

To appear in Jan 2005 issue of STATUS – the newsletter of the Committee on the Status of Women in Astronomy of the AAS. <http://www.aas.org/~cswa/status>

Applying to Graduate School

By Fran Bagenal

In my article on the ‘pipeline problem’ in the last issue of STATUS I commented that students applying for grad school lack good advice. Several people challenged me to provide examples.

As I expected, I found plenty of good advice available once I asked around. Here is a compilation of responses to a request for suggestions posted on the AASWOMEN e-newsletter, beginning with my three thoughts on the subject.

- Visit the grad schools to which you are accepted and make a decision based on your gut reaction to the people, place and program (rather than perceived national ranking).
- If you take the physics GRE then study seriously for the exam. If you do not take the physics GRE recognize that unless you have good grades in physics courses at a well known college/ university, then the places you are applying to will not have this simple quantitative basis to judge your application compared with the 150 others.
- If you do a research project (e.g. REU) at a non-academic institution (e.g. govt. lab) make sure the person writing your recommendation letters can make a useful comparison of your performance with those of other students. General statements such as “I was amazed how quickly Amanda learned how to analyze the data” are nice but useless for admission committees. We are looking for “I was impressed that within a month Amanda taught herself IDL, learned how to extract and calibrate data from the BLAH database and re-plot them in the new co-ordinate system she developed with my assistance. I have worked with 10 students over the past 3 summers and the only student of her caliber is now finishing a PhD at Top Notch U.”
- Good questions to ask when considering a graduate program:
 - _ Is the stipend enough to live on?
 - _ Do you have to scramble every year to get funding?
 - _ How is the qualifying exam(s) structured? How many pass?
 - _ How many grad students are accepted vs how many “slots” there are with advisors? (In other words are many accepted for the first two years to be TA’s and then a large percentage expected to not pass the qualifying exam)
 - _ How is the thesis committee structured and is there a way that the committee can help you in the advent of bad advising by the thesis advisor? (I didn’t ask about this when I was applying but have witnessed the experience of two friends who were screwed by extremely poor advising by their thesis advisor)
- Visit the department and talk to faculty, grad students and other people there. Be sure

to have a chance to ask meaningful questions (what do you like/dislike about the department? etc.)—especially of the grad students away from faculty. A good list of questions is at: <http://spider.ipac.caltech.edu/staff/rebull/goodquestions.html> which I used for my own grad school search (not 5 years ago).

- At each school, look and talk to people you see as future advisors. Do you like talking to them? Talk to their students (do they like working for them? what don't they like?). Choose a school that has a few different people you might like to work with. Advisors can change schools, move to a different continent, or you might decide to switch fields of research, so it's good to have more than just one person in mind.
- When visiting the school, think about how you would like that department (and the town) five years later. For example, if you hate big cities, take that into account when thinking about a grad school. The environment you live in can have an effect on your mood and hence performance.
- Your graduate school application essay is NOT equivalent to your college application essay. Paens to the beauty of the night sky glimpsed through gauzy curtains as you drifted off to sleep in your cozy little suburb when you were 8 are not the ideal opening. Stating that your aspiration in life is to win a Nobel Prize is also discouraged. The readers of these essays want to know why they should want to invest >\$200K in educating you to be a successful astronomer.
- It is FINE (even, perhaps, preferable) to NOT KNOW what area or subfield you want to study when applying to graduate school. You should apply to places with at least a few options, but freely admit that you are open to different possibilities if it is true.
- Invest the time to read Department websites and talk to the best-connected astronomers at your institution before even deciding where to apply. There are many programs with very different characters, and the recipe for success is not finding the most famous one, but finding the place that best matches your background, interests, and temperament.
- Talk to the current grad students at each place you're accepted, and see whether they are happy. Do they like the program? Are they excited about what they're doing, and the opportunities they're given? Are they people you would like being with and learning from? That's a pretty good indication of whether you'd be happy there as well.
- There are a LOT of really good schools, with a lot of people doing excellent research. So don't feel it's pointless to start a career in astronomy unless you go to Harvard! Conversely, it doesn't hurt to apply: a good student from Podunk U. really can get into Caltech...but not if she doesn't apply there.
- Recommendations are useful, particularly those that are comparative and quantitative; one can overcome one bad showing (e.g., poor grades or GRE), if it's clear that one is addressing the problem (e.g., based on a well-written reference letter).
- Grad school is not the same as undergrad, in that one is not so much learning facts and ideas, as learning how to develop them; etc.

- For women the biggest points from everyone I've talked to are (1) check with other women in the department (especially students), and (2) worry if there aren't any! Though this isn't always a sign of deep problems.
- Do well on the verbal GRE. As far as I can tell, this is the best predictor of success in graduate school.
- In my many years of reading graduate applications I got a strong impression that recommendations from summer research supervisors tended to be much higher than those from the student's professors, and therefore needed to be given less weight. How could these letters be made stronger?
- Students should make sure they understand the grading system of the GRE! Specifically, that wrong answers lead to a subtraction of points (a substantial penalty). Guessing is only likely to work when you have narrowed down your choices to two possibilities. Only answer those questions that you absolutely know are correct. This is not like a typical exam you're used to taking in class. There is no partial credit for picking the answer that was almost correct, but not the correct one.
- I've been advising physics majors on the astro track for many years, and most students don't seem to understand the significance that grad school admissions committees put on the GRE and most do not prepare appropriately and sufficiently.
- A low GRE score the first time you take it can be compensated for if you take the exam again and do much better the second time.
- My advice is to collect as much information as possible about the schools, so that you can make an informed decision. My recommended list of questions is posted http://www.astro.indiana.edu/grad_questions.shtml.
- For three years now, I've maintained a webpage on this subject: <http://satchmo.as.arizona.edu/~jrigby/gschool/> I started it in hopes of helping level the playing field for women & minority applicants and those from small schools (basically, everyone who doesn't get the advice from their professors.) It walks a prospective through the process, and includes several lists of questions to-ask-while-visiting, with an emphasis on questions-to-ask-if-you're-female.
- It took me three tries to get into grad school with money. I had abysmal Physics GRE scores and some mediocre physics grades. In my favor, I had worked at an astronomy institute for almost five years before starting grad school and I knew IDL, IRAF, and all the nitty-gritty details of an instrument.
- I tried to play up my work experience and the fact that I was a more mature person who really wanted to go to grad school and was stubborn enough to finish a thesis.
- Looking back an alternative route that would have helped me immensely on the physics

GRE's was to teach physics. A friend of mine did that route and aced the physics GRE. I now teach physics at a private high school and understand how that has really helped my understanding of the material.

- There is a resource about writing the essay that I found particularly helpful. It's a book by Donald Asher called *Graduate Admissions Essays* and it has good tips about how to start writing with lots of small exercises and specific questions. It helps to first write down answers to specific questions and then figure out how to adapt them and string them together to make an effective essay. Also, <http://www.haverford.edu/cdo/New/gradschool/Asher-Questions.pdf> has some questions of his that might be useful.

The whole subject of the physics GREs and their role in admission to graduate astronomy programs is a large topic which we will explore further in future issues of STATUS. Moreover, the role of the applicant's personal statements needs attention—students probably spend many hours carefully crafting personal statements, but how critical are they in the admissions process? Please send me your words of advice to students on writing personal statements (at bagenal@colorado.edu).