

BIOCHEMISTRY, PHD

for the Doctor of Philosophy in Biochemistry

Graduate Degree Programs in Biochemistry

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The Department of Biochemistry offers a graduate program leading to the Doctor of Philosophy degree. For an application and departmental materials that provide greater detail on programs, offerings, admission, degree requirements, and financial aid, visit our website at www.mcb.illinois.edu/graduate/gradprospect.html (<https://mcb.illinois.edu/graduate/gradprospect/>). The Department of Biochemistry is a part of the School of Molecular and Cellular Biology (MCB), which also includes the Departments of Cell and Developmental Biology, Microbiology and Molecular and Integrative Physiology as well as Programs in Biophysics and Neuroscience. The Department is part of an umbrella program in MCB that encompasses over 70 different research laboratories. Students admitted into any of these departmental graduate programs can select faculty thesis advisors from these active research laboratories in the School. Close ties are also maintained with the School of Integrative Biology, the School of Chemical Sciences, the College of Medicine, and the College of Veterinary Medicine.

Admission

Applicants interested in the Biochemistry, PhD program will need to apply directly to the School of Molecular and Cellular Biology (MCB) PhD program, <https://mcb.illinois.edu/graduate/gradprospect/>. The MCB PhD program is an umbrella program that requires admitted students to spend their first semester rotating among three different labs to explore their interests before joining one of our four departments.

MCB Admission requirements include a bachelor's degree in biological or physical sciences, a grade point average of a 3.0 or higher (A = 4.0), prior research experience and three letters of recommendation from individuals who can attest to the applicant's academic and research background. The Graduate Record Examination (GRE) is **not** required. Applicants interested in pursuing a PhD in Biochemistry should have a strong background in chemistry, biology, physics, and calculus. **In addition to these requirements, non-native English-speaking applicants must attain a minimum Test of English as a Foreign Language (TOEFL) overall score of 96, with at least a score of 22 on the speaking section.** MCB does **not** accept the International English Language Testing System (IELTS) to show English proficiency. Graduate College requirements also apply.

Graduate Teaching Experience

Experience in teaching is considered a vital part of the graduate program and is required as part of the academic work of all Ph.D. candidates in this program.

Centers, Programs, and Institutes

Biochemistry faculty are appointed and active in several cross-campus academic and research units, including the Center for Biophysics & Computational Biology, the Beckman Institute for Advanced Science and Technology, the Institute for Genomic Biology, as well as the interdepartmental graduate programs in Biophysics & Computational Biology, and Neuroscience.

Faculty Research Interests

Faculty research in the Department of Biochemistry covers a broad spectrum of the most dynamic areas of current research in biological chemistry and molecular biology: physical approaches to the structure and function of macromolecules and membranes; nucleic acid biochemistry and enzymology, enzyme mechanisms and evolution; membrane biochemistry and bioenergetics; protein-lipid interactions; protein-nucleic acid interactions and molecular recognition; molecular biological approaches to gene organization and expression; immunology; microbial physiology, and signal transduction.

Facilities and Resources

Campus resources for science research are state-of-the-art and available to all faculty research programs. Notably among these is the Roy J. Carver Biotechnology Center, which comprises the W.M. Keck Center for Comparative and Functional Genomics (Custom Library Services, High-Throughput Sequencing and Genotyping, DNA Core Sequencing, Fragment Analysis, Oligonucleotide Synthesis, Functional Genomics and Bioinformatics), Proteomics Services (Protein Science Facility, Immunological Resource Center and Flow Cytometry Facility), a Metabolomics Center and a Transgenic Mouse Facility. It also provides career counseling through the Career Services Office. Many other cross-campus facilities are important for the faculty research programs in Biochemistry, including the Fred Seitz Materials Research Laboratory, the National Center for Supercomputing Applications (NCSA), the high-field VOICE NMR Laboratory, Mass Spectrometry Center, Microanalysis Laboratory, Cell Media Facility, and many electronics, machine and glass shop service facilities.

Financial Aid

Financial aid for Ph.D. graduate students in biochemistry is available in the form of fellowships, teaching and research assistantships, and tuition and partial fee waivers. In addition, interdepartmental training grants from the National Institutes of Health support multidisciplinary training programs. Qualified candidates are considered for financial support upon application.

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For additional details and requirements refer to the department's G (<http://www.mcb.illinois.edu/departments/biochemistry/gradpgmstudy.html>) Graduate Program Handbook (https://mcb.illinois.edu/departments/biochemistry/Biochem_Grad_Handbook_Aug2019.pdf) and the Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Biochemistry, PhD

Code	Title	Hours
Biochemistry/MCB core courses and advanced elective courses		32
BIOC 599	Thesis Research (min/max applied toward degree)	64
Total Hours		96

Other Requirements

Requirement	Description
Other requirements may overlap	
A minimum of one semester at 50% FTE or two semesters of 25% FTE of teaching in lecture or laboratory courses is required.	
A thesis based on original research must be presented to a review committee at least two weeks before the final oral examination.	
Masters Degree Required Before Admission to PhD?	No, but Masters level requirements must be met (32 hours)
Preliminary Exam Required	Yes, administered by the end of the second year.
Final Exam/Dissertation Defense Required	Yes, and the final examination is limited to a defense of the thesis research.
Dissertation Deposit Required	Yes
Minimum GPA:	3.0

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The Biochemistry Department has the following expectations and goals for graduates of its Ph.D. degree program: Many basic outcomes from Standards for the Ph.D. Degree in Biochemistry and Molecular Biology. Recommendations of the Education Committee of the International Union of Biochemistry. TIBS(1989)14:205-209.

At the conclusion of the degree program students will be able to:

1. Develop and demonstrate an in-depth knowledge of a specific area of biochemical research, which may include (but is not limited to) protein, nucleic acid and/or membrane biochemistry, cancer and molecular immunology, computational and quantitative biology, etc.
2. Demonstrate independent and critical skills necessary to formulate specific experiments aimed at understanding molecular processes.
3. Gain the necessary experience and skills to train others in the performance of experiments.
4. Develop communication skills suitable to discuss scientific outcomes at a level for the layperson to understand but critical enough for peers. Typically, such training is developed through writing and editing scientific manuscripts, with input from a faculty advisor.
5. Deliver effective oral and written presentations of the results and conclusions of experimental work.
6. Be able to ask and answer questions within the research areas of Biochemistry.
7. Develop skills and abilities for effective teaching of Biochemistry in a course room setting.
8. Develop the skills and intellectual background to succeed at postdoctoral work in academics or in the commercial sector.
9. Demonstrate ethical conduct within the research process and the responsibilities of the scientist.

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