



How Do I Get into Research?

Tips from a Biology Undergrad

So you've decided you want to get involved with hands-on research. Perhaps you're a first year and are super excited to dive in. Maybe it's one of the main reasons you came to UR. Or you're a sophomore and you feel the idea of research now sounds more exciting than it does daunting. Or perhaps (as was my case!) you're an upperclassman, thinking about graduation and you're panicking because you feel you started the search too late. Whatever the reason, you've set your eyes on trying to get some scientific research experience while you're still in your undergraduate years.

If you are anything like me, chances are you're a bit lost as to where to start. When I excitedly went to a professor's talk my first year and waited until the end to ask, "How can I get involved in research? What should I start doing now?", the only response I got was: "You probably shouldn't even think about it until you're a sophomore". Though I understand where that response was coming from, I know from personal experience that when I was beginning to think about research, I had many unanswered questions. With that in mind, I've tried to provide some tips that I hope might be useful to you in your quest to become an undergrad research assistant.

Part 1: Figuring out what you like

Research, especially within Biology, can take a variety of different forms. It can vary based on the techniques, the overarching "big" questions the research seeks to elucidate, and the specific focus of each individual research group or lab. Thus, the first point you must think about is what you actually like to study. Ask yourself the question: "What am I interested in within Biology?". I know very well that that question can lead to too many, too few, or too broad of an answer, so how do you hone in on potential research interests?

If you have absolutely no clue:

- A good starting point is the science section of newspapers, news sites, and other secondary sources. These sources can show you potential topics you might be interested in. As you read reports on newly discovered species, interesting behaviors, biochemical advances, etc. you will get a feel for what general areas attract you more than others (i.e. larger matters of evolution as opposed to biochemical processes on their own). Here are some links to science news articles you can dive into:
 - www.livescience.com
 - www.nytimes.com/section/science
 - www.bbc.com/news
 - www.sciencemag.org/news/latest-news
- At the same time, pay attention to what topics jump out at you the most in your coursework. If you know that you liked a series of lectures on a subject, see if you can tease out what specific points and examples really caught your eye. Another option is to talk to your Biology TAs or the Peer Advisors. Many of them are involved with research in some capacity and can speak to their own experiences of getting involved in their topics of interest. It can be as simple as sending them an email saying you're interested in research and are wondering if you could ask them some questions.
- Thinking about what you really like is perhaps the most important thing to getting started. If haven't taken enough classes to have a feel for this, no worries- there's probably plenty of time. I understand now that *that* is what the professor meant when he told me to wait. He wanted me to dip further into the waters of Biology before making a choice about what I'd like to get involved in. (Coincidentally this same professor told me, "We'll see about that in two years" when I told him I wanted to do CRISPR-cas9 related research. Spoiler alert - he was right again).

Once you know what you like...

... take a deeper dive! You should start looking at some of the primary literature in your topic(s) of interest. Not only will this solidify what topics you are really interested in, but it will also prepare you for the practice of fully immersing yourself in the literature. This practice will most likely be a routine part of your research experience. You can find publications via Google Scholar, or through the UR library system. When searching, be specific in order to yield the best results. For example, looking for papers by searching “evolution” might yield results that are too broad. Try something like, “speciation in birds/mammals/etc” for papers that are more specific.

Understanding a scientific paper can be quite confusing even for the seasoned reader. Several of your classes (such as BIOL 111/113) are designed to show you how to read and really understand research publications. For some additional tips, read the attached article by Dr. Jennifer Raff on *How to Read and Understand a Scientific Article*.

There are also useful videos on YouTube which explain how to understand and tackle scientific literature:

www.youtube.com/watch?v=5Eg_Gzz3hXY&feature=emb_title

www.youtube.com/watch?v=BAS9I4tFgV8&feature=youtu.be

Part 2: Identifying potential labs & opportunities

Once you have a good grasp of the particular topics within Biology you find interesting, the next step is to see what research is directly available at UR. This way, you can find where your research interests and professors' research interests overlap. For a full list of Biology faculty and their research interests, see: www.sas.rochester.edu/bio/people/faculty/index.html

- I suggest going through the full list of faculty and writing down the names and contact info of all those whose research interest statement seemed interesting to you at a first glance, as well as their personal lab website link, if they have one available.

- Later you can visit their websites and foray into their publications. This will give you a better sense of not just what kinds of questions they are trying to answer, but what specific methods they are using. This will be useful when deciding where you'd like to work and what kinds of skills you want to develop. Use this information to further refine your list but keep your options open!
- Once you have a solid list of the labs/professors you are interested in working with, you can take the next step.

Part 3: Reaching Out

Now that you know which labs you are interested in, it's time to reach out to make yourself known. You should make yourself well-acquainted with the lab's/professor's papers (again, you can search these via the professor's name on Google Scholar or the Library system). This can really set you apart from other applicants. It is standard practice to make first contact by sending an email stating your interest in the professor's research and in possibly working in their lab.

Some people will simply say: "I am interested in your research", but this is not optimal. Others will briefly mention a specific paper's main findings and why they find them interesting, which is a slightly stronger approach. The best bet, however, is to dive into what this professor has been publishing and to highlight a specific recurring idea/theme or a specific element of their methodology, goals, etc., that speaks to you. If you can pose a question about what future research in a given topic might look like based on what has been done already, you will really stand out. This is not necessary, but it can help you significantly.

Why? Put yourself in the professor's shoes. Your research is your life's work and therefore probably of great importance to you. As you're looking at the pool of students interested in working with you, you most likely want to find those that will have something of value to contribute, and who seem to really care. If

you find a student who has taken the time to *really* understand what you're trying to do and why you're doing it, to the point where they can identify and mention things beyond just your abstracts, that demonstrates great interest and ability on their behalf. That's a student you would want on your team. Even if you are not taking in new students at the moment, you'll keep them in mind when you do.

Other things that are important to keep in mind:

- Make sure to have a solid resume, and one that is tailored to present you as an attractive candidate. For a template and guidelines on how to do this, the UR Career Center can be of great help.
- Think of relevant experiences you might have. You may not have any direct research experience, but you could have some tangentially related skills that apply. For example, I work at an entomology lab, and just mentioning that I have handled insects for fun since I was a child made the professor say I would fit right into their team! Letting the professor know what labs and relevant classes you have already taken can also be a good idea in some cases.