Goals & Milestones for Graduate Students

The purpose of this document is to suggest some general goals and milestones for graduate students and postdocs. Oftentimes it is difficult to assess your own progress or success because there are very few concrete milestones in graduate school and even fewer for postdocs. These suggestions should hopefully give you somewhere to start with personal goal setting.

Graduate Students

Year 1

Milestones:

- Complete 2 rotations and present end-of-rotation talks
- Choose a lab
- Complete 4 classes & often teach for 2 terms

Goals:

1. Effectively search through the literature to answer specific questions and keep up-to-date with the latest science in your field. Some resources to use are: Reaxys, SciFinder, Web of Science, Google Scholar, and checking ASAPs of the journals you read.

2. Extract the important information from papers efficiently. Start by reading introductions to situate yourself in your field and understand what has been done previously. Then read the abstracts and conclusions. Then incorporate results and discussion. Eventually, with a lot of practice, you will look at figures and understand the novelty or improvement of methods without having to read the entire paper.

3. Build self confidence and comfort with relevant lab techniques, lab equipment, and instruments. This comes with practice! We also have manuals by all of our instruments in case you forget something.

4. Attend seminars. Read papers by the speaker ahead of time. Be engaged. Examine the speaker's presentation skills, powerpoint aesthetics, ChemDraws, figures, etc. so you can learn how to present *your* research most effectively. If you learn one thing (even if it isn't science) at a seminar, it was worth your time.

5. Read as much as you can. This guideline is true for every year of graduate school and beyond.

6. Apply to fellowships! There are a lot of fellowships for 1st and 2nd year graduate students (NSF, NDSEG) and much fewer in later years of graduate school. You will understand your project in a deeper way and get practice with scientific writing.

7. Try paraphrasing published work to improve on your scientific writing. How would you phrase the introduction? How would you conclude the paper?

8. THIS IS YOUR TIME TO MAKE MISTAKES! If you make a mistake, it is not the end of the world. You will learn (and probably never make the mistake again). Remember that the health and safety of our lab members is paramount. Please do not be afraid to ask questions. It's better to ask and do something correctly than say nothing and potentially hurt yourself. Your first year is all about learning, learning, learning. Not producing, producing, producing.

Year 2

Milestones:

- Candidacy
- Classes

Goals:

1. Practice public speaking. Explain your project to a variety of people. How would you tell your parents about your science? Your younger sibling? A tenured professor in your field? An assistant professor in another department?

2. Ask yourself about the *what*, *how*, and *why*'s. What do reagents do in your reaction flask? What is the mechanism? Why are you using this number of equivalents? How will I purify the crude reaction mixture? Thinking ahead will help you answer questions during group meetings, subgroups, and candidacy.

3. Know your basics from classwork and how they apply to your project. Know your basics on chemistry terminology, like: "alkylation reaction" or "de-chlorination."

4. Learn how to answer questions eloquently and make educated guesses and hypotheses on the spot. This is a follow-up to point #2. You will not always know every answer to every question but when you know the basics of your project, you can generally guide yourself to the answer. And if all else fails…do what everyone does and say: "That's an interesting question! I haven't thought about that but I will."

5. Continue attending seminars. Start building the confidence to ask the speaker any questions you might have.

6. This needs to be reiterated: read, read, read!

7. Continue applying to fellowships.

8. Present a poster(s) at The Karle Symposium. It is a very low-stakes event and gives you experience in presenting your research.

9. Draw writing inspiration from papers that do similar science to your project. Start writing an intro to your first paper. This exercise will help you see gaps in your own project and knowledge. Don't be afraid to put words on paper, your first draft will never be your final product. Just get started!

Year 3

Milestones:

- 3rd year Seminar

Goals:

1. Start thinking about your future career. Explore different paths. Attend career workshops and give informational interviews. Twitter and LinkedIn are also good media for finding people to interview.

2. Attend different professional development activities. The university and department put on a lot of events for resume building, public speaking, scientific writing, etc.

3. If you haven't started writing your first paper, schedule a time with your PI to outline what the end-goal looks like for your first paper and set deadlines for yourself to get it completed.

4. Help your PI write a grant for your project.

5. Give a talk(s) at a national conference like an ACS or another large meeting.

6. Continue attending seminars and volunteering to meet or have lunch with speakers.

7. If you have several papers at this point, ask about applying for departmental or national awards.

Year 4

Milestones:

- Data meeting

Goal Ideas:

1. Go to job recruitment sessions to start preparing for future job searches. Network with professionals who work in industry, government, academia, etc.

2. Mentor an undergraduate or a junior graduate student.

3. You should be working on your second (and maybe third) papers at this point. Continue meeting with your PI and drafting outlines of papers and setting deadlines for yourself to keep yourself accountable. The fourth year goes quickly and you don't want all that training to go to waste!

4. Continue attending seminars and volunteering to meet or have lunch with speakers.

5. Think about ways you can "lead" in the lab. What does the lab need? How can you fill that void?

6. Apply for and attend a more specialized conference, like a Gordon Research Conference.

Year 5(+)

Milestones:

- Defend thesis

Goals:

1. Apply for jobs.

2. Start writing your thesis. Whenever you think you should start writing, start a month earlier!

3. Wrap up all papers and ensure that the next coworkers have everything they need to continue on your projects.

4. Continue attending seminars and volunteering to meet or have lunch with speakers.

5. Mentor an undergraduate or a junior graduate student.

6. Help your PI write a grant for your project.

Post-docs

Goals:

1. Don't be afraid to try *new* things! Most people expect you to move into a "new" area that is different from your PhD training. It will take time to learn new skills and techniques, but not as long as you think.

2. Practice for the job that you want. If you want to be a professor, ask if you can teach a class during your postdoc. If you want to go to industry, try to work on a project of relevance to industry and attend conferences in that field.

3. Be efficient with your time and experimental designs. You have a lot of expertise now in extracting the most from your time, use that well.

4. Be a responsible leader in the lab. Leave areas cleaner than when you arrived to use it. Show what good lab habits look like. What is the lab lacking? How can you fill that void?

5. Get to know all coworkers and their projects. Offer to mentor any individuals who are struggling.

6. Ask yourself: what do you want to do for your next steps? Reassessing your goals is OKAY! Do what is best for you.

7. Apply to a ton of different jobs (industry, academia, government, non-profits, etc).