

FROM THE CHAIR / Spring 2023

Dear friends and colleagues,

As graduation passes by, we celebrate the many achievements of our faculty, students, alumni, and the success of the department. The 40th Hilliard Symposium and MSE Awards Banquet took place on May 18. Many thanks to the student participants, our inspirational keynote speaker, Kelsey Stoerzinger, and our dedicated staff who made these events possible. We recognized the achievements of alumni Grace Wang, now president of Worcester Polytechnic Institute; and Jin Suntvich, associate professor of materials science and engineering at Cornell University, along with many achievements of students and faculty.

I am delighted that three new faculty will be joining over the next 18 months. Jennifer Fowle will arrive in September 2024 from a staff position at SLAC National Accelerator Laboratory. Her research interests are in the electronic properties of novel quantum oxides that are created by pulsed laser deposition and exfoliation. David Barton will complete a postdoc at Harvard and join us in January, focusing on oxide-based nanophotonics for integrated photonic devices. Rajan Kumar, currently a lecturer at Stanford, will arrive in November as an assistant professor of instruction. We are very excited to welcome these outstanding young materials scientists to the department.

The department reached a milestone at the end of this academic year with the retirement of Laurie Marks. Laurie joined the department in 1985 and quickly established a world-leading group that uses electron microscopy to study the evolution of materials, defects, and surfaces. His research interests have been wide-ranging; most recently he was involved with exciting extensions of the WEIN2K density functional code and a new view of the flexoelectric effect. We are fortunate Laurie will continue as a Walter P. Murphy Professor Emeritus and look forward to many future collaborations.

It has been a wonderful two years as chair. I am proud of our many accomplishments, in particular our recent faculty hires. It is my pleasure to announce that Mark Hersam will be the new chair beginning September 1. The future for MSE is extremely bright, and I am confident that Mark will lead the department to still greater heights.

Finally, it is with great pleasure that I share the very recent news that MSE alum Chris Schuh (PhD '01) will be the next dean of the McCormick School of Engineering and Applied Science, beginning August 1. A member of the National Academy of Engineering, Chris is a renowned researcher, serial entrepreneur, and dedicated educator, and we look forward to his leadership of the school.



Peter W. Voorhees
 Frank C. Engelhart Professor and Chair
 Department of Materials Science and Engineering
 McCormick School of Engineering

First Transient Electronic Bandage Speeds Healing by 30 Percent

The bandage developed by Professor John Rogers also monitors the healing process, alerting clinicians to issues in real time. VIDEO

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Variety in Enamel Composition May Predict Later Tooth Health



Professor Derk Joester mapped ions within human teeth and found significant structural differences between samples that may enhance understanding of enamel's life cycle and impact on human health.

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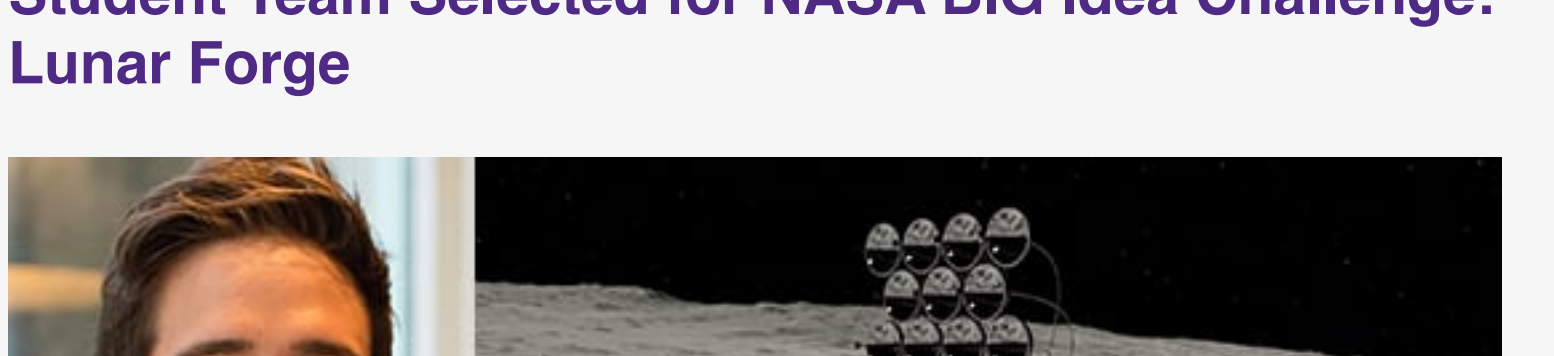
Hersam Named New MSE Department Chair



Effective September 1, Professor Mark Hersam will serve as the chair of the Department of Materials Science and Engineering.

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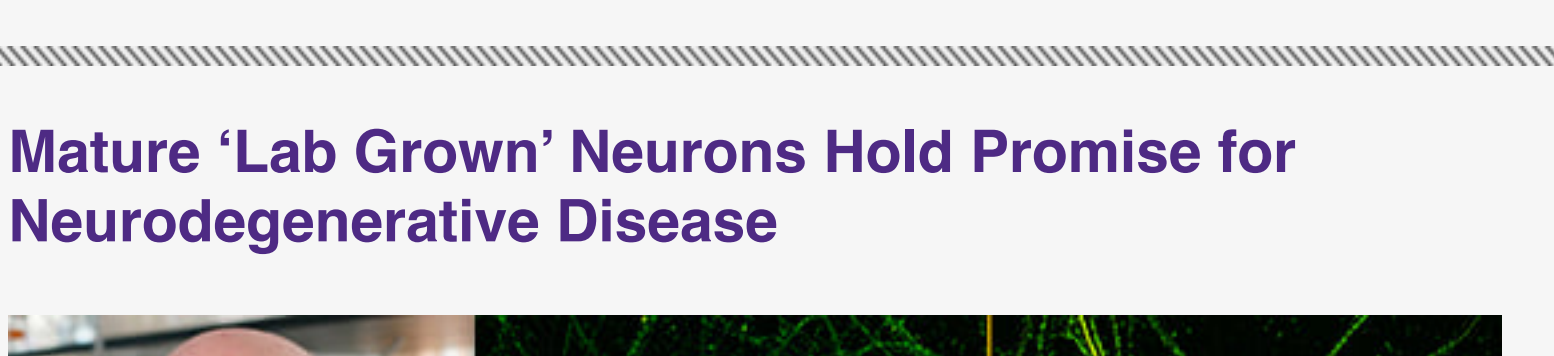
Student Team Selected for NASA BIG Idea Challenge: Lunar Forge



Under the guidance of Professor Ian McCue, the interdisciplinary group was one of seven to receive funding to explore methods to continuously and autonomously cast critical infrastructure on the Lunar surface. VIDEO

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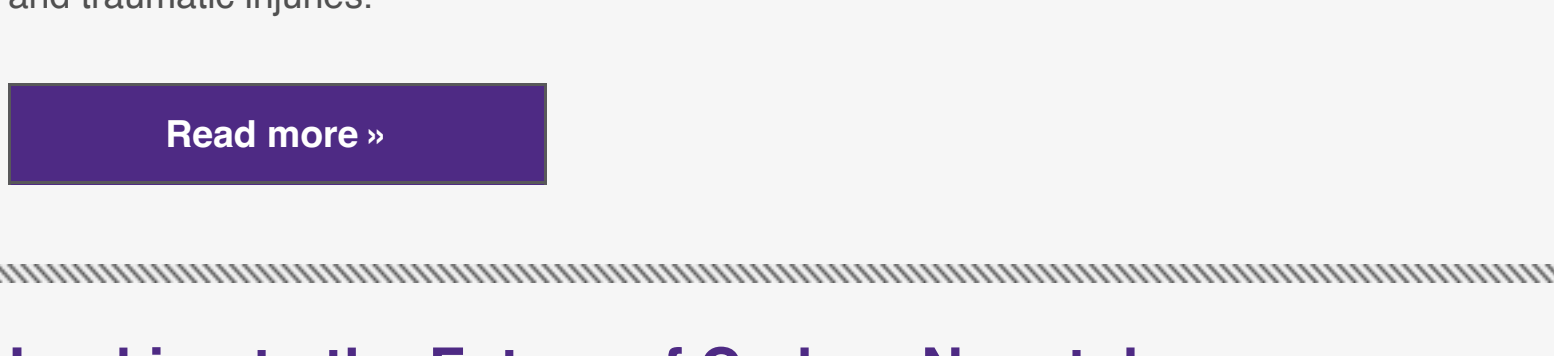
Mature 'Lab Grown' Neurons Hold Promise for Neurodegenerative Disease



Professor Samuel Stupp was part of a team that created the first highly mature neurons from human induced pluripotent stem cells, a feat that opens new opportunities for medical research and potential transplantation therapies for neurodegenerative diseases and traumatic injuries.

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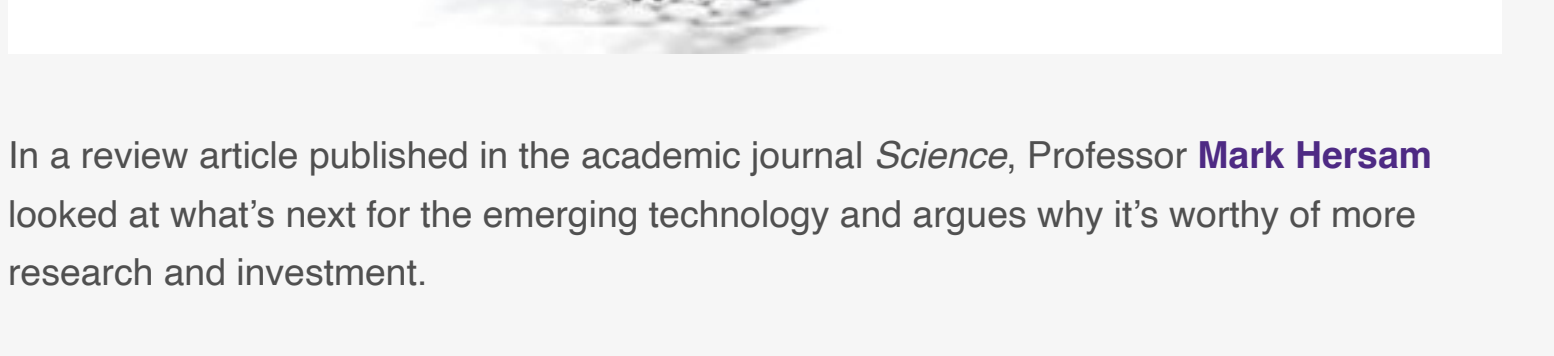
Looking to the Future of Carbon Nanotube Transistors



In a review article published in the academic journal Science, Professor Mark Hersam looked at what's next for the emerging technology and argues why it's worthy of more research and investment.

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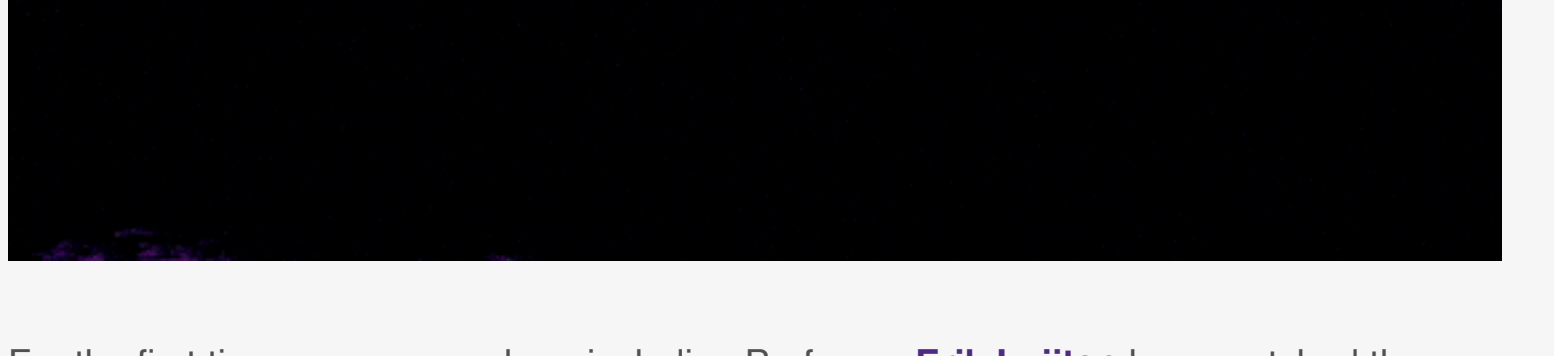
Watch Nanoparticles Grow into Crystals



For the first time ever, researchers including Professor Erik Luijten have watched the mesmerizing process of nanoparticles self-assembling into solid materials.

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MSE Student Named Goldwater Fellow



The fellowship received by Levi Hoogendoorn supports students who intend to pursue careers in the natural sciences, mathematics, and engineering.

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Ingredients for a New Kind of Materials Sandwich



Professor Robert Chang developed a technology that could lead to more material combinations, including new materials to advance flat-panel display technologies.

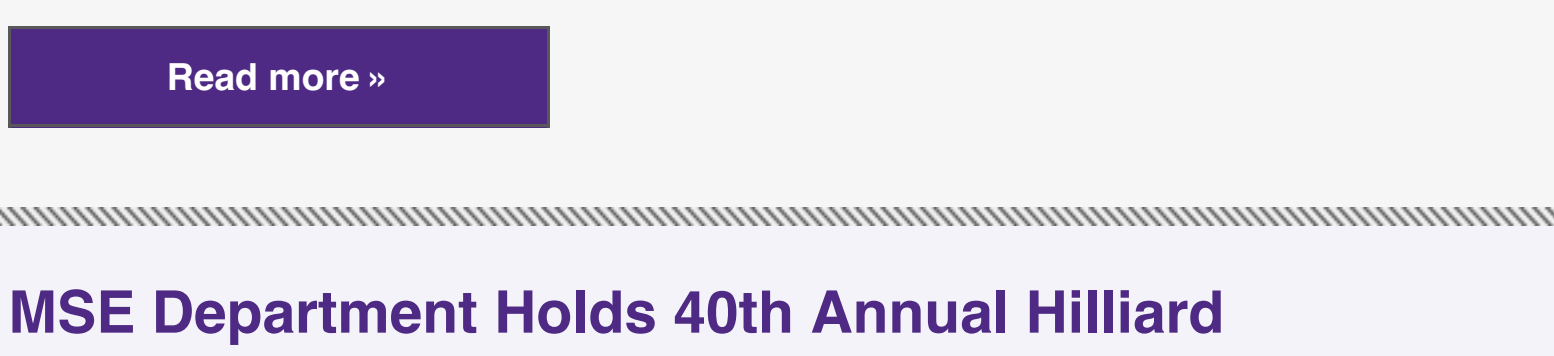
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MSE Department Holds 40th Annual Hilliard Symposium



The event honors the memory of Professor John E. Hilliard and included a keynote address from Kelsey Stoerzinger.

Nobel Laureate M. Stanley Whittingham Speaks at Northwestern



Stanley Whittingham, a renowned materials scientist who received the 2019 Nobel Prize in Chemistry for the development of lithium-ion batteries, spoke to the Northwestern community on May 2 as part of the Department of Materials Science and Engineering's John E. Dorn Lecture series.

In his talk, Whittingham explored how lithium batteries have evolved from an idea in 1972 to now dominating electrochemical energy storage today. He discussed why the technology is positioned to enable the large-scale introduction of renewable energy and electrify transportation, and how that will leave a cleaner and more sustainable environment for the next generation. He also explained the scientific opportunities for materials scientists to further improve their performance, cost, and safety.

Students See Applications of MSE Theory

Students in the Department of Materials Science and Engineering had multiple opportunities to see theory put into practice.

- In November, students in Professor David Dunand's MatSci 381: Energy Materials class visited Lion Electric Co. In addition to touring the facility, students had a chance to ride in and drive the all-electric buses.
- In February, MSE majors visited the combined Soarus and MSI Technology facilities in Arlington Heights, Illinois, hosted by Mark Pucci (PhD '82). Students toured the fabrication and characterization facilities used to produce and test multi-layer polymer films.
- Also in February, the MatSci club arranged a field trip to Evanston-based Materials Development Inc. hosted by Rick Weber and Stephen Wilke (PhD '20), where they observed containerless processing which enable materials research in extreme and non-equilibrium states.

FACULTY NEWS

Zdeněk P. Bažant received an honorary doctorate from the University of Minnesota.

Nathan Gianneschi is part of a Northwestern team that received a significant grant award from the Army's Synthetic Biology Center to explore engineered biological materials.

Sossina Haile presented the 2022 Materials Research Society's Fred Kavli Distinguished Lectureship in Materials Science, "Vignettes in Solid State Electrochemistry for Sustainable Energy Technologies."

Laurence Marks has been selected as a Fulbright US Scholar for 2023-24, and will visit Curtin University in Perth, Australia.

Chad Mirkin has been named a co-laureate of the King Faisal Prize in Science in the field of chemistry.

Teri Odom was selected as a 2022 fellow of the American Association for the Advancement of Science, the largest general scientific society in the world.

John Rogers was part of the planning committee for the new Chan Zuckerburg Biohub Chicago. Rogers's healthcare startup, Epicore Biosystems, received a 2022 Chicago Innovation Award.

Samuel Stupp was awarded the Bauerman Medal from the materials department at Imperial College, London.

ALUMNI NEWS

Claire Boland ('10) began a new job as the sustainability lead at Joby Aviation.

Carelyn Campbell (PhD '97), was named a 2022 ASM International Fellow.

Glenn Daehn ('83) received the ASM Gold Medal Award in fall 2022.

Ryan DeBlock ('15) is starting a new position as materials research engineer at US Naval Research Laboratory.

Emmanuelle Marquis (PhD '02), now a professor at the University of Michigan, was named a TMS Brimacombe Medalist "for excellence in characterization of high temperature and nuclear materials."

Edward Pang ('15) was promoted to senior manager, strategic projects, magnetics at MP Materials.

Casey Riscoe ('15) was recently promoted to global director of sustainability at Method Products.

Ashwin Shahani (PhD '16), now at the University of Michigan, received the Bradley Staughton Award for Young Teachers from ASM International, and the Frontiers of Materials Award from TMS.

Kelsey Stoerzinger ('10), assistant professor of chemical engineering at Oregon State University, was honored with a Materials Today Rising Star Award for her work on designing and understanding materials that are selective and efficient in the conversion and storage of renewable energy via chemical fuels.

Koichi Tsuchiya (PhD '19), managing director of the International Center for Young Scientists of the National Institute of Materials Science, received the Japan Institute of Metals and Materials Masumoto Hakaru Award for his achievements in functional materials.

Grace JinLiu Wang (PhD '01) is the 2023 recipient of the Ellen Swallow Richards Diversity Award from TMS.

Spencer Wells (PhD '18) has started a new position as an Electrophysics Engineer at Boeing.

Jill Wenderott, previously a postdoc in the lab of Sossina Haile, has joined Drexel University as assistant professor of materials science and engineering.

Thomas (Yue Yang) Yu ('12, PhD '17) started a position as product development lead at UniverCell Holding GmbH.

STUDENT NEWS

PhD students Lindsay Chaney (advised by Mark Hersam) and Broderick Lewis (advised by Kenneth Shull) won second and third place at the ASM Chicagoland Student Poster Competition, respectively, on April 19. MSE graduate James Male (PhD '22, advised by G. Jeffrey Snyder), regional ASM chapter chair, helped organize the event.

Three undergraduates – Juliana Davoglio Estradito, Levi Hoogendoorn, and Ekin Senvardarli – were awarded DAAD-RISE fellowships for summer research in Germany.

PhD students Hyeonseon Choi (advised by Lincoln Lauhon), Santiago Diaz-Arauzo (advised by Mark Hersam), and Paty Lohman-Meza (advised by Vinayak Dravid), undergraduate students Saahir Ganti-Agrawal and Jazmyin Lu, and graduate Leonidas Georgopoulos ('22) have been awarded NSF graduate research fellowships.

PhD students Alex Evenchik (advised by Ryan Truby), Samuel Price (advised by Ian McCue), and undergraduate student Jaime Berkovich have been awarded National Defense Science and Engineering Graduate Fellowships.

Fourth-year undergraduate Saahir Ganti-Agrawal represented Northwestern's Material Advantage Chapter at the Congressional visit days in April.