

CHEMISTRY

*Understanding the structure and composition of matter and
the changes that it undergoes*

RELATED STUDENT ORGANIZATIONS

Alpha Chi Sigma (chemistry honor society)

American Chemical Society

CAREER PATHS

Career opportunities for chemistry majors are wide open, especially in the areas of academia, industry and government. For example, more than 90 chemistry graduates are teaching at universities and colleges, and many alumni work in the pharmaceutical industry. Recently, alumni have secured the following positions:

- Chemist, Merck & Co., Inc.
- Client Relations Representative, Vanguard Group
- Chemist, Benchmark Analytics
- Research Technician, INVISTA
- Researcher, AmeriCorps
- Analytical Chemist, Celator Pharmaceuticals
- Product Development Chemist, Adhesives Research Inc.
- Chemist, Chemical Specialties Manufacturing Corp.

PROGRAM DETAILS

- Receiving a strong education in chemistry opens the way to investigating problems in medicine, materials science and the environment, as well as in the traditional areas of analytical, inorganic, organic and physical chemistry.
- A B.S./M.S. program allows a student to earn both a Bachelor of Science degree and a Master of Science degree in four years.
- The chemistry department offers courses in environmental chemistry. In conjunction with courses offered in the departments of geology, civil and environmental engineering and the social sciences, a student can be well prepared to pursue graduate study or to work in the field of environmental science.
- Coursework in chemistry helps students understand fundamental chemical principles, to apply these principles broadly and effectively and to evaluate critically the impact of chemistry on society.
- Students learn early on what chemists do by taking organic chemistry courses during their first year. Subsequently, they take courses in the other subspecialties of chemistry, leaving time in the curriculum for personal involvement in a research project in collaboration with a faculty mentor.
- The department emphasizes the importance of research experience. The opportunity to engage in an original research investigation, in collaboration with a faculty member, is a distinctive feature of this program.

FACULTY

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

Dee Ann Casteel

B.Mus. Coe College; Ph.D. Illinois

Scholarly interests: organic chemistry, organic synthesis, synthesis of peroxides, anti-malarial, anti-viral, anti-tumor agents, medicinal chemistry

Karen Castle

B.S. California at Irvine; Ph.D. Oregon State

Scholarly interests: physical chemistry, kinetics and dynamics of atmospheric processes

continued

GRANTS/AWARDS

Chemistry faculty members have recently secured grants and awards from:

American Chemical Society –
Petroleum Research Fund

NASA Geospace Science
Program

National Institutes of Health –
Academic Research
Enhancement Award

National Science Foundation –
Major Research
Instrumentation

SELECTED FACULTY PUBLICATIONS

Recently, scholarship by chemistry faculty members has appeared in:

Biochemistry

Journal of Chemical Education

Journal of Geophysical Research

Journal of Magnetic Resonance

Langmuir

Organometallics

Polymer Science

QUICK FACTS

Number of full-time faculty: 13

Average number of majors per class year: 14

FACULTY *continued*

Charles Clapp

A.B. Bowdoin; Ph.D. Harvard

Scholarly interests: biochemistry, enzyme mechanisms and enzyme inhibitors

Margaret Kastner

B.S. Ed., IU at South Bend; Ph.D. Notre Dame

Scholarly interests: inorganic chemistry, x-ray crystallography, chemical education

Molly McGuire

B.A. Carleton; Ph.D. Wisconsin

Scholarly interests: environmental chemistry, environmentally important redox reactions at clay mineral surfaces

David Rovnyak

B.S. Richmond; Ph.D. M.I.T.

Scholarly interests: biophysical chemistry, application of magnetic resonance techniques to the study of biological macromolecules

Thomas Selby

Ph.D. The Ohio State University

Scholarly interests: biochemistry, structure-function studies of signaling proteins, x-ray crystallography, biophysical characterization, enzymology, computational methods, combinatorial protein libraries

Thomas Shawe

B.S., M.S. Georgia; Ph.D. Emory

Scholarly interests: organic chemistry, organic synthetic methodology: stereo-selective reactions and alkaloid synthesis

Robert Stockland

Ph.D. University of Missouri

Scholarly interests: inorganic, organic and polymer chemistry; design and synthesis of transition metal complexes with useful catalytic properties; use of transition metal complexes to control polymerization and modify polymers

Timothy Strein

B.S. North Carolina State; Ph.D. Penn State

Scholarly interests: analytical chemistry, capillary electrophoresis of biological fluids, charge transfer reactions at ultrasmall electrodes, GC/MS of environmental samples

James Swan

B.S. Kentucky; Ph.D. Penn State

Scholarly interests: analytical biochemistry, affinity chromatography, conformational changes in proteins

Eric Tillman

B.S. Cal Poly at San Luis Obispo; Ph.D. Southern California

Scholarly interests: organic chemistry, synthesis and characterization of macromolecules possessing interesting photophysical or electronic properties

Brian Williams

B.S. Harvey Mudd; Ph.D. Cornell

Scholarly interests: biophysical chemistry; spectroscopic characterization; photophysical processes; synthesis of micelles, lipid membranes and vesicles

UNDERGRADUATE RESEARCH

Students can get involved in research projects as early as their first year at Bucknell. Each summer, 25 to 30 chemistry students are engaged in research full time for a 10-week period. This provides time for close cooperation with a faculty mentor on the student's personal project. Recent projects include:

- Determining Total Antioxidants Capacity Using In-Line Capillary Electrophoresis Assays
- Steric and Electronic Effects on Arylphosphonate Elimination from Organopalladium Complexes
- Temperature Effects on the Diffuse Reflectance Spectra on Nontronite Clays

FACILITIES AND RESOURCES

Bucknell's chemistry laboratories are equipped with major instruments normally found only at large doctorate-granting institutions. These major instruments include:

- Varian 600 MHz DirectDrive four-channel, multinuclear NMR spectrometer (14.1 Tesla) with pulsed field gradients, biomolecular liquids probe, two-channel 3.2mm magic-angle spinning solids probe and actively shielded Oxford AS600 magnet; obtained in 2006 with funds from a grant from the National Science Foundation
- Varian 400 MHz DirectDrive two-channel, multinuclear NMR spectrometer (9.4 Tesla) with autotuning, pulsed field gradients and premium shielded magnet; obtained in 2006 with funds from a grant from the National Science Foundation
- Multimode V atomic force microscope (AFM) (Veeco Instruments); obtained in 2007 with funds from a National Science Foundation grant
- Micromass Electrospray Quadrupole/Time-of-Flight Tandem Mass Spectrometer interfaced with liquid chromatograph; obtained in 2008
- Continuum pulsed Nd:YAG laser
- Laser Components tunable midinfrared diode laser
- SPEX Fluorolog-3 Steady-state Fluorimeter
- Bruker P4 single-crystal X-ray diffractometer
- Sciex API-III+ electrospray mass spectrometer equipped for liquid chromatography/mass spectrometry
- Extrel ELQ tandem mass spectrometer and two Agilent gas chromatography/mass spectrometry systems
- Micro-Now Model 8300 X Band ESR spectrometer
- Two Nicolet FTIR spectrometers

INTERNSHIPS

Chemistry majors can gain career experience through summer internships. Recently, students have interned at:

- University of Michigan
- Merck Research Labs
- Penn State Hershey Medical Center
- Cephalon, Inc.
- Woods Hole Oceanographic Institute
- Santo-Aventis Inc.

STUDY ABROAD

Chemistry majors in recent years have spent a summer, semester or year abroad in Ireland, Italy, France and Spain.

GRADUATE AND PROFESSIONAL SCHOOL

Nearly half of chemistry alumni pursue graduate or professional education after their time at Bucknell. Recently, alumni have gone on to:

- New York College of Osteopathic Medicine
- Thomas Jefferson Medical College
- Duke University
- Indiana University
- University of North Carolina
- University of Delaware
- University of Maryland
- Yale University
- University of Pennsylvania
- University of Illinois
- University of Rochester
- Cornell University School of Veterinary Medicine

continued

COURSES OFFERED

Advanced Environmental Chemistry	Physical Chemistry I and II
Analytical Chemistry I and II	Research in Chemistry Capstone Seminar
Biochemical Methods	Special Topics in Analytical Chemistry
Biochemistry I and II	Special Topics in Biochemistry
Biological Physical Chemistry	Special Topics in Inorganic Chemistry
Chemistry Capstone	Special Topics in Organic Chemistry
General Chemistry	Special Topics in Physical Chemistry
Inorganic Chemistry I and II	Synthetic Organic Chemistry
Introduction to Chemistry	Undergraduate Research
Introduction to Environmental Chemistry	X-ray Crystallography
Mechanistic Organic Chemistry	
Organic Chemistry I and II	
Physical Chemistry for Engineers	

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



Visit the chemistry website at www.bucknell.edu/chemistry

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