MECHANICAL ENGINEERING & MATERIALS SCIENCE

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M.S., M.Phil., Ph.D.

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Associate Professor Judy Cha

Assistant Professors Eric Brown, Rebecca Kramer-Bottiglio, Madhusudhan Venkadesan

Lecturers Beth Anne Bennett, Joran Booth, Kailasnath Purushothaman, Joseph Zinter

FIELDS OF STUDY

Fluids and thermal sciences: Suspensions; electrospray theory and characterization; electrical propulsion applications; electrified and magnetized interfaces of electrically conducting liquids and ferrofluids; combustion and flames; computational methods for fluid dynamics and reacting flows; turbulence; laser diagnostics of reacting and nonreacting flows; and magnetohydrodynamics.

Soft matter/complex fluids: Jamming and slow dynamics in gels, glasses, and granular materials; mechanical properties of soft and biological materials; and structure and dynamics of proteins and other macromolecules. Several faculty in Mechanical Engineering are also affiliated with the Integrated Graduate Program in Physical and Engineering Biology (http://peb.yale.edu).

Materials science: Studies of thin films; nanoscale effects on electronic properties of two-dimensional layered materials; amorphous metals and nanomaterials including nanocomposites, characterization of crystallization and other phase transformations; nanoimprinting; atomic-scale investigations of surface interactions and properties; classical and quantum nanomechanics; nanotribology; nanostructured energy applications; nanoparticle synthesis for energy applications; combinatorial materials science; and in situ transmission electron and scanning probe microscopy.

Robotics/mechatronics: Machine and mechanism design; dynamics and control; robotic grasping and manipulation; human-machine interface; rehabilitation robotics; haptics; soft robotics; flexible and stretchable electronics; soft material manufacturing; responsive material actuators; soft-bodied control; electromechanical energy conversion; biomechanics of human movement; mechanics of biological muscle; and human-powered vehicles.

For admissions and degree requirements, see Engineering & Applied Science.

For course listings, see Engineering & Applied Science.