

Mechanical Engineering

FROM THE CHAIR / Fall 2023

Dear friends and colleagues,

As the leaves begin to turn and our campus once again fills with new and familiar faces, we are excited to welcome the largest-ever sophomore cohort of 115 students in mechanical engineering (ME), a 41 percent increase compared to a year ago. It is wonderful to see the continued growth of interest in the ME discipline due to the versatile career opportunities it offers.

We will begin this issue of the ME newsletter with a celebration of student achievements. One of our ME senior capstone teams won first place at the 2023 Manufacturing Science and Engineering Conference's Student Manufacturing Design Competition. This is the first time that a group from Northwestern has won first place in that competition! Toward the end of this newsletter, you will also find a list of undergraduate and graduate student awards as well as Alumni Spotlights.

Our faculty have been busy tackling a wide range of groundbreaking research topics and making impact on global challenges. These advances include using eye-tracking technology to design better assistive devices (**Brenna Argall**), applying machine learning to the field of experimental solid mechanics (**Horacio Espinosa**), and finding that participation in climate prediction markets could increase support for action to reduce global warming (**Malcolm MacIver**). You can also read about the national and international recognition received by many of our faculty (**Brenna Argall**, **Zdeněk Bažant**, **Jian Cao**, **Yonggang Huang**, **Sinan Keten**, **Sam Kriegman**, **Richard Lueptow**, **Ken Park**, and **Neelesh Patankar**).

As we begin the new academic year, we are committed to enhancing our students' learning experience in ME. We are organizing new events to encourage undergraduate students to participate in research, and launching a new Alumni and Industry Seminar Series, with speakers who will share their career perspectives associated with the ME Concentrations.

Finally, I would like to give a warm welcome to our two new faculty members, Professors **Junsoo Kim** and **Tao Sun**. Additionally, congratulations to Professor **Jian Cao** in her new appointment as associate vice president for research in the Office of Research.

I wish you all a productive and enjoyable year.



Wei Chen
Wilson-Cook Professor in Engineering Design
Professor and Chair
Department of Mechanical Engineering
McCormick School of Engineering

ME Senior Capstone Team Wins Student Manufacturing Design Competition

The Northwestern project demonstrated a desktop robotic English wheel system related to the NSF ERC HAMMER effort.

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Study Finds Eye Gaze Signals Provide Key Answers in Assistive Device Control



Researchers with Northwestern's Center for Advancing Safety of Machine Intelligence, including Professor **Brenna Argall**, used eye-tracking technology to gather eye gaze signal data, and concluded that it's likely that assistive devices can be designed to allow for smoother control.

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Huang Elected to the Royal Society



The Royal Society, the oldest scientific academy in continuous existence, recognized Professor **Yonggang Huang** for his pioneering work in the mechanics of stretchable and flexible electronics, and mechanics-guided deterministic 3D assembly. Huang was also elected to the Canadian Academy of Engineering and the Academy of Science of the Royal Society of Canada.

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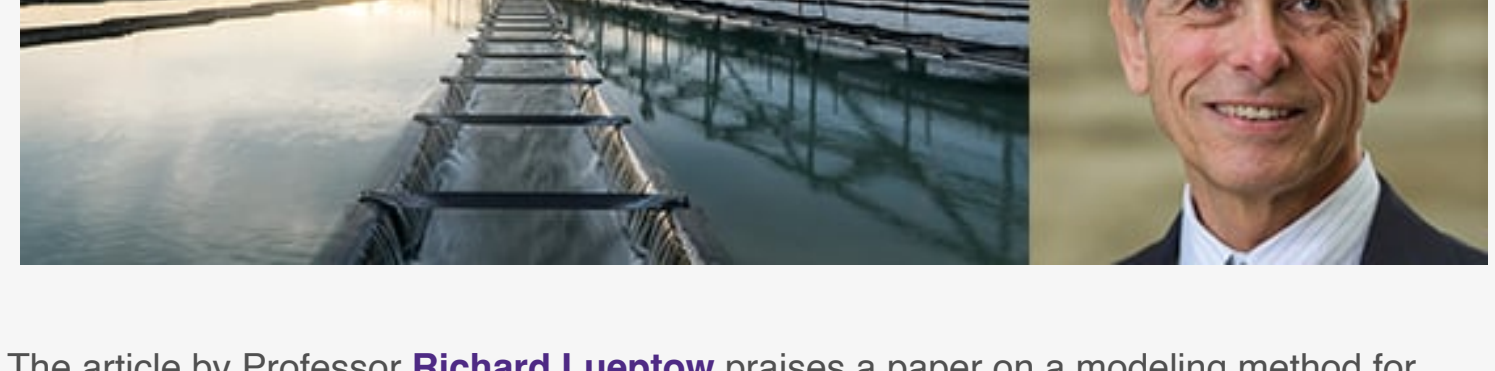
Why Machine Learning Could Change Experimental Solid Mechanics



A paper from Professor **Horacio Espinosa** shows that machine learning, which learns from data to make predictions or decisions, is bringing promising results when applied in the field.

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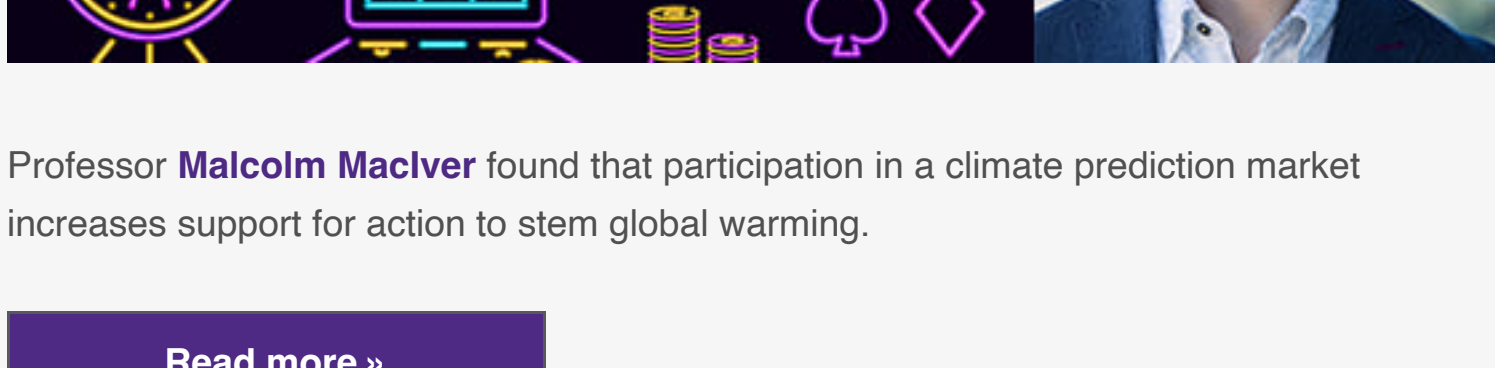
Commentary Evaluates New Advances in Water Transport Modeling



The article by Professor **Richard Lueptow** praises a paper on a modeling method for water transport.

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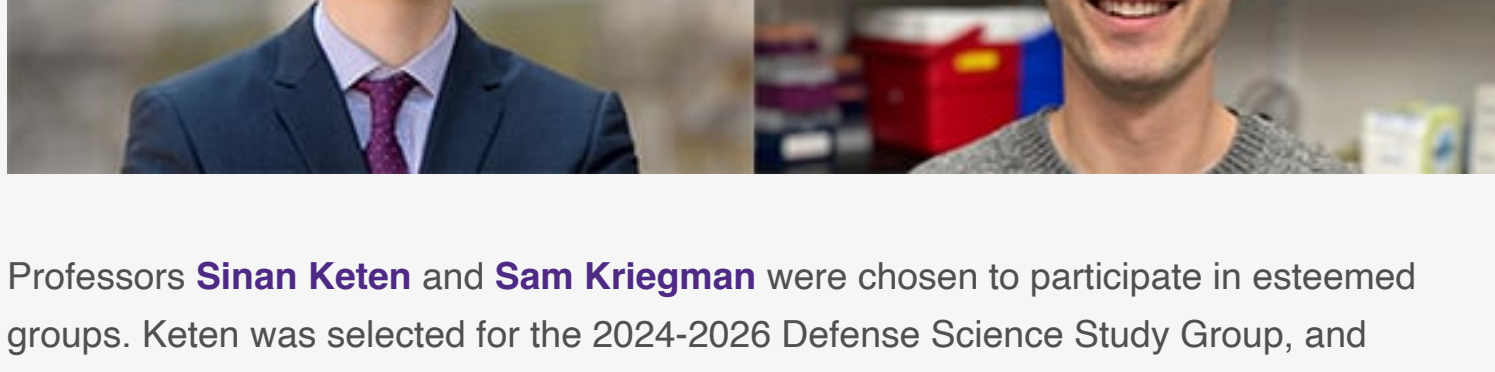
Using Prediction Markets to Raise Climate Concern



Professor **Malcolm MacIver** found that participation in a climate prediction market increases support for action to stem global warming.

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Keten, Kriegman Selected for Prestigious Groups



Professors **Sinan Keten** and **Sam Kriegman** were chosen to participate in esteemed groups. Keten was selected for the 2024-2026 Defense Science Study Group, and Kriegman was tabbed for the inaugural cohort of Schmidt Futures AI2050 Early Career Fellows.

[Read more about Sinan's selection »](#)

[Read more about Sam's selection »](#)

Meet Our New Faculty Members



The Department of Mechanical Engineering has welcomed two new faculty members to Northwestern, adding **Junsoo Kim** and **Tao Sun**.

Previously a PhD student and then a postdoctoral researcher at Harvard University, Kim joined the Northwestern faculty as an assistant professor. Kim's research is in the area of mechanics of soft materials.

Sun, who joined as an associate professor after being on the faculty at the University of Virginia, studies advanced manufacturing processes and materials. His research team now focuses on applying synchrotron x-ray and other sensing technologies.

ME Faculty Leading Conferences on Campus

Northwestern mechanical engineering faculty members have organized and led important academic conferences to advance research in the field. The events are on different topics, but collectively they show the different dimensions of the research conducted at Northwestern's Department of Mechanical Engineering.

From June 18-21, **Kyoo-Chul (Ken) Park** organized μ FIP, which has the scientific objective to bring together the phase change and single-phase heat transfer, multi-phase flow, biochemical and biomedical engineering, and micro flow process communities with an emphasis on energy applications having components exhibiting microchannel flow or microscale surface phenomena.

At a July 8 event organized by Professor **Neelesh Patankar**, officials from Northwestern University and Indian Institute of Technology Bombay **signed a memorandum of understanding** pledging an earnest commitment to work together to foster lively opportunities for students, researchers, and scholars alike.

On Sept. 18-21, **Ping Guo** (conference chair), **Jian Cao** (conference co-chair), and **Kornel Ehmann** (conference co-chair) organized the 6th World Congress on Micro and Nano Manufacturing. The conference featured plenary speaker **John Rogers**, scholars and practitioners from 16 different countries, and covered emerging topics in field of micro and nano manufacturing.

On Nov. 6-7, **Wei Chen** (local chair) is organizing the 9th International Engineering Systems Symposium: CESUN 2023. The annual meeting is an opportunity for the Council of Engineering Systems Universities (CESUN) members to discuss opportunities for future research and education in the areas of engineering systems, socio-technical systems, and policy design and governance of complex systems.

Awards, Honors, and News

Professor **Brenna Argall** was elevated to a senior member of the Institute of Electrical and Electronics Engineers.

The American Society of Mechanical Engineers has established the Zdeněk P. Bažant Medal to in honor of Professor **Zdeněk P. Bažant** to recognize an individual who has made significant contributions to the field of mechanics through research, practice, teaching, and/or outstanding leadership.

Professor **Jian Cao** was named associate vice president for research. Cao also was elected to the SME Board of Directors.

Professor **Wei Chen** was elected to the leadership team of the ASME Mechanical Engineering Department Heads Executive Committee.

Professor **Sinan Keten** was elected by the board of the Society of Engineering Science to serve as the vice president of the society, effective in January.

Professor **Richard Lueptow** was **elected a fellow of the American Institute of Chemical Engineers**.

Professor **Ken Park** was selected to receive the 2023 Outstanding Early Career Award by the Micro Flow and Interfacial Phenomena Conference. Park was also **a winner of the 2023 Cole-Higgins Award** for excellence in teaching.

Professor **Neelesh Patankar** was selected to receive the 2023 μ FIP Lab on a Chip Prominent Researcher Award.

Student Awards

GRADUATE STUDENTS
Shuheng Liao (nominated by Professor **Jian Cao**) was given the Belytschko Outstanding Research Award.

Christian Machado (nominated by Professor **Ken Park**) was given the Graduate Leadership and Service Award.

Conor Shanley (nominated by Professor **Jane Wang**) was given the Outstanding MS Thesis Award.

Jie Chen and **Joy Sun** from the Integrated Design Automation Laboratory received the third prize in the ASME-CIE data hackathon "Automating Material Selection for Product Design."

UNDERGRADUATE STUDENTS
Dingcheng (Dean) Huang (nominated by Professor **Jian Cao**) was given the Undergraduate Research and Innovation Award.

Adam Pelberg was given the Undergraduate Academic Achievement Award.

Jun Yamasaki (nominated by Professor **Manohar Kulkarni**) was given the Undergraduate Leadership and Service Award.

Bill Yen was given the Ovid W. Eshbach Award that recognizes overall excellence in scholarship and leadership at the college level.

Alumni Spotlight

Ramin Bostanabad (PhD '19), assistant professor at the University of California, Irvine, received an NSF CAREER Early Faculty award (2023-2028) for his research on "Design Under Uncertainty in Combinatorially Expanding Spaces."

Shane Dolan ('22) earned a spot on this year's **Chicago-specific Forbes' 30 Under 30'** list.

Jacob L. Smith (PhD '16), product design engineering at Apple, received the 2023 SME Delcie Durham Outstanding Young Manufacturing Engineer Award.

Zixuan Zhang (PhD '22), engagement manager at McKinsey & Co., received the 2023 SME Delcie Durham Outstanding Young Manufacturing Engineer Award.

FACTS & FIGURES

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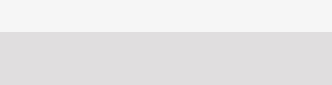
National Academy of Engineering members

14

Major centers, institutes, and programs led by ME faculty

No. 6

Ranking by Research.com among mechanical and aerospace engineering programs



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