A Senior's Perspective: Finding Undergraduate Science Research Opportunities
By: Parisa Oviedo, MCAS '16

Should you do research as an undergraduate? Absolutely. Medical and other graduate schools agree that research experience demonstrates leadership and independence, critical analysis skills, and exactly the deductive reasoning that... say... a physician would need to make a diagnosis. What kind of research, who your Principle Investigator (PI; person that directs and oversees the lab) is, whether or not you do it during the school year versus during the summer, and how many hours a week is up to you. Regardless, you should strongly consider getting involved in research particularly if you are considering a non-medical, graduate program in science; most if not all graduate programs in science require a minimum of two years research experience.

Deciding to work at a on-campus lab during the academic year depends on you, how proactive you are, and your research mentor. BC has a peculiar rule in which a student can only receive course credit or payment for their work at a lab *after* one semester of working there. In other words, you have to volunteer a *minimum* of 10-12 hours a week and cannot get class credit for your first semester. Twelve hours in a week is huge time commitment, so be prepared to prioritize your research over other extracurriculars and master time management. I found it difficult to balance research with all the other activities I was doing, and figured it might be alright if I did not work at a lab during the school year because I did research for three summers. Work in a lab at BC if you can commit the time and are not worried about managing grades or other activities.

The two main types of scientific research are "basic/benchwork research" (like in BC's standard Bio Lab course) and "clinical research" (which involves patient interaction and data derived from patient records). If you have no prior research experience, reach out to a professor or a more experienced student to get an idea of what research entails. If you don't know where to start, try basic/benchwork first since the experience is extremely useful and impressive. Don't be afraid that you won't like the type of research you initially choose; you'll still reap benefits by gaining important skills, and can always explore other types of research later. I gained invaluable skills from benchwork research but wanted something that involved interpersonal interactions, so I tried clinical research for a summer and I loved it so much that I will be doing it full-time after graduation.

There are few resources for students without prior research experience detailing how to find research opportunities, so I hope this feature provides undergraduate science majors with valuable insights. *Disclaimer*: I am no expert, and when you read these rules please bare in mind that everyone has a different path, interests, and can handle different time commitments. What I am sharing with you are rules that I have devised based on my personal experience, and may not apply to everyone or every situation.

Rule #1: Be Proactive and Create Opportunities Where They Do Not Exist
At the entry level, no one is going to come to you and hand you a position if you did not ask for one. Now and then you will see posters or emails with job or internship openings for a research assistant, but this is very rare. You have to actively seek out positions yourself through Google, email, or going to a faculty member or PI in person. Do whatever it takes to demonstrate your interest, and do not wait around for someone to discover you.

- Seek out the lab(s) you want to join and be extremely proactive, persistent, and patient: send emails, and do not always expect a reply in return. I know a student who sent an email to a biology lab at BC, and when he did not get a response after two weeks he showed up in person instead. If you can see the faculty in person during their office hours you will likely stand out from other applicants, and to your benefit the faculty member has to answer you since you are right there. If you find a lab you like, send that email or call the department to find out that teacher's office hours and stop by and introduce yourself in person. Often when you ask someone for a position and their lab does not have any available at the moment, they may keep you in mind for the future or offer to recommend another lab or put you in contact with someone else.
- Using the Internet: I worked in Professor Liane Young's morality lab in the BC Psychology Department from the summer after my freshman year. As a psychology major, I first looked up BC psychology labs and immediately found links to specific lab pages within the psychology department. You will find that you can do this for all science departments. Sometimes lab pages will have some kind of tab for people interested in joining, in which you can fill out an application requesting to be contacted when and if there is an opening for a Research Assistant (RA). If there is no section like this then search the website for some sort of contact information. Even if the lab does not explicitly seek a research assistant, email them anyway and see if you can create your own internship. Don't hesitate to create opportunities where they previously did not exist. In your email you should briefly introduce yourself, write 1-2 sentences describing why you'd like to join that lab in particular, and ask how to apply for or volunteer for RA positions if any are available or to have them keep you in mind for when a spot opens up.

Rule #2: The 5:1 Ratio:

When searching for research internships, contact five labs for every one that you want to hear back from. This sounds excessive, but a lot of people– especially those from outside of BC– will not reply to you. It does not hurt to apply to more opportunities; if you get no response or a "no", then you are simply right back where you were if you hadn't emailed at all.

- Create a spreadsheet: the summer between my sophomore and junior year I did benchwork research at Boston University Medical Center in the Wolozin Laboratory for Neurodegeneration. The December before that experience, I had decided that the general topic I wanted to do research in was neurodegeneration. I googled "Boston research labs neurodegeneration" and made an Excel spreadsheet of about twenty labs in Boston with details including the name of the lab, the contact information, the link, the location, the focus of their research, and the PI. I emailed about fifteen of those labs and introduced myself as a BC undergrad and McNair scholar, explained why I was interested in their lab specifically, and arranged a meeting to discuss whether I could volunteer at their lab that summer.

Rule #3: Arrange a Meeting (and do research on the PI and their lab):

In your email to the prospective labs, ask to set up a meeting instead of directly asking to work there. Do not send a detailed and lengthy email asking to work in their lab. I have no statistics to prove it, but I'm almost certain that the length of an email correlates to the probability that someone will not reply to it.

- Structuring your email: give a brief introduction and summary of who you are and what you are looking to do, catch their attention, and ask to set up a meeting to discuss further details and the prospect of your being a research assistant for them. This meeting will allow you an opportunity to pitch yourself in person to impress and convince them that you will be a great RA and team member. This also allows you to see the lab environment in person and meet your future boss to get a better sense of if you can see yourself working there on a daily basis. Send a follow-up thank you email to the person or people you met with within 24 hours to thank them for their time and consideration.
- *Do research on the PI and his or her lab*: out of the roughly 15 emails I sent that summer, I only heard back from three (see how I got that 5:1 ratio?). I met with one and got an offer. When I met with the PI in person at BU, I dressed business professional, printed out a copy of my resume, and did research on him and his lab. I even managed to weave in two of his publications into the conversation and he was very impressed. Do research on that lab in particular and even read a few publications and the PI's background; if you can incorporate the fact that you came prepared and make the PI see you want to work with that lab specifically then you're guaranteed to leave a good impression.
- Be ready to have an elevator pitch to present not just to the PI, but also anyone: the PI I was meeting with spontaneously took me to meet the PhD students and postdocs already working in his lab, and told me that I had to convince one of them to volunteer to train me. To my fortune, one did.

Rule #4: Find Funding Elsewhere (if possible):
It would be ideal get paid by the lab directly, but it's no surprise that the prospect of your internship or work at the lab is more appealing if they don't have to pay you.

- Find stipends and note deadlines: when I first sought out the BUMC research opportunity, I hardly had any research experience and was aware that I wasn't benefiting the lab but that the lab was benefiting me. The PI knew it too, but my internship was easier to pitch when I mentioned that I would be volunteering for free. For all three-summer research opportunities I have had, I applied to and received funding elsewhere through stipends and scholarships. The McNair Scholars program not only provided funding and housing for one of my summers, but also has since guided me through my undergraduate career and is helping to ensure I can successfully transition to graduate school. The remaining two summers were funded by an alumni stipend from my high school and by the Boston College Career Center's Summer Internship Stipend. With the financial aid of such programs, I could afford to lease a summer apartment and have some pocket money while still working at the lab. Don't miss these deadlines for stipends− even if the lab *is* paying you then it still doesn't hurt to have a little extra cash! Stipends for undergraduate research are actually easy to find and searching the BC website for them is a good start.

Once I had two summers of research experience in neuroscience and found funding for another summer, it was not as difficult to get the clinical research opportunity I had at Massachusetts General Hospital (MGH) in the summer after my junior year. I emailed two physicians at MGH with clinical research labs related to Parkinson's in mid-January, received an answer and set up a meeting with one in February, and was told I could work for him in late March. I had a

successful summer internship, and now I plan to work for the same physician-scientist full-time after graduation. Use these tips to get your foot-in-the-door and explore what it means to do research; once you begin to gain experience, you too will discover opportunities you did not know existed.