

## CELL BIOLOGY AND BIOCHEMISTRY

*Studies at the convergence of biology, chemistry and other natural sciences*

### RELATED STUDENT ORGANIZATIONS

Biochemistry Society  
Biology Club

### CAREER PATHS

The cell biology and biochemistry major provides excellent preparation for work in many areas of biotechnology, including biomedical research, pharmaceuticals, emerging industries using molecular and genetic engineering techniques, veterinary science, medicine and other health-science-related professions. Recent alumni have secured the following positions:

- Biology Teacher, Peace Corps
- Researcher, Booz, Allen & Hamilton
- Staff Biochemist, Merck & Company, Inc.
- Teacher, Worcester Academy
- Research Associate, Johns Hopkins University

### QUICK FACTS

Number of full-time faculty: 13

Average number of majors per class year: 17

### PROGRAM DETAILS

- Cell biology and biochemistry is an interdisciplinary program coordinated by faculty from the chemistry and biology departments.
- The majority of courses in the program involve extensive laboratory experience.
- Many cell biology and biochemistry students work in the cell culture laboratory, where they clone genes and purify and characterize nucleic acids and proteins.
- The major requires five biology courses and six chemistry courses, as well as an interdepartmental biochemical methods course and a number of electives.
- Because of the potential impact of this discipline on society, students must also take a course in which the social or ethical implications of biotechnology are considered.

### FACULTY

Bucknell's biology and chemistry 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.

**Dee Ann Casteel**, chemistry  
*B. Mus. Coe College; Ph.D. Illinois*  
Scholarly interests: organic synthesis, synthesis of peroxides, antimalarial and medicinal chemistry

**Mitchell Chernin**, biology  
*B.S. Massachusetts; M.S. University of Guam; Ph.D. Clemson*  
Scholarly interests: molecular biology, gene regulation in the cardiac renin-angiotensin and bone osteogenesis systems

**Charles Clapp**, chemistry  
*A.B. Bowdoin College; Ph.D. Harvard*  
Scholarly interests: enzyme mechanisms, enzyme inhibitors

**Kenneth A. Field**, biology  
*B.S. Vermont; Ph.D. Cornell*  
Scholarly interests: immunology, role of protein localization in oncogenic signaling

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## GRANTS/AWARDS

Cell biology and biochemistry faculty members have recently secured grants from:

- The Leukemia and Lymphoma Society
- Pennsylvania Department of Agriculture
- American Chemical Society-Petroleum Research Fund
- National Institutes of Health

## SELECTED FACULTY PUBLICATIONS

*Journal of Cellular and Molecular Medicine*

*Development*

*Journal of Parasitology*

*Transplant Immunology*

*Biochemistry*

*Journal of Magnetic Resonance*

*Langmuir*

*Magnetic Resonance in Chemistry*

*Journal of Chromatography*

## FACULTY *continued*

**Julie Gates**, biology

*B.S. University of Wisconsin–Madison;*

*Ph.D. University of Utah*

Scholarly interests: developmental biology of *Drosophila melanogaster*

**Matthew Heintzelman**, biology

*A.B. Dartmouth College; M.S.,*

*Ph.D. Yale*

Scholarly interests: cell biology, cytoskeleton and cell motility

**Lisa Marin**, biology

*B.S. UCSD; Ph.D. Stanford University*

Scholarly interests: nervous system development

**Kathleen Creed Page**, biology

*B.S., M.S., Ph.D. Penn State*

Scholarly interests: cell physiology, gene regulation in brain: response to stress and diet

**Marie Pizzorno**, biology

*B.A. Whittier College; Ph.D. Johns*

*Hopkins School of Medicine*

Scholarly interests: molecular and cellular biology of eukaryotic viruses, specifically herpes viruses

**David Rovnyak**, chemistry

*B.S. Richmond; Ph.D. MIT*

Scholarly interests: biological applications of nuclear magnetic resonance spectroscopy

**Thomas Selby**, chemistry

*B.S. University of Akron; Ph.D. Ohio*

*State University*

Scholarly interests: structure-function relationships in signaling proteins

**Emily Stowe-Evans**, biology

*B.A. College of Wooster; Ph.D.*

*University of Missouri-Columbia*

Scholarly interests: genetics, light regulated developmental processes in photosynthetic organisms

**Timothy Strein**, chemistry

*B.S. North Carolina State;*

*Ph.D. Penn State*

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

**James Swan**, chemistry

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

Scholarly interests: bioanalytical chemistry, chiral separations, bile salt interactions

**Brian Williams**, chemistry

*B.S. Harvey Mudd College; Ph.D.*

*Cornell*

Scholarly interests: synthesis and spectroscopic characterization of solvent sensitive materials, photophysical processes, molecular modeling

## UNDERGRADUATE RESEARCH AND CREATIVE PROJECTS

Most students in the cell biology and biochemistry program do independent research with faculty mentors. Many have their work published in peer-reviewed professional journals.

Recent undergraduate research projects include:

- Field, K.A., S. **Charoenthongtrakul\***, J.M. Bishop, and Y. Refaeli. 2008. Farnesyl transferase inhibitors induce extended remissions in transgenic mice with mature B cell lymphomas. **Molecular Cancer** 7:39.
- **Hebling, C.M.\***; Eckenroad, K.W.; Rovnyak, D.; and Strein, T.G. "Sodium Cholate Aggregation Observed by Nuclear magnetic Resonance

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## UNDERGRADUATE RESEARCH AND CREATIVE PROJECTS

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Spectroscopy of the Probe Molecule (R,S) 1,1'-bunaphyl-2,2'-dihydrogenphosphate (BNDHP)" *Langmuir*, 24, 2008, 13866-13874.

- **Shoener J.A.\*** and K.C. Page, 2006. Prenatal exposure to dexamethasone permanently alters hippocampal drive on hypothalamic-pituitary-adrenal axis activity. *American Journal of Physiology*, 290:R1355-R1373

## FACILITIES AND RESOURCES

- Molecular core facilities for molecular and cellular research
- High-speed centrifuges and ultracentrifuges
- Two labs for conducting animal tissue culture
- Digital gel documentation system for photographing and archiving gel electrophoresis
- UV-visible spectrophotometers, gas and high performance liquid chromatographs and capillary electrophoresis instrumentation
- Imaging Center equipped with a Nikon confocal microscope, CCD digital camera, fluorescent microscope and transmission electron microscope
- Major instruments for chemical analysis, including a Bruker x-ray diffractometer, a Bruker 300 MHz nuclear magnetic resonance spectrometer and three gas chromatograph/mass spectrometers

## COURSES OFFERED

### *Required courses*

Analytical Chemistry I	Inorganic Chemistry
Biochemistry I	Introduction to Molecules and Cells
Biological Physical Chemistry	Molecular Biology
Calculus	Organic Chemistry
Cell Biology	Organismal Biology
Genetics	Physics

### *Electives*

Advanced Environmental Chemistry	Molecular Genetics
Analytical Chemistry II	Neuroscience
Biochemistry II	Physical Chemistry II
Comparative Physiology	Physiological Mechanisms
Developmental Biology	Physiological Psychology
Endocrinology	Plant Growth and Development
Functional Genomics	Neuro Physiology
Immunology	Special Topics in Organic Chemistry
Inorganic Chemistry II	Synthetic Organic Chemistry
Mechanistic Organic Chemistry	Techniques in Microscopy
Microanatomy	Undergraduate Research
Microbiology	Virology

To view the entire Bucknell University catalog, see [www.bucknell.edu/catalog](http://www.bucknell.edu/catalog).

## INTERNSHIPS

Cell biology and biochemistry majors can gain career experience through summer internships. Recently, students have interned at:

- Bucknell Department of Chemistry
- University of Pittsburgh
- Mayo Clinic

## STUDY ABROAD

Fall semester courses and summer fellowships are available at the Marine Biological Laboratory at Woods Hole, Mass. Bucknell also offers a Virgin Islands marine science course. Students have recently studied abroad through programs in countries including:

- Spain
- Australia
- South Africa

## GRADUATE AND PROFESSIONAL SCHOOL

Most cell biology and biochemistry graduates go on to graduate and/or medical school. Recent graduates have gone to schools including:

- Georgetown University
- Thomas Jefferson University
- University of Pennsylvania
- Drexel Medical University
- Temple University School of Medicine
- Philadelphia College of Osteopathic Medicine
- University of Pittsburgh



Visit the cell biology/biochemistry program website at [www.bucknell.edu/biochemistry](http://www.bucknell.edu/biochemistry)  
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