



## ABOUT THE PROGRAM

The biochemistry major equips students with a broad understanding of the chemical and molecular basis of biological processes. It provides a foundation for careers in medicine, the pharmaceutical industry, patent law, science writing and teaching, biotechnology and graduate research in all branches of the biological sciences. Students gain the necessary background in chemistry (organic, inorganic and physical chemistry) and in biology (molecular and cellular biology, and genetics), as well as the basics of biochemistry. The department also offers introductory and advanced courses in specialized topics such as neurobiology, X-ray crystallography, electron microscopy, biological NMR and enzyme mechanisms.

### What makes the program distinctive?

At Brandeis, the biochemistry major focuses not only on the structure and function of biological molecules but also on their detailed mechanisms of action. Students learn how to investigate biological processes, typically

working directly with scientists who are on the cutting edge of biomedical research. Frequently, biochemistry majors at Brandeis undertake research projects that elsewhere are done only at the graduate level.

## FAST FACTS

**Current number of majors:** 61

**Number of faculty:** 11

**Can you minor in this program?** No

**Emphasis within the major:** dynamics of biological molecules, enzyme reaction mechanisms, membrane protein biochemistry, structural biology

**Popular second majors:** biology, neuroscience

**Website:** [go.brandeis.edu/bchm](http://go.brandeis.edu/bchm)

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## ACADEMICS AND RESEARCH

### Independent research

Virtually all biochemistry majors do independent research in the laboratory of a Brandeis faculty member, and many write honors theses based on their work. They are frequently co-authors of important scientific publications as well.

### Facilities and opportunities

Biochemistry majors have access to state-of-the-art instrumentation, including equipment for protein X-ray crystallography, NMR, electron microscopy, mass spectrometry and single-molecule spectroscopy. For example, several have participated recently in the three-dimensional structure determinations of proteins and protein-nucleic acid complexes. Biochemistry majors also attend interdepartmental colloquia given by the world's leading scientists, and they often attend scientific meetings where they may present a poster on their research.

### Preparation for graduate study

Senior biochemistry majors can take the same lecture courses as first-year PhD students in the biochemistry and biophysics program. This curriculum provides advanced training for students preparing for graduate study in biochemistry and related fields.

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## AWARDS AND RECOGNITION

### Distinguished faculty

In the 2007 National Research Council ranking of top U.S. universities, Brandeis ranked 17th in the country in biochemistry and molecular biology. The biochemistry department has one member of the National Academy of Sciences, two Howard Hughes Medical Institute investigators, a number of Guggenheim fellows, and several fellows of the American Association for the Advancement of Science.

### Grant-funded research

Research in the biochemistry department is funded by over 15 grants from the National Institutes of Health, National Science Foundation, and U.S. Department of Energy. Department faculty receiving notable grants and awards recently include Jeff Gelles, the HHMI-NIBIB Interfaces Award and the NIH Training Grant in Quantitative Biology; Daniel Oprian, the NIH Biochemistry Training Grant in Macromolecular Structure Mechanism; Dagmar Ringe, the Alexander von

Humboldt Research Prize and the Michael J. Fox Foundation for Parkinson's Research Award; Doug Theobald, the Camille and Henry Dreyfus New Faculty Award; and Dorothee Kern, named the National Lecturer of the Biophysical Society.

### Undergraduate awards

The biochemistry department awards several prizes for undergraduates, including the William P. Jencks Award, the Kaplan Prize and the Dagmar Ringe Research Prize.

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## BEYOND THE CLASSROOM

### Summer internships

Brandeis biochemistry majors often have the opportunity to do summer internships at pharmaceutical and biotechnology companies, both locally and elsewhere in the United States. Recent companies participating include Wyeth and Novartis. Occasionally, majors also have interned in laboratories abroad, including in Japan, England and Germany.

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## AFTER BRANDEIS

### Diverse careers

Notable alums of the biochemistry department include Roderick MacKinnon (Nobel Prize in Chemistry, 2003). Recent alumni of the department have gone to graduate school in biochemistry, neurobiology or biophysics at Yale, UCSF, Stanford and MIT. A number have attended medical school (including some MD/PhD programs); recent choices include Columbia, Cornell, UCSF, Harvard and Tufts. A few currently are working in biotechnology companies in the Boston area and on the West Coast. In the past, biochemistry majors also have continued on to law school, business school and journalism school.



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