How to Apply to a Research-Based Graduate Program

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Preface:

So, you're thinking about applying to grad school. Awesome! In this document, I have outlined a step-by-step timeline with tips for the graduate school application process. These applications consist of the following segments: statement of purpose, three letters of recommendation, resume or CV, transcripts, GRE scores, application fee, and sometimes additional writing samples, subject-specific standardized tests, and diversity statements. While you must submit every piece of the application on time, networking and setting yourself up before-hand are key pieces of the process.

Undergraduate Level or Postbaccalaureate: Getting Research Experience and Networking

It's never a bad time to begin setting yourself up for success, be it during your undergraduate experience, or after you've completed your degree.

As an undergrad, you can start creating a solid network of people from whom you can get advice, letters of recommendation, or experience. I highly recommend attending professors' office hours, even if you don't have any homework related questions. You can chat with professors about course material, their current research, and what you'd like to work on. Oftentimes professors will allow you to schedule one on one appointments if you want to learn more about how to get involved with their lab and research (or if you need help with the material and your schedule doesn't work with their posted office hours). I've even scheduled some appointments to talk about directions into which I can take my future. If you want to work in a lab, but you're not sure who is doing the research you are interested in, you can ask a professor whose class you've taken if they know of anyone in the department who would be a good fit for you; this is how I found the lab in which I completed my senior thesis! Completing a senior thesis in a lab can show that you have research experience in addition to showing that you can write up a project to completion.

Experiences are not only very valuable in a graduate application, but they are also formative in helping you decide what you like to do. I was a lab assistant in two different labs with vastly different areas of study before I found the one that I settled in best. Exploring your options is a great thing to do! By working with multiple different people, you can broaden your network even more, develop more skills, and get a taste of what options are out there.

Working in your college's lab isn't the only way to gain experience. If your school doesn't have a lot of active research, you can talk to your professors about directions you can go in, look into applying for research experiences for undergrads (REUs), and see if there are any hometown specific opportunities available over the summer. You can also volunteer or work at local institutions (like a museum or planetarium) or find a summer internship. Another option is to look for any remote coding or field work opportunities at other universities you might have a connection to.

Working in industry after you've graduated can also be helpful, especially if you're not sure if you'd like to go to grad school yet, or if you haven't settled on a specific type of research. Industry experience can develop you further as a scholar by refining and teaching you new skills, and making more connections who can act as both a character and employee reference. Industry jobs can also give you the opportunity to show that you can complete large projects, if you haven't already, and show that you can work independently or in a group setting.

Undergraduate Level or Postbaccalaureate: Coursework

Your major in college can be directly related to what you end up doing, or you could end up working on something that applies the skills you've learned in your major to a different area of study. Don't be concerned if you are almost done with or have completed your undergraduate degree and feel like you want to switch topics! You can highlight the transferrable skills and techniques you learned throughout your undergraduate career in your application. You can also show that you are motivated to learn more about a specific area of research by taking coursework that is either an upper-level elective course within your major, or a course outside of your major that would be relevant to your goals. For example, if you want to model climate change, and you are an earth science major, take a few classes in computer programming, so that you have the necessary skills you will need in the future to perform modelling research. Lastly, you can learn on your own by reading articles in the subject you are interested in.

Undergraduate Level or Postbaccalaureate: Deciding if Grad School is What You Really Want to Do

Decide why you want to go to grad school! Graduate school can be a really fun and transformative experience, but it is a lot of work and a huge time commitment, and you must be very passionate about the research you a working on. It is important to have at least some sort of experience in the field you are planning on applying to for graduate school, so that you know you enjoy doing it. There are many good reasons to go to graduate school, including loving lab work, passion for solving a problem, to become a more marketable candidate for future employment, and too many more to list. You should have a clear reason you want to pursue the degree; this can vary from person to person but having a motive for going to graduate school sets you up for success. The only reason that is usually a bad reason to go to graduate school is if you are postponing deciding what you want to do.

Consider whether a PhD program or a master's program is best for you. This will depend on your reason for applying to graduate school. Generally, master's programs are designed to qualify you for specific jobs, while PhD programs qualify you to perform research in the field; however, this varies greatly depending on the field. You can also pursue a PhD after you have received a master's. If you are unsure about which is right for you, I would suggest talking with an advisor or professor about what type of grad school is right for you.

Late Spring to Mid-Summer Before the Application is Due: Searching for Programs

Finding programs can be a tough part of the application process. There are many great schools out there, and it can be difficult to weed out the ones that aren't a good fit for you. To look for universities that do research you are interested in, I recommend searching for articles in google scholar that are similar to your specific interests. The scholars and universities affiliated with the article will be listed on it. I also highly recommend talking to undergraduate professors and advisors as they may have connections or insider knowledge about potential advisors. My senior thesis advisor recommended a list of potential advisors to me based on his personal knowledge of their advising style, and his academic knowledge of hard-hitting research in the field (and I ended up going to one of the schools he recommended!).

If you are concerned about paying for a research based graduate program, many people don't know that most PhD programs are funded, either by professors' grants or by the school. This means that you will likely be paid a stipend for the research you are working on, or for working as a teaching assistant 10-20 hours per week. This is an important piece of information to check on when you are applying to schools!

I've heard from many people that it isn't worth applying to safety schools, as you don't want to end up stuck for 4-6 years in a program that isn't exciting or supportive enough for you. They suggested that you should only apply to programs you would be excited about going to, and if you don't get in, to make your

application stronger for the next round of applying. This is a personal choice, however, and doesn't apply to people who just need to check off getting the graduate degree that they need for the career path they want to pursue. Remember that you don't have to apply to all the schools that are suggested to you, once you've got a list of ideas going, move on to the reaching out section of the application process. You don't want to waste time and money applying to schools that you wouldn't say yes to going to anyway!

Late Spring to Mid-Summer Before the Application is Due: Take the GRE

The graduate record examination (GRE) is a daunting standardized test that used to be required for almost all graduate programs. More recently, it is becoming optional or even obsolete in graduate applications, as schools see it as a barrier to admission, or not very representative of the applicant, and they are beginning to focus on more wholistic application pieces like the letters of recommendation and research direction. However, you may want to take it before you know which programs you'd like to apply to, just in case you need it later or would like to retake it before applications are due. If you are able to, another reason I recommend taking the GRE is because it can make you eligible to apply for certain scholarships and fellowships that you may want to apply for in the future.

There are many great GRE study tips online, and tons of test prep booklets available in bookstores and libraries. I won't go into the details of how to study for this exam, but at the bare minimum, if you're planning on taking it, I would recommend prepping by taking a practice test (available online). This way, you know what style of questions to expect, you can identify which parts of the test are difficult for you, and you aren't caught off guard during the real thing.

Late Spring to Mid-Summer Before the Application is Due: Write Up a CV or Resume

On many graduate applications, you need to include a curriculum vitae (CV) or resume so that the admissions committee can easily review your accomplishments, skills, and academic history. If you don't have a lot (or any) publications from prior master's or undergraduate work, you can absolutely detail your past research experience and make a list of skills you've acquired from lab work or courses! If you don't have a ton of prior research experience, adding your relevant industry work experience, skills, and techniques is also perfectly fine on a graduate application CV. Getting a refined CV early can be super helpful as well because you can attach it to your initial email to potential advisors.

Late Summer: Looking for Funding and Application Fee Waivers

Applications for funding opportunities and application fee waivers can be due deceptively early. Many application fee waivers are due long before the application for the school itself, even as early as October. Staying on top of deadlines like these can help reduce financial hardship and applying for outside fellowships can bolster your application as well. External funding opportunities, like the national science foundation graduate research fellowships program (NSF GRFP), NASA graduate fellowships, and more, can also be due much earlier than graduate applications. Applying for scholarships and fellowships can be good for your application, as they show your drive to succeed, your motivation to bring in outside funding, and they can be appealing to programs that don't have a lot of funding. Some advisors have room in their lab for new students, but aren't able to accept them due to a lack of funding. If you have the potential to bring in your own funding, you can be a stronger candidate. But don't worry, if you miss the deadline on some of these scholarships, you may still be eligible to apply for them in your first or second year of grad school!

Also, your employer may be willing to (or even have a program to) fund your master's degree. Many companies offer this option because they want to support their employees' growth and hope that they will come back with a larger skillset. It is something worth looking into!

Early Fall: Reaching Out

Reaching out to professors is a huge part of the application process! You should email potential advisors to introduce yourself and state your interests, so that they know who you are, and they can put a face to the name. By emailing professors, you can find out whether they are accepting students for this round of the application so that you don't waste time applying to a program that doesn't have any spots.

If they are accepting students, and you show your interest in working with them, you can set up a zoom or phone call with them to learn more about their research, whether your collective research interests align, and to see if you are a good fit for the program. It is very important to feel like you will get along with your advisor and will get the support you need from them, as you will likely be working with them for 4 or more years! It is definitely possible to switch advisors in graduate school, but it can be a lengthy process.

You will likely need to send many cold emails to potential advisors! If they don't respond, and many won't the first time you email them (professors are very busy), but you are still super interested in the program, send them a nudge email after about a week on the same thread. If possible, before the email or call, learn a little bit about their research so that you can propose a way that your interests tie into theirs.

My recommendation for what to include in your email is as follows: your name, your interest in their research, asking if they are accepting students, and a very brief overview of your background and experience. You can add your CV as an attachment to the email and state that you've attached it in case they want to see a little bit more about your achievements.

Early Fall: Ask for Letters of Recommendation

Letters of recommendation hold a lot of weight in graduate applications. It is important to ask letter recommenders early (at least a month in advance of the deadline) so that you give them enough time to write a strong letter of rec. Asking your network for letters early also allows you time to find an alternate writer if one of your letter writers falls through. Asking for a letter of rec can feel awkward but doesn't have to be an ordeal. Make sure that you ask politely and early, express your thanks and what you've learned from them, and know that they want you to succeed as well! I suggest asking for letters in person, if possible, unless you are at a different location from your recommender or if you've already established somebody as a recommender in the past.

Mid-Fall: Statement of Purpose

Probably one of the most stressful and time-consuming parts of the application is the statement of purpose or research statement. These statements must be tailored specifically to each institution you are writing them for. I highly recommend starting these early so that you have plenty of time to edit them, have peers and mentors read them, and so you have a draft if your recommenders want to read them so they can tailor their letters more specifically to each program.

Each individual will have a different style for writing their statement of purpose. I tend to use a chronological approach, detailing each piece of my research background and how it ties into the scholar I am today and then explaining what I want to do in the future (during graduate school and beyond). Others use a different approach, centering their focus on what they want to study and showing their

background knowledge on the subject as well as the questions they want to answer. Some people talk more about their motivations for what they want to do and why the school is a good fit for them to accomplish their goals.

Key points you should hit in your statement of purpose include the following: your past research experience (or coursework, volunteer work, or internships), how your past developed you as a scientist or scholar, how that ties into what you want to study now, your plan for your studies in graduate school (it is best if you already have a project in mind, or even one that you and a potential advisor discussed in a zoom call before you apply!), and, lastly, your goals for after graduate school and how this program will set you up for that. The bulk of your statement should be about your experience and what you want to do in graduate school. Don't be afraid to include your cultural background in your statement, especially if your background was instrumental in deciding what you want to do!

The reason schools include the statement of purpose is to see that you have the background knowledge and experience you need to succeed in their program, to see that you are passionate about what you want to study, and to see that you want to attend their program specifically. There is no one formula for a perfect statement of purpose.

After You Apply: Prepare for Interviews

Prepare for any potential interviews before you hear back about your application status. Many programs use interviews as a chance to see how committed you are to going to their school, and they want to know that you have been thinking about what you want to do there. There are many mock graduate interview questions online and in forums, and I recommend practicing answering them out loud, so you don't stumble over common questions if you're in a stressful interview. Don't worry though, as long as you are excited about the program and know what you want to do, that will come through when you talk. There is no way to prepare for every possible question and outcome but reading through some classic interview questions can get you more comfortable with the process.

After You Apply: Keep in Touch

Keep in touch with your potential advisors, and see if you can virtually meet any of their current lab group. Zooming with their current and past students can give you a chance to get further insight into the type of program that this school offers, the professor's advising style, student life, and student outcomes. You should be impressed by the program just as much as they should be with you. Talking with current students can give you an inside look about how the program works and can tell you if students there feel like they are happy and successful. Mental health is a big part of grad school!

After You Apply: Celebrate!

You've just completed a huge accomplishment by applying to these programs! Take a day to relax and enjoy the fact that you're done applying.