

## Materials Science and Engineering

## FROM THE CHAIR / Fall 2020

Dear friends of the department,

I hope this newsletter finds you safe and healthy in these challenging times. Last spring, the entire department adapted by working remotely as much as possible, including holding our first virtual Hilliard Symposium, advisory board meeting, and graduation ceremonies in May and June. As the new academic year begins, Northwestern continues to follow the latest scientific guidance, with a combination of remote, hybrid, and limited in-person learning. I appreciate the resilience and flexibility demonstrated by our students, faculty, and staff in meeting current challenges, and the confidence of the new cohorts of PhD and MS students that have joined our department this fall. Likewise, I am grateful for the critical conversations that are taking place between all departmental stakeholders on diversity, equity, and inclusion — topics that need to reflect core values of our community.

Since its founding, MSE has worked to prepare students to tackle difficult problems and to pioneer innovations. These skills are more relevant than ever. As you'll read below, several of our faculty have focused their efforts on the fight against COVID-19, from wearable devices that monitor symptoms to UV-resistant elastic for N95 masks and more.

There have been notable changes in the department this year. Greg Olson and Bruce Wessels have transitioned to emeritus status effective January 1 and September 1, respectively. Special thanks to alumna Carrie Campbell and MSE program assistant Kristina Lugo for organizing the "Olson Fest" last December and to the many in-person attendees.

In 2021, we will welcome Ian McCue and Ryan Truby as two new assistant professors. Ian is currently researching additive manufacturing and metallurgy at Johns Hopkins University. Ryan researches soft material robotics at MIT; his Northwestern appointment will be split between MSE and the Department of Mechanical Engineering.

Thank you to all of our alumni for your generous support over the past year; during these uncertain times, your support is invaluable.



**Erik Luijten**  
Professor and Chair  
Department of Materials Science and Engineering  
McCormick School of Engineering

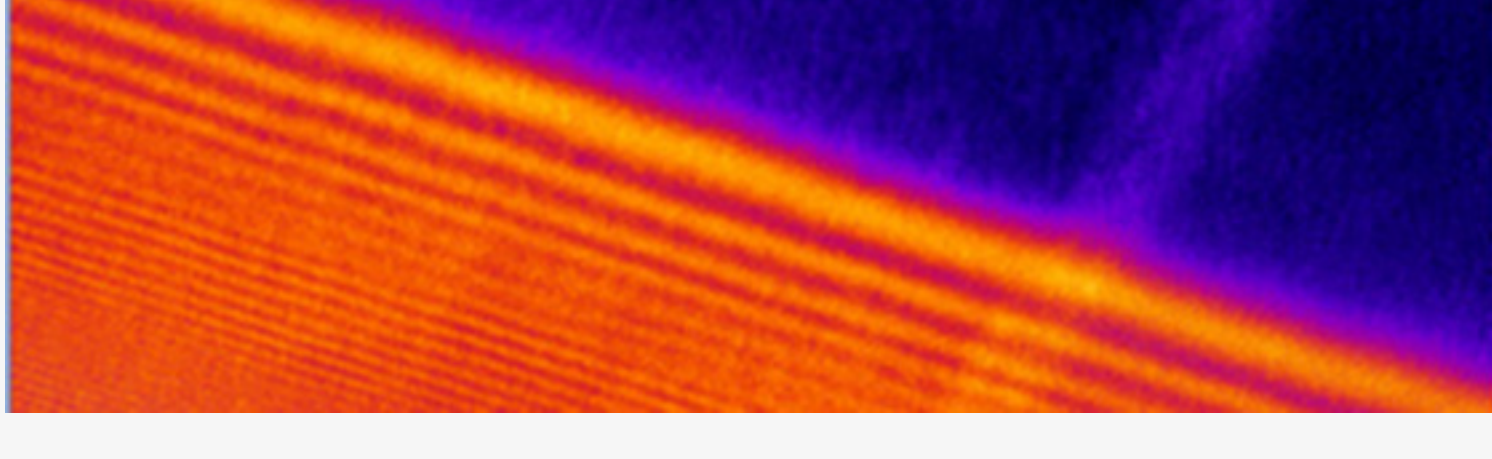
## Monitoring COVID-19 from Hospital to Home: First Wearable Device Continuously Tracks Key Symptoms



The wireless sensor developed by Professor **John Rogers** and researchers at Northwestern and Shirley Ryan AbilityLab gently sits on the throat to monitor coughs, fever, and respiratory activity.

[Read about the research »](#)

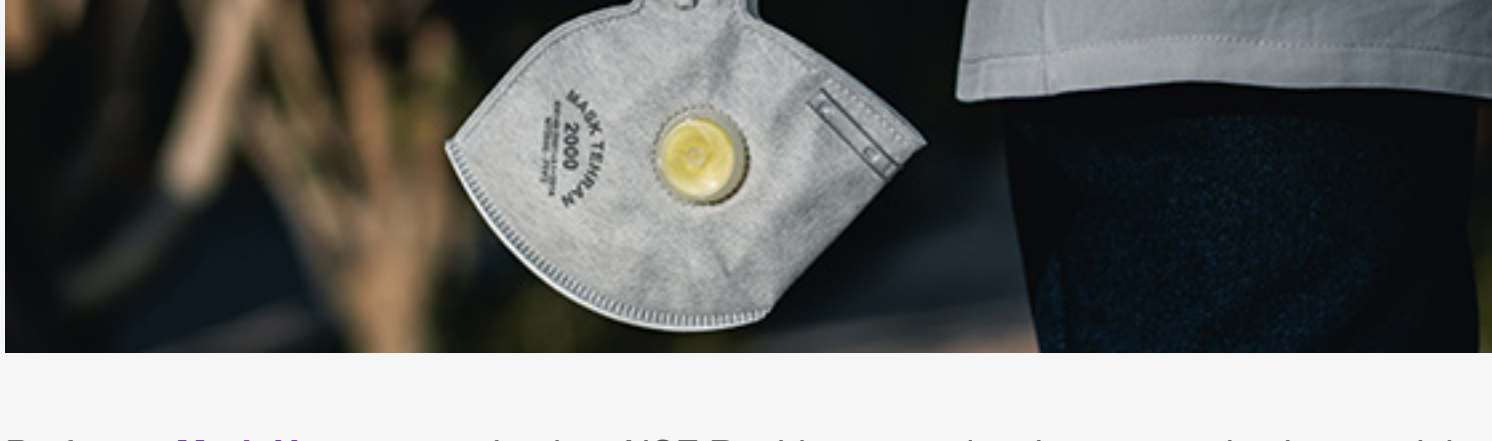
## Scientists Uncover Major Cause of Resistance in Solid Electrolytes



The findings from Northwestern Engineering researchers including Professor **Sossina Haile** and scientists at Argonne National Laboratory could provide new avenues to improve the performance of batteries and fuel cells.

[Read about the research »](#)

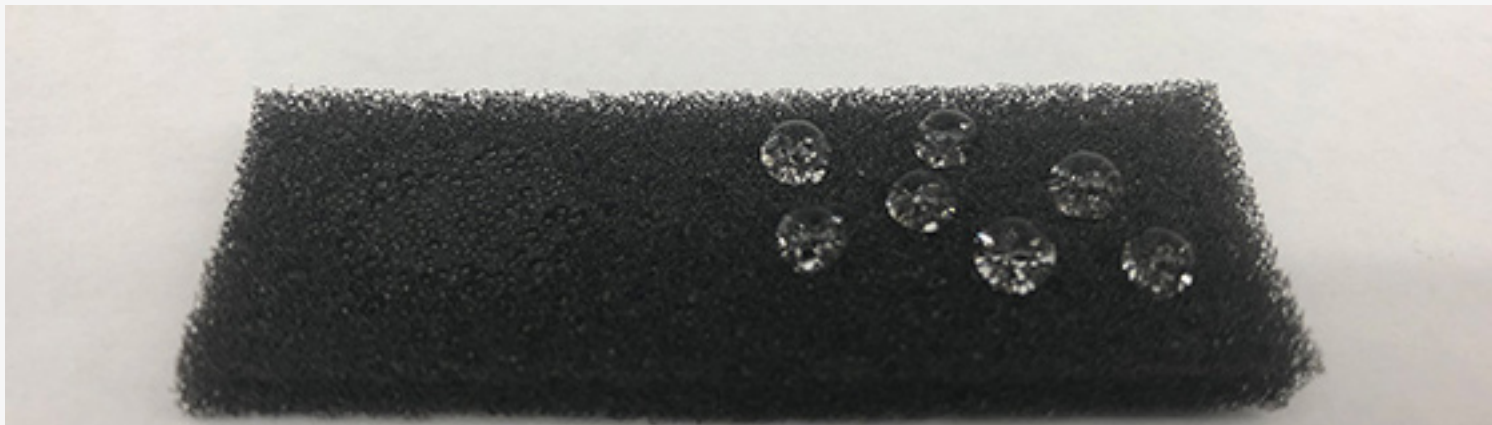
## NSF RAPID Grant to Develop UV-resistant Elastic for N95 Masks



Professor **Mark Hersam** received an NSF Rapid grant to develop a new elastic material that could enable N95 medical face masks to be disinfected and reused dozens of times.

[Read about the work »](#)

## Sponge Could Clean Up Oil Spills



A sponge developed by Professor **Vinayak Dravid** selectively absorbs more than 30 times its weight in oil, making it a potential valuable tool to clean up oil spills and help spare water and wildlife.

[Read about the research »](#)

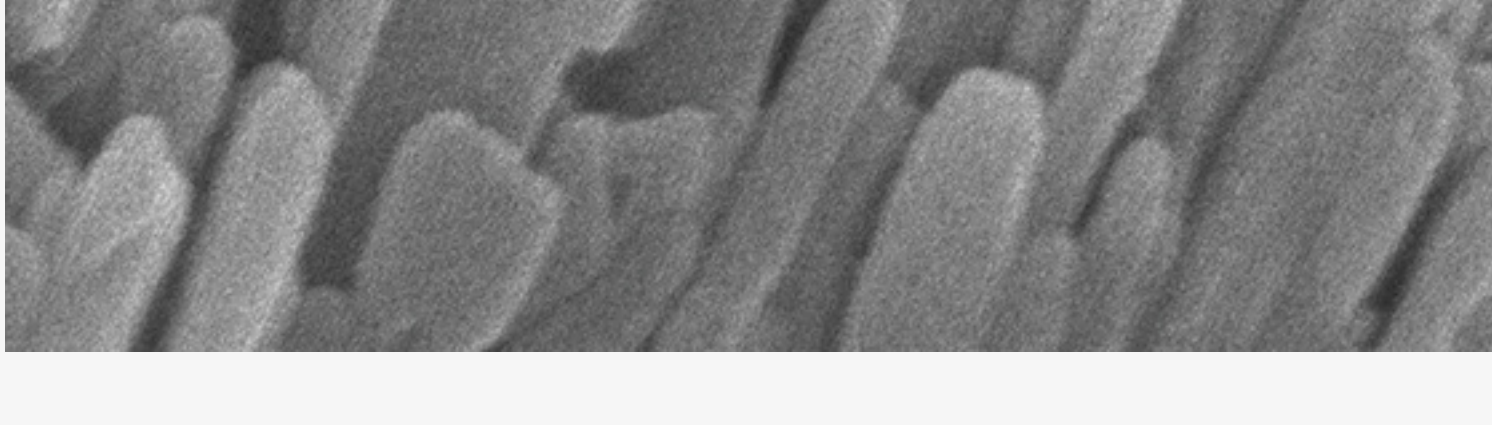
## Self-sanitizing Face Mask Project Receives NSF RAPID Grant



Professor **Jiaxing Huang** received funding to develop a new self-sanitizing medical face mask that deactivates viruses on contact.

[Read about the work »](#)

## Drilling Down to Vulnerabilities Involved in Human Tooth Decay



A study of enamel formation by materials scientists including Professor **Derk Joester** could lead to new interventions to prevent and treat disease and defects in human teeth.

[Read about the research »](#)

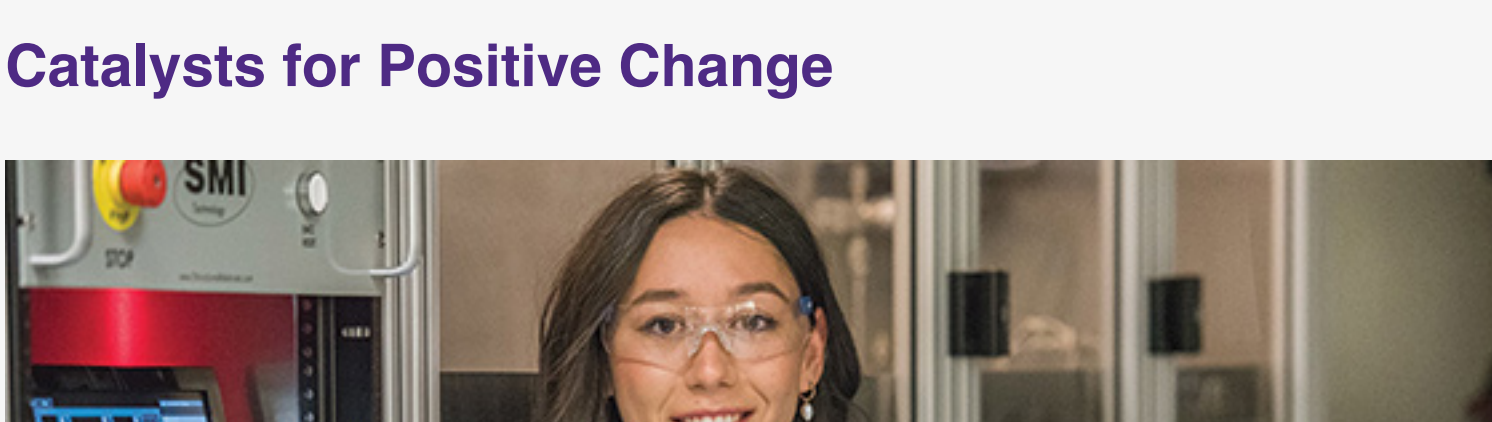
## Looking Back on a Materials Career



Professor Emeritus **Bruce Wessels** reflects on his career, discussing his experience working in academia and industry, his research highlights, and the importance of community service in the materials science field.

[Read about Wessels »](#)

## Catalysts for Positive Change



**Hadalia Bergeron** (PhD '20) reflects on her time as a materials science student, including how student groups and lab experience has led to life-long relationships.

[Read about Bergeron »](#)

## FACULTY NEWS

Professor **Scott Barnett** was elected fellow of the American Ceramic Society.

Professors **Robert Chang**, **Vinayak Dravid**, **Mark Hersam**, **Jiaxing Huang**, **Yonggang Huang**, **Mercouri Kanatzidis**, **Tobin Marks**, **Chad Mirkin**, **John Rogers**, **Jeff Snyder**, **Samuel Stupp**, and **Chris Wolverton** were named Highly Cited Researchers by the Web of Science Group.

Infective **Yip-Wah Chung** submitted a provisional patent on antimicrobial steels that inactivate bacteria and viruses (including SARS-CoV-2) with its unique ability to copper.

Professor **Jonathan Emery** received the 2020 **Cole-Higgins Award for Excellence in Teaching**.

Professor **Sossina Haile** was awarded the 2020 **Turnbull Lectureship Award** from the Materials Research Society for "fundamental contributions to the electrochemical and thermochemical materials science that advance sustainable energy, for her commitment to the broader international materials community, and for being an inspiring colleague and passionate mentor."

Professor **Mark Hersam** was selected for the **Medard W. Welch Award** due to his "pioneering contributions to the synthesis, surface science, chemical functionalization, and application of low-dimensional nanoelectronic materials." He is also producing COVID-19 electrochemical biosensors via high-throughput, low-cost additive manufacturing.

Professor **Yonggang Huang** was elected to the **National Academy of Sciences** and the **American Academy of Arts and Sciences**.

Professor **Nathan Gianneschi** was named to **AIMBE's College of Fellows** Class of 2020.

Professor **Teri Odom** was elected to the **American Academy of Arts and Sciences**.

Professor **Monica Olvera de la Cruz** was elected to the American Philosophical Society, the oldest learned society in the United States. She also **identified a vulnerability** in the novel coronavirus' spike protein — illuminating a relatively simple, potential treatment pathway.

Professor **Chad Mirkin** used his breakthrough high-area rapid printing (HARP) to produce **1,000 face shield components** per day.

Professor **John Rogers** was awarded the **Herbert Pardes Clinical Research Excellence Award** by the Clinical Research Forum for his work on wireless monitoring in neonatal intensive care. His startup, Sibel Health, received *Nature's* inaugural **Spinoff Prize**.

Professor **James Rondinelli** was promoted to full professor with tenure.

Five out of eight student projects in Professor **Kenneth Shull's** Spring 2020 Materials Design course focused on COVID-19 solutions.

Professor **David Seidman** was named a **Distinguished Physical Scientist** by the Microscopy Society of America for his advances in atom-probe tomography and materials science applications.

Professor **Samuel Stupp** was elected to the **National Academy of Sciences** for distinguished achievements in original research. He also received the **2020 Nanoscience Prize** for his pioneering contributions in the areas of self-assembly and supramolecular chemistry. He is collaborating with Professors **Monica Olvera de la Cruz** and **Nathan Gianneschi** to develop **peptide-based therapeutics** for targeting and disabling the coronavirus "spike proteins."

Professor **Emily Weiss** was named a national finalist for the Blavatnik National Awards for Young Scientists.

## ALUMNI AND STUDENT NEWS

**Megan Beck** (PhD '20) received the Materials Research Society's Gold Graduate Student Award.

Several MSE students received NSF Graduate Research Fellowships in 2020: **Leah Kuo**, **Miller** ('20), **Lindsay Chaney**, **Jillian Guthrie**, **Lauren Irie**, **William Jeang** ('20), **Lidia Kuo**, **Kyle Miller**, **John Misiaszek**, **Katherine Su** ('20), and **Margaret (Grace) Wickerson**. **Stephanie Ribet**, **Matthew Sweets**, and **Daniel Rosenthal** received honorable mention.

PhD student **Jennifer Distefano** received the Christine Mirzayan Science and Technology Policy Graduate Fellowship Program from the National Academies.

**Carolyn Duran** (PhD '98) was elected to serve as the **2021 vice president of the Materials Research Society** (MRS). She will serve as **MRS president** in 2022.

**Clyde Henderson** ('73) **retired after 32 years** as an orthopedic surgeon in Cincinnati, Ohio.

**Andrea Hodge** (PhD '02) was appointed chair of the Mork Family Department of Chemical Engineering and Materials Science at the University of Southern California.

**Grayson Marshall** (PhD '72, DDS '86) and **Sally Marshall** ('70, PhD '72) were honored by the Academy of Dental Materials with the creation of the "Marshall Postdoctoral Award" in recognition of excellence in dental biomaterials research. The award will recognize outstanding research performed by individuals in the transitional post-doctoral stage of their careers.

The department announced its 2020 MSE Undergraduate Awards recipients: **Jacob Mack**, Outstanding Sophomore; **Paul Brown**, Outstanding Junior; **William Jeang** ('20), Hilliard Award for Undergraduate Leadership, Scholarship, and Service; and **Leah Borgsmiller** ('20), Hilliard Award for Undergraduate Research and Design.

With more than 60 patents to his credit, **Edgar Menezes** (MS '79, PhD '80) **recently looked back** at his three-decade career leading innovation at Johnson & Johnson.

PhD student **Stephanie Ribet** received the 2020 NWRI-AMTA Fellowship from the National Water Research Institute and the American Membrane Technology Association to support her graduate research project titled "Multifunctional Nanocomposite (MNS) Membrane for Nutrient Recovery."

**Michelle Seitz** (PhD '09), senior scientist at DSM's Materials Science Center in Geleen, Netherlands, presented the keynote address at the 37th Annual Hilliard Symposium, which took place virtually in May. Winners of the event's speaking competition were **Akshay Murthy** (PhD '20, first place), **Karen DeRocher** (PhD '20, second place), and **Weizi Yuan** (PhD '20, third place tie) and **Kevin Chiou** (PhD '20, third place tie).

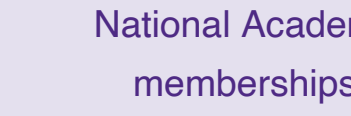
**David Snyder** (PhD '16), whose startup Lilac Solutions was born in the lab of Professor **Christopher Wolverton**, **received \$20 million in Series A funding** to develop a commercial-scale manufacturing line for the company's ion exchange beads.

## FACTS & FIGURES

**20+**  
National Academy  
memberships

**7**  
Highly cited researchers by  
Clarivate Analytics

**13**  
Affiliated research centers  
and institutes



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