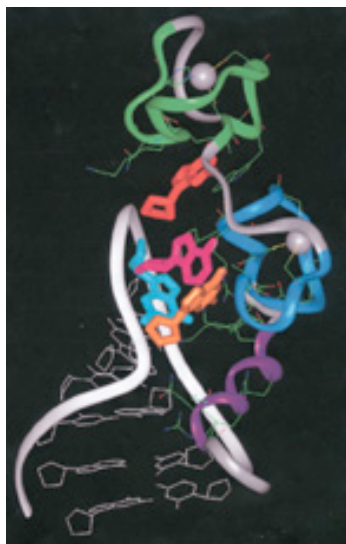


# BIOCHEMISTRY



Biochemistry is the study of the molecular basis of life. Lying at the interface between chemistry and biology, biochemistry is concerned with the structure and interaction of proteins, nucleic acids, and other biomolecules as related to their function in biological systems. As one of the most dynamic areas of science, biochemistry has led to improved medicines and diagnostic agents, new ways of controlling disease, and greater understanding of the chemical factors that control our general health and well-being.

The bachelor of science degree in biochemistry is appropriate for students pursuing advanced degrees in biochemistry, molecular biology, and biophysics as well as in the biomedical fields and health professions.

Before declaring the biochemistry major, students must earn at least 30 credits in courses graded A-F at Syracuse, and earn at least a grade of C+ in CHE 275 and BIO 326 or 327.

**Faculty** John M. Belote, Philip N. Borer, Mark S. Braiman, Joseph Chaiken, Arindam Chakraborty, Samuel H.P. Chan, John D. Chisholm, Daniel Clark, Heather Coleman, James C. Dabrowiak, Robert P. Doyle, Scott E. Erdman, Thomas P. Fondy, Anthony

Garza, Jerry Goodisman, James Hewett, Sandra Hewett, James Houglund, Bruce S. Hudson, James Kallmerten, Ivan V. Korendovych, Timothy M. Korter, Katharine Lewis, Yan-Yeung Luk, Eleanor Maine, Mathew M. Maye, Melissa Pepling, Ramesh Raina, Karin Ruhlandt, Nancy I. Totah, Roy Welch, Jon Zubieta

## DISTINCTION IN BIOCHEMISTRY

The biochemistry B.S. program encourages all of its students to participate in research through its BCM 460 course. For students whose research culminates in a written thesis, it is possible to graduate with Distinction in Biochemistry if the following requirements are met.

First, the student must have a transcript showing an overall cumulative GPA of 3.4, and must also have a minimum cumulative GPA of 3.4 in all natural sciences and mathematics courses taken at S.U.

Second, the student must have taken a minimum of 6 credits of BCM 460.

Third, before completion of the final semester at Syracuse University, the student must make an oral presentation (either poster or platform) based on his/her research, at one of the following: (1) the Syracuse University biology department Undergraduate Research Conference in April; or (2) an external conference sponsored by an outside (non-S.U.) educational institution with its own accredited 4-year biochemistry degree program; or (3) an external conference sponsored by a nationally-recognized scientific society with a biochemistry component (e.g. ACS, FASEB, Biophysical Society). A symposium specifically designed for undergraduate researchers from multiple institutions and sponsored by a regional or local chapter of a national scientific society is understood to qualify as external, even if it is physically located at Syracuse University.

Fourth, the written thesis must be judged to be of high quality by a committee of readers selected from among the biochemistry program faculty listed in the Syracuse University Course Catalog. The student is responsible for selecting potential readers and obtaining their consent to serve. The committee of readers should include the research supervisor, but in any case must include at least one member whose primary appointment is in Syracuse University's biology department, and one member whose primary appointment is in Syracuse University's chemistry department.

For further information, contact the biochemistry major advisors.

**Contact** James C. Dabrowiak, 2-016D Center for Science and Technology, 315-443-4601; [jcdabrow@syr.edu](mailto:jcdabrow@syr.edu) or Samuel H. Chan, 342 Life Sciences Complex, 315-443-3182, [shchan@syr.edu](mailto:shchan@syr.edu).

## B.S. DEGREE REQUIREMENTS FOR BIOCHEMISTRY

### RECOMMENDED ELECTIVES

#### Core Courses (48-60 credits)

- BIO 121: General Biology or  
Advanced Placement Biology Credit
- BIO 305: Integrative Biology Lab
- CHE 106/107 or 109/129: General Chemistry I/Lab
- CHE 116/117 or 119/139: General Chemistry II/Lab
- CHE 275/276: Organic Chemistry I/Lab
- CHE 325/326: Organic Chemistry II/Lab
- MAT 285 or 295: Calculus I
- MAT 286 or 296: Calculus II
- PHY 211/221: General Physics I/Lab
- PHY 212/222: General Physics II/Lab
- BIO 326: Genetics
- BIO 327: Cell Biology
- CHE 474: Structural and Physical Biochemistry
- BIO 475 or CHE/BCM 477: Biochemistry Lab or  
Preparation and Analysis of Proteins  
and Nucleic Acids Lab
- BCM 475: Biochemistry I
- BCM 476: Biochemistry II

#### Elective Courses (At least 12 credits, including at least one instructional lab indicated with an asterisk)

- CHE 335: Chemical and Biochemical Analysis Lab\*
- CHE 346: Physical Chemistry I
- CHE 356: Physical Chemistry II
- BIO 409: Microbiology\*
- CHE 412: Metals in Medicine
- BIO 422: Bioinformatics for Life Sciences w/Lab\*
- BIO 425: Cell and Development Biology Lab\*
- CHE 427: Organic Chemistry of Biological Molecules
- BCM 430: Journal Club in Molecular Pharmacology and  
Structural Biology
- BIO 447: Immunobiology
- BCM 460: Research in Biochemistry
- BIO 462: Molecular Genetics
- BIO 463: Molecular Biotechnology Lab\*
- BIO 464: Applied Biotechnology Lab\*
- BIO 465: Molecular Biology Lab\*
- BCM 484: Biomolecular Modeling w/Lab\*
- BIO 501: Biology of Cancer
- BIO 503: Developmental Biology
- CHE 546: Molecular Spectroscopy and Structure
- CHE 575: Organic Spectroscopy

If both BIO 475 and CHE/BCM 477 are taken, one may count toward the 12-credit elective requirement, thereby also meeting the instructional lab requirement.

BCM 460 counts once (up to 3 credits) towards elective requirement, but does not count as an instructional lab course.

#### Preparation for Graduate School in a Department of Biology, Biochemistry, or Molecular Biology

- BIO 409: Microbiology
- CHE 412: Metals in Medicine
- CHE 427: Organic Chemistry of Biological Molecules
- BCM 430: Journal Club in Molecular Pharmacology and  
Structural Biology
- BIO 447: Immunobiology
- BCM 460: Research in Biochemistry
- BIO 462: Molecular Genetics
- BIO 463: Molecular Biotechnology Lab
- BIO 464: Applied Biotechnology Lab
- BIO 465: Molecular Biology Lab
- BCM 484: Biomolecular Modeling w/Lab
- BIO 501: Biology of Cancer
- BIO 503: Developmental Biology

#### Preparation for Graduate School in a Department of Chemistry

- CHE 335: Chemical and Biochemical Analysis Lab
- CHE 346: Physical Chemistry I
- CHE 356: Physical Chemistry II
- CHE 412: Metals in Medicine
- CHE 427: Organic Chemistry of Biological Molecules
- BCM 430: Journal Club in Molecular Pharmacology and  
Structural Biology
- BCM 460: Research in Biochemistry
- BIO 465: Molecular Biology Lab
- BCM 484: Biomolecular Modeling w/Lab
- CHE 546: Molecular Spectroscopy and Structure
- CHE 575: Organic Spectroscopy

#### Preparation for Health Professions (M.D., D.D.S., D.V.M.)

- BIO 409: Microbiology
- CHE 412: Metals in Medicine
- BIO 447: Immunobiology
- BCM 460: Research in Biochemistry
- BIO 462: Molecular Genetics
- BIO 465: Molecular Biology Lab
- BIO 501: Biology of Cancer
- BIO 503: Developmental Biology

#### Preparation for Technical Careers in Pharmaceutical or Biotechnical Industry

- CHE 335: Chemical and Biochemical Analysis Lab
- CHE 412: Metals in Medicine
- BIO 409: Microbiology
- CHE 427: Organic Chemistry of Biological Molecules
- BCM 430: Journal Club in Molecular Pharmacology and  
Structural Biology
- BIO 447: Immunobiology
- BCM 460: Research in Biochemistry
- BIO 462: Molecular Genetics
- BIO 463: Molecular Biotechnology Lab
- BIO 464: Applied Biotechnology Lab
- BIO 465: Molecular Biology Lab
- BCM 484: Biomolecular Modeling w/Lab
- BIO 501: Biology of Cancer
- BIO 503: Developmental Biology
- CHE 575: Organic Spectroscopy