

BIOCHEMISTRY AND MOLECULAR BIOLOGY 2009-10



UNIVERSITY OF CALIFORNIA, SANTA CRUZ

THE BIOCHEMISTRY AND MOLECULAR BIOLOGY MAJOR

The biochemistry and molecular biology major constitutes an integrated curriculum of basic instruction in biology, chemistry, mathematics, and physics, followed by the opportunity to pursue advanced study in specialized areas of interest. In modern, well-equipped laboratories, distinguished faculty are engaged in frontline research. The Departments of Chemistry and Biochemistry and MCD Biology host a very active seminar series of national and international scholars in which advanced undergraduates are encouraged to participate.

STUDY AND RESEARCH OPPORTUNITIES

- ◆ B.S.
- ◆ Opportunities for independent research and study
- ◆ Advanced undergraduates may take one or more graduate courses offered in chemistry and biochemistry with the consent of the instructor.

HIGH SCHOOL PREPARATION

In addition to completing the courses required for UC admission, high school students who intend to major in biochemistry and molecular biology should take courses in biology, chemistry, physics, and advanced mathematics (precalculus).

- Mathematics 11A-B, *Calculus with Applications* (two quarters) or Mathematics 19A-B, *Calculus for Science, Engineering, and Mathematics* (two quarters)
- Mathematics 22, *Introduction to Calculus of Several Variables*
- Physics 5A/L, 5B/M, and 5C/N, *Introduction to Physics with Laboratory* (three quarters) or Physics 6A/L, 6B/M, and 6C/N, *Introductory Physics with Laboratory* (three quarters)

TRANSFER PREPARATION

Junior transfer students who plan to major in biochemistry and molecular biology should complete introductory biology courses in cell and molecular biology and organismic biology, introductory calculus courses, introductory and organic chemistry courses, and introductory calculus-based physics.

If the institution offers a physics course based on calculus as well as a non-calculus-based course, the student should take the calculus-based course. Prospective transfer students should consult with a community college adviser regarding details of course transferability, and soon after arrival at UC Santa Cruz they should meet with a Physical and Biological Sciences Undergraduate Affairs adviser in order to clarify their transfer credit status. UC Santa Cruz lower-division requirements for the B.S. degree in biochemistry and molecular biology are:

While it is not a requirement for admission, students from California community colleges may complete the Intersegmental General Education Transfer Curriculum (IGETC). A completed and certified IGETC program satisfies the university's general education requirements. To learn more about IGETC and its requirements, prospective transfer students should consult with their transfer center counselor.

However, students planning to major in the sciences and engineering are not well served by completing IGETC due to the extensive lower-division major preparation course load and related prerequisite course requirements. Students interested in these high-unit majors are encouraged to complete courses equivalent to the specific program's lower-division major requirements first and the university's broader general education equivalents second. Please see www.assist.org to identify these course equivalents.

- Chemistry 1A, 1B/M, and 1C/N, *General Chemistry with Laboratory* (three quarters)
- Chemistry 108A/L and 108B/M, *Organic Chemistry with Laboratory* (two quarters); or Chemistry 112A/L, 112B/M, 112C/N, *Organic Chemistry with Laboratory* (three quarters)
- Biology 20A and 20B, *Introductory Biology Sequence* (two quarters)

CAREERS

Biochemistry	Microbiology
Biomedical engineering	Molecular biology
Biotechnology	Pharmaceutical research
Cell biology	Pharmacology
Chemical manufacturing	Physiology
Clinical chemistry	Public health
Dentistry	Scientific writing
Environmental chemistry	Teaching
Genetic engineering	Veterinary medicine
Government regulation	
Medical research	<i>These are only samples</i>
Medical technology	<i>of the field's many</i>
Medicine	<i>possibilities.</i>

RECOGNITION

Harry Noller, the Robert L. Sinsheimer Professor of Molecular Biology and director of the Center for Molecular Biology of RNA, is widely recognized for his studies of ribosomes. In 2003, he won the first Lifetime Achievement Award from the RNA Society. Manuel Ares, a professor of molecular, cell, and developmental biology, used a \$1 million grant from the Howard Hughes Medical Institute to form the Hughes Undergraduate Research Laboratory, which focuses on genomics.

ALUM FOCUS

Dr. Joseph DeRisi (B.A., biochemistry and molecular biology, '92) is well known for his contributions in discovering the SARS virus. His breakthrough creation of a viral detection platform for malaria and other infectious diseases has helped advance biomedicine's ability to detect both existing and new viruses and may contribute to a cure for malaria. In recognition of his contributions, Dr. DeRisi, who is a Howard Hughes Medical Institute investigator and professor of biochemistry at UCSF, won a MacArthur "genius" award grant in 2004 and a Heinz Award in 2008. Dr. DeRisi is also known for his commitment to free and open-access scientific publishing.

PROGRAM PLANNING NOTES

Students who do not begin the lower-division requirements during their first year may have difficulty completing the program within four years. Transfer students may also have problems completing the program within the usual time, depending upon whether or not equivalent courses have been taken at their previous institutions. The adviser works closely with students interested in pursuing the major to insure that they begin the program immediately and follow the appropriate steps toward its completion.

It is strongly recommended that students avail themselves of the opportunities to obtain firsthand research experience through either independent study or senior thesis research. A number of graduate courses in biochemistry and molecular biology are offered by the biology, chemistry, and biochemistry programs. Advanced undergraduates with the necessary background may take one or more of these courses with the consent of the instructor; however, graduate courses may not be substituted for the required elective courses.

COMPREHENSIVE REQUIREMENT

Students have two options for fulfilling the senior comprehensive requirement: (a) achieving a score at or above the 50th percentile on the Graduate Record Examination (GRE) Biochemistry, Cell, and Molecular Biology Subject Test, or (b) completing a senior thesis sponsored or cosponsored by a faculty member affiliated with the biochemistry and molecular biology program.

FOR MORE INFORMATION

For further information about the biochemistry and molecular biology major and upper-division course requirements, see: reg.ucsc.edu/catalog/html/programs_courses/biocPS.html

Information about the biochemistry major can be found at: undergrad.pbsci.ucsc.edu/programs/chemistry or by e-mailing chemistryadvising@ucsc.edu.

For specific information regarding Chemistry and Biochemistry faculty and research, please visit the department web site at: www.chemistry.ucsc.edu.

For specific information regarding MCD Biology faculty and research, please visit the department web site at: www.mcd.ucsc.edu.

If you have other questions, contact:
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