Snapshot CHEMICAL ENGINEERING



Our Mission

The mission of the Penn State Department of Chemical Engineering is to foster a community of learning and scholarship, create new knowledge and technology, and enable our graduates to identify and achieve their goals.







Huck Institutes of the Life Sciences

Materials Research Institute

Penn State Health Milton S. Hershey Medical Center

\$9.8 MILLION 2022-23 Research Expenditures

Research expenditures include subcontracts, externally, and internally funded projects.









Research Labs and Facilities

- Alexopoulos Lab: Heterogeneous catalysis, reaction engineering, computational chemistry, machine learning, multiscale modeling
- Armaou Lab: Nonlinear process dynamics, analysis, and control
- Borhan Lab: Computational fluid dynamics and transport phenomena, wetting and capillary phenomena, complex fluids
- Chandler Lab: Heterogeneous catalysis, materials synthesis, selective oxidations/hydrogenations, reaction kinetics, energy systems
- Clark Lab: Heterogeneous electrocatalysis, electrochemical reaction mechanisms
- Curtis Lab: Chemical production and protein expression from plant tissue cultures, bioreactor design for non-traditional fermentation, plant genetic engineering
- Fichthorn Lab: Statistical mechanics, atomic-scale simulation, surface science, colloid science
- Enrique Gomez Lab: Polymers, organic electronics, organic solar cells, electron microscopy of soft materials
- Esther Gomez Lab: Biomechanics and mechanobiology, biomaterials, biosensors, lipid membrane interactions
- Janik Lab: Computational catalysis, mixed oxide catalysis, electrocatalysis for fuel cells and electrolysis, catalytic methane conversion, carbon dioxide utilization, conducting polymers
- Kim Lab: Surface science, nano-materials, nano-tribology, glass, biomass, catalysis
- Maranas Lab: Reconstruction analysis and redesign of metabolic networks: computational protein, enzyme, and antibody design, synthetic biology and metabolic engineering, optimization theory and algorithms
- Mather Lab: Polymeric smart materials, shape memory and self-healing polymers, controlled release of drugs
- Matsoukas Lab: Colloids, aerosols, plasma processing, population balances
- Milner Lab: Polymer and complex fluids physics, applied physics of commercial polymer processes

- Noh Lab: Heterogeneous catalysis, catalyst design and synthesis
- **Oh Lab:** Polymer membranes for environment, energy, and health; transport; energy-efficient separations
- Peeples Lab: Bioconversions, biofilm processes, extremophile biotechnology, sustainable chemical processes, bioremediation
- Pester Lab: Polymer chemistry, smart and adaptive surfaces, soft materials, lithography, heterogeneous photoredox catalysis
- Rioux Lab: Heterogeneous catalysis, catalyst design and synthesis, photocatalysis
- Salis Lab: Synthetic biology, genetic and metabolic engineering, DNA design
- Savage Lab: Chemical reaction kinetics, algae biofuel, catalysis, sustainability, supercritical fluids
- Sheikhi Lab: Micro- and Nanoengineering of Soft Materials for Medicine and the Environment
- Shi Lab: Life cycle assessment, sustainable design, biofuels and biochemicals, industrial ecology.
- Toraman Lab: Chemical reaction engineering, pyrolysis, heterogeneous catalysis, alternative energy sources, process intensification, twodimensional gas chromatography, plastic waste, biomass, methane, biogas and shale gas
- Darrell Velegol Lab: Innovation processes, probability theory for portfolio selection and optimal stopping points, chemical game theory for contested decisions, information theory, and network analysis
- Vogt Research Lab: Energy and environment, interfaces and surfaces, and materials and nanotechnology, including additive manufacturing, polymer physics, energy storage, and advanced characterization
- Wood Lab: Metabolic engineering, biofilm formation, toxin/antitoxins
- Zydney Lab: Development of membrane separation systems for bioprocessing and medical devices



Organizations

American Institute of Chemical Engineers Penn State Chapter

Chemical Engineering Graduate Student Association

Omega Chi Epsilon – Chemical Engineering Honor Society



Biotechnology

Catalysis

Computational and Data Science

Materials Engineering

Sustainability: Energy and Environment



The six-level, 109,100-square-foot Chemical and Biomedical Engineering Building opened in April 2019 and includes:

- Dow Chemical Knowledge Commons collaborative space
- 13 large research lab neighborhoods, each 3,000 square feet
- Variety of computer labs, classrooms, and conference rooms
- Informal, open-space collaborative areas



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