

1
Em
2026



PennState
Materials Research
Institute

IN THIS ISSUE

- ⇒ Backyard insect inspires large-scale invisibility particles production ⇒
- ⇒ From brain scans to alloys: Teaching AI to make sense of complex research data ⇒
- ⇒ AI approach takes optical system design from months to milliseconds ⇒
- ⇒ In brief: Like living cells, oil-in-water droplets reach out with 'arms' ⇒
- ⇒ Q&A: Growing novel ultra-pure materials for tomorrow's electronics ⇒
- ⇒ WEBINAR: Next-Generation Coatings for Manufacturing: Exploring Atomic Layer Deposition ⇒
- ⇒ MVC18: Materials Visualization Competition is now open for students, faculty, and staff ⇒

FEATURED STORY



BACKYARD INSECT INSPIRES
large-scale invisibility particles production

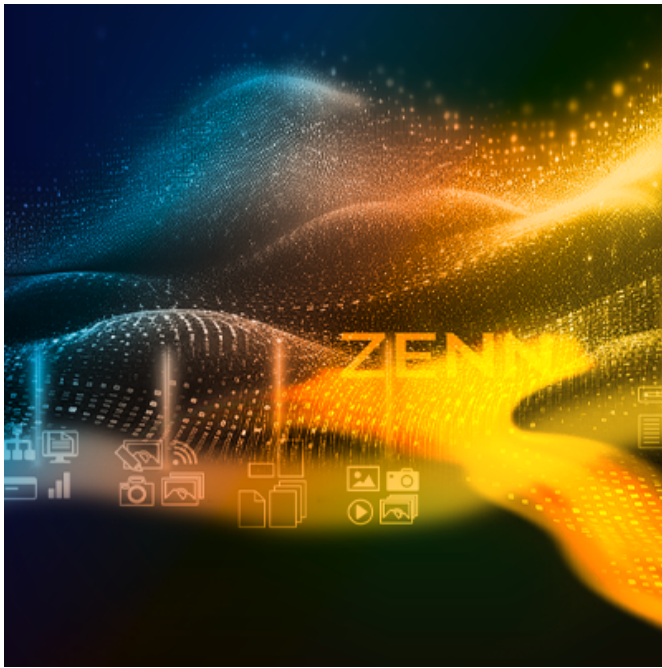


LEAD: PROF. TAK SING WONG

When most people see a leafhopper in their backyard garden, they notice little more than a tiny green or striped insect flicking from leaf to leaf. But these insects are actually master engineers, capable of building some of the most complex natural nanostructures known, which makes them invisible to many of their predators. Their secret lies in brochosomes: tiny, hollow nanostructures that leafhoppers naturally produce and coat themselves with. A team at Penn State has now developed a high-speed platform capable of producing synthetic versions of brochosomes at a rate exceeding 100,000 per second, a technological achievement that could lead to next-generation camouflage, sensors and other advancements for humans.

[READ THE LEAD STORY](#)

OTHER NEWS



From brain scans to alloys: Teaching AI to make sense of complex research data

LEAD: PROF. ZI-KUI LIU

Penn State researchers have developed a new artificial intelligence framework with potential implications for fields ranging from Alzheimer's disease research to advanced materials design. The approach, called ZENN, teaches AI models to recognize and adapt to hidden differences in data quality rather than ignoring them.

[Read More](#)

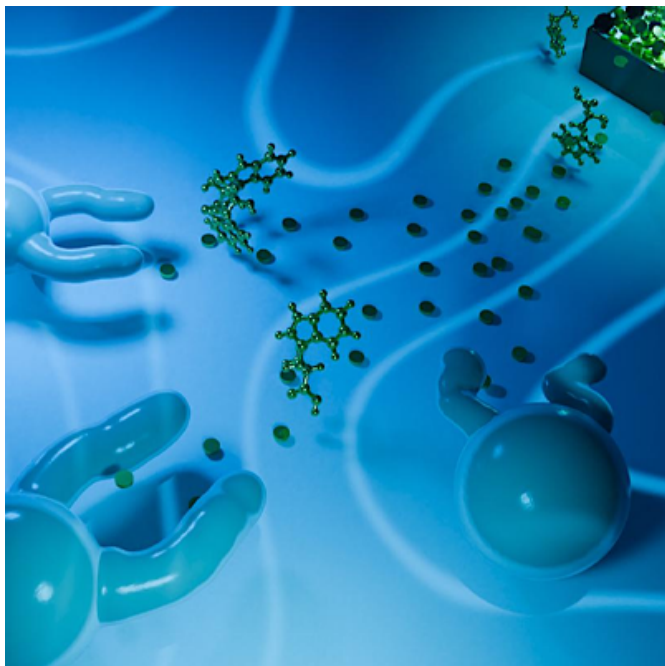


AI approach takes optical system design from months to milliseconds

LEAD: ASST. PROF. LEI KANG

A team of researchers at Penn State have devised a new, streamlined approach to design metasurfaces, a class of engineered materials that can manipulate light and other forms of electromagnetic radiation with just their structures. This rapid optimization process could help manufacture advanced optical systems like camera lenses, virtual reality headsets, holographic imagers and more.

[Read More](#)



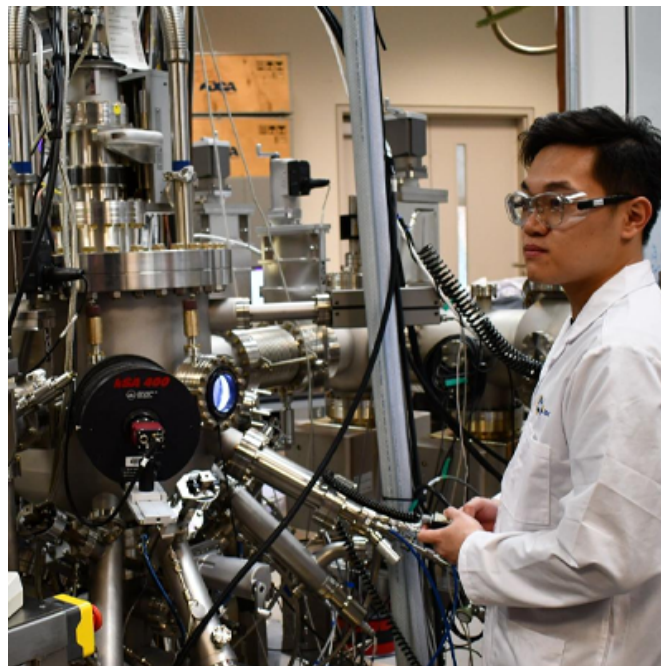
In brief: Like living cells, oil-in-water droplets reach out with 'arms'

LEAD: AYUSMAN SEN

LEAD: PROF. LAUREN ZARZAR

A research team led by chemists at Penn State studies the droplets to glimpse how matter may have transitioned to life billions of years ago. The researchers dissected the mechanism through which these arms form and showed that they respond directionally, growing toward or away from specific chemicals.

[Read More](#)



Q&A: Growing novel ultra-pure materials for tomorrow's electronics

LEAD: PH.D. QIHUA ZHANG

Pairing elements such as sulfur, selenium or tellurium with metals produces compounds whose atomic interactions give them unusual and useful electrical, optical and magnetic behavior. These materials, called chalcogenides, are the focus of Qihua “David” Zhang’s work as a postdoctoral researcher in the Two-Dimensional Crystal Consortium (2DCC) at Penn State.

[Read More](#)



MCL Applied Characterization Experience



PPG Foundation sponsors this year's ACE

The **Applied Characterization Experience (ACE)** is a hands-on training program run by the **Materials Characterization Lab (MCL)** that provides graduate students with an immersive learning experience using advanced characterization techniques and equipment. Students work side by side with MCL



staff experts in a real research environment to assist in training activities, help develop new experimental methods, and tackle complex materials analysis problems.

This year's ACE program is made possible through the support from the **PPG Foundation**, whose philanthropic investment helps students strengthen their technical and scientific skills.

One of this year's PPG Foundation-sponsored ACE Fellows, **Jessica Thompson**, a chemistry doctoral candidate graduating in May of 2027, shared this about her experience:

"As a chemistry Ph.D. student in the ACE program, I've had the chance to work hands-on with advanced methods in the MCL. Collaborating closely with staff, I helped develop a cryo-FIB workflow for preparing air-sensitive and beam-sensitive TEM samples. This experience has strengthened my scientific rigor, sharpened my troubleshooting skills, and boosted my confidence."

To learn more about philanthropic opportunities that support high-impact training programs like ACE, please contact **Dave Fecko, Director of Industry Collaborations**.

dlf5023@psu.edu

814-865-6691



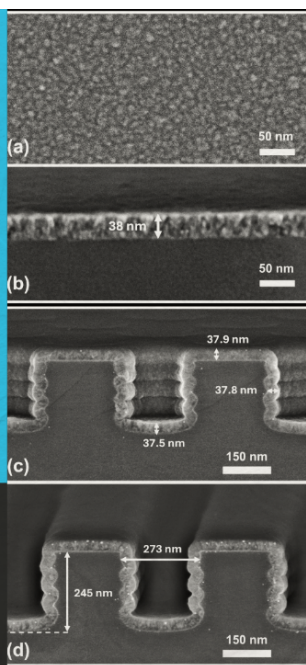
EVENTS & OPPORTUNITIES



WEBINAR

February 11

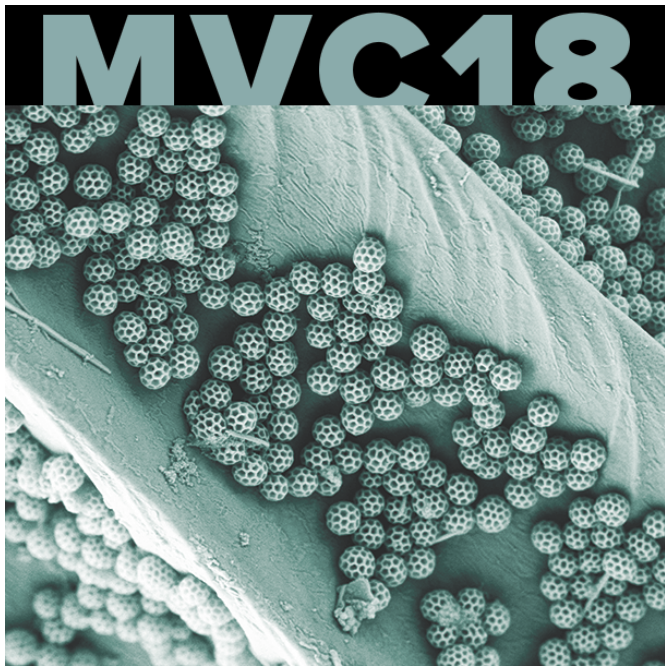
1 PM - 2 PM ET



JOIN OUR WEBINAR: Next-Generation Coatings for Manufacturing: Exploring Atomic Layer Deposition

This webinar will introduce the core principles of Atomic Layer Deposition (ALD) and showcase how the technology enables controlled film growth with unmatched accuracy in thickness, composition, and conformity—even on complex 3D surfaces.

[Details & Registration](#)



MVC18: Materials Visualization Competition is now open for students, faculty, and staff

What is the Materials Visualization Competition?

Created to celebrate the quality of research in materials at Penn State, this competition increases awareness of materials science through the creativity and visualization of our students, faculty, and staff researchers.

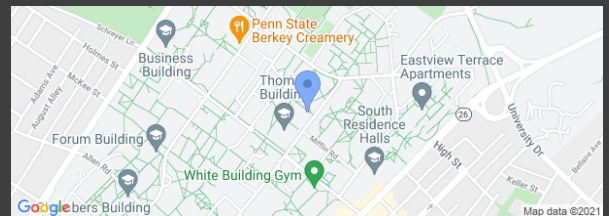
[Details & Enter to Win](#)

Copyright © 2026
Penn State Materials Research Institute, All rights reserved.

You are receiving this email because you indicated you would like to receive information from the Materials Research Institute at Penn State.

This publication is available in alternative media on request. Penn State is an equal opportunity employer and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status. UBR RES 26-07

Want to change how you receive these emails?
You can [update your preferences](#) or [unsubscribe](#) to be globally removed from all communications.



Our mailing address is:
Penn State Materials Research Institute
N-315 Millennium Science Complex
University Park, PA 16802