

A Primer On Getting Into Graduate School

by Eric L. Walters

University of California, Berkeley

Last Updated: 03 July 2007

Over the past 14 years, hundreds of undergraduates have assisted with my research. During many conversations, it became blatantly obvious that most have received little, if any, information on how to go about getting into graduate school. Rather than restricting my advice to my inner circle of associates, I am repeating it here as an attempt to help the larger community of ill-informed undergraduates that have no clue how to successfully get into graduate school.

Graduate school formats do vary by discipline so I will restrict my advice to those seeking postgraduate degrees in ecology, evolution, or wildlife biology (i.e. those postgraduate degrees with research theses / dissertations). Admittedly, my advice is slanted towards the American education system but is largely applicable to the Canadian system (save the GRE requirement) as well.

Having undergone the process myself and having served on several graduate school entrance committees, I can offer the following first-hand advice:

- Get good grades as an undergraduate
- Participate in graduate classes and lab reading groups
- Score high on the GRE (graduate record exam)
- Have good references
- Have good work experience
- Try and get a publication or two
- Identify a potential advisor
- Try and get funding (research, scholarship, fellowship)
- Know whether you want an MS vs PhD
- Know where to apply
- Read peer-reviewed publications
- Attend a National meeting
- Play the odds
- Have your timing down

Good grades

Many of us enjoyed our undergraduate experience (some of us a little too much). If you are reading this as someone who is currently engaged in an undergraduate degree, work hard to get good grades. It does have an effect on graduate entrance committees. If you've already graduated and are reading this, what's done is done. You have two options: (a) take some refresher classes and show that you can get good grades and / or (b) make up for the low GPA in other ways (see below). Important classes to take if you want to continue in biology include statistics (as many classes as you can take), ecology,

evolution, and an independent research project.

Participate in graduate classes and lab reading groups

Sitting in or participating in graduate level courses (as an undergrad or recent graduate) is an excellent way to get extra training in courses that are relevant to your future graduate career. Attending lab reading groups (aka journal clubs) is another way to familiarize yourself with recent research topics, a chance to meet faculty members, an opportunity to interact with graduate students, and another way to get a letter of reference from a faculty member (see "have good and relevant references", below). Most faculty will welcome any undergraduates that want to attend reading groups. Typically, the group will read a selected journal article and discuss it each week. It may also be a venue for bouncing ideas off the lab group, etc. There is no need to feel intimidated by such groups - it's an excellent way to immerse yourself in the academic culture (something you rarely experience by just taking undergraduate classes). See also "have good work experience" regarding working in a campus lab.

The GRE

Scoring high on the GRE is not an indication of your future success but it does inform graduate entrance committees about how you perform relative to others in your same position. I don't know how many times I've heard the excuse that "I don't do well on standardized tests". Get over it - none of us do. Work hard to get a good GRE score and you'll be well on your way to getting your foot in the door. Make sure you've mastered geometry so you can score well on the quantitative portion of the GRE. Some schools also require the Biology GRE so you should check each school's requirement.

Have good *and* relevant references

If you plan to apply to graduate school, you want to have references with clout writing the letters. While you may get a glowing recommendation from the restaurant manager where you worked during your summers, this is not going to mean anything to an entrance committee. They want to see academic references - the better known the person writing the letter, the better its effect on the committee. Failing academic references (including graduate students), having a biologist or other scientist write a letter is the next best thing. If you're really desperate, only then would I use non-academic, non-biologist references. I guess they are better than nothing, but not by much. With proper planning, you should be able to have three solid academic references. If you don't, then you haven't done your homework. As mentioned above (see "participate in graduate classes and lab reading groups"), by attending lab reading groups; you expose yourself to various faculty members and it is a chance to get to know them (and impress them) so that they'll write you a future letter. Professors that teach you during your undergrad are another source of letters. Unfortunately, they tend to have only limited contact with you and usually can only comment on your performance in class. And, of course, the best way to get a good reference from an academician is to work for one (either paid or volunteer). See the next

section "have good work experience" for more on this.

Have good work experience

Like the previous category, having worked as a painter, sales clerk, or lifeguard is not going to have any effect on the entrance committee. They are not going to care that you are fastidious about balancing your till at the end of the night or that you are the best-selling floor person at the Gap. Find good work experiences (paid or voluntary) that are related to your biological interests. If you think you want to work in a molecular lab, you should be working in a molecular lab on campus. If you want to study marine mammals, then you should be working with people that study marine mammals. Most undergraduate campuses are diverse and have a number of labs conducting relevant research. Even if the lab is not quite a perfect fit, getting research experience is very important and much more meaningful to the entrance committee. Of course, working in a lab also means you'll have at least one academic reference (see the previous section) and it will offer you a chance to get a publication (see below). I also recommend that you work for academicians when you graduate. Working for state agencies or private organizations is less desirable than working for a professor at a university who is conducting research. You will be exposed to the way faculty members attempt to ask research questions. You will have a good letter of reference from that faculty member. And you will increase your contacts in academia. The longer you are in this game, the more you will realize how small the world of biologists is. If you want to get into graduate school, surround yourself with an academic environment. Try to avoid working for state or private organizations that are involved in monitoring or surveying organisms. While this is an important endeavor, it's not going to help you realize your goal of getting into graduate school. Stick with professors at major universities where possible. Like I mentioned above, immerse yourself in the academic culture.

Get published

Besides GRE scores (see above), a sure-fire way to get an entrance committee's attention is to show that you have a publication or two. The committee is trying to assess your ability to be a successful graduate student. Having a publication demonstrates that you can come up with original ideas, know how write, are experienced with data manipulation / analysis, and have the motivation to be productive. A publication will almost always trump a poor GPA or GRE score. Volunteer in a lab, find a research topic that interests you and discuss your ideas with the faculty member in whose lab you are working. Tell him/her that you are interested in working towards a publication. They will most likely help you achieve this goal if you show the determination and motivation, especially as a volunteer.

Identify an advisor

If you are applying to a graduate program in ecology, evolution, or wildlife; almost all departments require you to have identified a potential faculty advisor before you apply. While other programs may simply have you blanketly apply to a program (similar to how

you applied to undergraduate schools), graduate programs in ecology, evolution, or wildlife almost always (caveat: many cellular / molecular programs have you rotate among labs and later choose an advisor) require that you have a faculty advisor on board. This faculty member should want you in his / her lab as a graduate student and should be willing to go to bat for you when the time comes to select the students being admitted to the program. You should have contacted a potential faculty member well before you apply. You should be familiar with their current research and you should have some sort of idea about what you'd be interested in studying for your graduate degree. You may even elect to visit the professor to find out more about the school, the professor, his/her other graduate students, etc. If the professor does express interest, you might also want to find out more about the person. Some faculty members look great on paper but are a real pain to work with. The best way to find out about someone's track record is to query other graduate students in the department. You can try asking his/her own graduate students but they may not give you a level assessment of their advisor. Asking other graduate students outside of the advisor's lab is probably the best strategy. Finding graduate students that have nothing to lose, and who are usually on top of all of the departmental gossip, is the best source of scuttlebutt on a potential advisor. You could also ask others in their field about potential advisors. This would best be done with people with whom you are familiar. Another method would be to meet the person at a meeting (see "attend a National meeting", below)

How do you go about finding a potential advisor in the first place? See "where to apply" and "reading peer-reviewed publications" (below). But, make sure you find an advisor. Sending an application to a department without having spoken to a potential advisor is an utter waste of time. They will almost certainly toss your application in the trash.

Funding

(a) Getting your own funding

Applying to graduate school with a scholarship or fellowship in tow is almost a sure-fire way to get admitted. If you come with funding, there is a much lower risk to the institution and it looks good to have students with such awards. There are many funding methods - National Science Foundation, National Institute of Health, Natural Sciences & Engineering Research Council (NSERC-Canada), US Forest Service, US Fish & Wildlife Service, National Parks Service, The Nature Conservancy, Conservation International, World Wildlife Fund, various societies (AOU, Cooper, ISBE, ABS, etc). There are also scholarships for minorities, women in science, etc. Be creative and find out what's out there. Landing a "full ride" scholarship makes it that much easier to get admitted to graduate school.

(b) Finding an advisor with a grant

When faculty members write research grants to NSF/NIH/NSERC, etc; they often write in positions for graduate students. If a faculty member has received a research grant, they may be looking for a graduate student(s). If they advertise nationally for a student, you

will be competing with at least 50-100 other applicants. If you contact them and they have funding but have not advertised for a graduate student, you may have hit the jackpot. If your interests fit with the theme of the research position, the potential advisor may be more than willing to bend over backwards to try and get you as a student. The down side to this approach is that you may be pigeon-holed into a research project that is already conceived and planned out. It allows less creativity for you to develop the project to suit your interests.

(c) Departmental Funding

Some departments guarantee funding as part of the admittance procedure. That is, if they are willing to accept you, they are also willing to make sure you are provided a teaching assistantship during your tenure as a graduate student. In exchange for working up to 20 hrs per week as a lab instructor, you will be provided funding to live on. Other departments only admit students that are funded through other means (scholarships, advisor's grant, etc). Some departments only provide limited T/A'ships and make graduate students compete for those positions. Almost universally, graduate schools look down upon (or even outright prohibit) part-time employment outside of academia. So, unlike undergrad where you may have supplemented your income with a part-time job, this is not really accepted among graduate schools. As a graduate student, you are expected to devote all of your time to your studies and other departmental commitments.

MS vs PhD

Graduate degrees in North America come in two forms: Master of Science (MS / MSc) and Doctor of Philosophy (PhD). If you want to teach at a 2-year college, go into government, work for a consulting firm, or be a professional biologist then you most likely would be interested in a Masters degree. These are typically 3-year degrees with 2 to 3 field seasons of research. If you want to go on in academia and become a professor or work in a higher level research position then you should be pursuing a PhD. Some schools don't offer a choice - they only grant PhDs and only issue MS degrees as a concession when a student isn't cut out for the PhD (often referred to as the "terminal Masters"). Other schools, especially wildlife programs, offer MS and PhD degrees. Some people, like myself, choose to embark on an MS to begin with. It gives you a chance to experience graduate school and learn more about the field without having to commit to 5-7 years of PhD research. You can cut your teeth so to speak and figure out what you'd like to do for a PhD once you are finished with the MS. Others, typically those that have only done PhDs, will argue that you shouldn't waste time on an MS if you ultimately want a PhD. These people go directly from undergrad into a PhD program and work very hard to get themselves up to speed to the level where they can start developing a dissertation topic. It's been my experience that very few undergrads are prepared to come up with novel ideas immediately after completing undergraduate degrees. It takes a number of years to catch up with the literature and become familiar with what research has been conducted, what ideas are novel, and determining a future research direction. Masters degrees put much less emphasis on the level of research questions as do PhD

degrees.

Where to apply?

In my opinion, there are 3 main factors that should help you determine where to apply.

(1) Advisor: You are going to spend the next 3-7 years working with your advisor. You want someone that you can get along with, that is going to help you realize your goals, that is conducting research that fits with your interests, and that has the personality that meshes with the kind of person you are. Also realize that the more famous a person is, the more unlikely it is that you will have quality one-on-one time with them. Junior faculty members tend to have less students and more time to nurture graduate students. Faculty with large labs will also have less time to devote to you. They will rely on senior graduate students or postdocs to help you out. Some faculty members will be very good at hand-holding and others will be very hands-off. It depends on the type of person you wish to work with. Some will give constant positive feedback and others will only share feedback when it is negative. But, of all the factors, the advisor you work with should be your number one decision on where you apply.

(2) School: The quality of the department to which you wish to apply needs to be assessed. Don't go by a school's overall reputation. Some schools may be held in very high regard by the public because they have an excellent Law or Medical school. These very same schools might have a very poor department with respect to ecology, evolution, or wildlife. Just because a campus may have some old buildings adorned with ivy doesn't necessarily mean it should be your number one choice. Again, as a neophyte, you may not be familiar with each school's reputation for your field of interest. Talking to faculty members at your undergraduate institution may help you separate out the better schools. There are also [ranking systems](#) that you can look up. If you are interested in Wildlife programs, you should specifically target [those schools](#) that offer such programs.

(3) Geographic Location: Many students I have spoken with want to go to school in a particular state or region of North America. I've heard students say they won't go to school in Canada because it's too cold or they don't want to go to the midwest because it's too flat or they want to avoid the South because it's too hot. Get over it. You shouldn't determine your entire future based on a few years in a location that isn't top on your list. Your focus should be on your research program and less on your social life and the local activities. You most likely will not end up where you go to graduate school anyway, so why worry about the location? If the faculty member you have identified to work with happens to be at a great school in a great location then you are set. But, unfortunately, the reality is that you may be lucky to get 2 of the 3 (advisor and school) - the geographic location is simply not that important. Besides, there is nothing stopping you from conducting your field research in some locale that you do fancy. Spend your school year in Chicago but your field season in the Galapagos, for example.

Reading peer-reviewed publications

One of the best ways to find a potential advisor is to read peer-reviewed publications. You can find journals associated with various topics: Birds (Auk, Condor, Wilson Journal of Ornithology, or Journal of Field Ornithology); Mammals (Journal of Mammalogy) Behavior (Animal Behaviour, Behavioral Ecology, Behavioral Ecology & Sociobiology); Ecology (Journal of Animal Ecology, Journal of Ecology, Ecology, Ecological Monographs, Ecological Applications, Ecology Letters, American Naturalist, Oikos, Oecologia); Evolution (American Naturalist, Evolution); Wildlife Biology (Journal of Wildlife Management); Conservation Biology (Biological Conservation, Conservation Biology) and the list goes on. Peruse the latest issues or do searches on topics that interest you. Almost all peer-reviewed publications can be viewed online through your school's library or viewed directly by visiting the library. Unfortunately, local libraries will usually not carry peer-reviewed journals so you will have to have access to a college or university library. If you can't get access to a university library then I would recommend Googling research topics and go from there. Almost all faculty members have web pages in this day and age. Most will list their publications and information about their current research. Try and keep current. Reading a paper that someone wrote in 1974 is not going to help you understand what their current interests are in. Look at their web page and look for more recent papers (use the Science Citation Index or Web of Science to look up their recent publications). Make sure the person you have identified as a possible advisor has an academic position somewhere. Many authors will be graduate students or government scientists. You need to tease apart those who are in a position to accept graduate students from those who are not. Look at the author's affiliation and then go to their web site to confirm that they are a faculty member associated with a university (and that they are not retired or worse, deceased!). Faculty members move around quite a bit as well. So, if you are reading a publication that is over a decade old, the affiliation may not be current. Again, Google the person and find out their current location and status.

Attend National Meetings

Almost all of the major journals mentioned in the previous section are run by societies (e.g. [Ecological Society of America](#), [Society for Conservation Biology](#), [Animal Behavior Society](#)) and have annual meetings. There is no better way to find out what research is current and meet major players in your field of interest. Google a society's web page and they will have information on their next annual meeting. These meetings will feature hundreds of 15-min talks arranged into sessions. Showing your motivation for graduate school by attending a national meeting is a great way to impress a potential advisor about how serious you are. Often, you can pre-arrange to meet up with potential faculty members if you contact them before the meeting to see if they are attending. You can also approach speakers after their talk to find out more about them. Meeting programs are available well before the meeting takes place. You can look at the various themes that are being discussed and look up individual presenters to find out more about their background and interests. If you've done your homework, you could meet up with 10 or more potential advisors at one meeting (especially one of the major meetings like the [Ecological Society of America](#) [known as the "Ecology meetings"] or the [Society for the Study of Evolution](#) [known as the "Evolution meetings"]).

Play the Odds

To successfully get into a graduate program means that all of the stars have aligned in the correct orientation. You found an advisor with your particular research interests, who happens to be interested in you, who happens to have room in his/her lab, who happens to be at a school that you want to attend, etc etc. There are many reasons you may be turned down for graduate school. The department may be more equitable and give first priority to faculty members who don't presently have graduate students. The potential advisor you have identified might be going on sabbatical for a year. The advisor may have just accepted two students the previous year. You can't bank on just one person when applying to graduate school. My advice is that you apply to 10 schools. Yes, it might be a bit pricey in terms of application fees, GRE scores, etc but it's well worth the investment. Play the odds and realize you have a slim chance of getting in at any one school. By spreading your applications about, you increase the probability of at least one of the schools coming through for you.

Timing

Don't leave applying to graduate school until the last moment. Most schools will have application deadlines some time between December and February. You should be planning out your application process at least a year from the application deadline (if possible). That year will give you a chance to get your GREs out of the way. It will give you time to read up about and contact future advisors. You want to plant the seed early so that they are interested in you with lots of lead time. You don't want to spring this on a potential advisor with only a week's notice. Some potential advisors might even try to write you into a grant if they know you are interested. NSF grants are typically submitted in early July and early January. Coinciding your contact with a potential advisor before they submit their grants can certainly help. On the flip side, advisors will find out if their grants were funded some time in May or November. They may start looking for graduate students at that time if they are successful. All the more reason to start early. And, if you apply early enough, you might even suggest working for or volunteering with a potential advisor. It's a great way to get a head start on your research, a way to impress the potential faculty member, a chance to assess whether you like working with the faculty member and their lab, etc.

Good luck - I hope this primer can help you get into graduate school! Send me a note if you have any comments, suggestions, or success stories.