

# Texas Tech University

## Department of Chemical Engineering

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Chemical Engineering Department  
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## GRADUATE PROGRAM IN CHEMICAL ENGINEERING

Texas Tech's Chemical Engineering Graduate Program offers an outstanding balance between theory and experiment and between research and practice. The Faculty represents a broad range of backgrounds that bring industrial, national laboratory and academic experiences to the future graduate student. External funding supports a diverse research portfolio including Polymer Science, Rheology and Materials Science, Process Control and Optimization, Computational Fluid Dynamics, Molecular Modeling, Reaction Engineering, Bioengineering and Nano-Biotechnology.

**Key Features:** We have fourteen faculty members with significant industrial experience and national recognition within their fields of expertise. There is a Process Control and Optimization Consortium with participation from eight key chemical industries. In 2009 the Department spent over \$2.3 million in research expenditure to support graduate research projects. Based on an NSF published report, the Department ranks 46th among all the chemical engineering departments in the country based on research expenditure. Department has an NSF-funded Nanotechnology Interdisciplinary Research Team (NIRT) studying dynamic heterogeneity and the behavior of glass-forming materials at the nanoscale. More than 30,000 students attend classes in Lubbock on a 1,839 acre campus. Texas Tech University offers many cultural and entertainment programs, including nationally ranked football and basketball teams. Lubbock is a growing metropolitan city of more than 200,000 people and is located on top of the caprock on the South Plains of Texas. The city offers an upscale lifestyle that blends well with old fashioned Texas hospitality and Southwestern food and culture.

**Admissions:** Prospective students should provide official transcripts, official GRE General Test (verbal, quantitative written) scores, and should have a bachelor's degree in chemical engineering or equivalent. Students are urged to apply by the end of January for enrollment in the coming fall semester. Prospective students should apply online by filling out the forms at the graduate school website.

[www.depts.ttu.edu/gradschool/prospect.php](http://www.depts.ttu.edu/gradschool/prospect.php)

## FACULTY



**Dr. Harvinder Gill**, PhD: Georgia Institute of Technology

Assistant Professor

**Research:**

Micro and nanosystems for drug and vaccine delivery; bionanomaterials; mucosal vaccination; immunomodulation



**Dr. Micah Green**, PhD: Massachusetts Institute of Technology

Assistant Professor

**Research:**

Rheology, phase behavior, and applications of carbon nanotubes; multiscale modeling of complex fluids and biological materials.



**Dr. Ron Hedden**, PhD: Cornell University

Associate Professor

**Research:**

Synthesis and characterization of polymer networks and gels; development and characterization of polymers for microelectronics applications



**Dr. Karlene Hoo**, PhD: University of Notre Dame

Professor

**Research:**

Integration of process design with operability; Hemodynamics of venous vein and valve; Embedded control; Intelligent control; Systems engineering.



**Dr. Naz Karim**, PhD: University of Manchester, UK

Chairman and Professor

**Research:**

Control and optimization of chemical and bio-processes; Bio-fuels production using recombinant microorganisms; Metabolic engineering; glyco-proteins in CHO cell culture; Diabetic and cardiovascular diseases; Vaccine production for flu viruses.



**Dr. Rajesh Khare**, PhD: University of Delaware

Associate Professor

**Research:**

Nanofluidic devices for DNA separation and sequencing; Lubrication in human joints; Molecular dynamics and Monte Carlo simulations; Multiscale modeling methods; Properties of supercooled liquids and glassy polymers;



**Dr. Uzi Mann**, PhD: University of Wisconsin

Professor

**Research:**

Particulate technology and processes; Chemical reaction engineering; Chemical process analysis modeling and design; Formulation and synthesis of hollow micro and submicro particles; Biodiesel.



**Dr. Greg McKenna**, PhD: University of Utah

Professor

**Research:**

Small molecule interactions with glassy polymers; Torsion and normal force measurements; Nanorheology and nanomechanics; Melt and solution rheometry; Residual stresses in composite materials.



**Dr. Rangunathan Rengasamy**, PhD: Purdue University

Professor

**Research:**

Fuel cell technology; Novel electrode and membrane fabrication for PEM fuel cells; Modeling, diagnostics and control of PEM and solid oxide fuel cells; Energy systems; Systems biology; Multi-Scale modeling and optimization; Controller performance assessment and process fault diagnosis.



**Dr. Al Sacco**, PhD: Massachusetts Institute of Technology.

Dean of Engineering

**Research:**

Carbon filament initiation and growth, transition metal and acid catalyst and their deactivation, and zeolite synthesis, catalysis, solid/gas contacting, equipment design for space applications.



**Dr. Sinee Simon**, PhD: Princeton University

Professor

**Research:**

The physics of the glass transition and structural recovery; Melting and T<sub>g</sub> at the nanoscale; Cure and properties of thermosetting resins; Measurement of the viscoelastic bulk modulus; Dilatometry and calorimetry.



**Dr. Siva Vanapalli**, PhD: University of Michigan

Assistant Professor

**Research:**

Mechanics of living cells; Biopolymer networks and single polymers; Integrated microsystems for cell and biomolecule analysis; Complex colloids for advanced materials; food emulsions, micro and submicro particles; Biodiesel.



**Dr. Mark Vaughn**, PhD: Texas A & M University

Associate Professor

**Research:**

Nitric oxide in the microcirculation; Membrane transport of small molecules; Transport and reaction in concentrated disperse system.



**Dr. Brandon Weeks**, PhD: Cambridge University, UK

Associate Professor

**Research:**

Nanoscale phenomena in energetic materials including crystal growth, nanolithography, thermodynamics and kinetics; Atomic Force Microscopy and small angle x-ray scattering; Scanning probe instrument design and microscale sensors.



**Dr. Ted Wiesner**, PhD: Georgia Institute of Technology

Associate Professor

**Research:**

Capturing the energy generated by the human body to power implanted medical devices; Robust control of rate-adaptive cardiac pacemakers; Wastewater treatment for long-duration manned spaceflight; Computer-based training for engineers.