Roadmap to Success

Expectations & Guidelines for Ph.D. Students in the Cohan Research Group

Welcome to Rice and to life as a Ph.D student! You have ahead of you an amazing array of opportunities: to learn broadly about environmental engineering, to delve deeply into your area of research, and to establish yourself as a promising young scientist. Sure you'll work hard, but graduate school is also a time of unparalleled flexibility to pursue your own interests, strengthen your abilities, and explore all that Rice and Houston have to offer.

Graduate school can be a lot of fun and a time of great personal and intellectual growth. You'll be surrounded by interesting and talented peers from around the world, outstanding faculty, and a vibrant campus environment. Make the most of this time! At the same time, graduate school doesn't pay very well and is just one step on your career journey. So you'll want to stay focused on your key objectives and work toward completing your degree in a timely fashion.

This Roadmap is meant to lay out my expectations for you as a Ph.D. student, and to let you know what you can expect as a member of our research group. It is an evolving document that may be adapted as our group grows. What follows are some expectations and guidelines to help you make the most of these opportunities and to ensure the success of our research group.

Schedule

A Ph.D. degree is a marathon, not a sprint. Pace yourself to work productively and maintain motivation over a several year pursuit. Only you know how you work best. Some students work effectively on a 9am-6pm schedule; others prefer more variability. Manage your time well and figure out how you work best. I'll be tracking your research progress, not your hours, so adopt a schedule that makes you most productive. Leave yourself time to explore, pursue a new hobby, contribute to your community, and just to have fun.

Let me know of any plans for extended travel. As a rough guideline, plan to take no more than 4 weeks of vacation each year. That includes periods such as spring break, which are not automatically holidays from graduate research.

Coursework

See the courses as an opportunity to broaden your knowledge and skills and to provide balance to your more targeted dissertation research.

First year: A primary goal of your first-year coursework is to develop a broad background in environmental engineering and to prepare yourself for the

preliminary exam, while leaving time to begin your research. Since this exam will be prepared by Environmental Engineering faculty, it is crucial that you take graduate-level courses taught by these professors or be familiar with the material covered. Expect to take 3 courses per semester in the first year, plus my Advanced Topics course and the departmental seminar.

Subsequent years: Research is your top priority, but courses can still prove valuable and a welcome change of pace. Plan to take 1-2 courses each semester, including:

- Courses in atmospheric science and numerical modeling. Look at courses in CEVE, Earth Sciences, CAAM, and at the University of Houston.
- Courses in related disciplines. Depending on your area of interest, this may include courses in economics, statistics, computer science, or various engineering and science disciplines.
- Courses for your own enjoyment and growth. Rice is filled with talented professors teaching outstanding courses in a range of fields. Have fun, explore, and learn something new. Also, if written or oral communication in English is an issue for you, find ways to strengthen these crucial skills.

Research

Research is the core of the Ph.D. experience, culminating in a dissertation that should represent an original and substantive contribution to your field. The following tips should put you on a path toward successful graduate research:

- **Publications.** Peer-reviewed publications are the measuring stick by which we are judged in this business. I expect you to publish or submit 3-5 papers in peer-reviewed journals before we schedule your thesis defense. Yes that's a high bar, but a strong track record of publications is the most important way you can establish yourself as a scientist.
- **Dissertation.** Once you've written your papers, the dissertation is a piece of cake. Just staple them and write up introductory and concluding chapters that tie your work together.
- **Content.** Much of your work may be connected to funded research grants awarded to our group. While we must fulfill the terms of those grants, you are encouraged to identify extensions beyond the original proposals or entirely new research paths to pursue. Some of the best research initiatives originate from student ideas; put your creativity, knowledge, and open mind to work, and let's talk!
- **Reading.** The best preparation for writing an effective scientific paper is to read effective scientific papers. The best way to chart new research paths without reinventing the wheel is to read what other researchers are already doing. Thus, you should be continually keeping yourself abreast of relevant papers in quality journals. In our field, that includes *Environmental Science & Technology*, *Atmospheric Environment*, *Geophysical Research Letters*, *Journal of Geophysical Research*, and broader journals such as *Science* and *Nature*. Subscribe to email table-

of-content alerts from these journals. Read broadly, and critically evaluate papers for what worked well, what didn't, the effectiveness of the text and figures, and potential avenues for follow-up research. As environmental engineers our laboratory is the world around us, so keep yourself informed of relevant news in Texas, the U.S., and beyond.

- **Conferences.** Scientific conferences enable you to share your work with a broader audience, to learn from the work of others, and to meet potential collaborators and employers. Expect to attend approximately 1 conference per year once your research is underway. Let me know if you hear of a conference that you'd like to attend, preferably one in which you could deliver a poster or oral presentation.
- **Research Milestones.**
  First Year: Become familiar with the project you'll be working on, and the relevant literature in the field. Become acquainted with the modeling systems or other techniques you'll need to apply.
  Thesis Committee: At some point in your second year, identify who will serve on your thesis committee. This must include at least one other CEVE professor and one professor from another department.
  Qualifying Exam/Proposal: It is in your best interest to schedule this for approximately the end of your second year. This will give you plenty of time to adjust your research direction based on the input of all committee members. It will also push you to have your preliminary results and research plan sufficiently developed by this time, and to have sketched out the papers you plan to write.
  Papers: As you conduct your research, start writing up papers as appropriate, and get them submitted to journals.
  Dissertation Defense: After you have completed sufficient work and I have reviewed and approved your dissertation, it is shared with other committee members and a defense is scheduled.

Group Expectations

A cohesive and collaborative group will help all of us work more productively and enjoyably. We are too small for anything other than highly effective teamwork.

- **What I expect from you.** I expect you to perform well in your courses and to make efficient progress toward your dissertation and publishable research. While your primary focus is your own research, you are expected to contribute to the group's overall success. This may include helping to train new graduate students or undergraduate research assistants, reviewing each other's papers and presentations, contributing to group discussions, or helping to maintain a group website.
- **What you can expect from me.** You can expect me to:
  - ✓ advise you toward the successful completion of your degree
  - ✓ mentor you in establishing your career
  - ✓ listen attentively and provide constructive feedback

- ✓ review your papers and presentations in a timely fashion
- ✓ limit time-consuming requests that distract from your research
- ✓ be responsive to issues that keep you from working productively
- ✓ support your participation in conferences and other scholarly activities
- ✓ provide you with direction, but also room to chart your own path
- ✓ provide resources necessary for conducting your work efficiently
- ✓ point you toward potential contacts and sources of information

- **Group meetings.** We will meet weekly as a group to discuss relevant literature and shared research or resource issues. These meetings will also provide a forum for practicing presentations before conferences.
- **Individual meetings.** I will meet with each of you individually once a week at a regular time to discuss your progress and next steps. Before your meeting, send me a brief write-up summarizing your recent work. Beyond the regular weekly meetings, feel free to stop by or set up additional times to meet as needed.