Advising Philosophy and Graduate Student Expectations

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What do I do?

My job as a professor includes research, teaching, and service. I am expected to write grants and perform research that will result in tangible contributions to the field, the community, and to society. As the PI, I will also train and advise researchers in the lab. I aim to contribute to your professional development including progress toward your degree as well as long-term goals. I have prepared this document to clearly communicate my expectations of advisees and what advisees can expect of me.

What do lab members do?

Advisees are expected to take responsibility for their own research, and upholding the standards of sound, ethical research. Lab members are also responsible for providing a supportive, accepting, and constructive environment for fellow lab members and their peers on campus. Advisees are expected to contribute to a lab setting that is a fun, safe, and inclusive place for scientific discovery. Lab members are expected to disseminate the findings of their research. Our goal is to publish research in scientific journals and communicate our findings through presentations in academic settings as well though outreach or other forms of science education.

PhD Students: The Dissertation

- Identifying your topic: I expect my advisees to develop research topics within microbial ecology and biogeochemistry. In some cases, these projects are part of ongoing grants and collaborations. In other cases, the research topic can be a new direction or tangential to ongoing research. Our projects generally examine microbial physiology and metabolism and/or carbon cycling in aquatic or cryospheric environments.

    - The development of an advisee's research topic is expected to evolve through interactions between myself and the advisee and with other lab members through individual meetings, lab group meetings, journal discussions and in-depth literature and topic review by the advisee. Typically, the topic and hypotheses should become clear before or during the second year of the degree program.

- Hypotheses versus Questions: I expect my advisees to develop research projects that are hypothesis-driven while also understanding that some unknowns in complex biological systems will lend themselves better to a question-oriented approach from which hypotheses can be generated and tested.

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- Dissertation versus Publications: Dissertation chapters should be written with the expectation that they be submitted as a series of publications. Ideally, chapters will have already been submitted for publication prior to the dissertation defense. The thesis chapters should be accompanied by a first chapter providing a literature review and synthesis of the subsequent chapters to represent a cohesive research program and a final chapter or conclusion chapter underscoring the results of the research program and potential next steps.

Master's Students: The Thesis

- Identifying your topic: I expect my advisees to work with me to develop research topics within microbial ecology and biogeochemistry during their first year. Master's students can expect more guidance in thesis development than PhD students can in dissertation development, but the same general parameters apply: In some cases, these projects are part of ongoing grants and collaborations. In other cases, the research topic can be a new direction or tangential to ongoing research. Our projects generally examine microbial physiology and metabolism and/or carbon cycling in aquatic or cryospheric environments.

- Hypotheses versus Questions: I expect my advisees to develop research projects that are hypothesis-driven while also understanding that some unknowns in complex biological systems will lend themselves better to a question-oriented approach from which hypotheses can be generated and tested.

- Thesis versus Publications: A master's thesis should be written in a publication style, and centered around at least one publication. The thesis chapters should be accompanied by a first chapter providing a literature review and synthesis of the subsequent chapters to represent a cohesive research program and a final chapter or conclusion chapter underscoring the results of the research program and potential next steps.

Doing the work of Science:

- Publications: Publishing is essential for most career paths; even if a student chooses to follow a non-academic career path, writing and presenting data of publication quality is a valuable skill. My expectation is that PhD students produce at least 3 first-author publications. Students pursuing a Masters' degree will be expected to first-author at least one journal paper submission. I expect publications to be written throughout the training program (not only at the end). For PhD students, I expect at least one paper to be submitted before defending with two others nearing submission and a timeline for planned submission. I also encourage and expect my advisees to be working on manuscripts that may be tangential to their thesis, whether as first author or contributing to collaborative projects in the lab or with external collaborators.

- Authorship: Barring unusual circumstances, it is my policy that advisees are first-author on all work for which they took the lead on data collection and preparation of the initial

draft of the manuscript. Authorship arrangements should be discussed at the onset of a project and be re- visited as soon as its apparent that data will result in a publication. I expect all students to prepare figures and write the results of interpretation of their data. In general, authorship arrangements will be discussed primarily between the first author and myself (or whomever is the corresponding author). I will dedicate time to reading and editing manuscripts, abstracts for meetings, grant proposals, etc.

- Original Literature: I expect advisees to dedicate time each week to read and review literature. Advisees are expected to maintain context for their research within recent and historical published literature so that previous studies guide their research. I also suggest advisees participate in journal clubs as their schedule permits.

- Taking care of the lab: we are lucky to have a wonderful lab space in the Great Lakes Research Center. We do not have dedicated laboratory technicians responsible for tidying space, stocking supplies or doing dishes. It is the responsibility of each lab member to ensure a safe and clean working environment including washing dishes, putting items away, keeping countertops clean, etc., and to communicate any safety issues. In addition, each lab member is responsible for replacing lab stocks and notifying others when materials or supplies need to be ordered BEFORE the materials are exhausted. Remember, discriminatory behavior or attitudes are not welcome in the lab.

  Each and every lab member is responsible for safety in the lab. Use personal protective equipment and if you have questions about how to ensure safety—for instance, proper disposal of waste, what needs to be performed in the fume hood, what is secondary containment—always ask and get an answer before proceeding. There should never be food in the lab, and keep all work areas clean and organized to maintain your safety and the safety of others. Label all chemicals and solutions with their contents, and hazardous or toxic material, and your initials/name and date of preparation and be sure to store each in an appropriate location—ask if you are not sure!

- Open Science: We are working, as a lab, to ensure greater transparency in our research by providing lab policies and updating procedures. I expect advisees to share codes and script and ensure the reproducibility of data analyses. Assuming the advisee is comfortable with it, we can also post manuscripts to BioRxiv, EcoEvoRxiv, or EarthaRxiv which are free for everyone, in addition to submitting them to peer-reviewed journals.

- Research Funding: I will work to obtain funding from external sources to pay for salaries, supplies, and general lab operations to facilitate advisee success. I also expect advisees to consistently look for and apply to opportunities for outside funding, and personal and professional development. Opportunities for professional development and external funding are mutually beneficial for both the lab and your career.

- Grant Proposal Writing: Proposal writing is an important skill for all scientists regardless of career path. I expect advisees to write proposals for internal (department, college,

university) and external funding opportunities including fellowships, research grants, travel grants, etc. I will also involve advisees in the grant writing process assuming their time permits.

Working Together and Your Grad Program:

- I ask that advisees acknowledge they have the primary responsibility for the successful completion of their degree. This responsibility includes commitment to coursework and research, and keeping track of deadlines associated with the degree process.

- Individual Meetings and Mentoring Style: I expect advisees to schedule individual meetings with me. Meetings can be arranged as-needed, between once per week and once per month. These needs are likely to vary based on the advisee's project stage, personal preferences, and both of our schedules. Meetings can serve as a mutual check-in, with no set agenda, but if there are specific topics to be covered or specific items to discuss, these should be shared with me at least 24 hours in advance so that I have to prepare. I expect mentees to communicate with me if they feel they need a meeting, and to keep me up to date on their progress. My goal is to be flexible and adaptable in mentoring for each advisee. I only have my lived experience to work from, but I will do my best to adapt and alter my mentoring style to best meet advisee background, expertise, and professional goals and aim to continuously improve my mentoring skills.

- Independence: In general, I expect advisees to work without daily input or guidance from me. As long as advisees are meeting expectations and deadlines, they can largely set their own schedule. We will work to establish mutually agreed upon deadlines for each phase of your work during one-on-one meetings.

- Communication: Communication is central to science and society. I prepared this document to clearly communicate my expectations of advisees and to reduce the possibility of misunderstandings. However, I also expect this document to evolve and adapt with changing circumstances and as I continue to develop as a mentor and a scientist.

  I am available by email or in my office. You can also call me or text me in case of emergency. I will respond to email as soon as time permits. My goal is to prioritize communication with my students, so please don't take it personally if I don't respond right away. When I'm in my office, I'm happy to talk to you on a walk-in basis but may not always have time to dedicate to a longer question during these times.

  Some of the projects in the lab are things that others in the group are also working on. In these cases, the information you may be sharing with me via email could be something that you should be communicating to the whole group, like a project update that might influence work that they are also doing. Please consider the entire scope of the project when implementing your communication. This will help all of us to keep working smoothly.

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Lab documents are shared via Google Drive. This includes protocols, chemical safety, lab inventories, etc. Lab members will be given access to the lab Google Drive are expected to use it for our collaborative work.

Do You Need Help with something?
We are an open environment for constructive feedback and collaboration. However, everyone is responsible for their own learning and development. This responsibility includes commitment to your coursework and research.

If you find yourself stuck, start with Google and primary literature. Adopt the policy of not asking someone else by default if you can figure it out yourself in a few minutes. We respect and value ours and others time while valuing the opportunity to learn something more deeply. Still stuck? Seek advice from your fellow lab-mates. I am also available to help if needed.

- Scientific Integrity: Never manipulate or selectively exclude/expand data to achieve an expected or desired result. This is falsification and ignorance is not an excuse. Never use text or content from elsewhere in your writing without citing it appropriately – this is plagiarism.

- Data: Every experiment must be documented in its entirety including date, time, detailed methods, and every result. If you also have additional notes or calculations, paste them in to your notebook. Your notes, records and all tangible research data are property of the university. Backup your computer data to Google Drive at least weekly. It is imperative for federally funded research that you record your data and findings.

- Lab Group Meetings: Participation in weekly or bi-weekly group meetings including presenting data, leading or contributing to discussions, and providing support for others is expected. I also expect each advisee will do their part to create a climate of constructive engagement and mutual respect. Advisees are expected to attend lab meetings and lab events and to show up on time and prepared. In the event that these expectations cannot be met, advisees must alert myself and other members of the lab in a timely manner. Note that we will, in some cases, participate in joint group meetings with labs on campus with interests similar to ours. Advisees should uphold the same standards of participation, support, and respect in these meetings as in our group meetings.

- Coursework: I do not have standard or expected course requirements beyond those of the graduate program, although I may have recommendations based on your background and our plans together. I encourage advisees to seek out coursework that adds to their career goals and professional development. I encourage advisees to attend workshops and seminars, visit collaborators labs or seek out any other opportunities that would build skills that their research and career path require.

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- Teaching: I expect all advisees to be involved in teaching (Graduate Teaching Assistantships, guest lectures, summer courses, etc.) and mentoring (other graduate and undergraduate lab members, other peers, or younger students through educational activities) as their program permits. These activities aid in learning to communicate complex subject matter to a range of audiences. In addition to communication skills, a GTA is an opportunity of advisees to gain valuable time management skills and to be able to balance to balance multiple responsibilities (such as teaching and research).

- Time Management: I expect a lot of advisees and degree programs come with their own expectations for course work and other degree requirements. I expect advisees to practice good time management and to work efficiently using a schedule and time that works best for them. I expect advisees to set and meet regular deadlines. I also expect advisees to need and want time away. Work-life balance and vacation time or time away are essential for creative thinking and health and I encourage advisees to take time off. I find that there are times when more effort will need to be devoted to work (field seasons, project deadlines, meetings, periods of intense coursework) and it may not be ideal to schedule time away, but those times are balanced by those when it is easier to get away. Remembering this, and identifying those times, can help significantly with getting through the busy times.

- Relationships with other advisees: I expect advisees to participate in the mentoring process. We each have strengths and weaknesses, and differing expertise or experience. As a result, each lab member is expected to help out other members of the lab when help is requested, provide constructive feedback and suggestions, and ask for help when necessary. In general, more senior personnel are expected to take on more responsibility for mentoring but the overall goal is for each of us to know our own strengths and weaknesses and aid each other when necessary. At the same time, advisees are responsible for their own research goals and are expected to use our time wisely to reach those goals and to respect others' time.

- Individual Development Plan: I encourage advisees to write individual development plans, and, if advisees feel comfortable sharing these, I am happy to contribute to the development and evolution of the plan. You can find examples from the Michigan Tech Graduate School here.

- Attendance at Department Functions: Students should attend the department seminar on Thursdays at 3pm, and are encouraged to participate in any other department events. Our participation is important to maintaining a collegial atmosphere in the department – we are responsible for building the culture we want to work in.

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Professional Development and Career:

- Developing a professional network is important for many career paths. I expect advisees to attend national meetings and to report on their research at those meetings. I will do my best to help find money to make this possible but obtaining support for meeting attendance should be a joint effort. Attending meetings will be discussed in individual meetings and as part of short- and long-term goals.

- Career Paths and Career Development: A graduate degree in the sciences can lead to a number of career paths, and I will dedicate time and resources to help equip advisees for their career goals. In order to facilitate this, I ask that advisees discuss the career paths and goals they are interested in while realizing this may evolve over time. Through the lab, coursework, workshops, and other opportunities, we will work together to build a program where you can obtain the experiences and skills needed to reach your career goals.
  I encourage advisees to explore service and outreach activities that will help them explore their interests and equip them with skills that will benefit them in their careers. Please take advantage of opportunities through the department, college, and Graduate School for professional development. Become a member of one or more professional societies (e.g. the Association for the Sciences of Limnology and Oceanography, the American Geophysical Union, the American Society for Microbiology), and consider joining a peer network such as the Association for Early Career Polar Scientists. Consistently look for and apply to opportunities for outside funding, and personal and professional development.