Our Mission

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

- **Alexopoulos Lab**: Heterogeneous catalysis, reaction engineering, computational chemistry, machine learning, multiscale modeling
- **Arges Lab**: Nanostructured electrochemical materials, polymeric materials for water, energy, and distributed manufacturing systems
- **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
- **Greenlee Lab**: Heterogeneous electrocatalysis, materials chemistry in aqueous systems, nanomaterials synthesis, resource and nutrient recovery, water-agriculture-energy systems
- **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
- **Costas Maranas Lab**—Chemical and Biological Systems Optimization: Reconstruction analysis and redesign of metabolic networks: computational protein, enzyme, and antibody design, synthetic biology and metabolic engineering, optimization theory and algorithms
- **Janna Maranas Lab**—Soft Matter Science and Neutron Scattering: Neutron scattering and spectroscopy, atomistic and coarse-grained molecular simulation
- **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
- **Peebles 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**—De Novo Synthetic Biology: Synthetic biology, genetic and metabolic engineering, DNA design
- **Savage Lab**—Sustainable Reaction Engineering: Chemical reaction kinetics, algae biofuel, catalysis, sustainability, supercritical fluids
- **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, two-dimensional gas chromatography, plastic waste, biomass, methane, biogas and shale gas
- **Velegol Lab**: Colloidal forces, electrokinetic flows, colloidal motors, particle charge nonuniformity
- **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**—Biofilms and Biotechnology: Metabolic engineering, biofilm formation, toxin/antitoxins
- **Zydney Lab**—Bioprocessing and Membrane Separations: Development of membrane separation systems for bioprocessing and medical devices

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**Student Organizations**

American Institute of Chemical Engineers
Penn State Chapter

Chemical Engineering Graduate Student Association
Omega Chi Epsilon – Chemical Engineering Honor Society

**Research Clusters**

Biotechnology
Catalysis
Computational and Data Science
Materials Engineering
Sustainability: Energy and Environment

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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 foot
- Variety of computer labs, classrooms, and conference rooms
- Informal, open-space collaborative areas

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