The department enjoys close relations with the chemical, petroleum, and materials processing industries. A number of cooperative research projects are carried out with the support of private companies. A substantial portion of the graduate student research is supported through federal grants and contracts.

### Areas of Study

**Biochemical and biomedical engineering.** Protein and nucleic acid engineering, metabolic engineering, synthetic biology, systems biology, bioinformatics, fermentations, genetic engineering technology, mammalian tissue culture, biomaterials, biosensors, biomolecular interactions, cell and tissue engineering, virus removal from blood, hemodialysis.

**Chemical engineering fundamentals.** Kinetics and catalysts, thermodynamics, transport phenomena.

**Energy resources.** Secondary and tertiary oil recovery, flow processes in porous media, acid gas treating, energy control and efficiency, photovoltaics, battery technology.

**Environmental engineering and sustainability.** Air pollution measurements, modeling and control, air pollutant and chemical exposures, atmospheric chemistry.

**Materials and processes for microelectronics.** Plasma processing, etching, chemical vapor deposition, selective laser sintering, supermolecular self-assembly and organization, colloidal systems, mesoscopic materials.

**Meso- and molecular-scale modeling and simulation.** Statistical and micromechanical modeling and Monte Carlo, Brownian, and molecular dynamics simulations of reactions, complex fluids, polymers, and biological molecules.

**Polymer engineering.** Synthesis; processing; reaction injection molding; properties, with specific emphasis on blends, transport, and thermodynamic behavior; membranes; microelectronics; thin film; composition.

**Process engineering.** Chemical reaction engineering and catalyst development; optimization; process simulation, dynamics, and control; fault detection, rheology and simulation of suspensions.

**Separations.** Membrane separations, distillation, absorption, supercritical extraction.

**Other areas.** Aerosol science, surface phenomena, crystal chemistry and physical properties, electrochemistry, electronic and optical materials, electrical impedance tomography.

### Graduate Studies Committee

The following faculty members served on the Graduate Studies Committee (GSC) in the spring 2023 semester.
Admission Requirements

Students with a Bachelor of Science degree in chemical engineering usually fulfill requirements for consideration for admission.

Students with a bachelor's degree in another discipline, such as chemistry, physics, other engineering sciences, and natural sciences, must have a background the department considers satisfactory for the study of advanced chemical engineering. A strong background will have included courses in math (including calculus and differential equations), vector physics, and ideally some courses that cover the topics of thermodynamics, heat and mass transfer, and chemical kinetics.

Apart from the requirements of the Graduate School, the department has no set criteria for admission. Applications are viewed holistically based on GPA, research experience, letters of recommendation, and personal statements. We view each of these categories as important and the admission committee ranks applications according to these metrics.