

Department of Biology GRADUATE STUDENT HANDBOOK

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A. **INTRODUCTION**

The major objectives of the Biology M.S. program are to provide the graduate student with (1) the course work necessary to develop a strong background in a sub discipline of biology, (2) an opportunity to plan, conduct and report on an original research project, (3) an intellectual atmosphere under which faculty and students can exchange ideas, and (4) encouragement to become involved in professional scientific meetings. The goal of the graduate program is to provide educational institutions, government, industry and society with well-prepared, professional biologists.

Program requirements are designed to allow the student's major advisor and Advisory Committee flexibility to create a plan of course work and research around the needs of the individual student, taking into account the student's previous background and future career goals. In addition to departmental requirements, the student must satisfactorily complete all University requirements as set forth in the Graduate Bulletin.

B. **ADMISSION POLICIES**

University and Departmental requirements for Regular Admission to the graduate program in Biology include a/an:

- Undergraduate degree with a major in the biological sciences.
- Overall GPA of 3.0
- Biology GPA of 3.0
- GRE General Test Scores
- Statement of interests
- Transcripts
- Three (3) letters of recommendation from professional references
- Faculty Advisor Acceptance

A successful applicant will have an undergraduate degree in the biological sciences including course work covering botany, microbiology, zoology, cell biology, genetics, ecology, and plant or animal physiology. In addition, one year of general chemistry is required while mathematics (e.g., calculus) and physics are highly recommended. For those applying for the M.S. in Biology, lab is required with the general chemistry and a semester of organic chemistry must be completed. Graduate students granted conditional admission must petition for Regular admission after deficiencies have been removed. Application forms for regular admission are available at Graduate Studies and on the departmental web sites.

C. PROGRESS TOWARD A DEGREE

Graduate students in the Biology Department are expected to complete their Master's degree in a timely manner (generally 4-5 semesters). To complete the MS degree in a timely fashion, students should adhere closely to the schedule listed below. Plan A graduate students are advised to take a heavy course load during their first 2 semesters so that they can devote more time to data collection, data analysis, and thesis writing during summers and semesters 3-5. Students who do not make satisfactory progress toward a degree will not be eligible for departmental support (teaching or research assistantship).

Graduate Program Schedule

Semester	Program Requirements	Form	Plan A cr. hrs.	Plan B cr. hrs.
1	Form Advisory Committee Select course plan	Committee Selection (BIO office) Authorization of Degree (GRAD office)	9	9
2	Complete prospectus Advisory Committee meeting Research compliance approvals Reapply for GTA	Feb. 1: Prospectus for Thesis (GRAD office) Feb. 1: Reappointment application (BIO office)	9	9
3	Committee meeting		6	9
4	Thesis to committee (March) Oral or written exam Submit thesis Department checkout	Plan A/B Sign-off (GRAD office) Thesis check list (GRAD office) Check list (BIO office) Graduation Application (GRAD office)	6	9
Total			30	36

1. **Selection of a Major Advisor** – Students work closely with their major advisors. Selection of students to the graduate program are contingent on a signed Faculty Advisor Acceptance. If the student's emphasis changes, and the student and/or faculty mentor wish to terminate the advisor/advisee roles a new major advisor can be selected. The termination of the advisor/advisee role needs to be documented in writing by both the student and faculty involved. This must be shared with the Graduate Coordinator, Department Chairperson, and Graduate Program Administrator. For a new mentor to be assigned, the student and new faculty mentor must formally document this desire of a change in major advisor and share with the Department Chairperson,

2. **Selection of an Advisory Committee** -- Students must select a Guidance Committee in consultation with their advisor during the first semester of course work. The Committee will consist of the student's major advisor and at least two additional members of the graduate faculty. A graduate faculty member from a cognate area may serve as one of three committee members. The Guidance Committee will review and approve the student's course requirements and research program. The Committee will administer a final oral and/or written exam. The graduate student must complete a *Graduate Student Guidance Committee* form (available online).
3. **Selection of Academic Program** -- In consultation with the Advisory Committee, the student must choose a program of course work and decide between pursuing either the Plan A or Plan B degree. A Degree Plan (available in Degree Progress) must then be completed in consultation with the advisor. This plan must be completed by February 1 for students entering in the fall semester and October 1 for students entering in the spring semester.
4. **Prospectus** – A draft of the thesis prospectus should be approved by the student's major advisor and submitted to the Department Office by February 1 for students entering in the fall semester and October 1 for students entering in the spring semester. Students must also complete a Prospectus form (available online) in consultation with their advisor and thesis committee. The Prospectus form and accompanying abstract must be filed with the College of Graduate Studies and the Department of Biology office before thesis research is begun. Students cannot enroll in more than 3 thesis credits (BIO 798) unless the Prospectus form is complete. If the Prospectus form was not turned in by February 1 for reappointment, it must be submitted to the Department Office by the end of the spring semester for students entering in the fall and by the end of the fall semester for students entering in spring.

D. ACADEMIC PROGRAM FOR M.S. DEGREE

1. Plan A degree requirements

- a. Course requirements – At least 30 semester hours of approved graduate course work must be completed; 15 of these hours must be at the 600 level or above. These 30 hours must include (what is the formal name of the course) BIO 500 and (what is the formal name of the course) BIO 630 or equivalent statistical and experimental design experience, and 6 hours of Thesis (BIO 798) and 1 hour of Seminar (BIO 730). Up to 9 hours of Thesis credits can be applied towards the degree. No more than 1/3 of the student's graduate course work may be earned in unspecified content courses, i.e., BIO 594, 597, 610, 620 unless approval is given. Up to 10 hours of the total 30 required credits may be earned in cognate areas. Candidates for this degree may transfer a maximum of 15 credit hours of approved graduate credit from other institutions. All degree requirements must be completed within seven years after admission to the program.
- b. Thesis requirements -- The Biology Department requires that a prospectus, as well as [Prospectus form](#) signed by all members of the student's Thesis Advisory Committee be on file in the Biology office before the student enrolls in Thesis (BIO 798).

All graduate students using vertebrates in their research must have [IACUC approval](#) for the use and care of animals before any work can begin.

All graduate students using humans in their research must have [IRB approval](#) of their research before any work can begin.

A [Preparation Guide for Thesis, Field Study, or Dissertation](#) compiled by the College of Graduate Studies is available.

Students should present near-final drafts of the thesis to each member of their committee at least two weeks prior to the expected date of the final oral examination.

- c. Final oral examination -- The examination committee consists of the Advisory Committee, but any member of the graduate faculty can attend the examination. The examination generally includes the student's defense of his thesis work, but any aspect of the student's graduate program is open for discussion. This exam should generally be scheduled during fall or winter semester, when committee members are available. [The Plan A Completion Approval Form](#) must be completed and distributed upon completion of the final oral examination.
- d. An electronic copy of your thesis needs to be submitted to the College of Graduate Studies. [Click here for instructions.](#)

The College of Graduate Studies will review your project, save the document as a PDF, and forward it to the Park Library for uploading into the University's [CONDOR](#) (CMU Online Digital Object Repository).

Bound copies of thesis are not required but an option. Please contact Printing Services at 989-774-3216 to inquire about having your thesis bound and added to the Libraries' collection.

- e. Upon completion of all degree requirements the departmental [Checkout List](#) must be completed and on file in the Department of Biology office.

2. **Plan B degree requirements**

Plan B consists primarily of course work, requires no thesis, but must include additional significant evidence of scholarship, such as research, independent study, internships, or practicum, or creative/artistic work appropriate to the field of discipline.

- a. Course requirements – At least 36 semester hours of graduate course work (approved by advisor and thesis committee) must be completed with at least 15 of these hours at the 600 level or above. Up to 10 hours may be in one or more cognate areas. No more than 1/3 of the student's graduate course work may be earned in unspecified content courses, i.e. BIO 594, 597, 610, 620. A course in statistics is recommended. Candidates for this degree may transfer a maximum of 15 credit hours of approved graduate credit from other institutions. All degree requirements must be completed within seven years after admission to the program. Credit earned in BIO 798 (Thesis) may not be applied to this degree.
- b. Final examination -- The content and type of final examination for the Plan B student will be determined by the Advisory Committee at the time that the Authorization for the Graduate Degree Program form is completed. It may be an oral or written examination and it may cover course and/or research material. This exam should

generally be scheduled during fall or winter semester, when committee members are available. The [Plan B Completion Approval Form](#) must be completed upon completion of the examination.

- c. Upon completion of all degree requirements the departmental [Checkout List](#) must be completed and on file in the Department of Biology office.

3. **M.S. in Conservation Biology**

The Biology: Conservation Biology program is designed to prepare students for career opportunities with state and federal agencies and conservation organizations. Course requirements follow those of Plan A or Plan B with the following additions. In addition to the Plan A required courses above, Conservation Concentration students must complete a course in Conservation Biology (BIO 680) and Population and Community Ecology (BIO 650) as well as a community ecology course.

E. ACADEMIC STANDARDS

Graduate students are expected to maintain a 3.0 or better GPA in each semester of their graduate program. If semester GPA falls below a 3.0, Graduate Studies will place the student on academic probation. A GPA below 3.0 for two consecutive semesters is sufficient justification for removing a student from degree candidacy or for removing financial assistance.

F. ACADEMIC LOAD

The normal academic load for a graduate assistant is 6-10 hours. Graduate teaching assistants and research assistantships must be registered for at least 6 hours of graduate credit during each term they hold an appointment. Some funding sources offer variable credits. Make sure you check with your advisor regarding credit hours before registering to avoid unanticipated costs (e.g. student fees).

G. RESPONSIBILITIES OF THE GRADUATE STUDENT

1. Read the departmental Graduate Handbook and university [Graduate Bulletin](#).
2. Complete required courses maintaining a GPA > 3.0.
3. Submit a prospectus of thesis research to the Biology Department (Plan A).
4. If you are a graduate teaching assistant, you must apply for reappointment each year (February 1).
5. Attend all Biology department seminars.
6. Present a Biology department seminar on your thesis research (Plan A).
7. Meet regularly with your major advisor and thesis committee.

H. RESPONSIBILITIES OF THE MAJOR ADVISOR

The graduate advisor is responsible for all phases of the student's program of study. It is of the utmost importance that a good channel of communication be open between the advisor and

student. All problems and questions should be brought to the attention of the advisor first before seeking assistance elsewhere.

1. Read the Graduate Handbook.
2. Acquaint students with your laboratory and its policies.
3. Discuss overall program of study and course requirements with graduate students.
4. Discuss your expectations regarding thesis research projects, time table, publication, etc.
5. Help graduate students choose a thesis committee.
6. Assist with experimental protocol, data analysis, scientific writing, and seminar preparation.
7. Encourage students to attend professional meetings.
8. **Meet regularly with graduate students to assess progress.**

I. FINANCIAL ASSISTANCE

1. [Graduate Assistantships](#)

Both research and teaching assistantships are available through the Biology Department each academic year. Tuition for up to 20 credits per year is waived for full-time graduate assistants.

Grant Funded Research Assistantships: Individual faculty members offer students summer and academic year RA's funded through grants and contracts. These are often tied to grant or contract deliverables and can require detailed accounting of hours and productivity. Make sure you work with your advisor to understand the time and product requirements of this funding. Many of these require additional paperwork to be completed for both the University and the funders. It is the obligation of the recipient to complete this funding in a timely manner.

College and University Research assistantships: These are merit based and provided to students after a faculty member has applied on their behalf. These opportunities provide funding for students to conduct research towards their degree completion.

Teaching Assistantships: New and returning graduate students must apply for teaching assistantships. The application deadline for teaching assistantships (available online) is generally February 1 for the following academic year. Applications can, however, be placed on file at any time. Generally, students may be awarded graduate teaching assistantships for a maximum of four semesters, excluding summers. Minimum requirements for appointment or reappointment as a GTA are provided online.

2. [Scholarships](#)

The Biology Department offers numerous **scholarships** that can be used to support graduate student research, and research and course work on Beaver Island.

3. [Funding to support research](#)

Graduate students can request financial assistance for research expenses from the College of Graduate studies. Applications and instructions are available on the site below:

4. [Funding to support travel](#)

If a graduate student is planning to travel to regional, national or international meeting to present results of CMU research, potential funding is available from the College of Graduate Studies, the College of Science and Technology, and the Department of Biology. Make sure to review all requirements and stipulations for funding prior to registering and traveling to a conference to avoid any issues with securing funding. Applications and instructions are available on the site below:

J. GRADUATE TEACHING ASSISTANT ROLES AND RESPONSIBILITIES

Graduate Teaching Assistants (GTA) are vital to the teaching and educational goals of the Biology Department. In many cases the GTAs have the most one-on-one interaction with our students. The GTAs are an integral and valued contributor to the instructional team. The information below is a brief introduction to GTA responsibilities. The goal is to define expectations and foster cooperative teaching in the undergraduate curriculum.

GTA Responsibilities

Graduate Teaching Assistants have been appointed by the Biology Department and you should consider this appointment as a professional position. You should treat your appointment as a job. As a job, you are expected to follow these general guidelines:

- Arrive on time and prepared for weekly meetings and labs
- Model appropriate and professional behavior for students
- Follow all lab and field safety guidelines
- Maintain cleanliness in the lab
- Treat students, peers, and instructional team with respect

As a Graduate Teaching Assistant, you are expected to:

- Familiarize yourself with the syllabus and be prepared to implement course policies
- Read, study, and be prepared to discuss lab materials prior to the lab preparatory meetings
- Follow directions from the instructional team, and not make changes to the course/content/expectations without approval
- Execute the labs with fidelity to the course learning objectives and lab protocol
- Maintain student grades with confidentiality
- Grade in a discerning manner and give sufficient feedback so that students learn from the assignments
- Facilitate a positive and supportive lab and lecture environment
- Maintain open communication with the instructional team regarding student issues and grades.
- Follow specific expectations relative to the course and instructional team

The GTA commitment ends when grades are due. This is usually in the week following finals week. It is expected that the GTAs will be available during the extent of the grading period to assist with grading materials, provide input regarding final grade assignment, and handle student inquiries related to the final grades, as needed.

The average weekly time spent by a GTA should be 20 hours per week over the whole semester. It is expected that GTAs will work efficiently and manage their time effectively.

The Instructional Team

GTAs will be supported by faculty and staff, including lab directors/coordinators, course coordinators, and course instructors. The GTAs, Coordinators, and Instructors are an instructional team. It is critical that this collaborative relationship be open and communicative.

The instructional team will have different compositions and responsibilities dependent on the course. Specific roles and responsibilities for team members will be made clear at the beginning of the semester. The following is a brief description of the other instructional team members:

- Lab Directors and Lab Coordinators are staff positions and have a role in coordinating all laboratory preparations. Lab Directors in the 100 level courses will have more of a role in working directly with the GTAs.
- Course Coordinators are faculty members that oversee implementation of the core curriculum (BIO111, BIO112, BIO211, BIO212, and BIO213).
- Instructors are faculty members that teach the course associated with the lab. In some instances, Instructors may oversee the lab in lieu of Lab Coordinators or Directors.

The instructional team needs to work together to provide a common, collaborative, and united front that encourages students to participate, try their hardest, engage, and learn. The coordinators and instructors will support the GTAs and not undermine the GTA's role to the students. Likewise, GTAs will support coordinators and instructors and not undermine the instructional team and/or course. It is expected that the GTA will facilitate a positive lab and class environment and support the instructor's decisions and course policies. Maintaining a cohesive, consistent, and supportive classroom environment and united front from the instructional team facilitates student learning and minimizes classroom conflict.

Student issues need to be cc'd to the coordinators and instructor, as directed, so communication is open and clear and the instructor of the course is fully informed of any issues. The team will discuss all student issues prior to discussion with student.

The instructional team will help GTAs complete their work and preparation in the time allotted via the GTA contract. It is expected the GTAs will work to help with the course, as needed, to assist with course implementation, grading, and student success. Because student enrollment is not even, GTA experience is not standardized, and everyone has

different expertise, the GTAs and instructors should view the whole course and all students as part of their responsibility and work collaboratively to teach a cohesive course.

Evaluation of Performance and Teaching Effectiveness

GTAs are also expected to teach effectively and should seek opportunities to practice and improve. As outlined above, GTAs are expected to put forth effort to understand content, practice and prepare for lab, and facilitate student learning. Positive, hard-working, prepared, helpful, and responsive GTAs that meet the defined expectations will receive positive GTA feedback. GTAs who do not come prepared to prep sessions, do not grade according to policy, are late to complete and post grading, are slow or incomplete when responding to requests, are not collaborative, or undermine the professor in meetings or amongst students will receive poor GTA evaluations.

GTAs will be evaluated over the semester by a faculty or staff member of the Instructional team. The evaluation will assess how well you have met the expectations outlined above. Student Opinion Score assessments will be administered in your course. These will be incorporated into your GTA evaluation, but are not the only, or even most significant, component to your overall evaluation. Remember all members of the instructional team are teachers too and understand the dynamics of a classroom, and we value your effort to facilitate learning and maintain high expectations of student performance. Once completed, your GTA evaluation will be reviewed by the Graduate Committee for your GTA reappointment.

K. CMU BIOLOGY GRADUATE STUDENT ASSOCIATION

The CMU-BGSA welcomes all biology graduate students. This informal organization meets as necessary to discuss problems that affect the biology graduate student, especially in regard to curricula, available equipment for research, faculty proceedings, and faculty-student interaction. New biology graduate students are encouraged to attend the meetings to help acquaint them with other students and to become familiar with the programs in the department.

L. CMU POLICIES

You should familiarize yourself with CMU's policies on [Academic Integrity](#) and [Research Integrity](#), which can be found at:

**BIOLOGY DEPARTMENT – FULL GRADUATE FACULTY
(ELIGIBLE TO SERVE AS GRADUATE ADVISORY COMMITTEE CHAIRS)**

ELIZABETH ALM, Professor, Ph.D., University of Illinois. Microbial Ecology, Environmental Microbiology.

HUNTER CARRICK, Professor, Ph.D., University of Michigan. How human activities alter water, and ultimately how this influences the health and biogeochemistry of natural ecosystems (nutrient cycling, productivity, gas exchange).

GREG COLORES, Associate Professor, Ph.D., University of Colorado. Microbial Ecology, Soil Microbiology, Biodegradation.

CYNTHIA DAMER, Professor, Ph.D., University of Virginia. Cell biology, genetics, and microscopy.

JOANNE DANNENHOFFER, Professor, Ph.D., University of Wisconsin. Molecular biology, biochemistry, genetics and microscopy applied to studies of protein deposition in maize endosperm and phloem proteins.

PETER DIJKSTRA, Assistant Professor, Ph.D., University of Groningen. Behavioral ecology, animal physiology, endocrinology, evolution.

TRACY GALAROWICZ, Professor and Chair, Ph.D. University of Illinois. Fish Ecology and Management.

THOMAS M. GEHRING, Professor and Graduate Coordinator, Ph.D., Purdue University. GIS applications, landscape ecology, management of wildlife-human conflicts, predator-prey ecology, and wildlife conservation.

STEVEN W. GORSICH, Associate Professor, Ph.D., University of Utah. Genetics, cell biology, and molecular biology of yeast mitochondria maintenance and stress tolerance.

PHILIP L. HERTZLER, Professor, Ph.D., University of California, Davis. Developmental biology of aquatic and marine invertebrates.

STEPHEN J. JURIS, Associate Professor, Ph.D., University of Michigan. Toxin biochemistry, molecular mechanisms of bacterial pathogenesis, cellular biology of host-pathogen interactions.

XANTHA KARP, Assistant Professor, Ph.D., Professor, Columbia University. Genetics, Developmental Biology, Cell Biology.

JONATHAN KELTY, Associate Professor, Ph.D., Miami University, Oxford Ohio, Neurobiology, neural control of respiration, environmental physiology.

PETER S. KOURTEV, Professor, Ph.D., Rutgers, The State University of New Jersey. Structure and function of microbial communities in the environment.

[DERIC LEARMAN](#), Associate Professor, Ph.D., Virginia Tech, Geomicrobiology, Microbiology, Molecular Mechanisms.

[DEBRA LINTON](#), Associate Professor, Ph.D., Rutgers, The State University of New Jersey. Ecology, Biology education.

[ERIC W. LINTON](#), Professor, Ph.D., Rutgers, The State University of New Jersey. Bioinformatics, eukaryotic microbiology and systematics.

[ANDREW MAHON](#), Professor, Ph.D., Old Dominion University. Molecular ecology and systematics.

[SCOTT McNAUGHT](#), Professor, Ph.D., University of Michigan. Director, Michigan Water Research Center. Limnology, zooplankton and larval fish ecology, statistics.

[ANNA MONFILS](#), Professor, Ph.D., Michigan State University. Plant Biology, Ecology and Evolution, Adaptive Management, and Conservation and Management of Aquatic Invasive Plants.

[KIRSTEN E. NICHOLSON](#), Professor and Curator of Natural History, Ph.D., University of Miami. Evolution and systematics of vertebrates, particularly reptiles and amphibians; museum studies.

[KEVIN PANGLE](#), Associate Professor, Ph.D., Michigan State University. Predator-prey interactions, Phenotypic plasticity, and Great Lakes food webs.

[SHASTA SABO](#), Assistant Professor, Ph.D., Rockefeller University. Neuroscience, Molecular and Cellular Mechanisms of Synapse Formation and Neuronal Development, Pathogenesis of Neurodevelopmental Disorders, and live fluorescence imaging.

[JOHN I. SCHEIDE](#), Associate Professor, Ph.D., Louisiana State University. Mechanism and regulation of ion transport in cells and tissues of vertebrate and invertebrate species.

[JENNIFER SCHISA](#), Professor, Ph.D., SUNY at Stony Brook. Genetics, molecular biology, and microscopy applied to studies of germ cells in the nematode, *C. elegans*.

[NANCY SEEFELT](#), Ph.D., Michigan State University, Ecology and evolution of vertebrates, museum studies.

[MICHELLE L. STEINHILB](#), Associate Professor, Ph.D., University of Michigan. Genetic models of human neurodegenerative disease, cellular and molecular neurobiology.

[BRAD SWANSON](#), Professor, Ph.D., Purdue University. Ecology, molecular ecology, conservation biology, population genetics, population dynamics, animal behavior.

[**DON UZARSKI**](#), Professor, Ph.D., Michigan State University. Wetland Ecology, Great Lakes Ecology, Nutrient Cycling, Ecosystem Ecology.

[**MALLARY WACKER**](#), Assistant Professor, Ph.D., University of Notre Dame. Immunology, Inflammation, Host-Pathogen Interactions, *S. aureus*.

[**DAELYN WOOLNOUGH**](#), Research Assistant Professor, Ph.D., Iowa State University. Spatial Ecology and Conservation Ecology.

[**DAVID ZANATTA**](#), Professor, Ph.D., University of Toronto. Molecular ecology and conservation biology in aquatic systems.