**Bushley Lab – Expectations for graduate students**

**Roles and expectations for myself as mentor and for you as mentee:** As you embark on graduate study, it is important to recognize that a graduate degree is very different from an undergraduate degree. As a graduate student, you are expected to develop into an independent and successful scientist. Unlike an undergraduate degree where doing well on exams is your measure of success, success in graduate school depends on a very different set of skills. This requires learning a diverse set of skills ranging from the seemingly mundane like time-management to the more lofty such as scientific reasoning. *As a mentor, I see my job as to help you develop these skills and to guide you in the process of becoming an independent scientist capable of conducting scientific research from the initial stages of conceptualizing research problems, to forming testable hypotheses, to designing experiments to test these hypotheses, to analyzing data, to writing to communicate results to the wider scientific community*. As a mentee, I expect graduate students to take initiative to participate actively to aid in this process. ***I expect you to regularly read the literature and independently synthesize ideas related to your research topic, to learn to think creatively and generate hypotheses and design experiments on your own, to research and learn new techniques in the lab or field as needed for your project, and to analyze and write about your results.***

Research always involves some degree of trial and error, sometime even failure! For many incoming graduate students, it is important to learn not to take the failure of an experiment personally. Sometimes even the best-designed experiments fail to give expected results even in the best of hands. This can sometimes lead to new and interesting insights in science or sometimes to dead ends. Part of my job as a mentor to help you distinguish between the two. An important skill for a scientist is to be able to step back from an experiment, interpret the results in light of your hypotheses, evaluate what if anything might have gone wrong in the design or execution of the experiment, and to redesign a new experiment to move forward. Thus, I don’t expect graduate students never to “fail”. Instead, ***I expect you to make your best effort to carefully think though and conduct your experiments in consultation with me and to communicate regularly about both successes and failures in your research.*** To facilitate this communication, I aim to meet with students regularly (at least biweekly) and also encourage informal conversations in the lab or office. As a team, we can make a plan to keep you moving successfully forward in your degree. Doing science does require commitment and hard work. ***I expect graduate students to put in an honest effort and hard work (at least 20 hours of work during classes and 40+ hours of work after completing classes) to advance their research project***

**Expectations for Writing and Publication: *I expect graduate students to write regularly and to publish their research in peer reviewed journals.*** As a professional scientist, I spend roughly 50% or more of my time writing. Learning to be a scientist including learning how to publish your work in peer reviewed journals and I strongly encourage students to write up their chapters and submit them for publication as soon as the research is completed. This is a much better model than saving all your writing for the last year of your degree! Developing a consistent writing habit and balancing time between experimental and analytical work and writing is critical skill for any scientist. For graduate students seeking careers outside of academia, communicating clearly in writing is also an important skill for most other professions I can think of. ***For master’s students, it is expected that at least one publication be submitted and accepted for publication from a master’s thesis. For PhD students, it expected that at least one and hopefully two or three publications be submitted and hopefully accepted for publication prior to defending the PhD thesis.***

**Professional development, networking, soft-skills, and well-being:** I also encourage students to participate regularly in professional development activities. These may include attending a workshop to learn specific skills needed for your research, attending at least one professional scientific meeting annually as well as more ‘soft-skills’ such as time-management, scientific writing, public speaking, and many more. I will help facilitate your networking with other scientists in your field. As a mentor, ***I also care about you as a person and your physical and mental health. Graduate school is not always easy, but there are many resources that can help you cope with the challenges, so don’t be afraid to ask and seek these out. It is important to learn balance and stress-management techniques in your life as an academic***.

**What constitutes a PhD thesis?** A PhD thesis involves developing a cohesive research project that addresses some overarching research question and advances knowledge in science. Thus, it must produce new and original scientific knowledge. The format of a thesis constitutes at least three separate aims or chapters under this overarching research question. While they should be developed in consultation with your advisor (me!), it is expected that you will show initiative and creativity to generate ideas and hypotheses about your research that will be addressed in each of these chapters. While chapters may be interrelated, they should also be able to stand alone as a research topic that might be submitted for publication. An additional introductory chapter should include a thorough review of the literature on your research topic and frame the questions you are asking. Ideally, some of these chapters will be published before you complete your degree and thus, you can **A master’s thesis** will follow a similar format, although the scope or range of the project will not be as comprehensive and some aspects of the chapters may have more overlap.