THE OHIO STATE UNIVERSITY

The Ohio State University Biophysics Graduate Program

Graduate Student Handbook

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Regarding this Handbook

This handbook is intended as a guide to students and mentors in the Biophysics Graduate Program at The Ohio State University, an interdepartmental program overseen by The Graduate School. The Program handbook is a supplement to the Graduate School Handbook (GSH), providing program-specific guidance; in the case of conflicting rules, the GSH takes precedence. This handbook is also neither perfect nor complete and is subject to revision. If in doubt, students should direct questions to Program administration at biophysics@osu.edu.

Program Mission Statement

- *To provide a rigorous educational structure and curriculum for graduate students to develop successful and nationally competitive careers in biophysics.*
- *To provide an effective University-wide environment that stimulates and promotes interdisciplinary and collaborative research at the interface of physics and biology.*
- *To provide an interdisciplinary environment for the development and implementation of innovative and highly quantitative, computational, and experimental approaches to important problems at the cutting edge of biomedical research and biotechnology.*

Introduction to the Program

Biophysics as a Discipline

Biophysics is a highly integrated discipline that encompasses nearly all aspects of biomedical science, from the interaction of various forms of energy with biologically relevant molecules to the mechanical forces involved with limb movement in an intact organism. What distinguishes biophysics from other disciplines of biomedical science is its approach to problems. Simply, the biophysicist examines biological systems through the eyes and tools of a physicist. The biophysicist is trained to understand the underlying interactions of energy and matter in living organisms or molecules and to use highly quantitative physical, statistical, and modeling methodologies to understand complex phenomena. The goal of the Program is to provide an educational structure for graduate students at The Ohio State University to develop as scientists at this interface of physics and biology.

Program Structure

A PhD in Biophysics is awarded for accomplishments in research. These accomplishments are evidenced by peer-reviewed publication of original research results, and through composition and defense of a Dissertation. The program is structured to prepare students for research in biophysics, to assist them in identifying a research mentor, and to evaluate their progress through the program. In their first year, students will take foundational and preparatory courses while “rotating” through several research groups. During these brief (~7-week) rotations, students will explore each laboratory’s research questions, techniques, methods and styles. At the completion of first-year coursework and rotations, students will join a research group, design the rest of their curriculum accordingly, and begin their graduate research. A “Candidacy Exam” at their end of their second year will assess their preparation and ability to complete a research

program. Upon completion of other program requirements, each candidate will defend their PhD dissertation via both public and closed-door examinations.

Program Tracks

To better organize the curriculum and to provide appropriate mentorship, the program is organized into four training “tracks”. Because the field of Biophysics is diverse, the research areas of individual students may not fit neatly into one of these overlapping tracks.

Biological Imaging and Spectroscopy (BIS)

Imaging and detection of chemical and biological processes and structures. Techniques include magnetic resonance (MRI, NMR, EPR, etc.), light/laser spectroscopy, multiphoton and confocal imaging, electron microscopy, optics, fluorescent detection, atomic force microscopy, and positron emission tomography (PET).

Cellular and Integrative Biophysics (CIB)

Physics of living systems at multiple scales, including membrane electrochemical behavior, patch clamping, channel biology, intracellular calcium ion regulation, molecular motors, cytoskeleton, muscle contractile function, nerve function, neural integration, bioenergetics and mitochondrial function, free radical biology, and biomechanics.

Computational Biology and Bioinformatics (CBB)

Computer modeling of molecular properties and behavior. Development and use of computer models, simulations, neural networks, and statistical approaches to interpret large data sets arising from complex biological systems.

Structural Biology and Molecular Biophysics (SBMB)

Structure and function of biological molecules, including proteins, nucleic acids, ligands, lipids, and their interactions. Methods include cryo-electron microscopy, X-ray crystallography, nuclear magnetic resonance, computational modeling, calorimetry, and optical spectroscopy.

Divisional Directors and The Graduate Studies Committee (GSC)

As described in the Graduate School Handbook, the Program is overseen and administered by a committee of mentor faculty in the Program, referred to as the Graduate Studies Committee (GSC). GSC members are selected from the mentor faculty by the director(s) of the program with the goal of providing diverse disciplinary and administrative representation in decision making and guiding students in the program. A member of the GSC serves as Director of each of the four Program Tracks and is an important point of contact for track-specific guidance.

Information for Prospective and New Students

General Admission Requirements

The Program admits students with a wide range of science and mathematics backgrounds. In general, applicants are encouraged to prepare themselves for a career in biophysics with the following background during their undergraduate training:

1. Physics: through particles and waves, quantum mechanics, and thermodynamics.
2. Mathematics: differential and integral calculus. Linear algebra is highly recommended.
3. Chemistry: inorganic, organic, and physical chemistry.
4. Biology: at least one of general biology, microbiology, botany, animal physiology, or plant physiology.

Students with deficits in one or more of these areas may be able to fill those gaps during their first year of graduate school. However, such gaps, and the student's prospect for success, are part of the admissions evaluation. Applications are considered once per academic year, and new students matriculate to begin their studies during autumn semester.

Curriculum and timeline

Incoming students begin their coursework and rotations in autumn semester; under special circumstances, interested students may have the option to begin rotations early during summer semester. By spring semester of the first year, students should match with a faculty **advisor** and begin the process of selecting an **Advisory Committee**. This committee of faculty members will provide additional research expertise, conduct the **Candidacy Examination**, monitor yearly progress through the program, and participate in the final **Dissertation Defense**. By spring semester of their second year, students should have completed their coursework and begun preparing for their candidacy examination. By the end of autumn of their third year, students who pass their candidacy examination (*i.e.*, doctoral candidates) will engage primarily in dissertation research. The program concludes when students produce a corpus of original peer-reviewed research and defend it before their advisory committee. Details are provided below.

Biophysics PhD Requirements Timeline

80 graduate hours (Graduate School Requirement)

Requirement (Due date)

- Complete Curriculum Planning Worksheet (**AU1, SP1, AU2**)
- Required Graded Courses, 9 hours
  - BIOPHYS 6702, Advanced Experimental Methods in Biophysics, 2.0 cr (**AU1**)
  - PHYSICS 6809, Topics in Biophysics, 4.0 cr (**AU1**)
  - BIOCHEM 6765.02, Physical Biochemistry, 3.0 cr (**SP1**)
- Graded Electives, at least 13 hours
  - Choose from approved electives – website link (**AU1-SP2**)
  - Meet data analysis/statistics requirement (**AU1-SP2**)
- Complete three half-semester laboratory rotations and join a lab (**SP1**)
  - By the 7th week of SP1, finalize mentor selection, or arrange for 4th rotation
- Define Advisory Committee (**SP1/SU1**)
- Completion and Approval of PhD Contract (**AU2**)
- Candidacy Exam (22 cr Graded courses before candidacy)
  - Specific aims approval and Form Submission (**SU2**)
  - Approval of full written proposal (**AU3**)
  - Oral defense of proposal (**AU3**)
- Seminar and research credit requirements
  - BIOPHYS 7990, MLS Seminar, 1 cr, Register AU/SP semesters pre-candidacy (post-candidacy students don't enroll but have reduced attendance requirements)
  - BIOPHYS 7891, Biophysics Seminar, 1 cr, Register AU/SP semesters pre-candidacy (post-candidacy students don't enroll but must meet standard attendance requirements)
  - BIOPHYS 8999, PhD Research, variable cr, balance of 18 cr pre-candidacy, 3 cr summers and post candidacy (Every semester; departmental equivalent after joining a lab.)
- Other requirements
  - BIOPHYS 6000, Scientific writing, 1 cr (**SU2**)
  - Yearly Progress Reports (starting AU4)
  - Plenary research presentation (Prior to applying to graduate)
  - First-author research publication (Prior to graduation deadline)
- Final Defense,
  - Approval of dissertation outline (~1 year before defense)
  - Approval of dissertation draft (≥ 2 weeks before defense)
  - Seminar and dissertation defense (Semester deadline)
  - Approval of final document (Semester deadline)

Biophysics Curriculum and Electives

Biophysics is the field that applies the theories and methods of physics to understand how biological systems work." https://www.biophysics.org/what-is-biophysics. Biophysicists are trained in the quantitative sciences of physics, math, and chemistry. They apply these sciences to a wide array of biological phenomena. **Required** courses are intended to provide a broad overview of the field, as well as some foundational knowledge. **Electives** are chosen to fill gaps in foundational knowledge, and to prepare students for success in their chosen area of specialization. Course offerings are updated regularly, and many are not offered every semester. Available course offerings can be verified via classes.osu.edu.

Curriculum Planning Worksheet

To assist with curriculum planning, and to ensure that requirements are met in a timely manner, students shall prepare and revise curriculum planning worksheets prior to enrolling in courses each of the first three semesters at OSU. Worksheets are to be prepared in consultation with program directors or Track representative of the GSC, and their research mentor once selected.

Required courses

Physics 6809, Topics in Biophysics, **4 cr**. Introduction to biological physics. Cellular structure, physical scales, introduction to thermodynamics and statistical mechanics, two-state binding, random walks, electrostatics, mechanics of biological rods, membranes, diffusion, dynamics and molecular motors.

Biophysics 6702, Advanced Experimental Methods in Biophysics, **2 cr**. Nucleic acid and protein synthesis, membrane potentials in cells, calcium flux in heart tissues, stochastic methods and data modeling, x-ray crystallography and cryo-EM, structural biology, confocal microscopy, single molecule instrumentation, Electrophysiology Recording Techniques, Neural Coding and Sensory Processing, Muscle biophysics, Calcium Binding proteins, optical trapping, nuclear imaging

Biochemistry 6765.02, Physical Biochemistry, **3 cr**. Methods and concepts in molecular biophysics. Experiment design, measurement and error, equilibria, calorimetry, UV/Vis spectroscopy, fluorescence, single-molecule methods, mass spectrometry, NMR, x-ray crystallography, cryo-EM, molecular modeling, computational data analysis.

Biophysics 7990, Molecular Life Sciences Seminar (S/U), 1cr. This seminar series features plenary lectures from invited faculty speakers, and is co-organized with the Biochemistry and Molecular, Cellular and Developmental Biology Programs, OSBP and MCDB. Pre-candidacy students must meet course requirements for attendance. Post-candidacy students have a reduced attendance requirement (minimum of 5-6 seminars per semester).

Biophysics 7891, Biophysics Seminar (S/U), **1 cr**. This features plenary lectures from invited faculty speakers, presentations from Program students, and topical small group discussions.

Biophysics 7600, First-Year Orientation (S/U), 1 cr. Orientation for first-year students; lectures on topics important for successful graduate experience; training in presenting scientific work; training in research ethics.

Biophysics 6000, Scientific Writing (S/U), 1 cr. Students are trained in key elements of proposal writing for NIH and NSF grants. Additional time is devoted to developing manuscripts, and poster and oral presentations.

Special Requirements

English Courses for Non-Domestic Students

All students from non-English speaking countries and for whom English is a second language must fulfill the University requirements in English; criteria for assessment and exemptions are available at https://ielp.ehe.osu.edu/aewp/graduate-assessment/. Arriving students may be evaluated by the Spoken English Program via the Oral Proficiency Assessment (OPA). Depending on their performance, students may be directed to enroll in **EDUTL 5040** and/or **5050**; these courses do not count towards unit requirements for graduation

EDUTL 5050 instructs students on how to teach at an American university. At the beginning of the course, students are given a "Mock Teaching Trial." Individuals who do extremely well in the trial can sometimes pass out of Spoken English 5050. At the end of the course, the students are also given a Mock Teaching Trial, usually scheduled around finals week. Students have the choice of practice teaching biology, chemistry, or physics and a representative of the Biophysics Program or one of the teaching departments will be in attendance.

Students who will serve as teaching assistants (TAs) may be asked to take the Oral Proficiency Assessment (OPA). Spoken English tests are performed by the Spoken English Program (Oral Proficiency Assessment Guidelines). Before going, ask the Biophysics program to prepare an e-request for payment so that the Biophysics Program can pay for the exam. Students who pass this exam are qualified by the university to teach.

Electives

In addition to the nine (9) credits of graded Required courses, students should complete a minimum of **13** credits of approved, graded elective courses, for a minimum of 22 credits courses prior to advancing to candidacy; S/U credits do not count towards this requirement. Elective courses are selected based on the student's interests, chosen area of research, and prior coursework. Students may also enroll in additional courses (selected from within/outside the electives list) to add breadth and depth. Electives are selected in consultation with the student's research mentor, program director(s) and/or members of the GSC.

Data Analysis/Statistics requirement

Students must take at least one course that meets program requirements in quantitative data analysis and statistics; this requirement counts towards the 22-credit minimum. Multiple options are available from the list of electives.

Individual Training Tracks: Coursework Options

Each student's curriculum plan is tailored according to their goals and background. At the start of their first semester each student will complete a "**Curriculum Planning Worksheet**" in consultation with a member of the GSC. In the second year, a "**Ph.D. Contract**" will build on the planning worksheet by including the content of the Candidacy Examination and any additional coursework needed for career development, in consultation with their research mentor.

A coursework planning worksheet for incoming students is available on the Program website. It

includes only general **requirements** of all students in the program (*i.e.*, it does not include specialized training associated each of the four tracks). Requirements may be met through (1) previous undergraduate or graduate education, (2) new coursework at OSU, and (3) evidence of self-study of equivalent material and/or proof by oral or written examinations provided by the graduate faculty.

Track-specific guidance in coursework selection is provided below. As shown in the following examples, most students exceed the 22-credit minimum during their course of study. **Individual plans should be reviewed and discussed with the student's advisor.**

Biological Imaging and Spectroscopy Track (BIS)

Students specializing in the Biological Imaging and Spectroscopy Track will be engaged in research utilizing high-end imaging and microscopy technology for medical diagnostic or basic research applications (e.g., MRI, EPR, PET, CT, Ultrasound, light microscopy (multiphoton, confocal, super-resolution imaging, etc.), electron and scanning probe microscopies and/or research using spectroscopic techniques for assessment of chemical and biological processes and molecular structures (e.g., NMR, EPR, light/laser spectroscopy, cryo-electron microscopy, Raman, and X-ray spectroscopy, optics, fluorescent detection etc.). Students specializing in this track must acquire a solid background and advanced knowledge in the physics and engineering of the specific imaging/spectroscopy modality they are working in, as well as good background in the structural and functional (physiologic) mechanisms to the studied.

Sample 2-Year Curriculum, Biological Imaging and Spectroscopy Track

This example curriculum below may be appropriate for a student with a strong undergraduate curriculum in physics, biophysics and mathematics who wishes to work in areas related to cardiac muscle imaging. (* indicates a required course. S/U indicate Satisfactory/Unsatisfactory grading scheme instead of A-E grading.)

First Autumn Semester (18 credits)

***PHYSICS 6809, Intro to Biophysics, 4 cr**
***BIOPHYS 6702, Topics in Biophysics, 2 cr**
*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7600, FY Orientation (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*BIOPHYS 8998, Research (S/U), 6 cr
PHYSIO 6101, Advanced Human Physiology I, 3 cr

First Spring Semester (18 credits)

*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*BIOPHYS 8998, Research Rotation (S/U), 10 cr
MECHENG 6711, Microscopy in Biomechanics, 3 cr or CHEM 7160 NMR Spectroscopy, 3 cr
PHYSIO 6102, Advanced Human Physiology 2, 3 cr

First Summer Semester (3 credits)

*Dept 8998, Research, 3 cr

Second Autumn Semester (18 credits)

*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research Rotation (S/U), 9 cr
BME 5001, Cardiovascular Bioengineering, 3 cr
STAT 6201, Mathematical Statistics, 4 cr

Second Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 10 cr
STAT 6410, Design and Analysis of Experiments, 4 cr
***BIOCHEM 6765.02, Physical Biochemistry**, 3 cr

Second Summer Semester (4 credits)

*Dept 8998, Research, 3
*BIOPHYS 6000, Writing, 1

Cellular and Integrative Biophysics Track (CIB)

Students specializing in Cellular and Integrative Biophysics must acquire significant knowledge in biochemistry, integrated life sciences and, increasingly, molecular biology. Depending upon the student's goals, expertise in life sciences can include areas such as cell biology, plant physiology/biochemistry, microbiology, and immunology. The following objectives should be met through formal coursework, approved previous undergraduate coursework, or through informal mechanisms, as may be recommended by the student's advisor, advisory committee. Students with existing strengths in these areas may elect to enroll in alternative courses in consultation with program directors and their research mentor.

Sample 2-Year Curriculum, Cellular and Integrative Biophysics

The sample curriculum shown below would be appropriate for someone with an undergraduate background in chemistry, physical chemistry, and biology, but not in physiology, and who intends to undertake their dissertation work in cellular and integrative biophysics. Many variations are possible, depending upon the interests of the student and the recommendations of the student's dissertation advisor and Advisory Committee. (* indicates a required course. S/U indicate Satisfactory/Unsatisfactory grading scheme instead of A-E grading.)

First Autumn Semester (18 credits)

***PHYSICS 6809, Intro to Biophysics, 4 cr**
***BIOPHYS 6702, Topics in Biophysics, 2 cr**
*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7600, FY Orientation (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*BIOPHYS 8998, Research Rotation (S/U), 6 cr
Physiology 6101, Organ System Physiology I, 3 cr

First Spring Semester (18 credits)

*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr

*Dept 8998, Research Rotation (S/U), 10 cr
***BIOCHEM 6765.02, Physical Biochemistry, 3 cr**
Physiology 6102, Organ System Physiology II, 3 cr

First Summer Semester (3 credits)

Dept 8998*, Research, 3 cr

Second Autumn Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 9 cr
STAT 6201, Mathematical Statistics, 4 cr
BIOCHEM 5613, Biochemistry I, 3 cr or BIOCHEM 6761, Macromolecules, 3 cr

Second Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 10 cr
BIOMEDE 6170, Microscopy in Biomechanics, 3 cr
MOLGEN 5607, Cell Biology, 3 cr.

Second Summer Semester (4 credits)

*Dept 8998, Research, 3
*BIOPHYS 6000, Writing, 1

Computational Biology and Bioinformatics Track (CBB)

This specialization involves the application of computing to modeling biological systems at any scale (computational biology), and/or the application of information theory to extracting knowledge from biological data (bioinformatics). Students specializing in this track should also develop a strong understanding of at least one biological system on which their computational research is centered. Students with existing strengths in these areas may elect to enroll in alternative courses in consultation with program directors and their research mentor.

Sample 2-Year Curriculum, Bioinformatics and Computational Biology

This example curriculum below may be appropriate for a student with a formal background in computing and a desire to work in computational protein engineering (computational biology). (* indicates a required course. S/U indicate Satisfactory/Unsatisfactory grading scheme instead of A-E grading.)

First Autumn Semester (18 credits)

***PHYSICS 6809, Intro to Biophysics, 4 cr**
***BIOPHYS 6702, Topics in Biophysics, 2 cr**
*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7600, FY Orientation (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*BIOPHYS 8998, Research (S/U), 6 cr
BIOCHEM 5613, Biochemistry I, 3 cr, or BIOCHEM 6761, Macromolecules, 3 cr

First Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research Rotation (S/U), 9 cr
STAT 6410, Design and Analysis of Experiments, 4 cr
Biochem 5614, Biochemistry II, 3 cr, or *BIOCHEM 6765.02, Physical Biochemistry, 3 cr

First Summer Semester (3 credits)

*Dept 8998, Research, 3 cr

Second Autumn Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 9 cr
CSE 5442, High Performance Computing and Machine Learning, 3 cr or CSE 5523, Machine Learning and Pattern Recognition, 3 cr
BIOCHEM/BIOPHRM 6701, Molecular Biology, 3 cr

Second Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 10 cr
***BIOCHEM 6765.02, Physical Biochemistry, 3 cr**
CSE 5361, Numerical Methods, 3 cr

Second Summer Semester (4 credits)

Dept 8998*, Research, 3
BIOPHYS 6000*, Writing, 1

A student with an informal computing background wishing to take a bioinformatic approach to extracting knowledge from existing databases of protein structure and function might substitute (1st Spring: CSE 5241, Database Systems 2cr, CSE 5544, Data Visualization 3cr. 2nd Autumn: CSE 5523 (Machine Learning and Pattern Recognition 3cr). 2nd Spring: CSE 5243 (Introduction to Data Mining 3cr) instead of the CSE courses in this same sample curriculum.

Structural Biology and Molecular Biophysics Track (SBMB)

This specialization emphasizes physical biochemistry, kinetics, and three-dimensional structure of biomolecules. Students specializing in this track must also have an extensive knowledge of biochemistry. Students with existing strengths in these areas may elect to enroll in alternative courses in consultation with program directors or their research mentor.

Sample 2-Year Curriculum, Structural Biology and Molecular Biophysics

This example curriculum below may be appropriate for a student with a strong chemistry or physics background and practical laboratory experience. (* indicates a required course. S/U indicate Satisfactory/Unsatisfactory grading scheme instead of A-E grading.)

First Autumn Semester (18 credits)

***PHYSICS 6809, Intro to Biophysics, 4 cr**
***BIOPHYS 6702, Topics in Biophysics, 2 cr**

*BIOPHYS 7600, FY Orientation (S/U), 1 cr
*PHYSICS 7891, Biophysics Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*BIOPHYS 8998, Research Rotation (S/U), 6 cr
BIOCHEM 6761, Macromolecules, 3 cr

First Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research Rotation (S/U), 9 cr
***BIOCHEM 6765.02, Physical Biochemistry, 3 cr**
STAT 6410, Design and Analysis of Experiments, 4 cr

First Summer Semester (3 credits)

Dept 8998*, Research, 3 cr

Second Autumn Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 10 cr
Elective (e.g., CHEM 7160, NMR Spectroscopy, 3 cr)
Elective (e.g., BIOCHEM 6701, Molecular Biology, 3 cr)

Second Spring Semester (18 credits)

*PHYSICS 7891, Seminar (S/U), 1 cr
*BIOPHYS 7990, MLS Seminar (S/U), 1 cr
*Dept 8998, Research (S/U), 11 cr
Elective (e.g., MATSCEN 6741, Practical Electron Microscopy, 2 cr)
Elective (e.g., BIOCHEM 6762, Enzymes, 1.5 cr and BIOCHEM 7770, Protein Engineering, 1.5 cr)

Second Summer Semester (4 credits)

*Dept 8998, Research, 3
*BIOPHYS 6000, Writing, 1

General Biophysics Graduate Program Policies

Ethical and Scientific Conduct

Students must be familiar with standards for ethical scientific and academic conduct set by the University and accepted broadly both nationally and internationally. The required course **BIOPHYS 7600** forms the core training for responsible conduct of research and conducting research with rigor and reproducibility. Additional training in these areas may be required by the advisor, training program, or other support mechanism (such as a fellowship sponsor).

All faculty, staff and students who conduct research at Ohio State must complete Responsible Conduct of Research (RCR) training by the CITI RCR online course. Students must complete the online course for biomedical research prior to beginning their first laboratory rotation.

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. The University Policy and Procedures Concerning Research Misconduct is available from the Office for Research and should be reviewed by all students. Research misconduct allegations are adjudicated by the Office of Research Compliance at the direction of the Vice President for Research.

Students are responsible for becoming familiar with, and adhering to, standards of scientific and academic conduct set forth by the University rules (Student Code of Conduct). Prohibited conduct includes various forms of academic misconduct, endangering health or safety, destruction of property, dishonest conduct and disorderly or disruptive conduct. The University and Program have zero tolerance for ethical and scientific misconduct. University rules require suspected violations to be reported.

Examples of academic misconduct:

> "Plagiarism is the representation, including but not limited to copying, of another's work or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas."
>
> "Unauthorized use of generative artificial intelligence systems or similar technologies to complete academic activities."
>
> "Falsification, fabrication, or dishonesty in creating or reporting laboratory results, research results, and/or academic activities."

Endangering includes:

> "Taking or threatening action that endangers the safety, physical or mental health, or life of any person, or creates a reasonable fear of such action."
>
> "Engaging in a pattern of unwanted conduct directed at another person that threatens or endangers the safety, physical or mental health, or life or property of that person, or creates a reasonable fear of such a threat or action."

Academic Standards

The Graduate School Handbook (Section 5) describes the academic standards for all graduate students, including the requirement to maintain a cumulative GPA of at least 3.0 in graduate classes. Students in the Biophysics Program are making satisfactory or reasonable progress toward their degrees if they meet the GPA requirement and follow the curriculum and other program requirements on the prescribed timeline, unless alterations are approved by the Graduate Studies Committee.

Satisfactory and reasonable progress toward doctoral research must be maintained, as evidenced by satisfactory grades (S) in graduate research courses and advisor comments on the Post-Candidacy Progress Report. Requirements for satisfactory and reasonable progress include attendance at seminars (Biophysics 7990, Physics 7891), required courses (Biophysics 7600 and 6000) and program events such as the annual Ross Lecture and IGP Symposium. Failure to participate in these required activities, and/or earning an unsatisfactory grade (U) will require students to appear before the Program Director(s) to discuss the reasons for the unsatisfactory progress, and the lack of progress may be reported to the graduate school resulting in loss of Good Standing (Graduate School Handbook Section 5.4). Receiving an unsatisfactory (U) grade in Research (BIOPHYS 8999, 799X or equivalent) will be reported to

the Graduate School and a warning will be issued, and students will be required to meet with their Advisory Committee and Program directors. Further unsatisfactory grades may result in denial of registration (Graduate School Handbook Section 5.5).

By Graduate School rules, students who do not raise their cumulative GPA above 3.0 after two consecutive terms of academic probation, students who fail the candidacy exam twice (below), or students who fail the final oral exam twice are automatically dismissed from the University.

Program Probation

Students that fail to meet Biophysics Program standards may be placed on Program Probation. Violations include:

1) Failure to maintain good academic standing as described by the Graduate School
2) Completing insufficient numbers of approved courses for their stage of program enrollment, and/or receiving an unsatisfactory grade 'U' for research credits
3) Unethical or inappropriate conduct, including any form of plagiarism, falsification of data, or misrepresentation of intellectual property. Unethical, inappropriate or disruptive behavior can be grounds for dismissal from the program. Inappropriate conduct can include behavior resulting in arrest, sexual misconduct, sexual harassment, unexcused absence from the University, or other activities considered incompatible with achieving a graduate degree, as deemed applicable by the Biophysics Graduate Studies Committee
4) Failure to find a suitable mentor by the end of the **spring semester of their first year** of training
5) Failure to attend program seminars and events and/or meet program deadlines, including submitting rotation report forms, selecting an advisory committee, meeting with advisory committees and filing annual post-candidacy progress (PCP) reports
6) Failure to complete their Candidacy Exam by **Autumn Semester of their third year** of enrollment
7) Unjustified delays of dissertation work or defense, including failure to graduate within the five-year candidacy period.

Students put on Program Probation will be referred to the Graduate School and be notified with a letter specifying the requirements for returning to Good Standing. Failure to meet those requirements may result in denial of further registration.

Ph.D. Students and Financial Aid

The OSU Biophysics Graduate Program is a Ph.D. training program. All PhD students in good standing can expect full financial support (stipend, tuition, fees, health benefits). During their first year, doctoral students are supported by the program or by merit-based fellowships. At the end of their first-year support, students in good standing can expect to be supported by their advisors, either as Graduate Research Associates (GRA), or as Graduate Teaching Associates (GTA). Under rare circumstances, the program may provide short-term contingency funding for students experiencing a temporary gap in support. Graduate associates and their dependents are provided with health insurance and other benefits as described in the Graduate School Handbook. Graduate students pursuing a Biophysics PhD are expected to be engaged in that

endeavor full time and are not permitted to be employed in another job while receiving a stipend as a GRA, GTA, or fellow in the Program.

Travel Grant Program

Subject to availability of funds, students may apply for and receive one travel grant of up to $500 during the student's tenure in the Biophysics program. Grants are offered on a competitive basis for conference travel, subject to eligibility rules and application timelines set by the program. Eligible expenses include registration fees, transportation, or lodging, all subject to OSU travel policy. To be eligible for award of a travel grant:

- Students must be post-candidacy and in good standing with the program.
- Students must be presenting a poster and/or talk at a national/international conference/meeting.
- Only one travel award will be given within a research group for any individual conference.
- If more applications are received than the program can fund in any given year, preferential consideration will be given to students who meet program deadlines and perform acts of service to the program.

To apply for a travel award, students must submit to biophysics@osu.edu:

- An updated OSBP Activity Report
- Current Advising Report
- Notification from the conference indicating whether it has been submitted for oral or poster presentation

MS Degree

The Biophysics Program does not admit or provide financial support to students wishing to pursue a terminal Master of Science (MS) degree. Admitted students who drop out of the PhD track into a terminal MS track (e.g., upon unsuccessful completion of the Candidacy Exam) may be supported by grants to principal investigators, or by teaching assignments arranged by their mentor within the mentor's home department, but not by the Program.

The MS in Biophysics can be earned by:

1. Successfully completing the Ph.D. Candidacy Examination. Students who complete this landmark accomplishment are awarded an MS degree upon filing an application with the Graduate School.
2. Complete a written MS dissertation containing original research, complete the 30 graduate credit hours with greater than 3.0 GPA (at least 22 graded credit hours of required and approved elective courses). The quantity of work necessary should generally be sufficient for at least one publication in a peer-reviewed scientific journal (note that most Ph.D. dissertations yield a body of work constituting 3 to 5 papers or manuscripts). The defense of the master's degree follows the guidelines in Section VI of the Graduate School Handbook.

Laboratory Rotations

PhD students supported by the program are required to complete three half-semester (7-week) experiential rotations with Biophysics Program faculty within their first two semesters. Students

should begin their first rotation within the first week of the semester. The primary purpose of laboratory rotations is to identify a mentor in your area of interest who can support your research training through GRA or GTA positions. Not all faculty will be able to take on new students at a given time; therefore, students should contact multiple faculty members to discuss rotations and a funded position.

The rotation gives students the opportunity to experience how individual laboratories operate, how successful investigators manage their staff and students, and what types of research or laboratory styles they enjoy. Some students, for example, find it effective to work in large laboratories with extensive staff and students to interact with, whereas other students thrive in smaller laboratories, where they may have more intimate scientific interactions with a mentor and one or two others.

The rotation also provides an opportunity for mentor faculty to evaluate the student. Beyond the academic credentials that allowed them to be admitted into the program, mentor faculty have other factors to consider. Is the student a good fit? Do they demonstrate a strong work ethic? Do they engage and communicate effectively with the PI and other group members? Do they share the same excitement for the science? A successful rotation provides answers to those questions, for both the PI and the student.

A secondary function of laboratory rotations is to learn new techniques, to develop laboratory skills, and to begin actively participating in research. At times, rotations can result in co-authoring publications and/or presentations of research at national or regional meetings.

While doing rotations, students will register for research hours using the course number(s) as directed by the Program. The number of enrolled credit hours depends on their course load and generally are chosen so that prior to candidacy they are enrolled in 18 credits each Autumn and Spring semester and 4 credits during Summer, and 3 credits per semester post-candidacy.

Rotation Contract and Report Form

A “Rotation Contract and Final Report” form must be completed for each rotation and filed with the Program. Sections of this form should be completed prior to doing the rotation so that both the student and instructor agree on what is to be accomplished during the rotation period. It is the student’s responsibility to submit the completed forms to the Biophysics Program.

Advisor

Students are expected to select a dissertation advisor upon completion of their third rotation, mid-way through their first Spring semester. Advisors must be Mentoring Faculty in the Biophysics Program. If a student is unable to identify an advisor after the third rotation, Program permission is required to authorize additional rotations. Failure to identify an advisor is considered unsatisfactory progress and is grounds for dismissal from the program. Advisor selection must be formalized by completion and submission of the Advisor Agreement form, which requires signatures from the Student, the Advisor, and the Chair of the Advisor’s department. The student is responsible for ensuring that this form is completed and submitted to the Biophysics Program. Once the Advisor Agreement form has been submitted, the student may begin their training in the Advisor's laboratory.

The Advisor has responsibility for designing and overseeing the student’s graduate training and serves as the student’s primary mentor. In most cases a student will have a single advisor who

is the PI of the laboratory in which the student is conducting his or her dissertation research. In the case of collaborative projects, the student may have different mentors for different portions of their project. However, one advisor must be designated the Advisor of Record and assume financial and administrative responsibility for the student.

Advisor-Student Conflict

Communication between the dissertation advisor and student is vitally important. Mentor-mentee relationships most often fail because the advisor and student have different expectations for the level of effort and commitment required for success. Other factors can contribute to this failure, including inattentiveness of the advisor to student needs, specific details of the research project, or change in priorities by the student. When conflicts arise, it is important for students to communicate with the Program. Students are also encouraged to seek counsel from the Graduate Ombudsman (https://ombuds.osu.edu/grad-ombuds). Sometimes, such conflicts can be resolved through moderated discussion. Situations in which changes of advisor are warranted occur infrequently and should be handled in such a way that all parties are aware of possible changes. This is especially relevant to situations in which students are supported by extramural grant funds. The Biophysics program cannot guarantee funding to students beyond the first year.

Advisory Committee

Upon joining a research group, each student will assemble an Advisory Committee (sometimes referred to as Examination Committee) that will be responsible for providing research and professional advice to the students and conducting program examinations. The Advisory Committee consists of the student's dissertation advisor plus at least three other faculty. Committee members are selected by the student in consultation with their Advisor. All committee members must normally have P-status in the Graduate School at OSU. At least three of the committee members (including the Advisor) should be members of the Program with either P- or M-status. The fourth committee member, and any additional committee members, may be faculty who hold P-status in another graduate program at OSU. The student's Advisory Committee will participate in the candidacy exam, annual progress meetings, and the final defense. Committees often remain intact throughout the student's tenure, but membership may be altered with proper justification. The Graduate School also has committee requirements.

Safety

It is the research advisor's responsibility, including laboratory rotation advisors, to ensure that students have fulfilled any necessary safety training requirements before starting work in the laboratory. However, students should proactively verify at the beginning of each rotation and upon joining a lab that the necessary requirements have been met.

At a minimum, students should take the EHS Online training modules (https://ehs.osu.edu/) deemed necessary by the advisor in accord with relevant University, college and departmental policy. OSU requires that all lab personnel take the OSU Building Emergency Action Plan and Laboratory Standard Training modules.

Vacation Policy

Students in Biophysics are on 12-month contracts, including time between semesters when

classes are not in session. The Graduate School Handbook has specific guidelines for students regarding short term absences and leaves of absence from the University. These guidelines are helpful for understanding University policy for needed time off for illness or emergencies during the academic semesters when class is in session. These are supplemented by Program Policies.

First year students should limit their time away from campus for purposes of vacation to a maximum of three weeks (15 working days) per year. After students have joined a lab, vacation expectations should be discussed and clarified in communication with their advisor. Students taking time away from their expected activities must fill out a Request for Leave-Funded Graduate Students form. These forms must be signed by the appointing unit supervisor; the student's advisor; and the student's graduate studies committee chair and filed with the Program. Deviations from this policy require prior approval from the program.

Internships

With the approval of their advisor, Biophysics students may apply for and participate in internships during a summer term. The Program must be notified before the student commits to an internship. Participation in an internship must not conflict with the student's Graduate Appointment (GA) or summer term enrollment. Therefore, students should consult both the internship host and the Program to clarify relevant policies. A key consideration is whether the internship offers a complementary opportunity for training and professional development without significantly hindering the student's progress toward candidacy or completion of their dissertation.

Examination Policies

By the autumn semester of their third year in the program students are expected to complete their **Candidacy Examination**, conducted by their Advisory Committee. The exam consists of two parts: a written portion and an oral portion. Failure to complete the exam by the first semester of their third year will result in loss of good standing status and the student will be placed on Program probation. After passing the Candidacy Examination, meeting program requirements and completing the dissertation, students must pass their **Final Examination/Dissertation Defense**. The guidelines for each of these examinations follow those of the Graduate School, which are explained in the Graduate School Handbook. Additional rules and guidelines that are unique to the Program are listed below.

To guide students towards preparation of their Candidacy Exam, a contract is formed between the student and the members of their Advisory Committee. The contract should be completed during the summer of their first year, in consultation with committee members. The contract defines areas of expertise expected of the student. The contract may be based on coursework, reading material, or broad topics of knowledge. The final contract must be signed by the student and all members of the Advisory Committee. It is the responsibility of the student to complete these details. The student's Advisory Committee also plays a role in monitoring student progress towards the final exam, and determining when a student is ready for the dissertation defense.

Candidacy Examination

The candidacy exam serves to evaluate the student's preparation to undertake PhD-level research and their potential to work creatively in a logical and hypothesis-driven framework at

the level of sophistication of a competitive scholar. The candidacy exam should be completed by the **Autum semester of their third year** to maintain Satisfactory Progress in the program.

Part 1: The Written Portion of the Candidacy Examination

The format of the written candidacy examination is a formal research grant proposal centered on the planned dissertation research topic of the student. Students must craft a focused research proposal, typically encompassing two or more specific aims. While the proposal often aligns with the student's current research, it doesn't have to encompass all aspects of their work. Inclusion of preliminary results is encouraged.

The document is prepared in two steps: (1) submission and approval of the Specific Aims page, followed by (2) submission and approval of the full proposal.

Specific Aims

The Specific Aims page is a concise presentation of the research premise and the specific questions to be addressed. Prior to embarking on writing the full proposal, the student will submit a titled specific aims page to their Advisory Committee for approval. While it is appropriate for the research mentor to provide input during their development, the Specific Aims must reflect the student's own creative approach to a research problem.

Within **one week** of receipt of the Aims Page, committee members should communicate a written evaluation to the student and entire evaluation committee, with the outcomes **Approve or Revise**. The student and research advisor will discuss the feedback from the committee. If revision of the aims is warranted by committee evaluation, a revised aims page should be sent to the committee within **two weeks**. Evaluation of the revised aims page will follow as above. Upon approval of the aims, the result shall be communicated to the Program by the **Student**, and they may begin work on the written part of the candidacy examination (Aims + Strategy).

Approval of the aims page is a requirement for progressing to the written part of the candidacy exam; failure to reach approval of the aims by the end of the second summer semester is grounds for program and University probation.

Research Strategy

The proposal should contain the following elements:

- **Background and Significance:** An explanation of the motivation for the proposed studies, their importance, and relevant scientific background.
- **Experimental Plan:** A detailed description of the proposed methodologies, including experimental design, controls, interpretation, potential pitfalls, and alternative approaches.
- **Bibliography:** Cited references used to support the premise of the proposed studies.

Students should submit the complete proposal to the Advisory Committee within **four weeks** of approval of the Aims. Within **one week** of receiving the proposal, committee members are asked to provide a written evaluation with a grade of **Approve or Revise**. Written evaluations should be communicated to the student and entire committee. Committee feedback is discussed by student and advisor as for the aims page to determine if and how to proceed a revision. Revised proposals should be resubmitted to the committee within **two weeks**, and review should proceed as above. Failure to receive unanimous approval of the proposal represents

failure of the written portion of the candidacy exam, and the committee may recommend that the student forego the oral portion of the exam.

Format requirements

Documents should be prepared with defined format: 8½ x 11-inch pages, minimum ½-inch margins, single spaced, fonts should not be smaller than 11-point Arial, Helvetica, Georgia or Palatino Linotype. The Aims page is limited to **1 page**; Research Strategy is limited to **6 pages**, inclusive of figures; references are not included in this limit. (Double-spaced documents are permissible for ease of providing constructive comments, thereby doubling page limits.)

Use of figures, tables, and structured headings is strongly recommended to enhance legibility. Figures elements should be legible at print scale. Statements in the proposal based on published findings should be supported via citations. Citations should follow a consistent format like those of journal scientific publications common to the student's area of research. Students should use a reference manager programs (e.g., Zotero, EndNote).

Part 2: The Oral Portion of the Candidacy Examination

The oral portion of the candidacy examination is held after completion of the written portion and must be completed within one month of the written portion. To schedule the oral exam, the student must submit an "Application for Candidacy" at https://gradforms.osu.edu and have this approved by their program and advisor at least two weeks before the oral's proposed date.

The oral candidacy exam follows the format specified by the Graduate School, https://gradsch.osu.edu/graduate-school-handbook-gsh/gsh-section-7-doctoral-degrees.

It must comprise two hours of questions and answers. Often, the advisor will begin by asking the student to briefly reprise the background and aims, using a limited number of prepared visual aids; such aids should only be used to establish context. The committee will ask questions to evaluate

- Breadth and depth of knowledge in areas related to the proposal.
- Understanding of the scientific basis of relevant methods and alternative approaches.
- Ability to design experiments and evaluate outcomes.
- Application of concepts from the curriculum to research problems.
- Capacity to think broadly about modern biophysics beyond the proposal.

Results of the Candidacy Examination

(Graduate School Handbook)

Decision. The decision about the outcome of the candidacy examination is reached in the absence of the student. After discussion, the satisfactory/unsatisfactory decision is reached by means of a vote. Each examiner indicates judgment by posting their decision on the Report on Candidacy Examination that should be submitted to the Graduate School, within 24 hours of the examination's completion.

Satisfactory. The student is considered to have completed the candidacy examination successfully only when the decision of the candidacy examination committee is unanimously affirmative.

After successfully completing the candidacy exam, students may file an "Application to Graduate" form through the https://gradforms.osu.edu website for completion of the MS degree from the Biophysics Program on the next graduation date. This application will also specify that the intent to continue toward the PhD degree.

Unsatisfactory. If the examination is judged unsatisfactory, the candidacy examination committee must decide whether the student will be permitted to take a second candidacy examination and must record that decision on the Report on Candidacy Examination. Students permitted to retake the exam must do so the following academic semester, which may also include changes to the written proposal.

Failure. A student who fails the candidacy examination twice is not allowed an additional examination. After two unsatisfactory attempts at the candidacy examination, a student is not permitted to be a doctoral candidate at The Ohio State University. A notation of dismissal will be posted to the student's academic record and further registration will not be allowed. Such students can seek admission to the master's degree program by utilizing the transfer of graduate program procedure and securing a support letter from the Graduate Studies Committee Chair of the proposed master's program. The Examination Committee shall hold a vote that is advisory to the Graduate Studies Committee, on whether to award the terminal MS degree.

Post-Candidacy Progress

After advancing to candidacy, students will continue working on their original research projects, which will be the basis of the dissertation. The program requires continuous enrollment and appointment of its students in all terms. Post-candidacy students should enroll in 3 credit hours per term. Post-candidacy students should generally enroll mostly in 8999 or equivalent research courses and may enroll in 1 credit hour of a seminar course each Autumn and Spring semester. The student must earn **80 credit hours** required for graduation with a PhD

After their second year, students will meet annually with their Advisory Committee. The first meeting will typically be to conduct the PhD candidacy exam, in Autumn Semester of their third year. In subsequent years, annual meetings **each autumn** will serve to provide progress updates to the committee. Each meeting (~1 hour) will include a presentation of progress and goals, along with expected timeline for completion of degree requirements and graduation. The student is also required to prepare a written **Post Candidacy Progress Report (PCPR)** and file a signed Progress Report **Form** with the Program. As the dissertation defense approaches, the student will provide the committee with an outline of the planned dissertation and solicit feedback on their expectations a complete, defensible document.

Research Dissemination Requirement

Post-candidacy students are required to attend the IGP Symposium each year. Beginning in their fourth year, they must also present either a poster or an oral presentation. Students are encouraged to share their research at regional and national meetings as well. To help offset the costs of attending these events, students should apply for travel awards offered by the conference and/or the Biophysics travel award.

Biophysics students are **required** to deliver a plenary presentation as part of the Biophysics 7891 seminar course. These presentations should communicate the students' research goals

and findings at a level appropriate for a diverse audience. Each presentation should last 20–25 minutes, allowing additional time for audience questions.

Publication Requirement

Peer reviewed research publications serve as primary evidence of a student's qualifications for a PhD degree. Students without such an accomplishment would not be recognized as having demonstrated a core competency of the research degree. Thus, the Program requires that students publish at least one original peer-reviewed first-author primary research publication before their final graduation can be approved. Co-first authored publications are acceptable. Review articles do not fulfil this requirement. The paper must be published, in press, or accepted. Notice of acceptance of the paper should be communicated to the Program.

Dissertation and Final Defense

"The dissertation is a scholarly contribution to knowledge in the doctoral candidate's area of specialization. By researching and writing a dissertation, the doctoral candidate is expected to demonstrate a high level of knowledge and the capability to function as an independent scholar." (Graduate School Handbook) The format of the document is variable, but often includes an Introductory chapter that provides background and context for the body of work, a series of chapters that represent semi-independent projects and may correspond to separate publishable bodies of work, and an Appendix detailing work that supplements the other chapters or details findings of insufficient breadth or depth to constitute a stand-alone chapter. Sometimes, a concluding chapter describing future directions is also appropriate.

A complete draft of the dissertation must be approved by the student's Advisory Committee before the defense can be scheduled. Because it takes time to read and provide comments on a dissertation students should expect to submit their dissertation to their committee at least six weeks before they hope to schedule a defense. Upon review of the document, the committee decides whether it is of sufficient depth and breadth to serve as the basis for a successful defense during an oral exam. Additional edits to the document are common after approval of the document for the exam, and before final approval to graduate.

Upon approval by the committee the student files an "Application for Final Exam" through https://gradforms.osu.edu at least two weeks prior to the oral exam date. The Graduate School will assign an outside faculty member to serve as their representative for the defense.

A common format for the final examination is to have approximately one hour of a public presentation during which questions are allowed form the general audience, followed by an hour of closed questioning by the committee.

Per Graduate School Guidelines, successful completion of the oral defense requires a unanimous approval of the members of the dissertation defense committee. The guidelines for the final oral examination and outcome are identical to those of the Graduate School and should be reviewed carefully.

Petitions and Grievances

Petitions to deviate from Program rules may be submitted in writing to the Program office (biophysics@osu.edu). Petitions by students should be accompanied by a letter of support from the student's advisor, or an explanation for why this is not possible.

Grievances related to program activities and requirements should be sent to the Program (biophysics@osu.edu), GSC Chair, or another member of the GSC. The GSC Chair (or other GSC member) will attempt to resolve the grievance, with the help of other GSCs members as necessary.

Crisis and Counseling

The Counseling and Consultation Service (CCS) of the Office of Student Life provides services to undergraduate, graduate and professional students (and their spouses/partners if covered by CSHI) for issues such as stress management, anxiety, depression, relationship problems, transitions in life, identity exploration, substance use, eating concerns, feeling overwhelmed, and academic adjustment. Students should call 614-292-5766 to schedule an appointment.

If you or someone you know is in imminent danger to themselves or others, go to the nearest ER or call 911. If you are feeling suicidal, please contact someone who can help you, such as the Columbus Suicide Prevention Hotline (614-221-5445) or the National Suicide Prevention Lifeline (800-273-TALK). Students who are experiencing a psychological crisis should call CCS at 614-292-5766 during business hours and will be contacted by a trained clinician by the end of the next business day.

Faculty who are concerned about non-emergency mental health issues with students can contact the director of CCS, Micky Sharma, Psy.D., at sharma.369@osu.edu or by calling 614-292-5766. **For mental health emergencies, call 911.**