

Astronomy Orientation 2007-08

Suggested Timeline for Completion of PhD Degree

Tips on a Successful Career

General comments:

The following is offered as a template for students who are aiming very high---for elite postdocs and professorial and staff appointments at the most elite universities and observatories. These are the things that you must do in order to position yourself competitively at the end of your graduate program here. This timeline and checklist are *very challenging* and might not fit you if your goals and/or talents are different. However: take heart---the vast majority of our PhDs have in fact continued on in astronomy in some capacity, and the small number who have not have found their PhD training very valuable and relevant to their final career. For examples showing the wide diversity of careers our graduates have pursued, see the Alumni page on the Astronomy Department website and the Alumni section of the Department Self-Study (which is on the web, <http://www.astro.ucsc.edu/externalreview>).

With that aside, we now make some general observations:

1) Your faculty advisors are of two types:

- First-year academic advisor: this is the faculty member you are being assigned to this week. If you don't do research with this person, it will be hard for them to really get to know your strengths and weaknesses. Their advice will be helpful in a general way but may not be finely tuned to your needs.
- Research supervisor: this is the faculty member who will advise you on your first-year research project. This is the first person here who will get to know you well. You may want to use this person for a letter of recommendation later. You may even wind up doing your thesis with this individual. Either way, this is a time to *make a very favorable Impression*, so work very hard on this first project and be aggressive in contacting your advisor and working together closely. *Visiting once per week is a minimum*. Agree on milestones for the next week and follow through faithfully. Quarters in which you have fellowship funding provide particularly valuable research time.
- Visits with advisors are of two types. The most frequent is the regular conference on the progress of a research project. The second occurs less frequently but is crucial and that is stepping back from the day-to-day activities and considering your future plans. This second type is easy to overlook in the press of day-to-day business. Consider using this timeline as a template checklist for the second type of visit. The once-per-quarter required visits with academic advisors are intended to be used for the second purpose.

2) A major message of this document is that *advance planning* is a key element of a successful graduate career. You always have to be thinking several steps ahead.

3) To position yourself well for competitive jobs, you need to obtain *visibility outside of UCSC* while still a graduate student. The following are tips designed to help you do that:

a) We recommend that for job applications you have *four* letters of recommendation and that *two* be from outside of Santa Cruz. Your advisor will of course be one of these, but all advisors strongly support their students so their letters are somewhat predictable. To get the second UCSC letter you need to establish a meaningful relationship with *at least one other UCSC professor*. That could be the person you do your first research project with, so take this project

very seriously with a view to getting a super letter. The outside letters are more difficult, and there are a variety of strategies. As noted, the outside member of your Qual Exam committee is one possibility. Think about bringing that person in from off campus. Talk these things over with your research supervisor.

b) Going to conferences and giving talks and posters is a second opportunity. You have to go to these events *actively* with a plan on who you want to meet and impress.

c) The very best thing is if you are independent enough to establish research collaborations and connections *on your own* (under your advisor's guidance, of course). Showing maximum independence and initiative at an early stage is noticed and wins admiration.

4) We are often asked how first and second-year graduate students should prioritize their time, to coursework or to research. Our advice is that research is vital, and making real progress on that must come first. So, in order of priority, we would recommend putting the first-year project first, then classes that seem most relevant to your chosen field, and finally other classes. Of course, you also have to do enough to pass the classes and also the Preliminary Exam, but this gives you a guide. Think of it this way: what will look best in your letters of recommendation? Your grade in Astro XXX will not mean much, but your contribution to and talent for research will mean a lot.

First year:

Enter fall quarter.

Take courses; start research project ASAP; line up research supervisor and GSR support for first summer and second year. You will most likely need support for at least the first summer, so consider this when choosing a project/faculty supervisor.

GSRs are at Step IV.

Good to get your required one-quarter of TA out of the way this year. If you will not qualify as a California resident in your second year, you **MUST** TA in your first year. Arrange TA's with Department Manager, Sissy Madden. (You can also TA more later if you want to.)

Please get started on writing your own web page. Get in the habit of posting interesting information about your research there as time goes on.

Meet at least quarterly with your academic advisor. Advisors will be assigned within the coming week. You will get an email notifying you of who this is. Please go say hello ASAP.

End of year: your first try on the Preliminary Exam. This is a no-lose opportunity; no penalties for not passing anything. Good experience for the real try after second year.

First summer: intensive work on research project. *Daily* meetings with your research supervisor are highly recommended! Line up support for second year if you have not already done so.

Second year:

Fall quarter: start second-year courses; give departmental research talk on research project. (spring quarter is deadline).

GSRs are at Step IV.

By fall quarter we hope you have switched over to the UCO/Lick Computer network from the Astro network. Computer support and available software are better there. This depends on your being employed as a GSR, which automatically carries this support.

Winter quarter: submit first paper to journal (you are lead author or major player). This is a very big milestone and hard to meet.

Spring quarter: complete course and TA requirements; line up thesis supervisor and start discussing thesis topic.

Meet quarterly with your advisor.

If you cannot qualify for resident tuition (e.g., international students), try very hard to take the thesis Qualifying Exam in spring or summer quarter of second year, even though you may not be quite ready. Your tuition and fees drop hugely at that point, and your faculty supervisor may insist on your taking this exam early in order to save grant money (faculty grants pay for your GSR tuition and fees in addition to your living expenses.)

End of year: second try on Preliminary Exam, if needed.

Second summer in July: Board Review: faculty committee meets jointly with the advisors of each second-year student. Discusses performance on Preliminary Exam, courses, and research to decide whether student advances to third year and PhD research. Biggest obstacle is typically not enough research accomplishments by that time, so you are in a much stronger position if you have already lined up a thesis advisor by that time. For more info on the Board Review, see Ph.D. Requirements (<http://www.astro.ucsc.edu/graduate/degree.html>).

After the Board Review, start to focus full-time on developing your thesis topic, aiming for second paper in winter quarter of third year. Possible conference/poster-paper this summer. Start noticing conferences in your field (see CADC website) and asking your faculty supervisor to send you. You can help! Many conferences have travel grants for students, and the AAS has a travel grant program for airfare.

Third year:

Now you are full-time research.

By spring quarter it is a strong goal that you take the thesis Qualifying Exam. Advance to GSR Step V on passing. As noted above, tuition for non-resident students is now greatly reduced; your advisor will push you to take this exam ASAP as their research grants are paying your tuition.

You have to have an external member on your Qual committee. This person is a likely letter writer for you, for job applications. Choose this person carefully with this in mind and cultivate them from this point on by keeping them constantly in touch with your research.

Winter quarter: submit second paper to journal (you are lead author); this is also preferably a chapter of your thesis.

Have an honest talk with your faculty supervisor and decide whether you can manage to finish in five years or whether it will take you six. If five, make a schedule now.

Third summer: Attend conference and give talk/poster paper. Talks give you much more exposure than posters. Aim for this, with help from your faculty supervisor.

Fourth year:

Fall quarter: submit third paper to journal, definitely a chapter of thesis.

Advance to GSR Step VI after one year at V.

Fall quarter for advanced/lucky students: apply for jobs, travel to departments to give job colloquia. Job applications take an enormous amount of time. You will not get a lot of research done during this period, so plan on this.

Everyone: angle for talk invitations at other departments and conferences. Apply to conferences for travel funds. Many have special help for grads.

Have another talk with your advisor to decide if you will take five or six years. The goal is five. If five, you will be spending most of next fall applying for jobs. For most people, you look like a stronger postdoc candidate if you get through faster, but there are sometimes factors on the other side, depending on your work and other opportunities. You and your advisor need to strategize.

Fourth summer: Attending conferences is a must for all students applying for jobs in fall.

Fifth year:

Fall quarter: submit fourth paper to journal, second chapter of thesis. Note: the papers you have completed to this date are the ones that you will be judged on for your job applications. Papers that come later don't count for this.

Fall quarter (everyone): apply for jobs, travel to departments to give job colloquia. Many jobs ask for research proposals, so by this time you have to have ideas for future research.

Spring/summer: complete thesis and pass Thesis Defense.

Late summer: travel to new position.

This plan gets you four lead papers in time for your job applications, plus one or two more final

papers from the completion of your thesis. This is ideal, but consider three lead papers by fall of your last year as a minimum requirement. Hopefully you will also have participated in other collaborative work, which will net you other co-authorships. However, the lead papers that are genuinely your work carry much more weight, and the difference is readily apparent to readers of your job applications.

Note: the median number of total publications upon graduation for OSU students has been 10 in recent years, and the median number of first-authored papers has been 6. This is also typical of the best UCSC students who have gone on to the best postdoctoral positions.