Manual for Graduate Students in Dr. Saylor's Research Group

Last Updated: September 7, 2016

1 Introduction

This manual is for members of my research group. It is directed primarily at the graduate students that I advise, however, much of what is included here is relevant for my undergraduate researchers as well. The purpose of this manual is to inform you of my expectations for your performance as my advisee and also to serve as a guide to help answer some of the typical questions students in my group have.

2 The Advisor/Advisee Relationship

As your advisor, I want you to succeed in your graduate studies, whether at the M.S. or Ph.D. level, and to continue to succeed upon graduation in your chosen career. My job is to guide and advise you during the course of your thesis project. This includes keeping you pointed in the right direction, providing you with the resources you need to pursue your research, giving you direction on courses to take, and keeping you updated on whether you are meeting my expectations or not. Your job is to excel in your research and courses. The product of this relationship is the generation of new knowledge, namely your thesis. If this relationship is successful, we both benefit. A successful thesis project should result in (i) journal publications, (ii) attendance at national and international conferences, and (iii) increased funding for this research group through proposals based on your research. These are things that are beneficial to both of our careers. I want to do whatever I can to help you be successful, and I want you to work hard to attain a high level of success.

3 General Expectations

I have the following general expectations of each member of the research group:

1. **Diligence:** Nothing in graduate school comes easily. Everything takes a lot of work and a lot of time. I expect all members of my group to be working on their research regardless of whether classes are in session or not. Working weekends, evenings, holidays, etc., is expected.

2. **Honesty:** In both research and course work, honesty is of the utmost importance You may have seen in the news cases involving scientific fraud. These are situations where scientists fabricated or otherwise falsified data or results. Such dishonesty is, of course, unacceptable in this research group. In the world of science, we each rely on the implicit assumption that the work of those who came before us is valid. Should this fail to be the case, the whole scientific endeavor is threatened. A single case of dishonesty of this kind can destroy the careers of the people who work with you, in addition to your own. Should the temptation to falsify data or results ever arise, recognize that the harm that will result greatly outweighs any minimal benefit you might attain.

3. **Resourcefulness:** Unlike undergraduate work where all of the information that you need is usually *provided* to you in the form of textbooks or handouts, graduate work requires you to *find* multiple sources of information. Accordingly, resourcefulness is an important attribute. You will find that in your work, questions will arise and it will not be obvious where the answers lie. Starting with your first day as a graduate student, you must learn how to identify

sources of information. This is one of the most important skills you will develop during your time in graduate school.

4. **Initiative:** Your thesis research is a reflection of you. You should work hard to do good work, and also to take the initiative in finding ways to make it better. Do not simply strive to satisfy whatever requirements that I impose upon you. Seek to exceed them.

4 Specific Expectations

4.1 Research

The most important part of your graduate experience is the research that you do. It is this research that sets you apart from other people in your field who have only a bachelors-level degree. Aside from learning in detail about a specific field, doing a thesis teaches you how to ask questions as well as answer them. Your thesis project will force you to learn how to deal with unexpected problems, draw up plans for attacking a problem, and how to search for resources to help you in solving problems. These are all very useful skills and they will help you in whatever career you pursue, even if the topic is very different from your specific thesis topic.

If you have just completed your B.S., you have probably developed some very good study habits and have developed good skills for the specific task of obtaining good grades in course work. Indeed, as an undergraduate student, your course work was the center of your academic life. In graduate school, however, the mind-set is quite different. You are still required to take courses and doing well in these courses is important. However, the most important aspect of your program is your research. This will require a significant effort on your part to become more research-focused, as opposed to course-work-focused (as most undergraduates are). New graduate students tend to focus on their courses and initially treat their research as an 'extra' activity. This is exactly the wrong attitude to have. From the very beginning of your graduate school experience, you should be

- Thinking about your research.
- Scheduling time to do this research on a daily basis.
- Making demonstrable progress on your research project every week.
- Communicating your progress to me each week.

Note that whatever you do when you finish your graduate degree, it is your ability to do research, and to use the skills you develop in your research, that differentiates you from those of your colleagues who have only a bachelors level degree.

Focusing on research can take some adjustment. Your course work will have regularly assigned work, due dates, regularly scheduled exams, etc. In contrast, your research has really only one due date: your thesis defense date! It is very easy to let things slip regarding your thesis research, but you must be diligent in preventing this. I expect you to be working on your research on a daily basis.

Here are some important suggestions with regard to your research:

1. Start it immediately! As soon as you arrive in Clemson, begin work on your research. If you are unsure where to begin, meet with me and we will develop a plan. Whether you are just reading papers to learn about your general area, or you are actually developing experimental apparatus or computer code, start right away.

2. Your research **is** a course. You have work due each week, and I expect you to present it to me each week during our individual meetings (described below).

3. Never let a test or homework assignment keep you from making progress on your research.

4.2 Meetings

You will be responsible for attending a minimum of two meetings per week regarding your research: *group meetings* and *individual meetings*.

Individual meetings: Each week I will meet with you for the purpose of learning about the progress you have made on your research. During that time I will expect you to update me on what you have done, what problems arose and what strategies your are developing to overcome those problems. We will meet for between a half hour and one hour. I will provide you with ideas, suggestions and advice on how to move forward. We will also develop short-term and long-term goals during these meetings. I will expect you to take these meetings seriously. Be sure to be on time and to be prepared to discuss your research. If you have problems or questions, be sure that they are clearly developed and that you are prepared to communicate them clearly. Do not come to these meetings unprepared.

Come to your individual meeting with notes, plots, printouts and anything else which details what you have done. Also bring a notebook and calendar so that you can write down ideas we develop, plans and target dates for future goals.

Group meetings: Each week we will have a group meeting that all members of the research group will attend. The size of the group may vary from several people to only two or three. We will have these meetings regardless of the group size. The purpose of these meetings is to communicate the status of your research to the whole group. Because of our individual meetings, I already know virtually all of what you tell the group during this meeting. Accordingly, you should direct this presentation to your fellow students. During these meetings each member briefs the other members on his/her progress, and we proceed around the table until everybody has given the group an update. Periodically, I will also ask members of the group to give a formal presentation on his/her research.

Journal club: When the research group consists mainly of new students, we may operate using a journal club format. In this case, I will assign an important journal article, relevant to everybody's research. Each of you will read and digest the entire article. I will have each member give a presentation on a specific part of the paper at the next meeting.

4.3 Writing

A surprisingly large portion of your time as a graduate student will be spent writing documents. In addition to writing your thesis, you will be writing a thesis proposal and journal articles. Becoming a good technical writer is an extremely valuable skill that will benefit you throughout your career.

Accordingly, pay special attention to developing this skill. I recommend that you take one of the following two courses in the English department, in addition to your required courses.

- ENGL 3140, Section 45 - This is a technical writing course focused on students who are not native English speakers.
- ENGL 3150, Scientific Writing and Communication - This is a course focusing on rhetorical conventions in scientific communication.
- ENGL 6900 - This is an advanced technical writing course.

Also, be aware that there is a Writing Center at Clemson (located in the Academic Success Center and at Cooper Library, 656-3280). The URL for the center is:

http://www.clemson.edu/centers-institutes/writing/index.html/

4.4 The Laboratory/Office

Concerning the laboratory and office space that you use:

Ownership: Whatever area you are using in the laboratory, take ownership of it and take pride in it. Make sure that your area is kept clean, is well-maintained and is safe. This is your space and is a reflection upon you. Be proactive – if something needs to be repaired, replaced, cleaned etc., do not wait for me to ask you to address the issue. Take action on your own. For example, if there is information on the news regarding computer viruses, find out what actions need to be taken to prevent your computer(s) from being infected. If a certain piece of equipment does not seem to be operating correctly, call the manufacturer and find out what needs to be done.

If you use a tool or piece of equipment, you are responsible for returning it to its proper location when you are done with it.

5 Resources

The university, college, and department have many resources that you should utilize in doing your research. Learn about these resources as soon as you can. Below is just a partial list of some of these resources

1. **Library** - in addition to the usual resources of printed books and journals, our library has the following:
   - Interlibrary loans - allows you to get journal articles that are not available in our library.
   - Electronic journals - can be accessed from the library web page. Allows you to obtain, on screen, journal articles from a very large list of journals, including most of the journals relevant to the research that we do.
   - Article searching tools - web tools allowing you to search for articles on specific topics and/or authored by a given individual.

- On-line catalogs for the Clemson library and other libraries.

Information on all of these resources can be found at the library web page:

http://www.clemson.edu/library

2. **Computer Support:** The university provides computer support in the form of hardware, network, and software support. Go to the CCIT web page to learn about all of the resources that are available:

   http://www.clemson.edu/ccit/

3. **Departmental Staff:** You will be interacting with all members of the departmental staff at some point during your time at Clemson. Please introduce yourselves to each of these people and learn about what they do. Here is a list of the staff. Their phone numbers and e-mails can all be found at:

   http://www.clemson.edu/cecas/departments/me/people/staff/index.html

6 Guidelines

Purchasing guidelines: If you need something for your research (equipment, supplies, software...), I will buy it if possible. When approaching me with a request for purchase, first type up the following, and send it to me in an e-mail:

- Description of the item
- Name of manufacturer
- Address of manufacturer
- Phone number of manufacturer
- Make and model number of the item.
- Price

The exact format for this e-mail can be found here:

http://cecas.clemson.edu/~jsaylor/purchaseRequest.pdf

Make sure you have checked multiple sources for the item, to ensure that we get a good price.

Computer guidelines: Clemson computers are to be used for your research and course work. Feel free to use the computers in the lab for anything that will better enable you to conduct your research. Using computers to send/receive e-mail is fine. However using IM or other messaging services is not. Also, downloading music using programs like Grokster, Napster, etc. is not permitted.

You are required to backup your work weekly using an external hard drive that you keep in a safe place. Computers crash and I will not accept this as an excuse for delays or lost work.

Safety guidelines: Some pieces of equipment in the laboratory present safety hazards. For example, several lasers are used in the experiments that we do. I will give you a safety briefing on all of these pieces of equipment if/when you need to use them. Do not work on any piece of equipment that presents a safety hazard, until I have briefed you on it. These safety hazards are significant and you must treat these pieces of equipment carefully and with respect. It is my goal to maintain an accident-free lab. If an accident does occur: (i) if you are severely injured, dial 911 and ask for help, (ii) if your injury is minor, notify me immediately and then go seek medical help. If I am not around contact another professor or the departmental chair. Whatever you do, do not ignore an injury in the lab.

Signatures: During the course of your graduate program, you will need to submit many forms that require my signature. Do not hand me forms the day before they are due and expect a signature. *Be sure to hand all forms requiring my signature at least one week in advance.* I will not sign a form right away simply to prevent you from having to pay a late fee.

Meeting with me: You may find that you have a question that needs to be answered before a scheduled individual or group meeting. I will meet with you if I can. Professors tend to have significant demands on their time, so I expect you to investigate other resources for information prior to seeing me. For example, if your computer isn't working contact one of the computer resources that can be found on the Clemson web pages. If a piece of equipment is not working, call the manufacturer before your see me. If you have a question about departmental policy, be sure to read the Graduate Student Manual (GSM) before seeing me. The GSM can be found at:

http://www.clemson.edu/cecas/departments/me/academics/graduate/media/manual.pdf

Departmental requirements: The department requires several things of you. These are all outlined in the GSM. Be sure that you have a copy – read it – know it. Make sure that I do not receive an e-mail from the department indicating that you are delinquent with regard to any departmental requirements. Do not ask me questions that can be answered by reading the GSM.

Vacation: Total vacation for graduate students is not to exceed two weeks per year. Note that typical academic holidays and vacations are **not** research holidays. Three day weekends, spring break, summer vacation, etc. are all time when I expect you to be working on research, and time taken off during these periods are charged against the total of two weeks vacation. Holidays such as Christmas, New Years Eve, etc., if taken off, are charged against the two week vacation total. All time taken for vacation must be approved by me and requested via e-mail at least two weeks in advance.

LaTeX: All LaTeX documents related to your research (thesis, conference presentations, journal publications), will be prepared using the LaTeX text processing language (this manual was written in LaTeX). I do all of my work in this language and I expect all of my students to do the same. This takes a little bit of time to learn, but it is time well spent. A template of a journal paper, written in LaTeX, can be found at the following URL:

http://cecas.clemson.edu/~jsaylor/gstud.html

Financial penalties: Note that a delay in getting (i) research completed, (ii) thesis written, (iii) thesis submitted, (iv) forms submitted, can all result in financial problems, ranging from late fees to the possibility of paying an extra semester of tuition. These problems are your responsibility. Do not expect me to approve your thesis early, etc. in order to avoid a financial penalty.

Completion of your graduate program: A checklist indicating what you must do before I will sign-off on the final version of your thesis can be found at the following URL:

http://cecas.clemson.edu/~jsaylor/gstud.html

Hyperlinks to several tutorials on LaTeX can be found at this URL:

http://www.eng.cam.ac.uk/help/tpl/textprocessing/