

# BIOPHYSICS & QUANTITATIVE BIOLOGY, PHD

*for the degree of Doctor of Philosophy in Biophysics and Quantitative Biology*

The Ph.D. degree is a research degree, and the program is designed with a major emphasis on individual research.

Biophysics and Quantitative Biology offers a doctor of philosophy degree program. In rare circumstances and with special permission of the director and advisor, a current student may obtain a terminal master's degree after meeting the requirements of the degree. Biophysics students are not admitted initially into the program for a master's degree. Opportunity also exists for specializing in computational science and engineering within the department's graduate program via the Computational Science and Engineering (CSE) Concentration (<http://www.cse.illinois.edu/education/minor-and-concentration/graduate-concentration/>).

## Admission

The objective of the program in biophysics is to give students sufficient training in physics, chemistry, and biology to enable them to apply the conceptual, instrumental, and mathematical approaches of the physical sciences for solving biological problems. The curriculum is broadly based and provides sufficient flexibility for students entering with either previous training in the physical sciences or for students with a background in biology and some experience in the physical sciences.

Admission requirements are usually one year of college biology, one year of college physics, chemistry through organic chemistry, and mathematics through calculus; however deficiencies in one of these areas can be corrected during the first two years of study. The Biophysics and Quantitative Biology Program does not require the subject GRE for admission. The Test of English as a Foreign Language (TOEFL iBT) or IELTS is required for international applicants.

Please refer to the Biophysics and Quantitative Biology Admissions web page (<http://www.life.illinois.edu/biophysics/program/admissions.html>) for additional information and application deadlines.

## 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. Every biophysics student is required to serve as a teaching assistant for one semester at the quarter time level or higher.

## Faculty Research Interests

Over 40 faculty members from the Schools of Molecular and Cellular Biology, Chemical Sciences, and Medicine, and the Colleges of Engineering and Veterinary Medicine, are affiliated with the Center for Biophysics and Quantitative Biology. Faculty interests range from experimental biophysics (single molecule spectroscopy, protein and RNA folding, molecular dynamics, cellular biophysics, imaging, etc.) to computational and theoretical biophysics (utilizing a wide range of computer platforms to simulate diverse biological phenomena at many

levels as well as bioinformatics). Individual faculty interests can be found on the Biophysics web site (<https://biophysics.illinois.edu/>).

## Facilities and Resources

Center faculty and students have access to world-class research facilities at the University of Illinois Urbana-Champaign, including the Beckman Institute, the Carl R Woese Institute for Genomic Biology, Blue Waters Sustained Petascale Computing, the National Center for Supercomputing Applications, the Biomedical Imaging Center, the Roy J Carver Biotechnology Center, and the School of Chemical Sciences' Mass Spectroscopy Center and Electron Paramagnetic Resonance (EPR) Research Center.

## Financial Aid

All incoming graduate students in biophysics will be supported by the Center for the first semester in the program. Continuing support for subsequent years will be granted as long as students remain in good standing and continue to make satisfactory academic progress, contingent upon the availability of funds. This support can be in the form of research assistantships, teaching assistantships, traineeships, or fellowships. After the first semester of study, most students are supported directly by their research advisor in the form of a research assistantship.

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A qualifying examination is offered each spring. This qualifier must be passed by the end of the second year. By the end of the third year, after formulating a definite research problem, the student takes a preliminary examination where the chosen research topic is presented to the student's faculty committee. The committee also examines the candidate on their chosen general research area. The Ph.D. thesis is based on original work of the student and is defended at a final public examination. The thesis and the exam must demonstrate a thorough knowledge of theory and techniques in one of the areas of biophysics.

For additional details and requirements refer to the department's Student Handbook (<http://biophysics.illinois.edu/program/courses/>) and the Graduate College Handbook (<http://www.grad.illinois.edu/gradhandbook/>).

Code	Title	Hours
BIOP 401	Introduction to Biophysics (or equivalent)	3
BIOP 581	Lab Rotation I	2
BIOP 582	Lab Rotation II	2
BIOP 583	Lab Rotation III	2
BIOP 586 & BIOP 590	Special Topics in Biophysics and Individual Topics	10
BIOP 595	Biophysics Seminars (Sections A & B)	3
BIOP 599	Thesis Research (32 max applied toward degree)	32

Two 500-level courses from the pre-approved Biophysics course list (see Course Lists tab)

One computational or experimental lab course – based on the student's research focus (see Course Lists tab)

MCB 580	Res Ethics & Responsibilities	1
Total Hours		64

**Other Requirements**

Requirement	Description
Other requirements may overlap	
Students are required to teach for a minimum of one semester during their graduate career	
Masters Degree Required in Biophysics and Quantitative Biology for Admission to PhD?	No, but Masters level requirements must be met (32 additional hours min)
Qualifying Exam Required	Yes
Preliminary Exam Required	Yes
Final Exam/Dissertation Defense Required	Yes
Dissertation Deposit Required	Yes
Minimum GPA:	3.0

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**Approved Biophysics Course List and Computational & Experimental Lab Course Lists****Biophysics Course List**

Code	Title	Hours
ANSC 542	Applied Bioinformatics	4
BIOE 505	Computational Bioengineering	4
BIOE 598	Special Topics (section TL)	1 to 4
BIOP 576	Computational Chemical Biology	4
CHBE 594	Special Topics (section HZ2)	1 to 4
CHEM 546	Advanced Statistical Mechanics	4
CHEM 570	Concepts in Chemical Biology	4
CHEM 572	Enzyme Reaction Mechanisms	3 or 4
CPSC 567	Bioinformatics & Systems Biol	4
CS 598	Special Topics (section JP or SS)	2 to 4
ECE 564	Modern Light Microscopy	4
MCB 571	Bioinformatics	4
PHYS 504	Statistical Physics (section A)	4

**Computational Lab Course List**

Code	Title	Hours
BIOC 455	Technqs Biochem & Biotech	4
PHYS 598	Special Topics in Physics (section OM or BP)	1 to 4
CHEM 483	Solid State Structural Anlys	4
PATH 521	Biophysics of Viruses	2

**Experimental Lab Course List**

Code	Title	Hours
ANSC 449	Biological Modeling	3 or 4
BIOP 576	Computational Chemical Biology	4
BIOP 586	Special Topics in Biophysics (section C)	1 to 4
BIOE 505	Computational Bioengineering	4
BIOE 598	Special Topics (section AGB)	1 to 4
CHBE 571	Bioinformatics	4

MCB 432	Computing in Molecular Biology	3
STAT 530	Bioinformatics	4

**Graduate Degree Programs in Department**

- Biophysics and Quantitative Biology, MS (<http://catalog.illinois.edu/graduate/las/biophysics-quantitative-biology-ms/>)
- Biophysics and Quantitative Biology, PhD (p. 1)
  - optional concentration:
    - Computational Science and Engineering (<http://catalog.illinois.edu/graduate/engineering/concentration/computational-science-engineering/>)

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**Center for Biophysics and Quantitative Biology**

Center Director: Satish Nair

Biophysics website (<http://biophysics.illinois.edu/>)

Biophysics Faculty (<https://biophysics.illinois.edu/faculty/>)

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(217) 333-1630

Center for Biophysics and Quantitative Biology email

([biophysics@life.illinois.edu](mailto:biophysics@life.illinois.edu))

**College of Liberal Arts & Sciences**

College of Liberal Arts & Sciences website (<https://las.illinois.edu/>)

**Admissions**

Biophysics and Quantitative Biology Admissions (<http://www.life.illinois.edu/biophysics/program/admissions.html>)

Graduate College Admissions & Requirements (<https://grad.illinois.edu/admissions/apply/>)