

THE FIELD

Biochemistry and molecular biology aims to understand the chemical and physical principles that make life occur as we know it. The field examines biological processes from physical, chemical, and genetic perspectives and, as an academic discipline, has great overlap with many other fields in the chemical, medical, behavioral, and biological sciences, making this a subject area of great interest to those students interested in pursuing a scientific career. Students whose interests span the fields of both biology and chemistry are frequently attracted to this discipline.

From investigations into the chemicals that constitute living organisms, the focus of this field has broadened to increase our understanding of how biochemical reactions are integrated and regulated, and how the genetic information stored in living organisms is expressed and controlled. Most recently, the goal of utilizing this knowledge in practical settings in medicine and agriculture has spawned an extremely productive academic enterprise and a worldwide biotechnology industry, both offering unbounded opportunities for making new discoveries.

A minor in biochemistry and molecular biology is available.

THE MAJOR

The major program provides the foundation for applications in an ever-increasing array of areas, such as medical genetic diagnostics, drug discovery, pharmaceutical design, neuroscience, bioinformatics, genomics, nanotechnology, biofuels, and paleontology. The highly integrated curriculum prepares students either for employment at the bachelor of science (BS) level or for further training in professional or graduate schools. Majors receive instruction in chemistry, physics, biology, mathematics, and statistics and begin their introduction to biochemistry in sophomore year. The program also encourages students to engage in independent research work in faculty laboratories. A strong high school background in mathematics, physics, chemistry, and biology is recommended. Course requirements are described on the program website (www.biochem.umass.edu/undergraduate/current-students/major-requirements).

SECONDARY TEACHER EDUCATION

Students majoring in biochemistry and molecular biology may obtain teacher certification for general science, chemistry, or biology. For the first two of these fields, no science courses beyond those already required for the major are needed. For biology, one course in ecology and one course in human biology must be taken. Undergraduate students must achieve a passing score on the Communication and Literacy Skills test of the Massachusetts Educator Certification Tests (MECT) prior to admission into professional preparation programs for educators. To obtain information about program requirements, students should visit the educator licensing programs website (umass.edu/education/be-teacher).

INTERSHIPS

There are many opportunities for biochemistry and molecular biology at laboratories in New England. These provide the student with an opportunity to gain valuable work experience in a research environment while earning academic credit.

HONORS

Contact the departmental honors program director (bmbhpd@biochem.umass.edu) and (umass.edu/honors/node/27563) for information on how to pursue honors opportunities within the major.

STUDY ABROAD

Selected programs allow students to obtain their four-year degree in biochemistry and molecular biology and enjoy the benefits of a year of education overseas. Students should contact the International Programs Office (413-545-2710, umass.edu/ipo) and work closely with their academic advisor to choose the appropriate courses in preparation.

CAREER OPPORTUNITIES

The program in biochemistry trains students for employment at the bachelor's degree level in a wide variety of fields. The Bureau of Labor Statistics estimates that employment of biochemists and biophysicists is projected to grow four percent from 2019 to 2029, as fast as the average for all occupations (www.bls.gov/ooh/life-physical-and-social-science/biochemists-and-biophysicists.htm). Graduates frequently find positions with major chemical and pharmaceutical and biotechnology companies, the food industry, scientific equipment suppliers, and various university, government, and medical research laboratories.

Biochemistry majors are particularly well trained to undertake graduate work in the field and in other areas related to the health sciences, such as microbiology, cell or molecular biology, pharmacology, virology, physiology, nutrition, and environmental law. Biochemistry majors also enjoy a high success rate of acceptance into medical and dental schools.

COLLEGE OF NATURAL SCIENCES

The College of Natural Sciences unites the life, environmental, computational, and physical sciences on campus. Students take advantage of a range of inquiry-based classroom and laboratory experiences, hands-on undergraduate research opportunities, multidisciplinary and cross-departmental education and research initiatives, and a variety of science student organizations. In addition, they are encouraged to develop strong written and oral communication skills, as well as leadership and problem-solving abilities.

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