ADVISING PROSPECTUS – DR. CREIGHTON M. LITTON

This document outlines my view of graduate education and is intended to provide information to prospective and current students on my experiences with graduate education, and the expectations of pursuing a graduate degree in my lab. Expectations are articulated for both what students are expected to accomplish while in school, and what students should expect from me as an advisor. Every student is different, and will have different career goals and a graduate program designed to best meet those goals. However, despite differences in individual goals and programs, my expectations for students and what students should expect from me are fairly constant. Probably the most important thing to know, and remind yourself of often, is that this is your degree, your career, and your life. This means that you are ultimately in charge of your program of graduate studies. I can and should help in many ways, from advice to resources, but it's your program, your degree, and your career. Self-discipline, self-initiative, and self-motivation will be critical to your success as a graduate student.

GRADUATE EDUCATION IN A NUTSHELL: Why pursue a graduate degree in science? If you can't answer this question, or your answer is a simple "I don't have anything better to do", then you shouldn't be in graduate school. Graduate school is not merely an extension of your undergraduate degree, where you take a few more classes and get to stay in that town you love so much with all of your buddies from undergraduate school! There are many reasons to pursue graduate studies, but invariably your choice to continue your education as a graduate student will revolve around career decisions. You should be in graduate school if it will help provide the tools and experiences that you need to continue, or start, your chosen career path. This is important because graduate school will not always, if ever, be easy. And there will be sacrifices – of time, often times finances, time, and more time. I have known a lot of people, including myself, that had a blast in graduate school, but we still had to work hard for it. It was fun because we made wise decisions – about what to get a degree in and where to do it, who to work with, what project to work on, what classes to take, etc. And it was fun because we took the time to make happy and healthy lives outside of school – everyone, even the most dedicated of students, needs to have fun and get away from school on a regular basis (but not too regular...).

Graduate education in science differs from undergraduate education in many important ways. Probably the most important distinction is that an undergraduate education emphasizes what is already known, and a graduate education trains students to identify the unknown (i.e., ask important and interesting questions) and make it known (i.e., design studies to answer these questions, and disseminate the results to your peers and to society as a whole). The fundamental role of science in society is to develop new knowledge and insights, and the goal of a graduate education in science is to teach the student how to be a scientist. A M.S. program is an introduction and should provide the student with: (*i*) the tools needed to thoroughly understand the scientific method, and (*ii*) an experience in applying the scientific method to a particular problem. The identification of an important problem that can be feasibly tackled in 2-3 years typically requires experience in the chosen field, so a M.S. student often receives much guidance from their advisor, and others, in the selection of and approach to a problem. A Ph.D. program, in turn, aims to produce scientists and, therefore, a Ph.D. is both qualitatively and quantitatively much more involved than a M.S. program. A Ph.D. should be considerably more self-sufficient in their graduate program, and is expected to make an important, original contribution to their scientific field.

[§]Many thanks to Drs. Dan Binkley and Michael G. Ryan for many of the ideas outlined here. Dr. Binkley's website has a much expanded version of this document (http://lamar.colostate.edu/~binkley/prospectus.htm)

ADVISING: The advisor serves a dual role in graduate programs. First, as a mentor, the advisor supports, encourages and nurtures student development and, in most cases, provides resources in the form of financial assistance and/or field and laboratory gear. Second, as a professor, the advisor judges the accomplishments and potential of each student. Students should expect support from advisors, but this support will often include challenges and constructive, albeit sometimes uncomfortable, criticism. The advisor is responsible for helping students develop their visions and accomplishments to meet the demands of the program. I have high expectations for my students and work very hard to provide them with the advice, resources, and experience they need to succeed. All of this takes time and energy on my part that I am more than happy to give. In return, I expect my graduate students to work very hard to complete their degrees in a timely and professional manner.

EXPECTATIONS FOR BEGINNING GRADUATE STUDENTS (M.S. AND PH.D.):

- Have personal motivation and enthusiasm for science and the scientific process.
- Have a solid, general background in biology or environmental sciences, and good communication, quantitative, and analytical skills.
- Be willing and eager to learn
- Be in graduate school for the right reasons (see above)

EXPECTATIONS FOR M.S. STUDENTS:

A student completing a M.S. degree should:

- Have a general, working knowledge of science, including its philosophy, approach, current state, and relevance to society.
- Have a solid understanding of the background, theory, problems, and impediments within the area of his or her interest and specialty.
- Be able to understand and use sampling procedures, basic statistics, analytical methods, and computer data analysis.
- Be able to communicate clearly and effectively, in written and oral presentations.
- Begin to critically read the literature.
- Have accomplished the planning and execution of a substantial research project.

M.S. MILESTONES EXPECTED:

1. Coursework plan developed and committee selected by end of first academic year.
2. Research plan/proposal developed and presented to committee by the beginning of third semester; includes completion of objectives and hypotheses to be tested, overall outline of the proposed work, and a solid draft of a review chapter that outlines the background for the research.
3. Coursework competed by the end of the 2nd year
4. Steady progress on coursework and research throughout.
5. Submission of at least one paper for peer-reviewed publication by the time of defense/graduation. An additional paper ready for submission near the defense date.
6. Presentation of research at a minimum of 1 national and 1 local conference

EXPECTATIONS FOR PH.D. LEVEL STUDENTS:

A student completing a Ph.D. degree should:

- Have a broad knowledge of the philosophy, history, and current state of science.
- Be competent in major techniques used in ecological research, including field, laboratory, statistical, and computer methods.
- Be an expert in the state of science within his or her specialty - know more about the subject than your committee knows!
- Be able to think clearly, critically, and creatively - your Ph.D. program should give you the skills to independently develop important ideas, and comfortably and constructively criticize the work of others.
- Routinely read the literature within and outside of your field.
- Be able to communicate clearly and effectively, in written and oral presentations.
- Have accomplished the inception, planning and execution of a substantial research project.

PH.D. MILESTONES EXPECTED:

1. Coursework plan developed and committee selected by end of first academic year.
2. Research plan/proposal developed and presented to committee by the beginning of third semester; includes completion of objectives and hypotheses to be tested, overall outline of the proposed work, and a solid draft of a review chapter that outlines the background for the research.
3. Submission of one original research paper before the end of your 3rd year; at least 2 more papers submitted or ready to submit at the time of graduation. The number of papers is flexible in cases where large (monograph) papers are produced.
4. Additional papers, such as a review paper or papers as lead or co-author with fellow students and mentors, will immensely improve your marketability after graduation.
5. Teaching experience as a T.A. or, at a minimum, a guest lecturer
6. Presentation of research at a minimum of 2 national conferences, and 2 local conferences
7. Serve or volunteer to serve as a peer-reviewer for an ecological journal
8. Submission of at least 2 grants/fellowship applications to help fund your research

EXPECTATIONS FOR ADVISING:

The graduate advisor should:

- Take a personal interest in each student's education, including goals, areas of interest, and abilities.
- Challenge each student to excel and achieve at the highest level.
- Encourage independent thought and action and provide space for the student to make mistakes and learn from them.
- Provide feedback on progress, and critique written and oral presentations. Within the constraints of other time commitments, feedback on proposals and ideas should be <1 week, and turnaround on review of student papers should be <2 weeks.

- Provide critical and constructive reviews of student outputs and ideas.
- Provide insights on the inner workings of science - funding, personalities, publications, manuscript review and publication.
- Provide financial support, whenever possible, including tuition, stipend, research funds and travel to a variety of local and national scientific meetings.

WORKLOAD:

If a student uses graduate school to advance their career goals, it's important to develop a clear idea of the professional job market. Good jobs will have many well-qualified competitors – a graduate program should produce graduates who are well positioned to compete successfully for a limited number of positions. When you apply for jobs in science, you will largely be judged on:

1. Quality of publications and presentations.
2. Number of publications and presentations.
3. Participation in grant-writing activities.
4. Presentations at meetings
5. Development of personal contacts with peers in your field.
6. Breadth and depth of experience, including multiple ecological questions and ecosystems.

FURTHER RESOURCES:

These are some references for understanding the process of getting into graduate school and thriving while there, and some career advice for post-graduation.

Bloom, Dale F. et al. 1998. The Ph.D. Process: A student's guide to graduate school in the sciences. Oxford University Press, New York.

Ford, E.D. 2000. Scientific method for Ecological Research. Cambridge University Press.

Medawar, P.B. 1981. Advice to a young scientist. Basic Books.

Oliver, lE. 1991. The incomplete guide to the art of discovery. Columbia University Press.

Peters, RL. 1997. Getting what you came for: The smart student's guide to earning a Masters or Ph.D. Farrar, Straus and Giroux.

Reis, Richard M. 1997. Tomorrow's Professor: Preparing for academic careers in science and engineering. IEEE Press.