



**McEwanlab.org**

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## ***Guidelines for Undergraduate Research***

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Undergraduate research is a fundamental component in the McEwan Lab. The work environment in the Lab is supportive of the development of intellectual and practical capabilities for students. Although students often begin by assisting with general lab tasks, the goal is to provide a pathway for the individual toward *assuming a leadership role in every piece of the scientific process*- experimental design, grant writing, data collection, data analysis, manuscript writing, and presenting. Undergraduates in the McEwan Lab are provided with the opportunity to move through a systematic progression as described below- although each case is unique and exceptions are common.

### **Lab Member Benefits**

We are committed to professional development for every lab member. This includes helping students find a research pursuit that also fits within the broader lab mission of the Lab. This will involve helping you put together the skill set, and connections, needed for you to accomplish the research, while also staying focused on the longer term development of the science. We are dedicated to career advancement for Lab Members. We will work to help you figure out where you want to go after UD, and what steps do you need to take now to get you there. We provide strong letters of support for those who contribute to the lab and we will leverage our professional network to help you take the next steps after UD. Joining the lab also enters you into an existing, broad, network of the McEwan Lab itself which includes alumni who are now professionals working in many different companies and organizations.

### **Becoming a Member of the McEwan Lab**

Becoming a lab member means signing on to serious experiential learning opportunity that requires the individual to commit themselves to the Lab community. We are looking to engage with students who are passionate about ecology and who will contribute to our collaborative culture. In particular, these are the 10 minimum expectation for every Lab member:

### ***La Decima --- Expectations for every lab member***

*If you cannot do these 10 things, then you cannot belong to the McEwan lab*

- 1) Register for BIO 300 – Forest Ecology. This is offered every semester and is a curricular way for students to get credit for lab work. It counts toward hours for graduation and your GPA but does not count for individual course or lab credit. Exceptions are possible.
- 2) Bring a positive and inclusive attitude into all lab interactions. Negativity or disrespect toward lab members will not be tolerated.
- 3) Remain informed about lab activity through paying attention to the lab email list. *If you are too busy and/or too irresponsible to read lab emails, you are too busy and/or irresponsible to belong to the McEwan lab.*
- 4) Attend weekly lab meetings during the academic year. We meet on Wednesdays at 11:00 am to discuss our ongoing projects, to read & critique each other's work, to talk about professional development, etc. We can also problem solve as a group, and take trips to field sites.
- 5) Spend ~3-5 hrs/week in the lab in training and scientific activities. These hours are most commonly coordinated with a graduate student or an undergraduate project leader. Helping others is a critical part of contributing to the lab community.
- 6) Join the field team when possible for off-campus opportunities training and scientific activity. Depending on the level of activity in the lab, there are often many opportunities for heading into the field and all lab members are expected to make efforts to join these forays.
- 7) Be punctual and responsible about appointments and for lab and field hours. One of your primary tasks, especially early in your time in the lab, is to demonstrate reliability.
- 8) Attend pertinent campus events. In particular, lab members should attend lectures on campus that are ecological/environmental in nature. As a lab, we usually host 1 invited speaker/semester who is a scientist from outside UD. I expect lab members to interact with that person.
- 9) Do high quality work. I expect students conducting research in the Lab to do high quality work that is worthy of professional presentations and, ultimately, publication. This means careful and diligent data collection. The details matter!
- 10) Push the science forward with presentations and, when viable, through to peer-reviewed publication. Each year, I expect most everyone in the lab who has usable data to present at the Stander Symposium. Some students may be able to present work at a regional or national conference.

## **Technicians**

These are paid positions, (minimum wage per BIO Department Policy); 5-10 hrs/week that some Lab Members move into. There are more interested students than positions, so getting into these slots is seniority based and competitive. This is step up in responsibility. Students in this position will be trusted with more complex tasks and analyses. When appropriate, these positions could include full-time employment during the summer break. Students in these positions, generally, are poised to start thinking about research projects that they could participate in more of a leadership role. Students in these positions are expected to comply with *la decima* and also:

- 11) Be willing (and able) to take on more complex scientific tasks.
- 12) Begin familiarizing themselves with both the operational aspects of field/lab tasks, but also the *reasons* for them.
- 13) Work independently, without supervision, effectively.
- 14) Instruct and serve as a role model for students with less experience.

## **Undergraduate Researchers**

These are more advanced position. Often >10 hrs/week. Students may be paid in these positions, may use these activities for independent study credits, or both. They are a step up in responsibility from the Technician position. In these positions, students are taking on large sub-sections of research projects. They are seeing field/lab tasks through to completion, collecting and beginning to analyze data. These students should begin reading scientific literature. A student in this position will begin writing small grants and may present research at scientific meetings. These students may also begin engaging with regional natural areas managers. In addition to all above, these students will:

- 15) Take a leadership role with their research.
- 16) Be willing to problem solve.
- 17) Work all the way through the scientific method, including preparing a final report of their findings and presenting at Stander.

*Note: If you are interested in pursuing an **Honors Thesis** at UD with your research based in the McEwan lab then you should attain this level of competence or higher.*

## **Undergraduate Project Leader**

These are the most advanced undergraduate position in the lab. Usually > 15 hrs/week. The student is expected to meet all of the above and take on most of the tasks associated with being a graduate student. A Project Leader takes the initiative with a project, helps develop a research vision and pursues that vision. A Project Leader develops timelines, collects data, processes data, analyzes data, and vigorously pursues presenting a regional or national meetings and publishing in a peer-reviewed journal. Very often a Project Leader will have undergraduates who they direct on their project. Students in this position are expected to interact at the level of a dedicated scientist, and may be invited to functions usually reserved for only Graduate Students. Ascension to such a position will usually involve working through the various other levels successfully (a multi-year process). A student in this position will be perfectly position to move into graduate school or become a professional ecologist. *It is quite rare for a student to arrive at this level of excellence.*

## **Norris Guidelines for Undergraduate Research Projects**

One of the biggest challenges of completing a research project is properly budgeting time for analysis and writing. These come at the end of the process and the time commitment needed to bring the project to completion properly is often *vastly* underestimated. Here are guidelines for research projects in the McEwan Lab that come from lab alumna Katie Norris:

During the final year of the project I expect:

- All initial data analysis to be completed, and turned in, by **November 1<sup>st</sup>**. This includes the creation of maps, graphs, and statistical analyses.
- A completed draft of the final manuscript must be turned in, by **February 1<sup>st</sup>** of the final year. The remainder of the semester will be spent editing and sharpening the manuscript.

## **Data Ownership, Sharing and Publishing**

As discussed at length in the Data Management Best Practices [document](#), at the time of graduation, or the ending of any particular project, all data and other information associated with the project must be transferred to Dr. McEwan for curation, storage, publication or sharing. Students may be entitled to authorship on subsequent publications; however, that is determined on an individual basis depending on the efforts of the students within the context of the overall project. As Principle Investigator in the lab, and the person responsible to funding agencies, etc, Dr. McEwan is the ultimate curator of all data collected in the lab and reserves the right to move forward with publishing or other uses pursuant to the [code of ethics](#) surrounding scientific information put forward by the Ecological Society of America.

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*I have read and accept these terms and conditions:*

Signature \_\_\_\_\_ Date \_\_\_\_\_.