

PhD Opportunities at Penn State University (PSU)



The [Electron Microscopy for Extreme Materials Lab \[\(EM\)² Lab\]](#) at Pennsylvania State University (PSU), led by Prof. Yang Yang, is seeking highly motivated PhD students. We welcome applicants from diverse backgrounds, including materials science, mechanics, physics, chemistry, and metallurgy.

Fully Funded PhD Positions

- Full financial support, including a stipend (~\$32,256/year) and full tuition coverage.
- Strong candidates should have an undergraduate or master's degree in materials science, mechanics, physics, chemistry, or metallurgy.
- English proficiency requirements: TOEFL or IELTS test (GRE is not required).

Research Areas

Our group leverages advanced electron microscopy techniques to explore materials at the atomic and nanoscale, aiming to unravel fundamental materials degradation mechanisms under extreme environments and develop next-generation functional materials. Specific research topics include:

- Deformation mechanisms in advanced two-dimensional materials
- Corrosion resistance in metals and alloys
- Radiation damage
- Mechanical properties of high-entropy alloys and metallic glasses
- In-situ four-dimensional scanning transmission electron microscopy (4D-STEM)

Advisor and Research Environment

The research group is led by Professor Yang, an Assistant Professor in the Engineering Science and Mechanics Department and a faculty member at the Materials Research Institute at Penn State.

Why Join Our Lab?

✓ Strong Research Environment

- PSU's materials research program ranks 30th globally (QS World University Rankings) and 11th in the U.S. (U.S. News & World Report, 2024).
- High-impact publications: Papers in top journals, including *Science*, *Nature*, *Nature Energy*, *Nature Communications*, *Nano Letters*, and *Acta Materialia*. In 2024 alone, our group co-authored 10 papers in *Nature* and its sister journals.

✓ Student-Centered Education Philosophy

- Student success is our priority: Graduation is not tied to publication requirements. While publications are encouraged, students are not required to publish to graduate.
- We focus on developing independent research skills, ensuring students are well-prepared for careers in academia and industry.

✓ Comprehensive Student Support

- We foster a caring and supportive research environment.
- Our students have received over 10 awards in the past four years.

✓ Access to Prestigious Research Centers

- Students have opportunities to collaborate with top U.S. national labs and universities, including MIT and UC Berkeley.
- Funded research visits for specialized experiments unavailable at PSU.

✓ Conference Opportunities

- Students will be funded to attend prestigious conferences—such as TMS, MS&T, and MRS—to present their research.

✓ World-Class Electron Microscopy Facilities

- The Materials Characterization Lab (MCL) at PSU provides access to seven advanced TEMs, two FIBs, and three SEMs, including a new Thermo Fisher Spectra Ultra TEM/STEM (Probe+Image Corrected X-FEG/UltiMono, 30-300 kV, 50 pm spatial resolution, Iliad EELS Spectrometer and Zebra Detector, and Ultra-EDX). The facility also offers specialized in-situ TEM holders for nanomechanical deformation, heating, biasing, liquid, gas, and cryogenic experiments.

How to Apply

Interested applicants should send their **English CV** to **yang@psu.edu**.