

# BIOPHYSICS, M.S.

**Students are not admitted into the Biophysics Program for a terminal master's degree.** However, a master's degree is officially offered. For more information, see the Biophysics Handbook (<http://www.biophysics.wisc.edu/handbook/>).

The doctor of philosophy degree with a major in biophysics is an interdepartmental offering under the supervision of the biophysics program committee. The biophysics degree is intended for those who wish to emphasize physical principles and methods in solving biological problems. By necessity, the interdisciplinary nature of biophysics generates interaction among, and expands the boundaries of, traditional areas of science. Persons with strong training in biophysics can be expected to be major innovators and contributors in research and applied technology. Biophysics graduates pursue careers in academic, industrial, and government research, and in teaching and administration.

The biophysics program consists of 44 faculty members from 14 departments that span four colleges within the university. State-of-the-art facilities are available within the biophysics program for research in x-ray crystallography, nuclear magnetic-resonance spectroscopy, electron resonance spectroscopy, fluorescence spectroscopy, microscopy and imaging, and computational chemistry. Graduate students in biophysics can choose from an expansive range of research topics including, but not limited to, biomolecular structure and function interactions, protein engineering and biotechnology, virus structure and function, enzyme catalysis and kinetics, membranes, neurochemistry, and electrophysiology.

The program is flexible in its formal course requirements and emphasizes excellence in research. The candidate is encouraged to begin research as quickly as possible, since it is research experience that brings focus and meaning to classroom studies, and research progress that empowers critical judgment and self-confidence for independent work. To enhance self-confidence, students are expected to participate in weekly seminars and to present a seminar.

Financial assistance is available to support qualified graduate students throughout their graduate studies. Types of graduate appointments that may be awarded include research assistantships, fellowships, and traineeships. The stipends awarded provide financial support to students during their graduate work, permitting them to devote their efforts to coursework and research. In recognition of the leadership provided by scientists and researchers at University of Wisconsin-Madison, the National Institutes of Health (NIH) have funded a predoctoral training grant in molecular biophysics for the past consecutive 20 years.

## ADMISSIONS

This master's program is offered for work leading to the Ph.D. Students may not apply directly for the master's, and should instead see the admissions information for the Ph.D (<http://guide.wisc.edu/graduate/graduate-school-wide/biophysics-phd/>).

## FUNDING

## GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information

(<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirements>), in addition to the program requirements listed below.

### MAJOR REQUIREMENTS MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW-Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

Requirement Detail	
Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy ( <a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a> ).
Overall Graduate GPA Requirement	3.00 GPA required. This program follows the Graduate School's GPA Requirement policy ( <a href="https://policy.wisc.edu/library/UW-1203">https://policy.wisc.edu/library/UW-1203</a> ).

**Other Grade Requirements** Credits are not counted from courses in which a grade of BC or below is obtained for the Biophysics core courses. In the event of an unsatisfactory grade, the student must repeat the course and obtain a grade of B or better if they want to count the class towards their Biophysics GPA and course requirements.

**Assessments and Examinations** Students take two rounds of exams in order to achieve dissertator status. At the end of students' second year, they are required to take their written preliminary exam. Once this exam is passed, students must take their preliminary exam by the end of their third year.

**Language Requirements** No language requirements.

## REQUIRED COURSES

The following coursework is completed on the way to earning the Biophysics Ph.D. and is the minimum required for the master's:

Code	Title	Credits
<b>Required by the time oral prelim is taken:</b>		
BIOCHEM/ CHEM 665	Biophysical Chemistry	4
CHEM 668	Biophysical Spectroscopy <sup>1</sup>	3
<b>Biophysics Additional Courses<sup>2</sup></b>		<b>6</b>

**Students must take at least 2 additional classes from different categories from the following list of classes (alternative classes may be substituted with approval from the Biophysics Program Steering Committee):**

<i>Structure</i>		
BIOCHEM 601	Protein and Enzyme Structure and Function	
BIOCHEM 625	Mechanisms of Action of Vitamins and Minerals	
CHEM 622	Organic Analysis	
CHEM 675	Introductory Quantum Chemistry	
ONCOLOGY 673	Purification and Characterization of Protein and Protein Complexes	
<i>Modeling</i>		
CHEM 661	Chemical and Statistical Thermodynamics	
MATH/B M I/ BIOCHEM/ BMOLCHEM 609	Mathematical Methods for Systems Biology	
<i>Molecular Biology</i>		
BIOCHEM/ GENETICS/ MICROBIO 612	Prokaryotic Molecular Biology	
BIOCHEM/ GENETICS/ MD GENET 620	Eukaryotic Molecular Biology	
<i>Neuroscience</i>		
NTP/ NEURODPT 610	Cellular and Molecular Neuroscience	
<i>Spectroscopy/Microscopy</i>		

B M E/  
MED PHYS/  
PHMCOL-  
M/PHYSICS/  
RADIOL 619

B M E 751	Biomedical Optics and Biophotonics
CHEM 860	Selected Topics in Physical Chemistry (Topic: Spectroscopy of Individual Molecules and Particles)
BIOCHEM 729	Advanced Topics (Topic: Advanced Topics in NMR)

### *Computational Courses*

ONCOLOGY 778	Bioinformatics for Biologists
B M I/ COMP SCI 776	Advanced Bioinformatics

### Specialty Courses

To fulfill the remainder of required credits, students can take specialty courses. It is recommended to take courses in areas such as biotechnology, computer science, electrical and computer engineering, molecular biology, or physics. Students should consult with their Thesis Advisor and thesis committee members about appropriate specialty courses to take pertaining to individual training goals.

**Total Credits** **30**

#### 1

Because CHEM 668 Biophysical Spectroscopy is only offered every other year, students will be advised upon joining the program in which semester they must complete the course. This course must be taken for 3 credits.

#### 2

To meet the 6 credit minimum, all elective courses must be at least 2 credits. That means that students can, for example, take two 3-credit courses, three 2-credit courses, or one 2-credit and one 4-credit course to satisfy this requirement. The above list of courses have all been approved as elective courses by the Biophysics Steering Committee. If you are interested in a different course, in order for it to count as an elective course towards your Biophysics graduate degree, the course needs to be approved by the Steering Committee. Please email the coordinator at [biophysics@bocklabs.wisc.edu](mailto:biophysics@bocklabs.wisc.edu) a syllabus from the course and a short paragraph detailing why the class is relevant to your research.

## POLICIES

### GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

### MAJOR-SPECIFIC POLICIES PRIOR COURSEWORK

#### Graduate Work from Other Institutions

With program approval, students are allowed to count no more than 9 credits of graduate coursework from other institutions. Coursework earned

more than two years prior to admission to the doctoral degree is not allowed to satisfy requirements. No admissions are made into the master's program.

### **UW–Madison Undergraduate**

No credits from a UW–Madison undergraduate degree are allowed to count toward the degree.

### **UW–Madison University Special**

With program approval, students are allowed to count no more than 9 credits of coursework numbered 300 or above taken as a UW–Madison Special student. Coursework earned more than two years prior to admission to the doctoral degree is not allowed to satisfy requirements. No admissions are made into the master's program.

### **PROBATION**

This program follows the Graduate School's Probation policy. (<https://policy.wisc.edu/library/UW-1217/>)

### **ADVISOR / COMMITTEE**

All students are required to have an advisor by the end of their first semester in the program. Thesis committees must be formed prior to their preliminary exam. The committee consists of at least four other faculty members and the student's advisor. After gaining dissertator status, students are required to hold yearly progress report meetings with their committee until graduation.

### **CREDITS PER TERM ALLOWED**

15 credits

### **TIME LIMITS**

This program follows the Graduate School's Time Limits policy. (<https://policy.wisc.edu/library/UW-1221/>)

### **GRIEVANCES AND APPEALS**

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
  - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Dean of Students Office (<https://doso.students.wisc.edu/>) (for all students to seek grievance assistance and support)
- Employee Assistance (<http://www.eao.wisc.edu/>) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (<https://employeeabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<https://grad.wisc.edu/>) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (<https://compliance.wisc.edu/>) (for class harassment and discrimination, including sexual harassment and sexual violence)

- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<http://www.ombuds.wisc.edu/>) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (<https://compliance.wisc.edu/titleix/>) (for concerns about discrimination)

Students should contact the department chair or program director with questions about grievances.

### **OTHER**

Fall semester enrollment only. First semester, program-sponsored lab rotations lead to thesis lab selection and research assistantship through the thesis advisor.

## PROFESSIONAL DEVELOPMENT

### **GRADUATE SCHOOL RESOURCES**

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

## LEARNING OUTCOMES

1. Articulates, critiques, or elaborates the theories, research methods, and approaches to inquiry or schools of practice in the field of study.
2. Identifies sources and assembles evidence pertaining to questions or challenges in the field of study.
3. Understands the primary field of study in a historical, social or global context.
4. Selects and/or utilizes the most appropriate methodologies and practices.
5. Evaluates or synthesizes information pertaining to questions or challenges in the field of study.
6. Communicates clearly in ways appropriate to the field of study.
7. Recognizes and applies principles of ethical conduct.

## PEOPLE

### **Faculty Trainers:**

Alessandro Senes – Program Director (Biochemistry) Website (<https://biochem.wisc.edu/faculty/senes/>)

Silvia Cavagnero – Program Assistant Director (Chemistry) Website (<http://cavagnero.chem.wisc.edu/>)

Paul Ahlquist (Oncology) Website (<https://mcardle.wisc.edu/faculty/>)

Tom Brunold (Chemistry) Website (<http://brunold.chem.wisc.edu/>)

Andrew Buller (Chemistry) Website (<https://www.chem.wisc.edu/users/abuller/>)

Mark Burkard (Medicine) Website ([https://www.medicine.wisc.edu/people-search/people/staff/703/Burkard\\_Mark/](https://www.medicine.wisc.edu/people-search/people/staff/703/Burkard_Mark/))

Briana Burton (Bacteriology) Website (<https://burtonlab.bact.wisc.edu/>)

Sam Butcher (Biochemistry) Website (<https://biochem.wisc.edu/faculty/butcher/>)

Ed Chapman (Neuroscience) Website (<https://chapman.neuro.wisc.edu/>)

Josh Coon (Chemistry) Website (<https://www.chem.wisc.edu/users/jcoon/>)

Scott Coyle (Biochemistry) Website (<https://biophysics.wisc.edu/staff/coyle-scott/>)

Cindy Czajkowski (Neuroscience) Website (<https://neuro.wisc.edu/staff/czajkowski-cynthia/>)

Katrina Forest (Bacteriology) Website ([https://bact.wisc.edu/people\\_profile.php?t=rf&p=kforres1](https://bact.wisc.edu/people_profile.php?t=rf&p=kforres1))

Sam Gellman (Chemistry) Website (<http://gellman.chem.wisc.edu/>)

Pupa Gilbert (Physics) Website (<https://home.physics.wisc.edu/gilbert/>)

Randy Goldsmith (Chemistry) Website (<https://goldsmith.chem.wisc.edu/>)

Tim Grant (Biochemistry) Website (<https://biophysics.wisc.edu/staff/grant-timothy/>)

Aviad Hai (Biomedical Engineering) Website (<https://biophysics.wisc.edu/staff/hai-aviad/>)

Jeff Hardin (Zoology) Website (<http://worms.zoology.wisc.edu/>)

Katie Henzler-Wildman (Biochemistry) Website (<https://biochem.wisc.edu/faculty/henzler-wildman/>)

Aaron Hoskins (Biochemistry) Website (<https://biochem.wisc.edu/faculty/hoskins/default.aspx>)

Xuhui Huang (Chemistry) Website (<https://biophysics.wisc.edu/staff/huang-xuhui/>)

Meyer Jackson (Neuroscience Department) Website (<https://neuro.wisc.edu/staff/jackson-meyer/>)

Jim Keck (Biomolecular Chemistry) Website (<https://bmolchem.wisc.edu/staff/keck-james/>)

Robert Kirchdoerfer (Biochemistry) Website (<https://biophysics.wisc.edu/staff/kirchdoerfer-robert/>)

Bob Landick (Biochemistry) Website (<https://landick.wisc.edu/>)

Ci Ji Lim (Biochemistry) Website (<https://biophysics.wisc.edu/staff/lim-ci-ji/>)

Megan McClean (Biomedical Engineering) Website (<http://mccleanlab.bme.wisc.edu/>)

Matthew Merrins (Biomolecular Chemistry) Website (<https://bmolchem.wisc.edu/staff/merrins-matthew/>)

Jacob Notbohm (Engineering Physics) Website (<http://notbohm.ep.wisc.edu/>)

Vatsan Raman (Biochemistry) Website (<https://biochem.wisc.edu/faculty/raman/>)

Ivan Rayment (Biochemistry) Website (<https://biochem.wisc.edu/faculty/rayment/default.aspx>)

Chad Rienstra (Biochemistry) Website (<https://biophysics.wisc.edu/staff/rienstra-chad-m/>)

Gail Robertson (Neuroscience) Website (<https://neuro.wisc.edu/staff/robertson-gail/>)

Phil Romero (Biochemistry) Website (<https://biochem.wisc.edu/faculty/romero/>)

Kris Saha (Biomedical Engineering) Website (<http://sahalab.bme.wisc.edu/>)

David Schwartz (Chemistry) Website (<https://www.chem.wisc.edu/users/schwartz/>)

Nate Sherer (Oncology) Website (<https://mcardle.wisc.edu/faculty/>)

Raunak Sinha (Neuroscience) Website (<https://neuro.wisc.edu/staff/sinha-raunak/>)

Melissa Skala (Biomedical Engineering) Website (<https://morgridge.org/research/medical-engineering/multiscale-imaging/>)

Lloyd Smith (Chemistry) Website (<https://www.chem.wisc.edu/users/smith/>)

Aussie Suzuki (Oncology) Website (<https://mcardle.wisc.edu/faculty/>)

Reid Van Lehn (Chemical and Biological Engineering) Website (<http://vanlehngroup.che.wisc.edu/>)

Ophelia Venturelli (Biochemistry) Website (<https://biochem.wisc.edu/faculty/venturelli/>)

Amy Weeks (Biochemistry) Website (<https://biophysics.wisc.edu/staff/weeks-amy/>)

Liz Wright (Biochemistry) Website (<https://biophysics.wisc.edu/staff/wright-elizabeth/>)

Yongna Xing (Oncology): Website (<https://mcardle.wisc.edu/faculty/>)

John Yin (Chemical and Biological Engineering) Website (<https://yin.discovery.wisc.edu/>)

Martin Zanni (Chemistry) Website (<https://zanni.chem.wisc.edu/>)

Please consult our faculty trainer site (<https://biophysics.wisc.edu/labs/>) as new faculty are added to the program each year.