



Department of Biological Sciences

Graduate Student Handbook

2019-2020

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INTRODUCTION

Welcome to the Department of Biological Sciences at Minnesota State University, Mankato. The Biology Graduate Student Handbook was designed to provide you with information that will help to get you started on the right track and keep you there throughout your graduate career. It contains highlights from the MSU Graduate Bulletin that address some of the more frequent concerns of graduate students. Use it as a reference guide but be sure to verify any questions with your advisor and a current MSU Graduate Bulletin.

The key below will help you locate buildings referred to throughout the handbook. A map of the campus can be found in the Graduate Bulletin.

AF	Alumni Foundation Center
WA	Wigley Administration Building
ACC	Academic Computer Center
CC	Carkoski Commons
ML	Memorial Library
SU	Centennial Student Union
TR	Trafton Science Building, North, South, East, Center
WB	Wissink Building
WC	Wiecking Center
FH	Ford Hall
TN	Trafton Science Center – North
TS	Trafton Science Center – South
TR	Trafton Science Center
TE	Trafton Science Center - East

HOW DO I GET STARTED?

The Graduate Bulletin

You will want to get a copy of the current Graduate Bulletin, which is available online at the College of Graduate Studies website (<http://grad.mnsu.edu/>). It will help to answer any questions that you have relating to graduate studies. Also see the Department of Biological Sciences website regarding admission (<http://cset.mnsu.edu/biology>).

THE DEPARTMENT OF BIOLOGICAL SCIENCES

Admissions

In addition to completing the minimum requirements for the College of Graduate Studies and Research, and the requirements described below, admission to the Biology program must be approved by the **Biology Graduate Committee** prior to completion of 16 credits of graduate coursework. The Graduate Committee will evaluate the student's potential for success based on additional criteria, including performance in Biology and related coursework, and correlation between the student's research interests and faculty research interests.

Summer Review of Graduate Applications

The potential advisor, graduate coordinator, department chair, and graduate committee members (if available) will review applications received after the last spring semester duty day. For all qualified graduate students, if the potential advisor is not available after two weeks, the application will be put on hold until the advisor is available, and the applicant will be notified.

How to Apply

Admission to the Biology MS Program requires that applicants satisfy the minimum requirements for admission to the College of Graduate Studies and Research. In addition, qualified applicants should satisfy the following three requirements for acceptance in the Biology MS Program. It is highly recommended that applicants identify and contact a potential research mentor prior to applying.

1. Demonstrate proof of meeting the academic requirements for the program by satisfying **ONE** of the following criteria:
 - a. Submit an official transcript signifying that you received a bachelor's degree in Biology or a closely related discipline with a minimum cumulative GPA of 3.00 and minimum biology GPA of 3.0; OR
 - b. Submit official transcripts showing that you possess a bachelor's degree in a discipline other than Biology but have satisfactorily completed one year of general biology for majors and courses at the

- 200-level or above in three of the following areas: Genetics, Ecology, Cell Biology, Microbiology, and Physiology (five courses total). The minimum average GPA for these classes is 3.00; OR
- c. Submit your official scores for the Biology Subject GRE with an overall ranking in the 70th percentile, as a minimum; OR
 - d. The graduate committee may consider applicants, who do not meet criteria a-c, on an individual basis with the support of a member of the Graduate Faculty in the Department of Biological Sciences.
2. Submit a letter to the Department of Biological Sciences describing your interest in our Biology MS program. This letter should succinctly identify your career goals, your research interests, and identify the faculty member(s) with whom you are most interested in pursuing a thesis research project.
 3. International students from a country where English is not the primary language must submit an official IELTS score with a minimum score of 7 in speaking and in two of the other three ability categories. An internet based TOEFL (iBT) is acceptable with minimum scores of 26 in speaking, 24 in writing, and 22 in the other two categories. Similar scores from an equivalent exam can also be considered.

Deficiencies

Students who do not meet the admission requirements or students that do not have an equivalency (a grade of C or better) in the core courses required for admission, have a scholastic deficiency (listed on your acceptance letter).

Deficiencies may be corrected by:

1. Formal course work **or**
2. Approved examination(s) given by the instructor in charge (with a C or better).

*Undergraduate course taken as a deficiency will not count toward the graduate degree. Any **graduate** course designated as a deficiency may be applied toward your graduate degree, provided it is first approved by your advisor, the Biology Graduate Committee, and the Biology Department Chairperson.*

The **College of Graduate Studies** will inform you of the decision of the Biology Graduate Committee concerning your application for admission. Upon admission to the Department of Biological Sciences, you will be assigned an advisor, or you may select an advisor independently. *All new graduate students are strongly encouraged to contact potential advisors either prior to application for admission to the program, or soon after admission.*

Biology Graduate Committee

The function of the committee is defined in the Biological Science Department Governance Document. Duties of the committee include screening applicants and determining eligibility. The committee consists of the department's graduate coordinators and three additional department faculty members selected each year.

Programs Available

1) Master of Science in Biology

This program offers a specialized professional degree in Biology designed for those students who wish to continue their education beyond the bachelor's level. Biology faculty have research expertise in Physiology, Cellular and Molecular Biology, Human Biology (biomedical), Toxicology, Microbiology, and Ecology.

Requirements:

Thesis (30 credits)

Required Core (7 credits)

- **BIOL 601** – Biometrics (2)
- **BIOL 602** – Research Methods/Proposal (2)
- **BIOL 695** – Graduate Seminar (1) (3 Seminar credits required)

Required Selected Topics (4 credits)

- **BIOL 619** – Selected Topics (2-3)
- **BIOL 605** – Ethical Issues in Biological Research (2)
- **BIOL 606** – Paradigms in Ecology (2)
- **ENVR 619** – Selected Topics (3)

Required Electives (13-16 credits)

Choose any 500/600 level Biology courses in consultation with an advisor

Required Thesis (3-6 credits)

- **BIOL 699** – Thesis (3-6)

At least half the required graduate credits for the program must be at the 600 level, not including thesis credits. At least **12 credits** of 600-level courses (not including BIOL 699) are required.

2) Master of Science in Biology Education

The Master of Science in Biology Education program is for those who want to broaden their education in both biology and education. A minimum of 6 credits in education and 6 credits in a related science must be included in coursework.

Requirements:

- Thesis (30 credits)
- Alternate Plan Paper (34 credits)

Required Core (11 credits)

- **BIOL 601** – Biometrics (2)
- **BIOL 695** – Graduate Seminar (1) [requires a total of 3 credits]

Restricted Electives

- **BIOL 605** – Ethical Issues in Biological Research (2)
- **BIOL 606** - Paradigms in Ecology (2)
- **BIOL 619** – Selected Topics (2-3) [4 credits required]
- **ENVR 619** – Selected Topics (2-3) [may be taken to satisfy 3 credits of BIOL 619 requirement]

Research/Methods Course(s)

- **BIOL 602** – Research Methods/Proposal (2)

Required Biology Electives (3-10 credits)

Choose any 500/600 level Biology courses in consultation with an advisor.

Required Professional Education (6 credits)

Choose 6 credits of professional education courses in consultation with an advisor.

Required Related Science Electives (6 credits)

Choose 6 credits of related science courses in consultation with an advisor.

Required Thesis or Alternate Plan Paper

- **BIOL 694** – APP (1-2)
- or
- **BIOL 699** – Thesis (3-6)

Note: At least half of the required graduate credits for the program must be at the 600-level, not including the thesis or alternative plan paper credits.

3) Master of Science in Environmental Sciences

Requirements: Thesis (30 credits)

Required Core (16 credits)

- **ENVR 540** – Environmental Regulations (3 credits)
- **ENVR 550** – Environmental Pollution and Control (3 credits)
- **ENVR 560** – Analysis of Pollutants (4 credits)
- **ENVR 570** – Environmental Assessment (3 credits)
- **BIOL 510** – Global Change Biology (3 credits)

Choose **TWO** courses from the following:

- **GEOG 681** – Environmental Issues
- **GEOG 673** – GIS for Planners
- **POL 669** – Public Policy Analysis
- **POL 670** – Urban Law
- **URSI 604** – Zoning and Legal Issues
- **URSI 609** – Applied Urban Analysis
- **URSI 661** – Long-Range and Strategic Planning
- **URSI 662** – Operational Planning

Required Thesis

ENVR 699 Thesis (3-6 credits)

Remaining 600 level courses are selected from other programs across campus in consultation with your academic advisor.

Thesis

While the University requires a Thesis or Alternate Plan Paper before a degree can be awarded, graduate students in the Department of Biological Sciences must write a thesis based on original research.

Thesis

A thesis must be a demonstration of your ability to do individual, independent work of a creative and/or investigative nature in an area related to your field of interest. It must show independent thought in the recognition of a clearly defined problem and in its method of treatment.

A **Thesis Proposal** must be approved by the student's examining committee prior to data collection.

- Papers involving research on human participants require IRB approval prior to data collection and thesis proposal approval. IRB proposal forms are available in the College of Graduate Studies and Research.
- Likewise, any project involving vertebrates must be approved by IACUC (Institutional Animal Care and Use Committee) prior to initiation of data collection. See Dr. Penny Knoblich for the necessary forms.

The members of your examining committee must approve the copy of your thesis before you are eligible for the final oral comprehensive examination. It must conform to an appropriate style. Check with your advisor for an appropriate style to follow; also, see the Graduate Office guidelines. Students should review the [Guidelines to Capstone Experiences and Thesis/Alternate Plan Paper](#), available online through the College of Graduate Studies and Research before starting the thesis.

Amending Approved Proposals

Research proposals and amendments must be approved in writing by all members of the examining committee. Thesis proposal forms for the research proposal and any amendments must be submitted to the Department of Biological Sciences and are placed in the student's file.

Submit your paper with the binding fee to the College of Graduate Studies by the deadline for the term in which you plan to graduate.

Continued Enrollment

All graduate students must be enrolled for **at least 1 credit hour** during the semester in which they plan to graduate. In addition, access to library, biology labs and resources, and other institutional resources requires that students be enrolled for at least one credit.

Graduate Assistant Positions

The Department of Biological Sciences offers two types of graduate assistant positions. Research Assistant (RA) and Teaching Assistant (TA).

Research Assistants

These positions are supported by grants to individual members of the faculty and involve field or laboratory research work with a specific faculty member. Positions are available on a limited basis.

Teaching Assistants

The duties of a TA include teaching lower division biology laboratory sections, setting up instruction laboratories, assignment and examination grading and record keeping as well as other related activities assigned by the department. These positions are supported by the department, the Federal Work study program and the College of Graduate Studies. (*See Appendix A for more information.*)

Who is Eligible?

Applicants **must have**

- A bachelor's degree and be eligible for admission to a Minnesota State University, Mankato graduate program.
- Good speaking, writing, and overall communication skills
- An ability to work independently and creatively
- Strong interpersonal skills
- An understanding of office management procedure
- A minimum 3.0 GPA in undergraduate courses in math, chemistry, biology, and physics
- IELTS scores: minimum of 7 in speaking and in two of the other three ability categories

Previous teaching experience is an advantage.

Contract

Any student that accepts an assistantship position **must sign a binding contract**. The contract states the number of work days and your salary. You will receive a 100 percent tuition waiver (**UP TO 18 CREDITS PER YEAR**; typically 9 credits per semester).

Enrollment Requirements for Graduate Assistants

Graduate Assistants must be enrolled concurrently in courses for every term they are receiving a graduate assistantship.

- Minimum credit hour enrollment during the Academic Year is **6 graduate credits** per semester (must be enrolled prior to the beginning of duty days).

- The maximum enrollment during the Academic Year is **12 graduate credits** per semester.
- During the summer, research and teaching graduate assistants must enroll for a **minimum of 1 graduate credit**. As of July 1, 2019, unused credits from the most recent year can be used during summer sessions.

Assistantship Renewal

Continuation as a TA during the current semester and renewal as a TA during the subsequent semester depends upon

1. Performance as a TA during the current semester
 2. Satisfactory progress toward the degree. (A minimum GPA of 3.0 in his/her current MSU Mankato graduate program, and acceptable progress on thesis project.)
 3. Other factors such as enrollment and satisfactory progress by the student toward completion of the graduate degree.
 4. Assistantship support beyond 3 years requires special permission.
- (See Appendix A for more details.)**

Salary

The salary for Biology graduate teaching assistants is \$10,000 per academic year. The salaries for Research Assistants vary according to the position.

Pay is distributed every other Friday. Any problems with payroll checks should be directed to the department administrative assistant (TS 242, extension 2786). Direct deposit to the any bank or credit union is required. Wells Fargo and Affinity Plus Federal Credit Union are both conveniently located in the Student Union.

Office Space

The Department will assign office space to each TA. This space is for TAs and meeting with students; others should not have access because confidential student materials are stored in TA office areas. Telephones are not furnished in all TA offices.

Office Hours

Teaching assistants are required to hold office hours for the courses they teach. Each The required number of hours per week is course dependent and is determined by the course instructor. Since office hours are not always attended by students, a TA can use that scheduled time for other work, but the TA must remain available to students and must indicate where they can be found if not in their assigned office. Regular staffing of tutor/study room is considered scheduled office hours.

Mailbox

Mailboxes are located in the department office, TS-244. Please be sure to check your mailbox every day for correspondence or any notice items from the department.

STUDENT MAV (ID) CARD

MSU offers the Mav Card, which contains your name and picture, and is a more efficient ID card that gives you a number of additional conveniences which include: use of the library, attendance of sporting events, discounts on food purchases on campus, and some lab and outside door access. Please see the Mavcard Office for further information, SU 117, Ext. 1707.

GRADUATE EDUCATION

Graduate Advisor (research mentor)

Initially, the graduate coordinator will be assigned as your graduate advisor unless you have identified a potential advisor (research mentor) prior to admission (this is strongly encouraged). Identify your permanent graduate advisor (research mentor), depending upon the area of Biology in which you will be concentrating your studies, by the end of your first semester.

- The **Change of Advisor form** (available on the web from the College of Graduate Studies) should be submitted to the graduate coordinator by the end of your first semester in residence.
- Your advisor should assist you in selecting course work that will meet Department and University requirements. She/he will help you in selecting a topic for your Thesis and provide input on research designs.

Change of Graduate Advisor

If, during project, a graduate student or advisor withdraws, the student must either have written permission from the former advisor to utilize the project concepts and data already collected, or must begin a different project. The former advisor reserves the right to decline to give permission for the student to use project concepts and data already collected.

Examining Committees

The Examining Committee is responsible for assisting you in completing your desired program. They serve on the final written and oral examination committee. *In order for your Examining Committee to be effective, it is important that you keep the members informed about any program changes and the progress of your thesis.*

MS Biology/MS Biology Education Examining Committee

Your advisor will help you to select an Examining Committee.

- In consultation with his/her advisor, each M.S. student will invite two other graduate faculty members (for a minimum of two committee members, including the research advisor, from biology) to serve on his/her examining committee. Faculty members reserve the right to either accept or decline committee membership based on their professional area of expertise and other factors.
- It is recommended that one member of the examining committee be from outside the Department of Biological Sciences, but this is not required.

MS Environmental Science Examining Committee

The Environmental Sciences Program is interdisciplinary. An examining committee is required for the Thesis. A minimum of 3 graduate faculty from MNSU-Mankato are required on the examining committee. In addition, we encourage but do not require that professionals from outside MNSU (industry, agencies) serve on the examining committee. The chairperson must have Regular or Research Graduate Faculty status from one of the following departments at MNSU-Mankato: Biological Sciences, Chemistry & Geology, Civil Engineering, or Geography. Two members of the examining committee must be graduate faculty (Research, Regular, or Associate status) in the Department of Biological Sciences at MNSU-Mankato. One member of the examining committee must be graduate faculty from outside the Department of Biological Sciences Faculty. This member has traditionally been from one of the following Departments: Chemistry & Geology, Statistics, Geography, Political Science, or Urban and Regional Studies.

Graduate Program - Plan of Study

In consultation with your advisor, complete the Graduate Program “**Plan of Study**” by the end of your first year. This form must be signed by your advisor, the examining committee, and the Graduate Coordinator. A copy is kept in your graduate file.

Milestones during your graduate education

Recommended timetable for M.S. students in the Department of Biological Sciences

<u>Milestone</u>	<u>Expected Date of Completion</u>
Selection of (agreement with) a major professor <ul style="list-style-type: none"> • Change of Advisor and/or Committee Member Form found at http://grad.mnsu.edu/forms/advisorChange.pdf - file with Graduate Office & give Biology Office a copy 	End of the first semester
Formulation of the examining committee <ul style="list-style-type: none"> • Change of Advisor and/or Committee Member Form found at http://grad.mnsu.edu/forms/advisorChange.pdf - file with Graduate Office & give Biology Office a copy 	end of the second semester
Submit thesis proposal to examining committee <ul style="list-style-type: none"> • Complete Thesis Proposal Form found in the Biology Office & attach proposal – file with Biology Office 	end of second semester
Completion of research component	variable; consult with major professor on timeline
Complete a course plan of study <ul style="list-style-type: none"> • Complete Plan of Study Template/Form found at http://grad.mnsu.edu/forms/planofstudy.html -- file with Biology Office 	end of the third semester
Thesis written <ul style="list-style-type: none"> • Submit written thesis to examining committee 	3-5 months after completion of research
Application for Graduation <ul style="list-style-type: none"> • Enroll in at least 1 grad credit the semester you defend and intend to graduate • Complete and have signed one copy of Application for Graduation Form found at http://grad.mnsu.edu/forms/appforgraduation.pdf - file with Graduate Office & give Biology Office a copy 	Nearly 3 months <i>before</i> graduation date (See Graduate College deadline for the anticipated graduation semester.)
Oral presentation and examination <ul style="list-style-type: none"> • After defending have committee endorse written thesis – use Format of Endorsement/Signature Page link found at http://grad.mnsu.edu/capstone/ . Follow directions on the link to submit this page. • Complete and have signed one copy of Recommendation for Awarding the Certificate/Master's Degree found at http://grad.mnsu.edu/forms/recommendcertificatedegree.pdf - file with Graduate Office & give Biology Office a copy 	Announce public presentation of thesis 2 weeks prior to the defense. A good faith effort should be made to schedule defense at a time the majority of faculty are available. Presentation and exam must be at least 1 week after examining committee receives written thesis.
Completion of Master of Science degree	2-3 years after admission
Completion of student exit survey	Immediately prior to graduation

Items to consider prior to beginning your final semester

- Review Pre-Graduation Checklist.
- If you wish to participate in graduation exercises, order cap and gown.
- If you are required to take a written comprehensive exam, **Written Comprehensive Examination Request and Report** should be filed with the Graduate Office at least two weeks prior to taking the examination.
- For oral comprehensive exam, announce public presentation of thesis 2 weeks prior to the defense. A good faith effort should be made to have the defense at a time the majority of the faculty are available. Examining committee (and Biology Office for Environmental Science only) must receive a copy of the completed thesis at least **one week before the oral exam date**.
- The Recommendation for Awarding the Degree form is due two weeks before the end of the semester of anticipated graduation with College of Graduate Studies.
- Approved Thesis must be completed and given to committee members at least one week before the oral exam.

Deadlines for graduation applications and recommendation for awarding the degree are available on posted flyers through the campus or available from the College of Graduate Studies (check the web).

Comprehensive Examinations

- The Written Comprehensive Examination may be required at the discretion of the Examining Committee.
- The Oral Comprehensive Examination is required for each degree candidate and includes an open seminar on the candidate's research.

SERVICES AT MSU

Memorial Library

Services include reference/instruction for areas of on-line bibliographic retrieval, interlibrary loan, study carrels, procedures for reserve materials and many others. See student handbook for a more complete description.

Student Health Services/Medical Clinic

All registered students and those paying an activity fee at the university are eligible for the services offered at the Student Health Service located in the Carkoski Commons room #21. See Student Bulletin for more details. Group health insurance for students is available on a semester or annual basis. Brochures are available in Cashier's Office or Student Health Services.

Women's Center

Programs and services focus on issues, scholarship funding, problems and concerns affecting all University women. Located in SU 218. (phone extension #6146)

Student Union

Some resources and services available in the SU are

- Affinity Plus Credit Union
- Campus Dining
- Commuter Affairs/Housing/Community Connections
- Counseling Center
- Credit Union
- Fraternities
- Impact (Events Hot line)
- Information Desk
- Mavcard Office
- Maverick Gameroom
- Campus Computer Store
- Minnesota River Review
- MSUSA Credit Union/Loan Department
- Recreation Center
- Reporter/MSU Newspaper
- Rideshare Program
- Sororities
- Student Association
- Student Development Programs and Activities
- Student Exchange - Books/records can be traded/bought
- University Attorney
- University Bookstore
- Wells Fargo Bank
- Violence Prevention Center

CLASSROOM AND OFFICE SUPPLIES

Most of the materials and items you will need for your teaching classes can be found in the Biology Store located in TS-153. If you should need to purchase materials or supplies not available from the storeroom ask student employees in the store or the course coordinator for help on how to purchase these items.

COMPUTERS

All graduate students may use computers in TS 165 and TS 286 unless the room is reserved for another purpose. Graduate teaching assistants only may use the computer and printer in TS 244 for teaching-related purposes.

The Academic Computer Center has a large selection of computers for student use with no charge. The Center operates on a first come-first serve basis. There are also a variety of computers available in the research labs within the department.

PHOTOCOPYING SERVICES

Copies for your teaching duties can be made with department funding at the Trafton Copy Shoppe (TR C-118). A copy machine is located in TS-244. Teaching assistants will receive a code for all copying related to teaching duties. In addition, personal copies can be purchased for cash in Trafton Copy shop located in TC-118 or any copy shop on campus. Personal copy cards can be purchased at the Copy shop in the University Bookstore or Armstrong Copy shop.

SECURITY AND SAFETY Wiecking Center, WC 222 (phone extension #2111)

Building Access/Keys

You will need keys for the classrooms and possibly research labs or an office. In addition, if you intend to be in Trafton during irregular hours (i.e. nights and weekends), please carry your Mavcard so Security staff can verify your access. Outside doors to Ford Hall and Trafton South can be opened with your Mavcard.

- Pick up an access form in the Biology department office, take to the appropriate faculty supervisor for approval, and return to main office. After you have completed it you can expect a 24-hour turnaround time before you receive your building access and/or key form.
- To obtain keys for classrooms, labs, and offices, take approved key form to University Security located in Wiecking Center WC-222. A required deposit is \$15.00 per key, which can be paid with cash, credit card or check. All key(s) MUST be returned to the Key Department in Security when you graduate or no longer use them. Your key deposit will be returned at that time. Office cubicle keys are to be returned to the Biology administrative assistant.

- If you are found in the building after hours, which is usually considered after 11:00 p.m. weekdays or on weekends without appropriate access and/or your picture ID, your keys may be seized and you will be asked to leave the building. Your keys can be retrieved the next working day at University Security WC-222 (2111).

Parking Permits

Permits are required to park in designated areas on and around the campus. Permits are color-coded and are issued for the full academic year. Each color has certain privileges and restrictions.

Please refer to the "Handbook of Parking and Traffic Regulations" or <https://www.mnsu.edu/parking/> for details. The handbook can be picked up at the Cashiers Office (WA-128). Parking permit registration forms can be picked up from the Cashiers window also.

THINGS TO DO BEFORE YOUR LEAVE MSU,M

1. Remember to turn in your building, lab, and office keys to Security so your deposit can be refunded.
2. Leave your grade books with the course instructor or Administrative Assistant.
3. Clean up your office but leave department supplies so the next person can use them (includes all items picked up at the Biology Store for office use).
4. Leave contact information with department administrative assistant should we need to reach you. Please stay connected with us, as we always want to continue to support you and follow your successes.
5. Turn in your office cubicle desk keys to the Biology administrative assistant.
6. If you used a department computer, please save important data as needed on other devices. Then, inform the administrative assistant you have finished using the computer, and she will have the computer scrubbed and set up for a new user.

GRADUATE FACULTY RESEARCH INTERESTS

NAME	RESEARCH INTERESTS
Dr. Michael Bentley	<i>Applied Anatomy; Image Analysis of Vasculature</i>
Dr. Rachel Cohen	<i>Neural and hormonal control of reproduction and reproductive behavior</i>
Dr. Geoffrey M. Goellner	<i>Molecular Neurobiology; Polyglutamine Proteins</i>
Dr. Marilyn Hart	<i>The Role of Actin Capping Protein in Cancer Progression</i>
Dr. Matthew Kaproth	<i>Plant Functional Trait Adaptation, Stress Tolerance, Species Conservation (Prairies/Oaks)</i>
Dr. Penny Knoblich	<i>Physiology; Hypertension; Renal Function; Exercise; Nutrition; Obesity</i>
Dr. John D. Krenz	<i>Ecology, Evolution, & Behavior</i>
Dr. Allison Land	<i>Innate Immunology, Virology & Cancer Biology</i>
Dr. Bethann Lavoie	<i>Science Education; Problem-solving and Inquiry</i>
Dr. Gregg Marg	<i>Industrial Biotechnology; Products from Renewal Resources</i>
Dr. Steven Mercurio	<i>Toxicology; Pesticides Endocrine Disruption; Microcystins</i>
Dr. Michael Minicozzi	<i>Comparative Anatomy, Functional Morphology, and Ecotoxicology in Fishes</i>
Dr. Bertha Proctor	<i>Water Quality; Assessing Sources of Pollution</i>
Dr. Christopher T. Ruhland	<i>Plant Physiology; Antarctic Ecosystems; UV light and Plant Production</i>
Dr. Timothy Secott	<i>Microbiology; Genes and Molecular Mechanisms of Mycobacteria</i>
Dr. David Sharlin	<i>Thyroid Hormone Action in Development; Endocrine Disruption</i>
Dr. Brittany Smith	<i>Biology Education; Metacognition</i>
Dr. Robert Sorensen	<i>Parasite-Host Coevolution; Population Genetics</i>
Dr. Daniel Toma	<i>Genetics of Behavior</i>
Dr. Ryan Wersal	<i>Aquatic plant ecology and management; Surveying and detection methods for plant ecology</i>
Dr. Yongtao Zhu	<i>Microbiology; Genetics of Bacteroidetes</i>

Faculty research interests may also be found online at:

<http://cset.mnsu.edu/biology/dir/faculty.html>

GRADUATION DEADLINES

Summer 2019

Application for Graduation - June 7, 2019
Final Version of Thesis Completed, Approved, and Submitted to the
College of Graduate - July 12, 2019
Recommendation for Awarding the Degree Form - July 26, 2019

Fall 2019

Application for Graduation – September 27, 2019
Final Version of Thesis Completed, Approved, and Submitted to the
College of Graduate – November 15, 2019
Recommendation for Awarding the Degree Form – December 6, 2019

Spring 2020

Application for Graduation – February 21, 2020
Final Version of Thesis Completed, Approved, and Submitted to the
College of Graduate – April 10, 2020
Recommendation for Awarding the Degree Form – May 1, 2020

Summer 2020

Application for Graduation - June 5, 2020
Final Version of Thesis Completed, Approved, and Submitted to the
College of Graduate Studies - July 10, 2020
Recommendation for Awarding the Degree Form - July 24, 2020

If the thesis submission deadline is not met, the student must register for a credit the next term, unless the final thesis is turned in before that term begins (prior to first day of classes). The degree will still be awarded in the later term.

Purchase Cap, Gown and Hood from MSU Graduation Services. (Specialists need to order their garb six weeks before the graduation ceremony.)

Appendix A: Department of Biological Sciences Expectations of Teaching Assistants and Faculty Mentors of Teaching Assistants

Teaching Assistants

Work Responsibilities & Job Description

1. Faculty duty days are days you are contracted to work. You are expected to be available to meet with your course instructor/coordinator on every duty day of every semester.
2. Work should average 20 hours/week, the equivalent of a 50% time appointment.
3. Plan ahead (prepare, prepare, prepare) for the sections you teach. Have a backup plan should technology fail, which means you cannot cancel class because the projector doesn't work, your computer file got lost, or there was a similar technology failure.
4. Teach your two or three sections each week competently.
5. Conflicts with teaching (planned and unplanned absences)
 - a. Inform course instructor/coordinator at the beginning of the semester, or as soon as you know, of potential conflicts with teaching obligations. You are responsible for supplying your course coordinator with a list of potential substitute teachers. (Potential substitutes must be teaching the course already.)
 - b. In the event of an **emergency** (family death, severe illness, etc.) contact your course instructor/coordinator as soon as possible. If time permits, find potential substitutes as above.
6. Prep labs and clean up labs as assigned.
7. Attend weekly course meeting (if your course has one).
8. Proctor lecture and lab exams.
9. Hold weekly office hours as required for your course. Post a note on your office door if there is a change. Changes can only be made for emergencies.
10. Grade student work accurately and return it in a timely manner (as specified for your course, but not before all students in the course have handed the assignment in).
11. First Semester, New TAs Only: Observe another TA teaching the lab before you teach it (actively practice doing the lab during this time).
12. Attend lectures for your course as requested by your course instructor/coordinator.
13. Be on time to classes you teach and weekly course meeting (if there is a meeting for your course).
14. Leave room in your schedule for all of these things, not just 6 hours per week of teaching.

Professional Conduct

1. Be friendly, but you do not have to be your students' friend. Be enthusiastic, and remember you are the key course contact for the students because they do not get a lot of one-on-one time in lecture. Rotate among students during lab to help. You represent the department and the course.
2. Do what your course instructor/coordinator asks.
 - a. If you think there needs to be an exception or change, ask him/her and receive approval before making a change. Often the professor asks you to do something to keep consistency across the sections of the course. The students do talk, and we want to be as fair to all the students in all the sections as we can.
 - b. The course instructor/coordinator is responsible for the entire course, including the content and accuracy of all lecture and laboratory/discussion course materials and the performance of the laboratory instructors. In these regards, the course instructor/coordinator has the right to see any materials related to the course.
3. Give your students a way to contact you, at the very least your official MSU email address (firstname.lastname@mnsu.edu) and office room number.
4. Check your biology department mailbox and email daily. If you are not on campus daily, tell students that you cannot and do not check your biology department mailbox daily. Respond to students within 48 hours. If you cannot answer a student question within this time period, at least respond and tell them you are looking into the question.

5. Maintain confidentiality regarding students. You may discuss students with the course instructor/coordinator but may not discuss them with anyone else to comply with MSU's data privacy policy. Do not post or email students grades with names, tech ID number, or other identifiers. If you post grades, ask students for a code they want used when you post grades, and use this instead of names, tech IDs, etc. Do not return papers such that grades are visible to other students.
6. Do not date your students.
7. Act professionally: proper language (no swearing), no offensive jokes, do not demean students – support and help them.
8. You are responsible for finding a substitute teacher in the event of an emergency (family death, severe illness, car accident, etc.). Let your course instructor/coordinator know what is happening and who your sub will be immediately.
9. Keep students in lab the entire time – learning, not doing busy work
10. Abide by policies on discrimination, coercion, harassment, and favoritism. See <http://www.mnscu.edu/board/policy/1b01.html>, <http://www.mnsu.edu/affact/brochures/DISABILITY.pdf>, <http://www.mnsu.edu/affact/brochures/RACIAL.pdf>, <http://www.mnsu.edu/affact/brochures/SEXUAL.pdf>, http://www.mnsu.edu/affact/brochures/SEXUAL_GENDER.pdf.
11. **Your continuation as a TA during the current semester and renewal as a TA during the subsequent semester depends on**
 - a. Performance as a TA during the current semester. Poor performance includes:
 - i. Failure to follow effectively work responsibilities and professional conduct outlined above.
 - ii. Missing more than one week of teaching obligations for non-emergency situations (emergency = family death, illness, or injury), even if a substitute is available.
 - b. Satisfactory progress toward degree.
 - i. GPA of 3.0 or greater in his/her current MSU Mankato graduate program (Unofficial transcripts must be submitted for TA renewal.)
 - ii. Acceptable progress on thesis project
 - c. Meeting enrollment requirements
 - i. A minimum of 6 graduate credits per semester
 - ii. A minimum of 1 graduate credit during summer
 - d. Assistantship support beyond 3 years requires special permission
 - e. Course enrollments. (If course enrollments are low, TAs may not be needed.)

Faculty Mentors

1. If your requirements of your student create conflicts with teaching responsibilities, you must work with the course instructor/coordinator to resolve these conflicts.
2. Faculty mentors are encouraged to pursue research assistantships for any students whose research will cause significant conflicts (such as missing more than one week) with teaching obligations.

Reminder: Repeated failure of a faculty mentor to accommodate student teaching obligations may affect the awarding of future teaching assistantships.

Appendix B: Order of Granting Teaching Assistantships

1. Returning TAs, completed 1 year, good standing
 - a. Appropriate academic progress
 - b. Appropriate progress in research (mentor feedback*)
 - c. Acceptable teaching effectiveness (course coordinator feedback*)
2. Returning TAs, completed 2 years, good standing
 - a. Appropriate academic progress
 - b. Appropriate progress in research (mentor feedback*)
 - c. Acceptable teaching effectiveness (course coordinator feedback*)
3. New admits, based on good quality applications, AND Current graduate students without a teaching assistantship, in good standing
 - a. Appropriate academic progress
 - b. Appropriate progress in research (mentor feedback*)
4. Returning TAs, completed 1 year, marginal progress
5. New admits, average application, AND Current graduate students without a teaching assistantship, average standing
 - a. Appropriate academic progress
 - b. Appropriate progress in research (mentor feedback*)
6. Returning TAs, completed 2 years, marginal progress
7. Returning TAs, completed 3 years (beginning 4th year)
 - a. These can be moved up if recommended by the advisor (i.e. research project suffered unusual setbacks, but student is working hard.)
8. Returning TAs from other departments

Grad assistants that need to convert to TA funding will be treated as a TA with the same standing.

*Feedback may be initiated by the graduate coordinator, the course coordinator, or the mentor.

An email will be sent each spring to all faculty members, asking for feedback concerning current TAs.

Each spring semester, all current TAs will fill out and return to the Biology Office, a form requesting the following information.

- Whether or not the TA desires a teaching assistantship for the following fall.

- Preferred course teaching assignments, numbered 1 through 3.
- Summer contact information
- An unofficial transcript

Priorities (in order of importance) for granting TA-ships for Summer Sessions.

1. TA must be registered, or planning to register for fall semester, **OR** TA will graduate in the summer.
2. Preference of the course instructor.
 - a. If requested by the instructor, a single TA may be assigned more than one section.
3. If the course instructor has no preference:
 - a. Experience in teaching the course
 - b. Likelihood of progress during the summer on the research project.

Appendix C: Suggestions from Graduate Alumni for Research Practices in the Department of Biological Sciences

Graduate students should note that Appendix C does not document Department of Biological Sciences policies. It contains recommendations, and its purpose is to start conversations between research mentors and students.

As a university dedicated to enriching students' experience in both academics and research, conduct in research practices must uphold the integrity of the Department of Biological Sciences at Minnesota State University, Mankato. This document serves guidance for ethical standards for how biologically-based research is expected to be conducted. It also serves as a reference for issues associated with project development, scientific integrity and project completion.

Misconduct and Negligence

Differentiation and understanding what constitutes misconduct and negligence are important to process with scientific research. The federal government and MSU Mankato define misconduct as fabrication, falsification and plagiarism. MSU, Mankato's policy is found in: Responding to Issues of Research Misconduct: at <http://www.mnsu.edu/atoz/policies/issuesofresearchmisconduct2015.pdf>

Misconduct in research is sufficient reason to terminate a student in the program. Misconduct is a rare occurrence. A student who suspects misconduct should first talk with the person involved, be it student or advisor before initiating a formal complaint. If there is sufficient evidence of misconduct that is not being addressed, a student should talk with the next person in authority for advice. For example, if the misconduct is by a fellow student, then to the advisor, then graduate coordinator and/or department chairperson, before going to the dean and academic affairs.

Negligence occurs when continual mistakes are made within research and not corrected. Poor attention to details of protocols, recording of data, timeliness and proper handling of research subjects results in frustration, breakdown of relationships within the lab, and poor progress towards completion of degree work. Negligent behavior can have other far reaching ramifications. Negligent behavior and malpractices can result in damage to campus property or pose as a safety hazard to students and faculty members working within the laboratory environment. Also, negligent behavior could result in the unethical treatment of animals if proper care is not taken during research involving animals as test subjects. Consequences of confirmed negligent behavior can lead to expulsion of the student if deemed necessary by the supervising department.

Conflicts of Interest

Conflicts of interest may arise in the research process and can be resolved effectively if approached properly. Potential conflicts could arise between people involved in the

research team, with a funding source, with the university, or with collaborative affiliates. Any number of problems could arise, including but not limited to project timetables, deadlines, coercion, bribery, and scientific misconduct. If a student should feel that a conflict of interest is arising, the problem should be communicated directly with the party in question. After doing so, if the conflict has not been resolved or handled appropriately, the student should go to the next highest authority figure above the questionable party. This process should be continued until the conflict is resolved and an appropriate solution implemented.

Student and Mentor +/-or Advisor

A professional relationship between a student and an advisor/mentor is critical to the student's success, and is often important to the professional success of the advisor. Furthermore the relationship requires trust between the two individuals and others in the lab. Regular contact between all parties should begin early in the student's program to facilitate a reasonable completion date. Important expectations need to be established as early as possible, yet remain flexible to accommodate unforeseen conflicts.

Some expectations in the research relationship with student and advisor follow:

For the student	For the mentor/advisor
Prepare written protocols for specific experiments	Give clear guidance and review of protocols
Keep accurate and complete records of experimental work	Review lab notebooks early and often to provide guidance
Carry out specified techniques and experiments	Teach procedures, review progress
Be prepared for meetings	Meet regularly and in person if possible
Communicate when something isn't working as expected	Recognize and help solve problems
Take some initiative in developing the research project through literature search, analysis of past	Help student learn how to search the data bases, analysis tools, etc.
Think about the project and make constructive comments	Think about the project as it develops and make constructive comments
Plan for future after MSU, Mankato	Provide insight into career opportunities and other possibilities

Many discussions should take place between graduate student and advisor relating to research. The following are questions that should be answered early in the relationship.

1. Plan of study:

- What are the best choices for coursework to support the research?

- What balance is expected between coursework, research activities, and, if applicable, teaching responsibilities?
- What is the expected level of involvement outside of the academic calendar?
- What extracurricular obligations could interfere with the project program?

2. Research expectations

- What projects are available for the student to work on?
- What freedom does the student have in choice of a project or the implementation of a given project?
- Is the student able to propose/develop project unrelated to what the advisor is working on?
- What are the required protocols and procedures affiliated with the research?
- What contingency plans are appropriate if the project proves to be unfeasible or too complex? Or if the student's level of performance is affecting results?
- How does one keep good records of research? What needs to be included? Who owns the data I generate in this study?
- How is funding to be obtained?
- If outside mentors are needed for the project, how is the student to relate to both the advisor and mentor?
- Is a publication possible from the project? Are external presentations possible? Who presents (student or advisor)? How is authorship decided if a publication is written based on the project?
- Is the graduate student able to recruit undergraduates to help in the project? Does the advisor need to approve the undergraduates? What are the expectations in supervising those undergraduates?

3. Timeline:

- What are the recommended milestones for successful completion and when should they occur?
- When should the committee be formed? Who would be a good committee member for this research project? How often should the committee meet with the student?
- How long should the project take considering course work, employment needs, etc.?
- What can be done if the student has been diligent yet the project is not progressing as expected?
- When should the research proposal be completed? What should be included in the proposal?

Dissemination of Research

Thesis, manuscripts, presentations

To complete the thesis degree, the research study is presented as a formal thesis. Styles of theses vary with mentor and discipline. It pays to start collecting information for your thesis as early as possible. In some ways, the thesis is a team effort.

Students should expect to write many drafts and to receive much feedback from their mentor and committee members.

Once data collection is completed, a presentation or publication might be possible. Presentations can be at the university or at national or international conferences. Presentations can be in the form of a poster or an oral presentation. If there is a possibility of publication, this should have been discussed at the beginning of the project. The research mentor determines authorship (inclusion and order) of research done under the auspices of the research mentor's lab. The order of authors will depend on the project, but the first author should be the person who helped plan the project, conducted most of the experiment, and/or wrote most of the paper. The order of the authors may depend on the journal specifications that the manuscript is submitted to. To be an author, the person must have had a significant contribution to the project.

Peer Review within Labs

Students will share their ideas and drafts with the lab members, but all lab members will be respectful of the research and won't plagiarize ideas or share ideas with the public. All students will be respectful of the intellectual property of others (written drafts, overhearing ideas).

Thesis Defense

Students present their public presentation before graduation. Students will do a public presentation and a private presentation specifically for committee members.

Other Ethical Issues Pertinent to Some Research Topics

Use of human subjects for research requires approval from the Institutional Review Board (IRB) before any work can proceed. The link to the guidelines presented by the MNSU IRB is as follows: (grad.mnsu.edu/irb/). The primary investigator (PI) must fill out the appropriate paperwork. All students involved in the research will be trained in the proper protocols. Completion of formal consent paperwork is necessary for all study subjects involved in research. If the research participants are impaired, whether because they are infants or adults with communication impairment, they should not be a target for the study because they cannot effectively communicate their decisions. Limits on what can be done within research involving human subjects, is up to the discretion of the IRB at the time of methodology submission.

In order to use animal subjects within research a proposed animal care and use form must be submitted to the MSU, Mankato Institutional Animal Care and Use Committee (IACUC). Their link is as follows: <http://grad.mnsu.edu/research/iacuc/>. The PI involved with the research must create an Animal Care and Use proposal every nth amount of years with the ability to add research students and projects between years. The students' responsibility is to abide by the animal use procedures and communicate with their mentor if the protocol happens to be altered in any way for further experimentation. This change would then need to be resubmitted to the

IACUC. When using animal subjects the researchers should always remember the three R's that promote proper animal care and use: reduce, refine, and replace. It is important that researchers use the least amount of individual animals to obtain their results. Refining methodology and techniques to insure reduced pain and suffering of the animal is needed within protocols.