Bucknell UNIVERSITY

CHEMICAL ENGINEERING

Creative application of basic and engineering sciences in the design, production and analysis of chemical products

RELATED STUDENT ORGANIZATIONS

American Institute of Chemical Engineers (AIChE)
Global Learning Opportunities for Bucknell Engineers (G.L.O.B.E.)
National Society of Black Engineers (NSBE)
Society of Women Engineers (SWE)
Tau Beta Pi (engineering honor society)

CAREER PATHS

The chemical engineering program prepares students for a variety of opportunities in industry, government or academia. Common industry sectors include food, pharmaceuticals, petroleum, specialty gases, plastics, environmental clean-up, catalysis, consumer products and finance. Recent alumni have secured the following positions:

- Operations Engineer, Frito-Lay, Inc.
- Process Engineer, ExxonMobil Corporation
- Associate Manufacturing Specialist, GlaxoSmithKline
- Systems Engineer, Exelon Nuclear
- Process Engineer, Merck & Company, Inc.
- Applications Engineer, Philadelphia Mixing Solutions
- Materials Scientist, Department of the Army

PROGRAM DETAILS

- Students relate theory and practice through intensive laboratory and project design experiences.
- Heavy emphasis on oral and written communication and teamwork skills.
- Students learn from accomplished faculty who are committed to teaching excellence.
- Bucknell's liberal arts environment offers diverse learning opportunities, encourages critical thinking and supports engineering problem solving in a societal context.
- Senior design experience involves work on open-ended engineering problems proposed by real clients in industry, government or academia.
- Students can tailor the curriculum to their interests, which may include study abroad, pre-medical training, preparation for graduate study or pursuit of a concentration within the major (biological, environmental, materials, process).
- Students can further minor within the College of Arts and Sciences or in biomedical engineering, or apply for a five-year dual degree (second degree in liberal arts, management, or M.S. in chemical engineering).

FACULTY

Bucknell's chemical engineering faculty members provide close, personal attention to students in the classroom and in the lab. The professors are active researchers who often invite students to become involved in their work.

Jeffrey Csernica
B.S. Lehigh; Ph.D. Massachusetts Institute of Technology
Scholarly interests: materials science, polymer physical chemistry, solid surface modification, polymer blends

Michael Gross
B.S. Bucknell; M.S., Ph.D. Pennsylvania
Scholarly interests: electrochemistry, catalysis, electronic and ionic conducting materials, Solid Oxide Fuel Cells (SOFC)

continued

GRANTS/AWARDS

Chemical engineering faculty have recently secured grants from the National Science Foundation for:

- development of a nanofabrication laboratory
- study of atmospheric aerosols
- enhancing engineering education
- laboratory improvement and instrumentation (atomic force microscope, polymer composite extruder)

SELECTED FACULTY PUBLICATIONS

Chemical Engineering faculty have recently published their scholarship in:

Journal of the Electrochemical Society

Granular Matter

Journal of College Science Teaching

Journal of Geophysical Research

Applied Surface Science

Macromolecules

QUICK FACTS

Number of full-time faculty: 12

Average number of majors per class year: 26

Class sizes: 12-30

Laboratory Section Sizes: 8-14

FACULTY *continued*

Michael Hanyak
B.S. Penn State; M.S. Carnegie Mellon; Ph.D. Pennsylvania
Scholarly interests: applied instructional design, multi-media courseware development, chemical process analysis

Erin Jablonski
B.S. Rutgers, M.S. Rutgers, Ph.D. Iowa State
Scholarly interests: polymer physics, photoresist technology, surface spectroscopy polymer blends and thin film chemistry

William King
B.S. Pittsburgh; M.S. Carnegie Mellon; Ph.D. Pennsylvania
Scholarly interests: bioengineering, chemical reaction engineering, process control, transport in tumors, photodynamic therapy, hemodialysis

James Maneval
B.S. Virginia Polytechnic Institute; M.S., Ph.D. California at Davis
Scholarly interests: process design, applied math, NMR methods, chromatographic and membrane separations

Michael Prince
B.S., WPI; Ph.D. California at Berkeley
Scholarly interests: problem-based and collaborative learning, instructional design, environmental barrier design

Timothy Raymond
B.S. Bucknell; Ph.D. Carnegie Mellon
Scholarly interests: atmospheric physics and chemistry, materials science, cloud condensation nuclei, organic aerosols

William Snyder
B.S., M.S., Ph.D. Penn State
Scholarly interests: thermodynamics, polymer degradation, catalysis, specific ion electrodes, drag reduction, water quality monitoring

Margot Vigeant
B.S. Cornell; M.S., Ph.D. Virginia
Scholarly interests: surface chemistry, bacterial transport and surface adhesion, novel microscopic imaging

Brandon Vogel
B.S. Minnesota; M.S. Iowa State; Ph.D. Iowa State
Scholarly interests: materials and polymer science, biomaterials, chemistry

Katsuyuki Wakabayashi
B.S. Pennsylvania; M.S., Ph.D. Princeton
Scholarly interests: materials science, polymer processing and characterization, nano blends/composites, sustainable engineering

UNDERGRADUATE RESEARCH

Chemical engineering students often participate in research projects with faculty mentors. Recent projects include:

- Fabrication of Polymer-Clay Nanocomposites via Solid-State Processes
- Synthesis of Poly(lactic acid)-Silica Particles for Targeted Drug Delivery
- Development of Redox-Stable SOFC Electrodes for Fuel Cell Applications
- Small Molecule Diffusion Through Semi-Permeable Microchannels

continued

UNDERGRADUATE RESEARCH *continued*

- Effect of Aerosol Morphology on Cloud Condensation Nuclei Activity

Students are encouraged to present research work to peers and professionals both on and off campus. For example, 12 students presented their work at the recent American Institute of Chemical Engineers Annual Meeting in Philadelphia (November 2008).

FACILITIES AND RESOURCES

- Analytical Laboratory (thermal, optical, chromatographic analyses)
- Bioprocess Laboratory (fermentation systems, biological monitoring)
- Fluid Flow Laboratory (pressure, flow, viscosity measurement)
- Heat Transfer Laboratory (conductivity, boiling and convection, industrial heat exchange)
- Kinetics Laboratory (flow and stirred reactors, reaction monitoring)
- Materials Science Laboratory (physical and mechanical property characterization)
- Nanofabrication Laboratory (surface patterning, thin film segregation and self-assembly)
- Polymer Laboratory (synthesis, characterization and processing)
- Process Control Laboratory (coupled tanks, heating/cooling, and analysis instrumentation)
- Unit Operations Laboratory (pilot scale distillation, extraction, and solid-liquid separation and processing)

COURSES OFFERED

Applied Mathematics for Chemical Engineers
Atmospheric Chemistry and Physics
Biomaterials: Materials in Medicine
Bioprocess Engineering
Chemical Engineering Principles
Chemical Engineering Project
Chemical Engineering Research
Chemical Engineering Seminar
Chemical Engineering Thermodynamics
Chemical Reaction Engineering
Colloid, Surface and Nanoscience
Equilibrium Stage Processes
Fuel Cell Science and Technology
Green Engineering
Heat and Mass Transfer
Particle Technology
Polymer Science
Process Control
Process Engineering
Product and Process Chemistry
Project Engineering
Special Topics in Chemical Engineering
Topics in Chemical Engineering Applied Mathematics
Topics in Chemical Engineering Thermodynamics
Topics in Reaction Engineering
Topics in Transport Theory
Unit Operations Laboratory

To view the entire Bucknell University catalog, see www.bucknell.edu/catalog.

INTERNSHIPS

Bucknell provides opportunities for students to find summer employment in industry, government or academia. Recently, students have interned at:

- Air Products and Chemicals, Inc.
- Merck and Company, Inc.
- Armstrong World Industries, Inc.
- ExxonMobil Corp.
- National Institute of Standards and Technology
- University of Colorado
- Cherokee Pharmaceuticals

STUDY ABROAD

Each year, about 20 percent of our engineering students study overseas in their junior year at such locations as the United Kingdom, Australia and Spain.

GRADUATE AND PROFESSIONAL SCHOOL

Some chemical engineering alumni choose to enroll in graduate programs focusing on chemical engineering, energy, catalysis, biotechnology, polymers, medicine, biomedical engineering, pharmacy and materials science. Recently, alumni have gone on to:

- University of California at Berkeley
- University of British Columbia
- University of Michigan
- Princeton University
- Cornell University
- Drexel University
- University of Delaware
- University of Texas-Austin

Bucknell
UNIVERSITY

Visit the chemical engineering website at www.bucknell.edu/chemicalengineering

Office of Admissions | Bucknell University | Lewisburg, Pennsylvania 17837 | 570-577-1101

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