s research broadly encompasses solid-state ionic materials and devices, with a particular focus on energy technologies. She has established a new class of fuel cells based on solid acid electrolytes and

demonstrated record power densities for solid-oxide fuel cells. Her more recent work on water and carbon dioxide dissociation for solar-fuel generation by thermochemical processes has created new avenues for harnessing sunlight to meet energy demands.

Before joining Caltech in 1996, Haile spent three years as an assistant professor at the University of Washington in Seattle. She has received many awards, including the NSF National Young Investigator Award, Humboldt Fellowship, Fulbright Fellowship, AT&T Cooperative Research Fellowship, Coble Award from the American Ceramics Society, and TMS Robert Lansing Hardy Award.

Snyder is interested in solid-state chemistry, physics, and engineering of electronic, magnetic, and energy materials. He currently focuses on novel thermoelectric materials and devices. He has developed the concept of thermoelectric compatibility for design and optimization of segmented generators, and he has developed empirical and analytical models for calculating thermoelectric performance.



G. Jeffrey Snyder

“The collaborative environment here makes science more exciting.”

G. Jeffrey Snyder

From 1997-2006, Snyder served as a senior member of the technical staff at Caltech and NASA’s Jet Propulsion Laboratory. Using electrochemistry and low-cost microfabrication techniques, he developed the process and tests for thermoelectric microdevices. He also designed and tested portable power sources for terrestrial and space applications.

## Mark Hersam, continued

MacArthur award will allow the lab to diversify its materials set to other elements in the periodic table.

Earlier this year Hersam testified before US Congress to push for “coordinated, predictable, and sustained federal funding” for nanotechnology research and development. His numerous awards have included the Beckman Young Investigator Award, the National Science Foundation CAREER Award, a Sloan Research Fellowship, the Presidential Early Career Award for Scientists and Engineers (PECASE), and six Teacher of the Year Awards.

## \$92 Million Gift, continued

In recognition of their generosity, the new biomedical research center on Northwestern’s Chicago campus will be named the Louis A. Simpson and Kimberly K. Querrey Biomedical Research Center.

Construction will begin this year on the 12-story Biomedical Research Center that will be connected to the Robert H. Lurie Medical Research Center. The new state-of-the-art research center, comprising approximately 600,000 square feet, will have nine laboratory floors. It has been designed to accommodate an

additional 15 laboratory floors of vertical expansion in the future.

The Simpson Querrey Biomedical Research Center will provide new space for SQI investigators and collaborators as well as other biomedical scientists working in cancer, heart disease, neurodegenerative disorders, and genetics. It will help draw the most talented research faculty, PhD students, and postdoctoral fellows, and will provide new research opportunities for medical students, residents, and clinical fellows on both the Evanston and Chicago campuses.

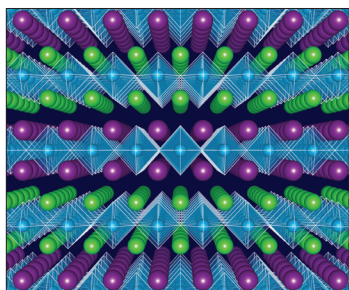
“Regenerative medicine is both a great challenge and a great hope. We want to regenerate parts of the human body lost to trauma, aging, disease, and genetic factors,” said Samuel I. Stupp, the Board of Trustees Professor of Materials Science and Engineering, Chemistry, Medicine, and Biomedical Engineering, who has led SQI since its founding. “We are seeking to go beyond the current boundaries of medical science and in doing so, provide hope to those afflicted by these factors.”



# New Method Allows for Greater Variation in Band Gap Tunability

**THE METHOD CAN CHANGE A MATERIAL'S ELECTRONIC BAND GAP BY UP TO 200 PERCENT**

If you can't find the ideal material, then design a new one. James Rondinelli uses quantum mechanical calculations to predict and design the properties of new materials by working at the atom-level.



Atomic scale structure of "designer" layered oxides

His group's latest achievement is the discovery of a novel way to control the electronic band gap in complex oxide materials without changing the material's overall composition. The finding could potentially lead to better electro-optical devices, such as lasers, and new energy-generation and conversion materials, including more absorbent solar cells and the improved conversion of sunlight into chemical fuels through photoelectrocatalysis.

"There really aren't any perfect materials to collect the sun's light," said Rondinelli, assistant professor of materials science and engineering. "So, as materials scientists, we're trying to engineer one from the bottom up. We try to understand the structure of a material, the manner in which the atoms are arranged, and how that 'genome' supports a material's properties and functionality."

The electronic band gap is a fundamental material parameter required for controlling light harvesting, conversion, and transport technologies. Via band-gap engineering, scientists can change what portion of the solar spectrum can be absorbed by a solar cell, which requires changing the structure or chemistry of the material.

Current tuning methods in non-oxide semiconductors are only able to change the band gap



James Rondinelli

"There really aren't any perfect materials to collect the sun's light. So we're trying to engineer one." James Rondinelli

by approximately one electronvolt, which still requires the material's chemical composition to become altered. Rondinelli's method can change the band gap by up to 200 percent without modifying the material's chemistry. The naturally occurring layers contained in complex oxide materials inspired his team to investigate how to control the layers. They found that by controlling the interactions

between neutral and electrically charged planes of atoms in the oxide, they could achieve much greater variation in electronic band gap tunability.

Supported by DARPA and the US Department of Energy, the research was described in the January 30 issue of *Nature Communications*. Prasanna Balachandran of Los Alamos National Laboratory in New Mexico is coauthor of the paper.

## Materials Science Workshop in Tel Aviv

**THE WORKSHOP IS A PART OF A NEW STRATEGIC INITIATIVE ANNOUNCED LAST SPRING**

A new, strategic partnership between Northwestern and Tel Aviv University (TAU) marked its first event last winter in an ongoing, long-term collaboration.

Based around the theme of semiconductors, electronic materials, thin films, and photonic materials, the inaugural workshop took place February 22-25 at Tel Aviv University in Israel. The event aimed to build new and strengthen existing collaborations between faculty members in the McCormick School of Engineering and TAU's Iby and Aladar Fleischman Faculty of Engineering.

David Seidman, the Walter P. Murphy Professor of Materials Science and Engineering at McCormick, and Noam Eliaz, founding chair of the department of materials science and engineering at TAU, were workshop co-chairs.

The first two days of the workshop consisted of scientific presentations and discussions, designed to initiate new, cross-school collaborations. Presenters from McCormick included professors Seidman, Koray Aydin, Randall Berry, Matthew Grayson, Mark Hersam, Jiaxing Huang, Lincoln Lauhon, Laurence Marks, Seda O. Memik, James Rondinelli, Selim Shahriar, Jeffrey Snyder,

Peter Voorhees, and Bruce Wessels. The third day featured poster presentations from graduate and postdoctoral students from across Israel.

"We believe that this inaugural workshop will build new collaborations and expand already excellent research connections among faculty in materials science and engineering, resulting in new, multi-, and interdisciplinary scientific insights at both institutions," said McCormick Dean Julio M. Ottino. "We hope these workshops will bear much collaborative fruit in the coming years."



Workshop co-chairs David Seidman (left) and Noam Eliaz (right) with Yossi Rosenwaks (middle), dean of the faculty of engineering at TAU

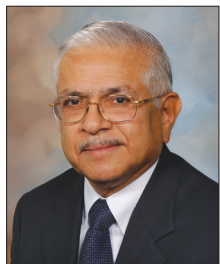
# Materials Science Alumni Honored

## ANIL VIRKAR AND GRACE WANG TO RECEIVE ALUMNI AWARDS

**T**wo outstanding alumni will be honored at the 2015 Annual Alumni Celebration Banquet on Wednesday, May 20. Anil V. Virkar will receive the Distinguished Career Achievement Award for Alumni of Materials Science and Engineering at Northwestern University, and Jinliu “Grace” Wang will receive the Early Career Achievement Award. They will speak at the banquet about their McCormick experiences and discuss how their time at Northwestern shaped their careers.

### ANIL V. VIRKAR (PHD ’73)

*Distinguished professor of materials science and engineering at the University of Utah; Distinguished Career Achievement Award recipient*



Virkar’s research interests include ceramics, fuel cells, batteries, sensors, electrochemistry, materials synthesis, and renewable energy. He is a member of the National Academy of Engineering and a fellow of ASM International. He also cofounded several companies, including Materials and Systems Research Inc., Versa Power Systems, Ceramtec Inc., and Nano-Oxides Inc.

### JINLIU “GRACE” WANG (PHD ’01)

*Deputy assistant director of the Directorate for Engineering at the National Science Foundation; Early Career Achievement Award recipient*



Wang was appointed deputy assistant director of the NSF Directorate for Engineering in July 2014. She previously served as NSF’s division director of Industrial Innovation and Partnerships (IIP), program director of IIP, and led the NSF small business programs in the areas of nanotechnology, advanced materials, and manufacturing. Before joining NSF in 2009, Wang was a scientist at Hitachi and IBM.

#### Describe how your experience in Northwestern’s MSE department shaped or affected your career.

Northwestern is an incredible setting that allowed for the freedom to think. The materials science and engineering department always had excellent faculty, staff, and facilities, highly motivated students, and a friendly atmosphere. Most of the faculty members were very well funded, which was quite important from a student’s perspective. As students, we knew we did not have to worry about funding—instead we could worry about studying.

#### What are some of your most memorable classes/experiences/moments from your NU MSE years?

After tragedy struck Kent State University, Northwestern wanted to include social aspects of campus life in its courses. Professor John Hilliard took photographs of students gathered on campus that were naturally at oblique angles. Our homework assignment was to determine the crowd density using stereology. Later that same year, a group of researchers at another university submitted a comment on the Cahn-Hilliard paper on spinodal decomposition. Hilliard gave us the comment to critique and review, which was a tough job. Ultimately,

Cahn and Hilliard submitted a rebuttal, and their decomposition theory has survived the test of time while the comment has long been forgotten. Finally, it was a ritual to go to Beef & Stein on Howard Street in Chicago to drink beer, eat peanuts, and throw shells on the floor—all while discussing research and talking about the Cubs.

#### What have been your most memorable or proudest career moments?

It has been a great ride. One of the proudest moments was when my first PhD student graduated. The other was being recognized as an ISI Highly Cited Researcher in 2001, again to the credit of some excellent students I had over the years.

#### What advice would you give to current MSE students about to begin their careers?

Take as many courses as you can while a student. Taking courses—especially in supporting fields like math, physics, chemistry—is most helpful in research and academia. Also, I always tell my students to take as much math as they can. One is always limited by the math one knows. And keep an open mind. Research problems present opportunities to broaden horizons and constantly learn new things.

#### Describe how your experience in Northwestern’s MSE department shaped or affected your career.

My undergraduate and master’s degrees were both in polymer materials. During my first quarter, my classmates and I were given the opportunities to talk to materials science and engineering faculty and explore future research interests. Instead of focusing on polymers, I joined Professor Yip-Wah Chung’s research lab and worked on surface science and thin film technologies. Looking back at this experience today, it not only broadened my technical horizons, but it taught me that a career is not a set path. It is more of a life-long learning experience. During my time at IBM, Hitachi, and now at the National Science Foundation, I worked on many different projects/programs and in a few different positions. I found that what Northwestern provided me was way beyond knowledge.

#### What are some of your most memorable classes/experiences/moments from your NU MSE years?

When I joined Professor Chung’s lab, I had no prior experience or fundamental understanding of vacuum science. I made many small mistakes in an ultra-high vacuum

system that I worked on. One day, Professor Chung talked to me very frankly and said, “Vacuum science is an art.” He said I needed to learn to observe and stop making all those small mistakes in order to make it work. I never forgot that moment. His advice worked on that ultra-high vacuum system. It also worked in many other occasions; I learned that small mistakes do count.

#### What have been your most memorable or proudest career moments?

While at Hitachi, I worked on the first-generation perpendicular recording media, which was the enabling technology for terabyte hard-disk drives. I was very proud to be part of the team that worked around the clock together to make it happen.

#### What advice would you give to current MSE students about to begin their careers?

Engineering is an exciting and rapidly emerging field. There are many opportunities in front of us. Never limit yourself. Fearlessly explore the opportunities, new technologies, and have fun doing it!

# Department News

## FACULTY NEWS

**David Dunand** and a team of undergraduates, including Kristen Scotti, Kimberly Clinch, Felicia Teller, and Emily Northard, will spend part of June in flight in NASA's famous "Weightless Wonder." Last summer, they explored fabrication of porous materials by freeze-casting in microgravity with the goal of enhancing material properties to increase efficiencies in dye-sensitized solar cells and will continue the work in summer 2015.

**Mark Hersam** was named a fellow of the American Association for the Advancement of Science, the world's largest general scientific society.

**Laurence Marks** received the Astor Visiting Lectureship in Oxford.

**Chad Mirkin** received an honorary degree from Federal University of Rio Grande do Sul in Brazil.

**Greg Olson** was awarded an honorary doctorate from KTH Royal Institute of Technology in Stockholm. He was also honored with a Catalyst Award from the City of Evanston and Northwestern, which honors entrepreneurial faculty at who built businesses in Evanston to enhance the local economy.

**Monica Olvera de la Cruz** has been awarded a Miller Visiting Professorship at UC Berkeley.

**James Rondinelli** received a prestigious Faculty Early Career Development (CAREER) Award from the National Science Foundation.

**Ramille Shah** was featured in *Crain's Chicago Business's* list of "40 Under 40" for her work using 3D printing to develop implantable biomaterials.

**Kathleen Stair** was named to the 2014 Associated Student Government Faculty Honor Roll.

**Julia Weertman** received the TMS 2015 Ellen Swallow Richards Diversity Award.

## STUDENT NEWS

In April 2015, graduate students **Megan Beck** (Hersam) and **Matthew Peters** (Voorhees) received National Defense Science and Engineering Graduate Fellowships.

In April 2015, graduate students **Megan Beck** (Hersam), **Kevin Chiou** (Stupp/Olvera), **Alane Lim** (Huang) and **Shay Wallace** (Hersam), and senior **Peter Santos** (Stupp) were awarded National Science Foundation Graduate Research Fellowships. **Sarah Clark** (Hersam), **Robert Free** (Joester), **Eve Hanson** (Dravid), **Ryan Paull** (Lauhon), and senior **Andrew Rowberg** (Hersam) received honorable mention.

Seniors **Ryan DeBlock**, **Kelsey Jorgensen**, **Cheyenne Lynsky**, **Edward Pang**, **Sarah Plain**, **Peter Santos**, and **Rachel Wang**, coached by graduate student **Dana Frankel** and Professor **Greg Olson**, placed third in the ASM Undergraduate Materials Design Competition with their project "Design of a Fatigue-Resistant Shape Memory Alloy for Artificial Heart Valve Frames." Northwestern MSE alum **Paul Sanders** (PhD '96) coached the second place team from Michigan Tech.

**Ryan DeBlock** was selected as McCormick's 2015 Walter P. Murphy Cooperative Engineering Education Student of the Year. A "super co-op," DeBlock completed co-op and internship programs with Baxter, NASA, and General Electric to develop hands-on experience in more than one arena.

PhD students **Michael Geier** (Hersam), **Tejas Shastry** (Hersam), and **Alex Smith** (Huang) have developed a wearable device that captures kinetic energy as you move and then converts that energy into an electronic charge. The device, called AMPY, has been a favorite on the startup circuit. In April, Ampy received a \$200,000 Emerging Growth Award from the Chicago-based Clean Energy

Trust. The team previously won a total of \$100,000 in startup competitions, including the 2014 Clean Energy Challenge and Cleantech Open Global Forum. They also won a 2014 Proto Labs Cool Idea! Award, which funded prototype production for pilot testing. The device has received widespread media attention, appearing in *Forbes*, *Crain's Chicago Business*, *CNET*, *USA Today*, and *Buzzfeed*. Smith also appeared live on Fox Business and CNBC, where viewers voted AMPY as the Tech Crowd Leader of the Week.

**Deep Jariwala** (Hersam and T. Marks) won the ASM Chicago Regional Chapter 2014 Graduate Student Award. Deep also received the oldest and most prestigious national level student award, the Russell and Sigurd Varian award, at AVS this year and the best student award of the nanometer scale science and technology division (NSTD) of the AVS. He was awarded the 2014 SPIE Optics and Photonics Education Scholarship, ASM Chicago Regional Chapter



(left to right) Tejas Shastry, Michael Geier, and Alex Smith

2014 Graduate Student Award, and 2014 IEEE DEIS Graduate Fellowship.

**Xing Liao** (Mirkin) and lab mate Keith Brown were selected as graduate finalists of the 2014 Collegiate Inventors Competition for their invention of The Desktop Nanoprinter. Their adviser, **Chad Mirkin**, was also acknowledged for supporting these students who represent the most innovative collegiate students in the country.

Senior **Edward Pang** received a Churchill Scholarship from the Winston Churchill Foundation to pursue graduate studies at the

## In Memoriam

**Charles Chiou** (PhD '59, Fine) passed away on September 9, 2014. The very first PhD alumnus of the department, he spent 26 years at IBM, where he was recognized for his research, patents, and publications. He then spent nine years at Raytheon, followed by a fruitful consulting career that took him—along with his wife Jane—around the world. Thank you to those listed below for their generous gifts made in honor of Dr. Chiou's memory:

Mr. Ike Y. Chang  
Ms. Veronica T. Chang-Fitzgerald  
Ms. Jane Chiou  
Mr. Gabriel Chiu and  
Ms. Yain Fuu Chiu  
Ms. Theresa L. Chu  
Ms. June K. Forsythe  
Mr. George Huang and  
Mrs. Saling Huang  
Ms. Ya Ping Kottler  
Dr. Herching Ku  
Dr. Sing-Pui Lam

Dr. Ching-Chung Li ('56, '61)  
and Mrs. Hanna Wu Li  
Mrs. Rachel L. Pan and  
Dr. Charles M. Pan  
Mrs. Julianna Seto and  
Mr. Gene Seto  
Mr. S. So  
Ms. Grace L. Tan  
Mr. Wing Yuk Tong  
Dr. Sung Tung and  
Mrs. Eleanor Tung  
Ms. Joan Yeh



# Contributions

University of Cambridge. He will focus on a new family of titanium-based shape-memory alloys, which promise substantial efficiency improvements in gas turbine engines, such as those used in aircraft and power generators.

Junior **Spencer Park** was awarded the Windy City Chapter Scholarship from the Association of Old Crows.

**Deep Jariwala** (Hersam and T. Marks) has been awarded the 2014 (and the very first) Weertman Graduate Fellowship. The Johannes and Julia Randall Weertman Graduate Fellowship is an achievement-based award to recognize a PhD candidate in materials science and engineering for their outstanding scholarly achievements and promise. The department established the fellowship in honor of the tremendous contributions of Hans and Julia Weertman to the materials science and engineering discipline.

Senior **Andrew Rowberg** received a Fulbright Fellowship to study in Germany next year.

**I-Cheng Tung** (Bedzyk) received the Materials Research Society Graduate Student Award for "In Situ Characterization of Dynamic Processes during Materials Synthesis and Transformation" during the MRS 2014 fall meeting in Boston.

Graduate students **Nanjia Zhou** (R. Chang and T. Marks) and **Deep Jariwala** (Hersam and T. Marks) received Silver Graduate Student Awards from the Materials Research Society.

## ALUMNI NEWS

**Deepak Ahuja** (MS '87, Mason), CFO of Tesla Motors, received an alumni award from his undergraduate university, BHU-IIT, at their annual alumni event in Lisle, Illinois in September.

**Luke Brewer** (BS '96, PhD '01, Dravid) has joined the faculty of the metallurgical and materials engineering department at the University of Alabama.

**Bryan Harder** (BS '04, PhD '10, Faber) received the NASA Early Career Achievement Medal for exceptional contributions to NASA's aeronautics goals by developing new environmental barrier coating systems for ceramic turbine engine materials. Harder works at the NASA Glenn Research Center.

**Linn Hobbs** (BS '66) recently celebrated his retirement from MIT. The John F. Elliott Professor of Materials Emeritus at MIT, Hobbs was named an Order of the British Empire officer in 2001.

**Raj Kumar** (BS '14) received the 2014 ASM Chicago Undergraduate Award. Kumar is pursuing doctoral studies at UC Berkeley.

**Rahul Mitra** (PhD '92, Fine, JR Weertman) was named the 2014 "Metallurgist of the Year" by the Ministry of Steel and Mines, on the basis of recommendation of the Indian Institute of Metals. He is a professor at the Indian Institute of Technology in Kharagpur, India. He was recognized for his significant contributions in the development of molybdenum, titanium, and niobium silicide-based heat-resistant materials and zirconium and hafnium diboride-based composites for high-temperature applications.

**Chantal K. Sudbrack** (PhD '04, Seidman) was recently profiled in *JOM*. A materials engineer at NASA Glenn Research Center, she also served as guest editor of *JOM*'s October 2014 issue.

## Donations made between August 16, 2014 and April 3, 2015

We thank all those who have generously donated to the department and to the Johannes and Julia Randall Weertman Graduate Fellowship Fund. If you would like to contribute, please contact Ben Porter, director of development at McCormick, at 847-467-5212 or at b-porter@northwestern.edu.

## JOHANNES AND JULIA RANDALL WEERTMAN GRADUATE FELLOWSHIP

Mr. Dhruv Agarwala ('93)  
Dr. Loral L. Briggs ('73, '78 PhD) and Dr. Timothy J. Scale ('75 MS, '80 PhD)  
Dr. Adrian P. Brody ('69 PhD) and Ms. Pauline N. Brody  
Professor Stephen H. Carr and Dr. Virginia McMillan Carr  
Dr. Rong-Tsang Chen ('81 PhD)  
Dr. Tsu-Wei Chou ('66 MS)  
Dr. Bruce James Christensen ('93 PhD) and Dr. Renee Jesse Christensen ('94 PhD)  
Professor David C. Dunand  
Dr. Stephen T. Gonczy ('78 PhD)  
Dr. Jeffrey T. Gotro ('83 PhD) and Mrs. Elaine M. Grossman-Gotro ('79)  
Mr. Robert L. Hsieh ('83)  
James P. Hughes ('99)  
Dr. Robert J. Lad ('80) and Ms. Patricia Lad  
Dr. Don M. Lipkin ('91)  
Professor Thomas O. Mason and Mrs. Gayle R. Mason  
Dr. Richard James Matyi ('75, '83 PhD) and Rita Montes De OCA Matyi ('80)  
Dr. George William Nieman ('91 PhD) and Rita Nathanson  
Mr. Robert A. Niemiec ('79)  
Dr. Kanji Ono ('64 PhD)  
Dr. Cynthia Pierre ('10 PhD)  
Mr. Ben Porter  
Dr. Arthur H. Purcell ('72 MS, '73 PhD) and Mrs. Deborah Ross Purcell  
Dr. Joseph S. Santner ('75 PhD) and Mrs. Barbara K. Santner  
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# Nobel Laureate Dan Shechtman Visits Campus

## SHECHTMAN PROPOSED TECHNOLOGICAL ENTREPRENEURSHIP AS A PATH TO PROSPERITY

**C**an technological entrepreneurship improve lives in developing countries? Nobel Prize-winner Dan Shechtman believes it can.

Shechtman visited McCormick in October to deliver two lectures, one of which urged scientists and engineers to lead entrepreneurial efforts that could develop high-tech industries in struggling economies.

The Philip Tobias Distinguished Professor of Materials Science at Technion Israel Institute of Technology, Shechtman received the 2011 Nobel Prize in Chemistry for the discovery of quasiperiodic crystals, which have a large number of applications, including the formation of steel and non-stick insulation for electrical wires.

“How do I open a startup? How do I get an idea? Where do I go? Whom do I turn to for advice? That’s the knowledge,” Shechtman told the audience of faculty, staff, students, and guests. “The spirit is different. It’s elusive. It’s in the air and suddenly you realize that every young man or woman wants to open a startup.”

Shechtman will be recognized with an honorary degree at Northwestern’s 157th commencement ceremony on Friday, June 19. McCormick alumna Virginia Rometty (’79) will deliver the address at the event.



*Nobel Prize-winner Dan Shechtman addresses the audience in Tech.*

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**McCormick**  
**Department of Materials Science**  
**and Engineering**  
**Robert R. McCormick School**  
**of Engineering and Applied Science**  
Northwestern University  
Technological Institute  
2145 Sheridan Road  
Evanston, Illinois 60208-3100



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Editors: Mike Bedzyk, Kathleen Stair,  
and Amanda Morris  
Designer: Amy Charlson Design