Jacobs School of Medicine and Biomedical Sciences
University at Buffalo

DEPARTMENT OF PHYSIOLOGY & BIOPHYSICS

GRADUATE HANDBOOK

M.S. Program in Cellular & Molecular Physiology

Updated May 2026

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TABLE OF CONTENTS

I. Preamble
II. Diversity Statement
III. Graduate Affairs Committee (GAC)
IV. The Program
  • Program Learning Outcomes
V. Admission Requirements
VI. Student Advisors
VII. Course Requirements for M.S.
VIII. Thesis vs. Research Path
IX. Academic Standing
X. Financial Aid
XI. Student Leave Policies
XII. Petitions
XIII. Grievance Procedure
XIV. AI Policy
XV. Additional Resources
Addendum A – Annual Review Report for M.S. Students [UB form]

I. PREAMBLE

These Guidelines provide graduate students, faculty, the Graduate Affairs Committee and the Directors of Graduate Studies with a description of the program and policies for graduate study in the Department of Physiology and Biophysics. These departmental Guidelines are nested within those put forth by the Faculty Council Policy on Graduate Education, located here: https://medicine.buffalo.edu/faculty-council/policies/faculty-council-policy-graduate-

education.html.

II. DIVERSITY STATEMENT

The Department values the diversity of all individuals regardless of race, ethnicity, sex, disability, religion, gender identification or sexual orientation. Diversity leads to excellence. We strive to create and foster an inclusive environment that is safe and gives voice to all members of the department: students, trainees, staff and faculty.

III. THE GRADUATE AFFAIRS COMMITTEE (GAC)

A Graduate Affairs Committee (GAC), chaired by the Directors of Graduate Studies and consisting of five other faculty members will be responsible for administering all facets of the graduate program, including admissions. The Director of Graduate Studies and the other members of the Committee are appointed by the Department Chair.

IV. THE PROGRAM

The Department of Physiology and Biophysics of the State University of New York at Buffalo is one of six basic Medical Science Departments in the School of Medicine and Biomedical Sciences. It is a Department with University-wide teaching responsibilities for approximately 180 medical, 90 dental, 50 graduate, and 2,000 undergraduate students per year. The Department's degree programs are exclusively at the graduate level. The Department currently offers Ph.D. and M.S. programs in Cellular and Molecular Physiology.

The program emphasizes both extensive training in molecular, cellular, and systems physiology and intensive training in current topics in physiological research. Students can pursue research in neurobiology, cardiovascular, cellular, gastrointestinal, and renal physiology. The program offers training in the laboratories of an exceptional departmental research faculty. Students also have the opportunity to pursue collaborative research in other related departments or areas of the university.

Program Learning Outcomes

The goal of the MS program is to produce graduates who are well founded in the principles of organ system and cellular physiology and are able to perform research in specialized areas of physiology.

- Enrolled students will plan and conduct research on a specific project under the guidance of an advisor while developing the intellectual independence that typifies true scholarship.

- Graduating students will demonstrate a broad base of established and evolving knowledge within a chosen discipline and detailed knowledge of a specific research area in their field of study.

- Graduating students will be trained in responsible conduct of research to improve their ability to make ethical and legal choices. This includes practicing rigor, honesty, and integrity in experimental design and data analysis, reporting data with acceptable standards of reproducibility and understanding the rules for ownership and access to data and the criteria for authorship.

V. ADMISSION REQUIREMENTS

The candidate should have demonstrated above-average academic performance.

Entry into the program is contingent upon award of the baccalaureate degree.

The Graduate Affairs Committee evaluates these credentials, conducts interviews with promising candidates, and will make an offer of admission to the program.

Applicants to the M.S. Program in Biomedical Sciences are required to submit the following:

- transcript(s) from every institution you have previously attended
- three (3) letters of recommendation
- an up-to-date resume or CV
- a personal letter stating career objectives and research experience.

Research experience is highly desirable.

Special Note for International Students

If you are applying from outside the United States, apply as early as possible to ensure time for application and visa processing. After admission to the program, there may be additional materials requested by the university's International Admissions team in order to secure an I20.

Regardless of your program's deadline, it is recommended that you apply **at least** 6-9 months prior to the term start date (depending on your country of origin). Check with your program's application coordinator for specific guidelines.

English Proficiency Requirement

International applicants must present a valid English Language Proficiency test score. It is university policy that test dates are no older than two years when students enter a program. We recommend uploading scanned copies of your results at the time of application in order to expedite the review process.

- Institution code: **R2925** (SUNY-University at Buffalo)

Accepted Tests and Minimum Scores General Admission Requirements

- Department Code: **36**

Fees

Once you submit your application online for formal review, you will be provided with a link to our online payment system, where you can pay the application fee.

VI. Student Advisors

During the first semester, students are normally advised on academic matters by the Director of Graduate Studies (DGS). The DGS will advise the student on any academic matters concerning classwork and will also offer guidance on choosing an appropriate research rotation and mentor for the MS degree. Students are also encouraged to consult with the Graduate Coordinator and other faculty members, as needed or desired.

It is expected that by the end of the first Fall semester, MS students will have chosen their research advisor or mentor. The mentor should have a **primary** appointment in the Physiology and Biophysics department. From that time on, the mentor will be the primary advisor for the student, along with a member of the Graduate Affairs Committee, who will be assigned to the student to provide guidance as needed and will serve on the student's Master's Committee.

The Master's Committee is chaired by the mentor and consists of a minimum of three graduate faculty. The Physiology and Biophysics Department Chair is an *ex officio* member of all Master's Committees and can resolve disputes if necessary.

VII. Course Requirements for the M.S.

Objectives of the curriculum are to provide an education in the principles of physiology: instruction in the basic sciences relevant to the understanding of physiological principles and instruction in research methodology including experimental design, instrumentation, and analysis.

A minimum of 30 credit hours of graduate study is required; 24 of these must be completed at the State University of New York at Buffalo. Continuous registration for a minimum of one semester hour each Fall and Spring term is required until all requirements for the degree are completed. One of the following courses of study is required of all students entering the program unless they have completed equivalent graduate-level courses elsewhere.

There are two research paths: **Research Project Path** or **Thesis Research Path**

- This is further outlined in section **VIII**.

First Semester

PGY 505 - *Cellular and Molecular Physiology,* 4 credits

PGY 507 - *Laboratory Exercises in Physiology,* 4 credits

- This is a laboratory rotation to determine your research project. Research is conducted under the guidance of your major professor and research advisory committee.

*Electives–4 credits

Second Semester

PGY 607 - *Cellular and Molecular Basis of Disease,* 3 credits

PGY 508 - *Laboratory Exercises in Physiology (Research),* 4 credits

*Electives - 5 credits

First Summer

Research, 0-12 credits

- Apply for full-time status, which allows you to take less than 12 credits per semester for the duration of your program to reduce tuition cost.

Elective Courses

Elective courses are taken to provide opportunities for advanced education in specialized areas relevant to the student's research and advanced general education. Courses may be elected by the student in consultation with the student's thesis/project adviser. Some suggested elective courses include:

- PGY 551 - *Human Physiology I*, 3 credits
- PGY 552 - *Human Physiology II*, 3 credits

- PGY 555 - *Neuroimmunology*, 3 credits
- NRS 520 - *Cellular and Molecular Neuroscience*, 4 credits
- BCH 503 - *Biochemical Principles*, 3 credits
- BCH 507 - *Protein Structure and Function*, 2 credits
- BCH 508 - *Gene Expression*, 2 credits
- BMS 501 - *Cell Biology*, 4 credits

Departmental Seminars

Students are required to attend the departmental seminar series. Students will often be given the opportunity to discuss research findings or career opportunities with the seminar speakers.

VIII. Thesis vs Project Path

Research is conducted under the guidance of the student's major professor and research advisory committee.

There are two research paths:

A: Thesis Research Path

Thesis research will culminate in a written thesis dissertation and an oral thesis defense.

This path usually requires third and fourth semesters to complete.

Third Semester
PGY 701 - *Thesis Research*, 3 credits

Fourth Semester
PGY 702 - *Thesis Research and Defense*, 3 credits

MS Thesis Research, Thesis Preparation, Thesis Reviews

The thesis research is conducted by the graduate student under the guidance of his/her thesis adviser and thesis advisory committee. The student and thesis adviser recommend three members of the graduate faculty (two from inside and one from outside the department) to serve on the thesis advisory committee.

Individuals who are neither members nor associate members of the UB graduate faculty may serve as additional committee members if their expertise would be of significant value to the student and the core members of the committee. The committee is appointed by the director of

graduate studies and chaired by the thesis adviser. The thesis research will culminate in a written thesis dissertation, which is an original contribution, written in English. Thesis preparation is critically monitored and supervised by the thesis adviser and the thesis advisory committee, both of whom must approve the thesis prior to the oral defense.

The oral defense of thesis is scheduled after the candidate's thesis advisory committee has approved the thesis. The thesis is presented to the department in a seminar followed by an oral defense.

B: Research Project Path

The focus of a research project is generally more applied than that for a thesis and will culminate in a written project report.

This path usually requires the third semester to complete.

Third Semester
PGY 950 - *Research in Physiology*, 6 credits

MS Project Research, Research Report Preparation, Research Report Reviews

Research conducted by a graduate student can result in a master's research project rather than a thesis. The project research is conducted by the graduate student under the tutelage of his/her project adviser and project advisory committee. The project advisory committee will consist of the project adviser and two members of the department Faculty.

The focus of the research for a master's project is generally more applied than that for a thesis, with the student often defining a problem and developing a solution for it. The project will be a scholarly undertaking that results in a tangible outcome (e.g., a technical report, a computer program, a manuscript), but that does not fit neatly within the framework of a traditional scholarly thesis paper.

The final project must be accompanied by a report written by the student that introduces, analyzes and contextualizes the project, and demonstrates the student's familiarity with the relevant literature of the field.

The master's project final paper must be approved by the graduate student's project adviser, project advisory committee, and the director of graduate studies for physiology.

IX. ACADEMIC STANDING

Students are expected to obtain a grade of B or better in all required courses and to maintain a grade point average (GPA) of 3.0 or better. A grade of B minus (B-) or below in a required course may be grounds for dismissal from the program and will be a matter of discussion by the Graduate Affairs Committee of the Department. An overall GPA of lower than 3.0 will result in academic probation. A student on academic probation has 1 semester to bring his/her GPA to 3.0. Failure to do so will result in dismissal from the program.

Academic dismissal

Graduate students who do not meet the written terms of their academic probation may be academically dismissed from the program by the director of graduate studies or chair of the department. Such dismissals shall be done in a timely fashion but no later than three weeks after the completion of the term. The Graduate School will be notified in writing of all such academic dismissals.

Graduate students who are dismissed for academic reasons from a graduate program will have a "GRD" (Graduate School) service indicator placed on their academic record to prevent future registration.

X. FINANCIAL AID

Normally there is neither financial support nor tuition waivers for master's students.

Funding for Conferences/Travel: Departmental funding may be available for MS students who present a poster or oral presentation at a conference. Requests should be submitted in writing to the Director of Graduate Studies and the Chair of the Department.

Students may also want to apply for department travel funding using the Travel Funding Application

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XI. STUDENT LEAVE POLICIES

Department policy is that students will have available to them 2 weeks of leave per year to use for vacation. Those students who need a longer vacation period because of extended travel times may pool two years' allowance into a single trip; otherwise, the annual leave time shall be non-accumulating.

Master's students who are not U.S. citizens and who travel home to foreign countries should be aware that visa renewals may take extensive time to process or may be rejected. Thus, it is not generally recommended that students travel outside the country unless necessary. In regard to

vacation leave, the period chosen should result from discussion between the student and mentor and should be consistent with the educational and research commitments associated with the student's academic and research objectives and responsibilities.

Students shall also be allowed reasonable medical absences for sickness or treatment. Time spent fulfilling Departmental assignments or responsibilities are not considered vacation or leave time (*e.g.*, assisting in courses, student mentoring and recruitment, organizing Research Day).

Two principles shall be followed by the student and mentor in discussing leave time:

1) The student and mentor have made a mutual commitment to training and research objectives
2) Achieving these mutually reinforcing objectives requires flexibility in effort and time-of-effort.

Although the mentor cannot forcibly deny a leave request, she or he can certainly view such a request as inconsistent with the student's commitment to these training and/or research objectives.

If disagreements arise which the student and mentor are unable to resolve: the Department Chair and Director of Graduate Studies should be informed by either the student or mentor or both and an effort will be made to mediate the dispute.

XII. PETITIONS

Petitions must be submitted to the Director of Graduate Studies and/or the Graduate School (and approved by the Divisional Committee in the latter case) for the following purposes:

A. Extension of time limit for completion of degree. Students must submit a petition listing justifying reasons for an extension beyond two years for completion of the M.S. degrees.

B. Leave of absence. If a student wishes to take a leave of absence a petition must be submitted detailing the reasons for the leave.

C. Change of status. A petition to change status from M.S. status to PhD status (upon approval by the mentor) must be submitted in the form of a letter to the Director of Graduate Studies. The Graduate Affairs Committee will discuss the petition and either approve or deny it. A copy of the petition letter and the Graduate Affairs Committee approval must accompany the student's program form when it is submitted to the Graduate School. A petition for a switch from the M.S. to the Ph.D. program is subject to the admissions process and will only be approved if the student has shown adequate abilities in their coursework and research.

D. **Change of Thesis Advisor:** The same procedure for a letter is followed as in **C**, above.

E. **Course requirements:** If a student requests that an exception be made to the normal course requirements, the same procedure is followed as in C, above.

XIII. GRIEVANCE PROCEDURE

The Department of Physiology and Biophysics follow and adhere to the Graduate School grievance procedures found here: https://www.buffalo.edu/grad/succeed/current-students/policy-library.html#grievance

Students should feel free to contact the Director of Graduate Studies or the Chair of the Department on personal and academic matters or with grievances. On matters under departmental jurisdiction in which a student believes they have been aggrieved, a formal grievance review may be requested. The request must be in writing from the student concerned to the Chair of the Department and must be filed within one month of the alleged grievance. It must clearly state the charge of grievance, its effects, and summarize the particulars concerning it.

The Chair of the Department, in consultation with the parties concerned, will appoint an *ad hoc* committee with student representation to investigate the grievance within 20 academic days of receipt of the student's appeal. The *ad hoc* committee's action is restricted to procedures or administrative matters, as opposed to judgments of academic performance. All hearings of the Grievance Committee will be closed. No formal minutes will be taken. The committee will report its recommendation for resolution of the grievance within one week after filing. Grievance reviews for graduate students are also available through the Graduate School.

XIV. AI Policy

Use of Generative AI in Dissertations, Theses and Scholarly Projects

Dissertations, theses, and other culminating scholarly projects must reflect the student's original intellectual work, including the development of ideas, analysis, interpretation, and written expression. Generative artificial intelligence (GenAI) tools may be used in a limited and controlled manner as described below; however, such tools must not replace the student's independent thinking, scholarly judgment, or authorship.

Non-Substantive Use (Permitted without prior approval)

Use of GenAI that does not alter meaning, reasoning, or intellectual contribution. These include grammar correction, minor stylistic edits, formatting, and transcription. Use of AI-based literature curation tools is permitted provided that students perform synthesis and written literature reviews without GenAI assistance. Only clearly non-substantive functions are allowed. When in doubt, treat use as substantive

Substantive Use (Restricted; requires approval)

Any use of GenAI that influences or contributes to intellectual content, including generating arguments, literature synthesis, writing sections, coding for analysis, or data interpretation.

Prohibited Uses of GenAI

- Submitting GenAI-generated text, figures, tables, code, or other materials as original work without proper authorization and disclosure;
- Using GenAI to generate or substantially contribute to core scholarly components, including research questions, hypotheses, literature reviews, analytical arguments, or interpretations of data, without prior approval;
- Fabricating, manipulating, or altering research data or results using GenAI tools;
- Using GenAI systems to generate citations or references without verification of their accuracy and existence in the scholarly record;
- Uploading or entering confidential, proprietary, unpublished, or sensitive research data—including human subjects data—into publicly accessible GenAI systems or tools that do not meet institutional data security requirements.

Violations will be treated as academic misconduct and may result in disciplinary action, up to and including degree revocation. Students should review the UB Academic Integrity Policy: (https://catalogs.buffalo.edu/content.php?catoid=17&navoid=863#academic-integrity)

Advisor/Mentor Responsibilities

The dissertation or thesis advisor, in consultation with the student's thesis/dissertation advisory committee, is responsible for establishing expectations regarding the permissible use of generative GenAI for each student's project, consistent with this policy and applicable program standards. Students must consult with their advisor prior to using GenAI tools for any purpose beyond basic editorial support.

Advisors may:

- Prohibit the use of GenAI entirely for a given project;
- Permit limited uses of GenAI aligned with this policy; or
- Approve specific, clearly defined uses of GenAI, provided such uses are documented and disclosed.

All approvals must be communicated clearly to the student and documented in writing. In cases of ambiguity, the default expectation is that GenAI-generated substantive content is not permitted.

Student Responsibility

The use of generative GenAI does not diminish the student's responsibility for the accuracy, originality, and integrity of their scholarly work. Students remain fully accountable for all content submitted, including any material developed with the assistance of GenAI tools. Students are

responsible for complying with both program-level requirements and advisor-specific guidance. In the event of conflicting guidance, the more restrictive standard will apply.

Students are required to obtain approval for any substantive GenAI use related to the generation of their dissertation, thesis or scholarly project report. Permission should be obtained in writing prior to use of the tool. Students should maintain a written record of tool use, including identification of the tool, as well as prompts and outputs. When the student submits their thesis, dissertation or scholarly project report to their advisory committee, it must be accompanied by a one-page attestation documenting GenAI use and should be signed by both the student and the major advisor/mentor.

The attestation should include a clear and accurate disclosure of any use of generative GenAI tools in the preparation of the dissertation, thesis, or scholarly project.

The disclosure must:

- Identify the GenAI tool(s) used;
- Describe the specific purpose(s) for which the tool was used;
- Clarify the extent of use, including whether the tool contributed to editing, organization, coding, or other functions; and
- Affirm that all intellectual content, analysis, and conclusions are the student's own.

In cases where GenAI use extends beyond basic editorial assistance and has been approved by the advisor or committee, students may be required to provide additional documentation beyond the attestation, such as summaries of interactions, prompts, or draft outputs, upon request.

Program Director / Graduate Affairs Committee Responsibility

This policy establishes baseline standards governing the acceptable use of generative GenAI in dissertations, theses, and scholarly projects. These standards define the minimum expectations for permissible use, prohibited activities, and disclosure requirements. Although the major advisor serves as the primary authority in approving any substantive use of generative GenAI, the academic program (e.g., Program Director or Graduate Affairs Committee) will maintain formal records of all such approvals. This oversight ensures that permissions are applied consistently and fairly across students, helping to prevent disparities in access to or use of GenAI tools within the program

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XV. ADDITIONAL RESOURCES

Additional Resources for current graduate students provided by UB and the Jacobs School of Medicine and Biomedical Sciences can be found here.
https://medicine.buffalo.edu/education/graduate/current-students.html