Graduate Student Handbook for Incoming Engineering Students

Academic Advice:

Comparison between undergraduate and graduate studies

- Graduate studies are more independent than undergraduate studies. In undergrad classes, the professor generally gives you all the material you need. In undergraduate courses, the student rarely needs to study outside materials and the "prime" objective is to be ready for the tests. As a graduate student, you are expected to take the initiative to bring the course material to bear on your own research topic. This is why it is very important that you, in concert with your advisor, select courses that are closely related to your research area.
- Classes and the material covered are deeper (harder) and more challenging in graduate school than in undergraduate classes. One crucial goal in a graduate class is to come up with new questions and research interests and to help define a path to your thesis – not only to know a lesson.
- In graduate studies, it is difficult to compare yourself to the other students in your class (there must be a change of mentality). Within the same program, students pursue different paths (theoretical or experimental), different projects with different faculty (some projects may well be interdisciplinary and involve other departments), and thus branch off. There is no one measure of your success relative to your fellow students. Success is a combination of conducting original research, knowing your field, finishing a thesis and moving on to a job.
- Communication skills and reasoning are important skills to a graduate student. When you discuss your progress or experiments – not only with your advisor but also with other faculty members, graduate students and researchers – you must communicate clearly and "sell" your results. This regular communication about your research will train you so you feel more confident about your work.
- As an undergraduate, your time was structured around semesters and you were "free" between semesters. As a graduate student, you should expect to be working "all the time" (with some holidays approved by your advisor). In fact, you may well find that your advisor has more time, more focus, and is much more supportive during between-semester breaks when he/she is not as busy with teaching and service activities. Do not expect to get the summer off! This is normally when a great deal of research gets done.

Course Work and Qualifiers:

Each department has their own requirements, and quite possibly several different tracks, for getting an MS or a PhD. Read the requirements carefully and discuss them with your advisor or a designated faculty member in the department. In some cases, the MS track is quite different from the PhD track, so if you don't want to lose time be sure you are on the appropriate track.

Every department has its own rules about course work and qualifying examinations. To find detailed info in your department, follow the links:

- Biomedical Engineering
- Chemical & Biomolecular Engineering
- Civil and Environmental Engineering
- Computer & Information Sciences
- Electrical and Computer Engineering

- Materials Science and Engineering
- Mechanical Engineering

Relationship with Your Advisor:

Whether you are a MS student with thesis or a PhD student, your advisor is vital to your success. Thus, choose your advisor carefully and work towards a good relationship with your advisor and his/her group both while you are a student and after you graduate**.** This way, you and your advisor will have a mutually beneficial, long lasting relationship.

Your Thesis Advisor:

- Is a source of funding! He or she regularly writes proposals for funding to support graduate students and postdocs. Additionally, he or she writes proposals to national agencies for equipment and travel funds. Your advisor will already have equipment, or access to equipment, and secures office space and computers for graduate student usage.
- Is a recognized national expert in his or her field of research. Your advisor has experience with choosing good/doable problems, with determining when results are suitable for publication, with potential bureaucratic snafus that may arise, and with organizing and giving research presentations.
- Knows other experts in your research area and thus will be an excellent resource for helping with finding jobs after your graduation.

The method of choosing an advisor/research group differs from department to department and you **must** check the culture of your specific department in that regard. Given that caution, you should be sure to:

- Meet with/talk with the potential advisors. Research groups all have a different culture. In some groups, there are required groups meetings each week, or required one-on-one meetings with the advisor. In some groups, students are required to spend a certain amount of time in the lab. Try to clarify for yourself what the potential advisor's expectations would be of you and how often he/she would meet with you.
- Talk with students from the potential advisor's research group to get a different point of view on the points in the previous bullet.
- Visit the spatial location of the research group so that you will see the lab, the office space you would be working in, and observe interactions among current group members.
- You may be asked to attend research group social events. These may be occasional "working" lunches, and/or maybe more formal events 1 or 2 times a year. Other than "working" lunches, you need not feel obligated to attend these events. However, you should be aware that social events are part of the professional environment and consistently rejecting after hours events may affect your status in the group.

In any case, if there is an issue, talk and speak out. Find a solution as soon as possible!

Organize Your Time

Keep a time table, keep working AND be sure to keep your advisor posted on your progress. Time management is crucial; it also gives you more freedom. Keep daily and weekly schedules.

It's important to know what your advisor wants and when. Schedule daily and schedule weekly. Keep in mind that you should also allow time for and schedule free time to exercise, to have dinner with friends, etc. Balancing life and work depends on time management. Although it is hard to find a perfect balance, try to make your lifestyle and work style fit together. A great advantage of graduate school is that usually there is more freedom to decide when during the day to run experiments and simulations, read research papers, go to the gym, etc. The best plan is to sort out your timetable within the research group schedule, so it fits in with the times that you work the best.

LISTEN…

Always take notes when you talk with your advisor! This is not a sign of weakness, it is a sign of interest. It is too easy to forget very quickly. Also, it is not a good strategy to have to ask your advisor again to repeat what he/she said to you (unless it is for clarifications, of course). After the meeting, it is a good idea to sit down for a short time and rewrite your notes while the ideas are fresh in your mind, and to put them in a format and place where you can regularly refer back to them.

If things don't seem to be working, talk with your advisor SOONER rather than LATER. Ask for help before the problem snowballs out of control. Remember that the relationship between you and your advisor should be mutually beneficial. If you are stuck, or if you don't understand how to progress, that is not helping your advisor. Talk with him or her and get support so that you can get work flowing again. On the other hand, remember that your advisor is very busy. He or she has other students to advise, proposals to write, courses to teach, as well as service duties to the department, the university and professionally. So don't "waste" his or her time. Organize your thoughts and clearly state your problems and/or your progress.

Be aware that advisors usually respond especially well to positive work and results. If you don't show them results (whether positive or negative) they aren't even aware that you are working. So organize yourself to regularly summarize where you are, what you have accomplished and where you are stuck and need help.

Common Grad School Frustrations

Lack of communication with your advisor

Be proactive; don't wait until your advisor contacts you. If you contact your advisor, or a person to be your advisor, and they don't respond in a short time:

- Try another communication mode one time (if you tried by email, stop by the office or telephone or leave a written note). Sometimes email gets "lost" (whether in transit or in an inbox) or advisors might be out of town.
- If you're looking for a project or advisor and one doesn't reply then keep looking!
- Keep some (but not too many) options open.
- You might try asking for a short project so you and your advisor can see if you are professionally compatible.

Publishable material

The decision of whether your progress is publishable or not might be delayed if there is a lack of feedback on your progress with your advisor. Make sure you are receiving correct and timely advice for publishing. Your advisor should be a guide for your research so that you continue to make satisfactory progress toward the degree. Different faculty members have different styles of managing a PhD project (hands on or hands off). In either case, never hesitate to ask questions!

Expect things not to work the first time!

And don't get frustrated. Discuss issues with your colleagues and try to avoid group competitiveness. It is important to decide when a certain path is not worthwhile pursuing as it is not/will not yield worthwhile results.

Keep your focus on the goal, which is to be ready to "wrap up" and graduate! This means two things: 1. Getting a good project and working hard on it to get results and 2. Being aware of time and checking in regularly with your advisor as to expected completion dates and expected project results for a complete thesis.

Unexpected surprises

Things can happen to throw your progress off course. For example, it is possible that your advisor might decide to leave the University for another job or that the funding for your project not be renewed, i.e. your funding gets cut. The most important thing is not to panic nor to sink into depression, but rather to act logically and quickly. Check with your advisor as to his/her plans for you. If that isn't productive, check with the department chair as to possibilities. If your funding is cut because the project funding isn't renewed, you can also try to find resources and other departments on campus that might have funds for graduate positions (not only Research Assistants, but also Graduate Assistants).

Unexpected personal conflicts within the research group

If there is a problem within your group, it is up to you to decide when you need support or when the situation gets too personal. Get advice from someone else as to how to handle the situation. In some cases, it is best to go to your advisor who is, after all, in charge of the group. If for some reason that is not appropriate or not productive - for example, if you feel pressure to do something uncomfortable to you - then find someone else to talk it over with. The College of Engineering and WIE have several faculty members and graduate student representatives who could help you judge the dilemma and who can guide you or suggest resources to help you resolve the situation.

You are not alone

Graduate students often tend to take failure personally and tend not to be good judges of when they have done enough or when a result is important. Don't fall into these traps. You are a graduate student (not already a faculty member/postdoc) because you are learning about these issues. Again, don't retreat into yourself, talk to others about your frustrations. Most students, postdocs and faculty have been through similar experiences.

Being a Teaching Assistant (TA)

If you would like to pursue academia after graduation, pay special attention to possible opportunities to work as as a Teaching Assistant (TA) during graduate school. These will be your very first teaching experiences and you will want to get the most out of them!

The work as a TA might be very different from what you expected in grad school. Some good resources for Teaching Assistants can be found at the English Language Institute (ELI) and the Center for Teaching Effectiveness (CTE). If you are very interested in teaching, you should definitely check out the CTE for their teaching effectiveness program and events.

Frequently Asked Questions (FAQ)

What do I do if my funding disappears?

First, don't panic. Look into what options are open for you in the immediate term. Depending on where in your graduate program you are, you might think about getting a MS degree, becoming a teaching assistant, switching to another research group (or another program) or start looking for a job (in case you already have a MS).

Be aware that there are other assistantships on campus available to all graduate students. You don't always have to receive funding from your own department. There are also summer jobs on campus that can help you in the short term. Find part-time on-campus job listings here.

Discuss your situation with your colleagues. Sometimes senior students may know more than you think, and they might have the right advice, who to contact, where to ask help, etc.

You might want to contact someone on the WIE steering committee for information and advice. The membership of this committee is available on the web. The committee consists of two experienced graduate students from each engineering department on campus as well as two faculty members who actively work with students on the improvement of graduate life.

How can I judge my progress?

Discuss your progress with your advisor. What does she/he expect from you? Compare yourself to the other students in the group or the department. How much work did they have to do to publish their first paper, go to their first research conference or to graduate?

What is a typical daily schedule of a graduate student?

Graduate student schedules vary with the year of the student (e.g., first year students may be primarily taking courses, final year students are devoting full time to research) and the type of project (some lab schedules need to be coordinated, while computing can be done almost anytime). The best advice would be that you discuss your work schedule with your advisor. Don't feel afraid to talk directly or ask when are you expected to show up and for how long. Also, ask older students as they might have experience with your advisor.

How many days of vacation do grad students have each year?

There are no rules regarding vacation but certainly you should take vacation once a year. It is recommended that you take a break and clear your mind to come back with energy for another full year of research. However, the timing of your vacation should be cleared with your advisor well ahead of time. Advisors don't like surprises. Additionally, you may find your advisor is more focused on research when he or she is not teaching, so normal vacation times may well be better reserved for intense research. For information about what paperwork needs to be completed if you plan to leave the country, please visit the Office of Foreign Student and Scholars.