University of Massachusetts - Amherst

Experience our program in Chemical Engineering

Amherst is a beautiful New England college town in Western Massachusetts. Set amid farmland and rolling hills, the area offers pleasant living conditions and extensive recreational opportunities. Urban centers of Boston and New York are nearby and easily accessible.

For application forms and further information on fellowships and assistantships, academic and research programs, and student housing, see:
http://che.umass.edu/

or contact:

Graduate Program Director
Department of Chemical Engineering
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University of Massachusetts
Amherst, MA 01003-9303
Email: chegradprog@ecs.umass.edu

Facilities:

The Department occupies modern research space in Engineering Laboratory II, the Conte National Center for Polymer Research, and the new Life Science Laboratories. Instructional and administrative facilities are located in Goessmann Laboratory. State of the art characterization and nanofabrication facilities are available through the NSF Nanoscale Science and Engineering Center on Hierarchical Manufacturing, the NSF Materials Research Science and Engineering Center on Polymers and the W.M. Keck Center for Electron Microscopy.

Faculty:

Lauren Andrews (*Colorado, Boulder)*
Omar A. Abdelrahman (*Syracuse)*
Peng Bai *(Minnesota)*
Peter J. Beltramo *(Delaware, Newark)*
W. Curtis Conner, Jr. (*Johns Hopkins)*
Jeffrey M. Davis (*Princeton*)
Christos Dimitrakopoulos *(Columbia)*
Wei Fan *(Tokyo)*
Neil S. Forbes (*California, Berkeley*)
Michael A. Henson (*California, Santa Barbara*)
Friederike Jentoft (*Ludwig-Maximilians, München*)
Rolf Jentoft — Lecturer (*California, Davis*)
Ashish Kulkarni *(Cincinnati)*
Jungwoo Lee (*Michigan*
Michael F. Malone (*Massachusetts, Amherst*)
Dimitrios Maroudas (*MIT)*
Peter A. Monson — Emeritus (*London)*
T. J. (Lakis) Mountziaris — Emeritus (*Princeton*)
Sarah L. Perry (*Illinois, Urbana-Champaign*)
Shelly R. Peyton *(California, Irvine)*
Jessica D. Schiffman (*Drexel*)
H. Henning Winter (*Stuttgart*)
Nianqiang Wu (*Zhejiang*)
Dandan Xu — Lecturer (*Minnesota)*

Current Ph.D. projects receive support at a level of over $9 million per year through external research grants. Examples of research areas include:

- **Bioengineering: cellular engineering;** living tissue models for disease risk factor diagnosis; microfluidic cancer model systems; cancer therapies and tools; targeted bacteriolytic cancer therapy; nanostructured materials for clinical diagnostics; delivery systems; imaging/diagnostic technologies; biopolymers; biomaterials (fiber scaffolds, hydrogels); antimicrobial & antifouling technologies; synthetic microbial systems; metabolic engineering; systems biology; computational microbial community models.
- **Catalysis, Reaction Engineering and Sustainable Energy:** Renewable chemical platforms from biomass; new approaches for biofuels and gasoline upgrading; new approaches for natural gas conversion; scalable nanoparticle manufacturing; CO2 conversion; catalytic fast biomass pyrolysis; microkinetics; microwave reaction engineering; biorefining; high-throughput testing; reactor design and optimization; fuel cells; energy engineering.
- **Materials Science and Engineering:** Functional materials via colloid assembly; polymer colloids; functional monomers, polymers and surfactants; coatings, adhesives, fibers, membranes and films; soft matter rheology; bioinspired mateials; aqueous polymer nad nanoparticle self-assembly; complex coacervation; porous materials; organic and hybrid semiconductor materilas; epitaxial graphene growth; synthesis and functionalization of nanostructured photoic materials; novel optical biosensors; vapor phase epitaxy of compound semiconductors; reaction engineering and design for material synthesis.
- **Molecular and Multi-scale Modeling & Simulation:** computational quantum chemistry and kinetics; molecular modeling of nanostructured materials; molecular-behavior of fluids in porous materials; molecular-to-reactor modeling of transport and reaction processes in materials synthesis; atomistic-to-continuum scale modeling of thin films and nanostructures; systems-level analysis using stochastic atomic-scale simulators; modeling and control of biochemical reactors; nonlinear process control theory; computational catalysis; adsorption, diffusion and separations; machine learning and high throughput computation.
- **Fluid Mechanics and Transport Phenomena:** biofluid dynamics and blood flow; hydrodynamics of microencapsulation; mechanics of cells, capsules, and suspensions; microscale flow modeling; hydrodynamic stability & pattern formation; interfacial flows.