The Molecular Biology and Biochemistry (MB&B) Department supports a graduate program with emphasis in molecular genetics, molecular biology, biochemistry, and molecular biophysics. The MB&B graduate program is designed to lead to the degree of doctor of philosophy. A master of arts degree is awarded only under special circumstances. The department currently has 20 graduate students, and the graduate program is an integral part of the departmental offerings. Graduate students serve as teaching assistants in undergraduate courses, generally during their first two years. The emphasis of the program is on an intensive research experience culminating in a dissertation. The program of study also includes a series of courses covering the major areas of molecular biology, biochemistry, and biophysics; journal clubs in which current research is discussed in an informal setting; practica designed to introduce first-year students to the research interests of the faculty; and several seminar series in which either graduate students or distinguished outside speakers participate. The low student-faculty ratio (2.5:1) allows programs to be individually designed and ensures close contact between the student and the faculty.

COURSES

Ideally, incoming students will have completed courses in general biology, cell and molecular biology, genetics, biochemistry, general chemistry, organic chemistry, physical chemistry, and calculus. Deficiencies in any of these areas would normally be made up in the first year. A core curriculum of graduate courses in the following areas is given on a two-year cycle:

- nucleic acid structure,
- biosynthesis and its regulation,
- regulation of gene expression,
- regulation of chromosome dynamics,
- structural mechanisms and energetics of protein-nucleic-acid interactions,
- protein structure and folding,
- protein trafficking in cells,
- physical techniques,
- molecular genetics,
- the cell cycle,
- biological spectroscopy,
- bioinformatics and functional genomics, and
- molecular, biochemical, and cellular bases of cancer and other human diseases.

Additional graduate course electives are also available. Within this general framework, an individual program of study tailored to fit the student’s background and interests is designed in consultation with the graduate committee and the student’s advisor.

PROGRESS AND QUALIFYING EXAMS

The criteria for admission to candidacy for the PhD will be performance in courses, aptitude for research, a written qualifying examination at the end of the third semester, and the oral defense of an original research proposal by the middle of the fourth semester.

TEACHING

Normally, three to four semesters of teaching are required.

RESEARCH

- control of DNA replication
- mechanism of protein secretion
- global regulations of ribosomal biogenesis in the yeast S. cerevisiae
- mechanisms of DNA replication and repair
- protein-protein and protein-nucleic-acid interactions
- the structural dynamics of nucleic acids and proteins
- chromosome structure and gene expression
- UV resonance Raman spectroscopy of biological macromolecules
- biological assembly mechanisms
- protein fiber formation in disease
- enzyme mechanisms
- the olfactory system and new frontiers in genome research
- elucidation of membrane protein function by x-ray crystallography

CONCENTRATIONS

The Chemistry Department and the Molecular Biology and Biochemistry Department offer an interdepartmental certificate in molecular biophysics supported by a training grant from the National Institutes of Health. This program is designed to prepare students for research and careers that combine interests in the physical and life sciences. Interested students are encouraged to consult David Beveridge or Irina Russu in the Chemistry Department or Manju Hingorani or Ishita Mukerji in the MB&B Department.

ADDITIONAL INFORMATION

For additional information, please visit the department website at wesleyan.edu/mbb/grad_studies (http://wesleyan.edu/mbb/grad_studies).