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Northwestern | **CENTER FOR ENGINEERING
SUSTAINABILITY AND RESILIENCE**

CESR Newsletter, February 21, 2025

ANNOUNCEMENTS and ACCOMPLISHMENTS of CESR FACULTY AFFILIATES

Mangan, Seitz, Wang Named Sloan Research Fellows

The honor highlights the research accomplishments of early-career researchers

By Win Reynolds, McCormick Engineering News 2/18/25



Northwestern Engineering faculty members **Niall Mangan**, **Linsey Seitz**, and **Xiao Wang** have been awarded a prestigious 2025 Sloan Research Fellowship. Gifted by the Alfred P. Sloan Foundation, the honor highlights the creativity, innovation, and research accomplishments of early-career researchers.

With seven new fellows total, Northwestern was the educational institution with the most faculty in the 2025 Sloan Research Fellowship honorees, a distinction it shares this year with MIT, which also has seven fellows. Outside of Mangan, Seitz, and Wang, Northwestern's new fellows are mathematician **Rachel Greenfeld**, economist **Matthew Rognlie**, chemist **Roel Tempelaar**, and physicist **Jason Wang**.

The seven faculty, each a part of the McCormick School of Engineering or Weinberg College of Arts and Sciences, are among 126 of the most promising young scientists across the US and Canada who make up this year's class. The annual fellowships are awarded to scholars in seven scientific and technical fields: chemistry, computer science, Earth system science, economics, mathematics, neuroscience and physics. Candidates are nominated by their fellow scientists.

[Read the Complete Article](#)

Cécile Chazot Receives Army Research Laboratory Early Career Program Award

ECP awards are meant to attract early career faculty to pursue research relevant to the Army

Engineering News, 2/6/25



Northwestern Engineering's **Cécile Chazot** has received an Army Research Laboratory (ARL) Early Career Program (ECP) Award.

Chazot, the Julia Weertman Professor in Materials Science and Engineering at the McCormick School of Engineering, leads the Sustainable Polymer Innovation Laboratory. **The lab** seeks to develop methods for sustainable manufacturing and recycling of

polymers and composites. Its focus areas include fiber-based materials, biopolymers, large-scale processing, structural colors, and green chemistry. The group's interdisciplinary work spans from fundamental understanding of materials and their properties to applications and industrial deployment.

The ECP proposal is titled "Electrochromic Composite Fibers based on Cholesteric Liquid Crystalline Cellulose." The research aims to develop liquid crystalline conductive and structurally colored fibers that can change appearance when exposed to an electrical current.

[Read the Complete Article](#)

Why Climate Change Sometimes Brings Major Winter Storms

By Simone Shah, Time Magazine 2/12/25



If the earth is warming, why are we still getting winter storms?

Climate change is leading to shorter and warmer winters in North America, experts agree. But that doesn't mean that winter storms will become a thing of the past.

In fact, climate change is making storms more intense. As the Earth's atmosphere warms, it's able to collect and hold more moisture—which means more precipitation. “The atmosphere behaves a bit like a sponge, and that means that it can suck up more moisture when it's warmer, but also that when you wring the sponge out, more moisture can fall out of the sky in the form of precipitation, and in the winter, snowfall,” says Daniel Horton, associate professor in the Department of Earth, Environmental and Planetary Sciences at Northwestern University.

[Read the Complete Article](#)

RECENT PUBLICATIONS

Giuseppe Buscarnera, Professor of Civil and Environmental Engineering

Title: **“A Poromechanical Framework for Internal Interactions Induced by Solid Inclusions”**

Authors: Yifan Yang, Giuseppe Buscarnera

Publication: International Journal for Numerical and Analytical Methods in Geomechanics, February 12, 2025

Gianluca Cusatis, Professor of Civil and Environmental Engineering and (by courtesy) Mechanical Engineering

Title: **“High-fidelity SPH-DEM Framework for Mesoscopic Rheological Behavior of Fresh Fiber-reinforced Concrete”**

Authors: Cheng Huang, Lei Shen, Wenyan Yu, Nizar Faisal Alkayem, Yan Han, Zhenghong Tian, Hao Yin, Gianluca Cusatis

Publication: International Journal of Mechanical Sciences, February 13, 2025

Vinayak Dravid, Abraham Harris Professor of Materials Science and Engineering; Founding Director, Northwestern University Atomic and Nanoscale Characterization (NUANCE) Center; Founding Director, Soft and Hybrid Nanotechnology Experimental (SHyNE) Resource, an NSF-NNCI Node

Title: **“Rinse, Recover, Repeat: pH-Assisted Selective Extraction of Phosphate and Metals with a Sponge Nanocomposite”**

Authors: Kelly E. Matuszewski, Benjamin Shindel, Vikas Nandwana, Vinayak P. Dravid

Publication: ACS ES&T Water, February 5, 2025

Omar Farha, Charles E. and Emma H. Morrison Professor in Chemistry; Chair, Department of Chemistry

Title: **“The Last Piece of the Puzzle: Access to 7-Connected Zirconium Metal-Organic Frameworks for Hexane Separation”**

Authors: Xianhui Tang, Lei Jia, Xiaoliang Wang, Shengyi Su, Yongwei Chen, Xiang-Jing Kong, Zi-Ming Ye, Haomiao Xie, Wei Gong, Enping Du, Yan Liu, Kent O. Kirlikovali, Omar Farha, Yong Cui

Publication: Angewandte Chemie, February 4, 2025

Title: **“Architecting Metal–Organic Frameworks at Molecular Level toward Direct Air Capture”**

Authors: Zi-Ming Ye, Yi Xie, Kent O. Kirlikovali, Shengchang Xiang, Omar K. Farha, Banglin Chen

Publication: Journal of the American Chemical Society, February 7th, 2025

Omar Farha, Charles E. and Emma H. Morrison Professor in Chemistry; Chair, Department of Chemistry

Randall Q. Snurr, John G. Searle Professor of Chemical and Biological Engineering

Title: **“Exceeding flexexpectations: a combined experimental and computational investigation of structural flexibility in 3-dimensional linker-based metal–organic frameworks”**

Authors: Courtney S. Smoljan, Filip Formalik, Michael L. Barsoum, Kira M. Fahy, Madeleine A. Gaidimas, Florencia A. Son, Haomiao Xie, Karam B. Idrees, Omar K. Farha and Randall Q. Snurr

Publication: Chemical Science, February 10, 2025

Matthew Grayson, Professor of Electrical and Computer Engineering

Vinayak Dravid, Abraham Harris Professor of Materials Science and Engineering; Founding Director, Northwestern University Atomic and Nanoscale Characterization (NUANCE) Center; Founding Director, Soft and Hybrid Nanotechnology Experimental (SHyNE) Resource, an NSF-NNCI Node

Title: **“Charge Density Wave and Superconductivity in BaSbTe₂S Heterolayer Crystal with 2D Te Square Nets”**

Authors: Zhong-Zhen Luo, Hengdi Zhao, Weizhao Cai, Shima Shahabfar, Juncen Li, Songting Cai, Jameson Berg, Tushar Bhowmick, Jin-Ke Bao, Shiqiang Hao, Yihui He, Weiping Guo, Duck Young Chung, Yan Yu, Suchismita Sarker, Matthew Grayson, Christopher Wolverton, Vinayak P. Dravid, Wendan Cheng, Zhigang Zou, Stephan Rosenkranz, Christos D. Malliakas, Shanti Deemyad, and Mercouri G. Kanatzidis

Publication: Journal of the American Chemical Society, February 11, 2025

Mark Hersam, Chair of Materials Science and Engineering; Walter P. Murphy Professor of Materials Science and Engineering and (by courtesy) Electrical and Computer Engineering and Chemistry; Director, Materials Research Science and Engineering (MRSEC)

Title: **“Fine Tuning of Electrical Characteristics of Inkjet Printed Graphene for Physical and Chemical Sensing”**

Authors: Hyun-June Jang, Rapti Ghosh, Wen Zhuang, Xiaoben Zhang, Yuqin Wang, Xiaobao Shi, Xingkang Huang, Haihui Pu, Byunghoon Ryu, Janan Hui, Mark C. Hersam, Junhong Chen

Publication: ACS Applied Materials & Interfaces, February 11, 2025

Steven Jacobsen, Professor of Earth, Environmental, and Planetary Sciences

Title: **“Thermoelastic Properties of Iron-Rich Ringwoodite and the Deep Mantle Aerotherm of Mars”**

Authors: Fei Wang, Hannah J. Bausch, Laura L. Gardner, Dongzhou Zhang, Katherine Armstrong, Aaron S. Bell, Jiyong Zhao, Ercan E. Alp, Steven D. Jacobsen

Publication: Geophysical Research Letters, February 4, 2025

Jeffrey Richards, Assistant Professor of Chemical and Biological Engineering

Mark Hersam, Chair of Materials Science and Engineering; Walter P. Murphy Professor of Materials Science and Engineering and (by courtesy) Electrical and Computer Engineering and Chemistry; Director, Materials Research Science and Engineering (MRSEC)

Title: **“Anisotropic Electrical Transport in Mechanically Responsive Silver-Coated Microparticle-Gel Composites for Flowable Semiconducting Materials”**

Authors: Matthew D. Brucks, Alina Arslanova, Nicholas F. Byrne, Janan Hui, Heather E. Kurtz, Mark C. Hersam, Jeffrey J. Richards

Publication: Advanced Materials, February 9, 2025

Randall Q. Snurr, John G. Searle Professor of Chemical and Biological Engineering

Title: **“Small Rotations, Big Effects: Lessons from Water Adsorption in NU-1000”**

Authors: Filip Formalik, Bartosz Mazur, Faramarz Joodaki, Bogdan Kuchta, Randall Q. Snurr

Publication: The Journal of Physical Chemistry C, February 5, 2025

CONFERENCES and SEMINARS



Enabling DOE Regional Energy-Water Demonstrations: Public Information-Gathering Meeting #2

March 3rd, 2025, 8:00 AM – 4:00 PM CT

March 4th, 2025, 8:00 AM – 12:00 PM CT

[Register](#)

Join the National Academies for an information-gathering meeting on March 3 and 4, 2025 in Atlanta, Georgia focused on regional energy-water issues in the Southeast and how DOE energy-water demonstrations might enable solutions. We welcome industry, community, agency, and academic stakeholders from across the southeastern U.S.

Chicago Energy Conference

Co-Organizers: Northwestern Energy and Sustainability Club (NESC) and UChicago Energy and Climate Club (ECC)

April 5th, 2025, 7:30 AM – 5 PM

Ida Noyes Hall, 1212 E 59th St, Chicago, IL 60637

[Register](#)

The Northwestern Energy and Sustainability Club (NESC) and the UChicago Energy and Climate Club (ECC) are excited to announce the inaugural undergraduate student-run Chicago Energy Conference! Taking place on April 5, 2025, at Ida Noyes Hall, this conference will bring together students, professionals, and industry leaders to explore the theme "Bridging the Gap: Policies, Technologies, and Investments Needed for A New Energy Age."

What to expect:

- Keynote Speakers – Featuring industry leaders like Kate Ringness (former Senior Advisor to the Secretary at the DOE).
- Panel Discussions – Covering crucial topics such as Energy Transition in the Global South, Nuclear Fission and Fusion, Sustainable Urban Design, Grid Reliability, Clean Energy Finance, and more.
- Networking Opportunities – Connect with clean energy companies at our expo and engage with panelists from the Department of Energy, Illinois Commerce Commission, City of Chicago, California Office of Land Use, RWE, and other leading organizations.

Tickets are FREE for Northwestern students, staff, and faculty.



Agile BioFoundry Student Workshop

April 10th, 2025

12PM – 2PM CT

[Register](#)

Are you a student, postdoc or early-career researcher interested in learning more about working in synthetic biology/biomanufacturing? Join us on April 10, 2025 from 10:00 AM – 12:00 PM PST for our virtual Student Workshop led by early-career researchers in the Agile BioFoundry. You'll learn more about the Agile BioFoundry, what it's like to work in synthetic biology/biomanufacturing, and career advancement opportunities.

JOB OPPORTUNITIES



Postdoctoral Scholar – Cementitious Materials

University of Kentucky Center for Applied Energy Research

Deadline: February 28, 2025

Over the past 30 years the University of Kentucky Center for Applied Energy Research [UK CAER] has built up an outstanding research program directed to the development and characterization of novel low-energy and low-CO₂ cementitious materials based on industrial by-products.

CAER is staffing up its Cementitious Materials program in response to several new externally supported projects and seeks one postdoctoral scholar. The successful candidate will join a small team with primary responsibilities focused on one or more of the following:

- a) Characterization and process of raw materials,
- b) Carrying out process trials for optimizing clinker compositions, followed by characterization of the clinker samples,
- c) Investigating the hydration process and mechanical development of cement, mortar, and concrete samples.



Berkeley
UNIVERSITY OF CALIFORNIA

Postdoctoral Scholar – Civil & Environmental Engineering

University of California, Berkeley

Deadline: March 1st, 2025

The Apte Group at University of California, Berkeley is searching for one to three outstanding postdoctoral researchers to conduct innovative interdisciplinary research centered on air pollution and aerosols. Broadly, we are interested in how air pollution connects to other major local and global challenges, including environmental justice, environmental health, climate change, energy, and development.

Focus Areas: The specific area(s) of research will be determined based on available funding and mutual interest between the successful candidate and Prof. Apte. Active areas of research in Prof. Apte's lab group include the development and application of air pollution assessment methods at the local, national and global scale. Current priority research areas include:

Methods:

- Hyperlocal air quality mapping: Methods and applications of mobile monitoring for mapping urban air pollution sources and impacts at high spatial resolution using a combination of fast-response analyzers and spectrometers.
- Reduced-complexity air quality models: Development and application of reduced-complexity models (InMAP) for use in California, USA, and South Asia.
- Hyperlocal inverse modeling: Development and application of inverse modeling methods to characterize fine-scale emissions patterns in cities.
- Other: observation and modeling methods, including satellite remote sensing, sensor networks, and chemical transport models.

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