

BIOPHYSICS, MS

Students are not admitted into the Biophysics Graduate 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/>).

Biophysics is an inter-disciplinary PhD program in the biosciences. It brings together students from diverse backgrounds (from biology to biochemistry, chemistry, physics, bioengineering, computational biology, neuroscience, cell biology, and so on) who are interested in research at the cross-section between these disciplines.

Our broad inter-departmental program consists of approximately 60 faculty trainers (<https://biophysics.wisc.edu/labs/>) from departments that belong to five different colleges (Letter & Science, Agriculture & Life Sciences, Engineering, and the Schools of Medicine and Pharmacology). This highly collaborative environment offers a spectrum of opportunities that include, for example, protein structure/function and engineering, nucleic acid and membrane biophysics, neuroscience, virology, as well as synthetic and system biology applied to both bacterial and eukaryotic organisms. These areas of research share the common goal of understanding biological systems in physical and mechanistic terms, the use of cutting-edge quantitative instrumental methods, and, frequently, the integration of computation and machine learning. Please find an overview of our research areas (<https://biophysics.wisc.edu/research/>) on our website.

UW-Madison is a center of excellence in structural biology, with major instrumentation facilities such as the National Magnetic Resonance Facility, the CryoEM Research Center, and the Midwest Center for Cryo-Electron Tomography. Trainers who participate in these centers offer outstanding research opportunities to students who want to become experts in the application and/or development of structural biology.

In addition, many other accessible facilities and instrumentation in our trainers' laboratories provide advanced training in spectroscopy, microscopy and single-molecule imaging, high-throughput methods, and the integration of experimental and computational methods applied to the analysis and modeling of macromolecules and biological systems.

Biophysics is an inclusive and collaborative community whose goal is to prepare students of diverse backgrounds with rigorous interdisciplinary and quantitative training for a future in research and teaching in academia, industry, and alternative careers. The program is flexible in its formal course requirements, emphasizing excellence in research. For this reason, the coursework can be tailored to the specific research interests and the diverse backgrounds of each student.

For more information, please visit the Biophysics Graduate Program website (<https://biophysics.wisc.edu/>).

ADMISSIONS

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

FUNDING

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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	30 credits
Credit Requirement	

Minimum	16 credits
Residence	
Credit Requirement	

Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
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 PhD and is the minimum required for the master's:

Code	Title	Credits
Required Courses:		
CHEM 665	Biophysical Chemistry	3
CHEM 668	Biophysical Spectroscopy	3
Biophysics Advanced Electives¹		6

Students must take at least 6 credits of advanced electives from at least two different categories using the following list of classes (alternative classes may be substituted with approval from the Biophysics Program Curriculum Committee):

Structure

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
MICROBIO/ BMOLCHEM 668	Microbiology at Atomic Resolution
ONCOLOGY 673	Purification and Characterization of Protein and Protein Complexes

Modeling Theory

CHEM 661	Chemical and Statistical Thermodynamics
MATH/B M I/ BIOCHEM/ BMOLCHEM 609	Mathematical Methods for Systems Biology

Molecular Biology

BIOCHEM/ GENETICS/ MICROBIO 612	Prokaryotic Molecular Biology
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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	Microscopy of Life
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)
<i>Bioinformatics and Computational Biology</i>	
BIOCHEM 570	
B M I/ COMP SCI 776	Advanced Bioinformatics
ONCOLOGY 778	Bioinformatics for Biologists

Speciality 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 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 were approved as elective course options by the Biophysics Steering Committee. If you are interested in a different course to count as an elective course towards your Biophysics graduate degree, the course needs to be approved by the Curriculum Committee. To request a course approval, please use this form (<https://biophysics.wisc.edu/advanced-elective-approval-form/>) (you will need 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 Credits Earned at Other Institutions

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Undergraduate Credits Earned at Other Institutions or UW-Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Credits Earned as a University Special Student at UW-Madison

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

PROBATION

Refer to the Graduate School: Probation (<https://policy.wisc.edu/library/UW-1217/>) policy.

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

Refer to the Graduate School: Time Limits (<https://policy.wisc.edu/library/UW-1221/>) policy.

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/>)
- 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://employeedisabilities.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 Student Assistance and Support (OSAS) (<https://osas.wisc.edu/>) (for all students to seek grievance assistance and support)
- 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

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

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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

PEOPLE

PROGRAM LEADERSHIP

Director

- Dr. Alessandro Senes, Professor, Department of Biochemistry

Associate Director

- Dr. Silvia Cavagnero, Professor, Department of Chemistry

FACULTY TRAINERS

Our broad inter-departmental program consists of approximately 60 faculty trainers (<https://biophysics.wisc.edu/research/>) from departments that belong to five different colleges (Letter & Science, Agriculture & Life Sciences, Engineering, and the Schools of Medicine and Pharmacology). This highly collaborative environment offers a spectrum of opportunities that include, for example, protein structure/function and engineering, nucleic acid and membrane biophysics, neuroscience, virology, as well as synthetic and system biology applied to both bacterial and eukaryotic organisms. These areas of research share the common goal of understanding biological systems in physical and mechanistic terms, the use of cutting-edge quantitative instrumental methods, and, frequently, the integration of computation and machine learning. Please find an overview of our research areas (<https://biophysics.wisc.edu/labs/>) on the program's website.

STAFF

Graduate Program Manager

- Michael Sullivan