BIOPHYSICS (PHD)

Visit program website. (https://biophysics.ucsf.edu/)

Degree Offered: PhD
Program Leadership:
Aashish Manglik, MD, PhD, Program Director
Admission Inquiries:
Nicole Flowers, Program Administrator

Program Information

The Biophysics program spans research at the interface of physics, chemistry, and biology. It is aimed at students who want to explore the physical properties, structures, and interrelationships of living things by using physics and chemistry to quantify biological processes at the molecular, cellular, and systems levels.

Early access to emerging technologies allows students in the UCSF Biophysics graduate program to explore biology in entirely new ways — before these technologies are generally available to other scientists. As important, the Biophysics faculty has achieved high recognition both nationally and internationally for its accomplishments. More than 10 members of the faculty are members of the National Academy of Sciences. UCSF faculty members pioneered applications of electron microscopy, crystallography, NMR, and image reconstruction techniques. The UCSF Biophysics graduate program ranks among the top in the U.S., according to a report by the National Research Council.

Faculty

More than 60 faculty members are associated the Biophysics program from the departments of bioengineering and therapeutic sciences, biochemistry, pharmaceutical chemistry, cell and tissue biology, neurology, and physiology; as well as the Gladstone Institute and the Cardiovascular Research Institute at UCSF.

The Biophysics program is a member of the Quantitative Biosciences Consortium (https://qbc.ucsf.edu/) (QBC) and the Program in Biological Sciences (PIBS) at UCSF.

Sub-disciplines

- Biophysical Approaches to Cell Biology
- Complex Biological Systems
- Computational and Theoretical Biophysics
- Membrane Biophysics
- Protein Engineering and Synthetic Biology
- Proteomics and Genomics
- Structural Biology

Admission Requirements

Bachelor's degree in a related field.

Learning Outcomes

Passing the Qualifying Exam

1. Understands how to pose a scientific question.
2. Is able to develop a systematic approach to its solution.
3. Can interpret the results of that approach concisely and rigorously.
4. Is able to frame that interpretation both within the context of the system in question and of other related biological systems.
5. All proposals must include a section on the incorporation of responsible conduct of research in your project.

Graduation Criteria

Obtaining a PhD from UCSF signifies that a student has demonstrated the ability to perform and complete high-quality research that makes an original contribution to their field. In practice, the expectation is that at least one first-author paper is "in press" before the thesis is signed. Learning to respond to reviewer critiques is a critical part of graduate training. There is, however, no simple bureaucratic formula to determine what is sufficient, and often the body of work forming a thesis is reported in multiple first-author publications; there are way too many scenarios, and so we rely on the judgment of the thesis committees to make the evaluation of a substantial and original contribution to science.

General Principles: The thesis committee has broad authority to determine when a student has completed a sufficient body of scientific work to graduate, literally by "signing off" on the thesis. In rare cases, the Executive Committee and the program director may become involved in the process, e.g., if the student and his/her adviser do not agree on when it is appropriate for the student to graduate. In no case is it acceptable for a student to ask their committee to sign their thesis solely because they have accepted a job or wish to "move on" for one reason or another. The degree will not be granted until the thesis committee is satisfied that the requirements for graduation have been met, e.g., by completing the publication process for a critical portion of the thesis, regardless of whether the student remains "in residence" at UCSF.

Additional Information

Program Faculty

- *Find a* program faculty list *(*https://biophysics.ucsf.edu/people/faculty*) on the program website.*

Career Outcomes

- *Find* career outcomes and other data on PhD programs *(*https://graduate.ucsf.edu/program-statistics#career*) on the Graduate Education and Postdoctoral Affairs website.*

Degree Requirements

- Minimum GPA of 3.0
- All core courses and required activities taken and passed
- Six quarters in residence including a minimum of three registered quarters after advancement to candidacy
- Pass qualifying examination
- Completion and submission of the dissertation
- For additional details, please see: graduate.ucsf.edu/phd-degree (https://graduate.ucsf.edu/phd-degree)

Year 1

- Courses
- Lab rotations
- Choose research adviser

Year 2

- Research
- Form orals committee
- Complete oral qualifying exam (by end of 2nd year)

Year 3

- Research
- Advancement to Candidacy
- Form a thesis committee
- Bi-annual evaluation of progress by thesis committee

Year 4

- Research
- Publish results
- Bi-annual evaluation of progress by thesis committee
- 4th-year research talk

Years 5–6

- Research
- Publish results
- Bi-annual evaluation of progress by thesis committee
- 5th-year research talk
- Complete thesis
- PhD awarded

Core Courses

Code	Title	Units
Core Courses		
BIOPHYSICS 204A	Macromolecular Structure and Interactions	3
BIOPHYSICS 204B	Methods in Macromolecular Structure	4
BIOPHYSICS 205B	Biophysics of Cells, Tissues, & Systems	4
BIOPHYSICS 207	Mini Quals	3
BIOPHYSICS 219	Special Topics in Biophysics [1]	3
BIOPHYSICS 241	Physical Biology	5
Additional Non-Core Requirements		
BIOPHYSICS 215	Laboratory Rotation	3
BIOPHYSICS 220	Biophysics Seminar	1
BIOPHYSICS 223	Scientific Communication Seminar	1
BIOPHYSICS 224	Critical Topics in Biophysics	1
BIOPHYSICS 250	Research	8
BIOPHYSICS 297	Scientific writing: applying for the NSF predoctoral fellows	1
BIOSTAT 273	Introduction to Biostatistics	0.5
GRAD 202	Racism in Science	3
GRAD 214	Responsible Conduct of Research and Rigor & Reproducibility [2]	0-1.5
Total Units		**40.5-42**

[1] In the spring quarter, students are required to take any three of the mini courses from the following list: BIOCHEM 210 Special Topics, BIOPHYSICS 219 Special Topics in Biophysics, BIOMED SCI 270 Special Topics in Biomedical Sciences, BIO MD INF 219 Special Topics in Bioinformatics, CHEMISTRY 219 Special Topics in Basic and Translational Chemical Biology, GRAD 219A Special topics in racism and social justice in science, GRAD 219B Special topics in racism and social justice in science, GRAD 219C Special topics in racism and social justice in science, NEUROSCI 219 Special Topics in Basic and Translational Neuroscience, PHARMGENOM 219 Special Topics in Pharm Sci and Pharmacogenomics

[2] GRAD 214 is taken across three quarters during the first year.
- Fall and Winter enrollment should equal 0 units
- Spring enrollment should equal 1.5 units

Approved Electives

Code	Title	Units
BIO MD INF 203	Biocomputing Algorithms	4
BIO MD INF 206	Statistical Methods for Bioinformatics	4

Non-course Requirements

- Attendance at annual QBC (Quantitative Biosciences Consortium) Retreat
- Attendance at the annual Biophysics Graduate Program Retreat
- Introductory Onboarding Intensive before start of first year
- Faculty Student Talks in first year
- State of the Field lectures in first year
- Pass qualifying exam
- Advance to candidacy