

Getting involved in research:

There are many opportunities to join faculty research programs while you are here at Bowdoin. These are available to all of you, and getting involved is probably not as difficult as you might think.

Below, we provide information that should help you decide whether you would like to get involved in research yourself. By the end, we hope that you will have all of the information you need to understand the opportunities available to you and how to go about getting started if it sounds like a good idea.

First of all, it is important to realize that few students who end up getting involved in research here at Bowdoin entered campus with prior experience. That is to be expected, and is completely fine with us! The faculty are certainly not expecting that you know what you are doing right from the start. We will enjoy teaching you what you need to know.

Furthermore, we do not expect you to have research ideas of your own before joining our labs. Instead, the expectation is that you would join our ongoing research programs, which means that the projects are already underway. These are almost always multi-year projects, and require the work of multiple students to complete. So, instead of trying to figure out your own research questions beforehand (which would certainly be intimidating!), we introduce you to our own work, and then mentor you as you go along. The goals are that we do some great science together, and that you get the most out of the experience. Of course, any ideas you might have along the way are always welcome, but you should not feel like you need to come up with something on your own to get started. It is also not required that you be an upper-class student to get started—having more courses under your belt is always helpful, and some faculty will require this, but it is certainly not uncommon for first-year students to get involved in research!

What might a research experience look like? There are different variations, and which one suits you best will vary among students. Basically, your research experience can consist of summer research fellowships, independent studies, and even a senior Honors thesis. Many possible combinations of these are possible.

One possibility is that you would apply for a fellowship to work with a professor during the summer months. Indeed, Neuroscience faculty strongly encourage a summer research experience before joining their lab as an independent study student, since the learning experience in the summer is so intense and without distractions. These are especially fun experiences—summer weather is great in Maine, campus is less crowded and less hectic, there are not so many obligations for everyone to juggle all at once, we get to spend a great deal of concentrated time working together, and you even get paid for it all! To do research here in the summer, you must apply for a summer research fellowship, and any one of us can help walk you through the process. Of course, there is no guarantee that everyone will receive a fellowship, but Bowdoin is very fortunate to have many of them available, and it is often the case that most students end up getting awarded one. To be clear: Getting a summer fellowship does not require "straight A" grades and a great deal of prior research experience! In fact, for many students their first summer fellowship is also their first research experience. These fellowships begin within a few weeks after the end of spring semester (the precise time varies among labs), and will last for 8, 9, or 10 weeks (depending on the summer

schedules of both you and the professor). You would work "full-time" for those weeks, and it is very much like an independent study, but much more focused and intense.

Another way to engage in research is to enroll in a semester-long independent study with a professor. You register for this "class" just like any other; this means that one of your four courses for that semester will be the independent study. The expectation is that you would put in roughly the same amount of time for an independent study as you would for any other course. Faculty are generally not going to allow the independent study to be tacked on as a fifth course; experience has taught us that this almost never works out well. An independent study counts towards your total credits for graduation, and one semester of independent study will count as an elective towards the Neuroscience major. Precisely what the semester's work will entail varies quite a bit, depending on the faculty member in question as well as your own background and interests. Generally, there will be regular and frequent meetings with the professor (usually a few times per week) to discuss everything: the big ideas behind the research, how it fits into our specific research field, what is going on in the lab, challenges that we are trying to solve, what experiments to do next, what some results might mean, etc. These meetings may be one-on-one with the professor, but can also be small-group meetings that include other students who are also working in the lab. Of course, it is not all just about meetings: You will also do a great deal of hands-on research. In general, there are no quizzes or tests in an independent study (although that is up to the professor), but there is always the expectation that you are participating fully, and you will normally write an end-of-semester paper that summarizes your work.

The one-semester independent study might end there—perhaps you find that research is not your favorite thing in the world. Everyone varies in what they find the most interesting, and we encourage you to follow your passions during your education; doing scientific research is not for everyone, and learning about what it's like to do research could help you make decisions about what you would like to do in the future. On the other hand, you might decide that the research experience itself is great, but that you would really rather join a different lab if a different area of neuroscience strikes you as even more interesting. Neuroscience is a huge field, and you should work on what you find the most fascinating! That is perfectly fine with us; we understand this very well, since many of us have made such a transition at some point in our careers (especially early on in our research trajectories).

Alternatively, you might find the whole experience in that professor's lab enjoyable and rewarding, and decide that you would like to continue working with that particular professor. If so, you could sign up for another independent study to work with them at some point in the future, or apply for a summer fellowship (discussed below). Continuing with the research does not need to happen immediately—perhaps your course requirements, or study-away plans, or other obligations mean that taking a semester (or more) off from research is best for you. This is common, makes perfect sense, and is fine with us. You are not committing to an uninterrupted series of independent studies if you want to get involved in research.

OK, now let's talk about how you actually get started with all of this. For any of these research opportunities, the first step must be to decide which professor's lab is doing the research that most interests you. This may be based on information provided in the Summer Research Information meeting in the fall semester, on information gleaned in Neuroscience courses, and/or on

information found on the Neuroscience website. Links to each of the faculty, with descriptions on that professor's research, as well as lists of some publications that have come out of our labs, are on the website. Which professor's research sounds interesting to you? You may be most interested in one research program, or equally interested in more than one.

Of course, space in research labs is limited; we have limited equipment, supplies, and lab space, as well as time to mentor research students. To facilitate the process of finding a lab with space and to maximize the number of students who are able to conduct research at Bowdoin, we have generated a Research Interest Form, which is linked on the webpage.

To apply for a summer fellowship, you should start thinking about this possibility during the FALL semester (to apply for the following summer). This early schedule might be surprising, but the application process starts early in the spring semester, and professors must commit to mentor those students who are applying to work with them; and of course, the "space is limited" issue arises. You should thus fill in the Research Interest Form by December 1 for work the following summer. You can always contact professors later than that, but be prepared for the possibility that their lab is already "full."

Once you have filled out the form, you will be contacted to let you know whether there is space in a lab on your list, and which one can accommodate you. The application process after that will involve writing a short document (two pages, single-spaced) that describes the project, the basic plan for what will be accomplished during the summer, and how the experience fits into your academic and career goals. Your mentor will work on this with you. It is due early in the spring semester; dates and details are available in the PowerPoint on the website as well as on the Student Fellowships Office website. The goal is to demonstrate that you have a handle on what the research is all about, and that you have a basic understanding of what you will try to accomplish. You will learn whether you received an award towards the end of March.

For an independent study, the process is relatively simple—you will need to talk with a faculty member or perhaps spend the summer working in their lab. Then you register for the class, and meet with the professor right at the beginning of the semester to get started. The professor will work with you to lay out the plans for the semester. If you want to do this and have not already spent a summer in that research lab, you should contact the professor well before registration (maybe a month or so beforehand?), since there is the issue of available space in a given lab, and you will need to determine if there is space available. During registration or during drop/add, you will need to have the independent study approved through the registrar's office (via an online form) for you to enroll, but there are no official pre-requisites otherwise. The pre-requisites are entirely up to the professor in question. After that, it is just a matter of waiting for the semester to get started!

If you intend to try to complete an Honors project, you will be required to enroll in an independent study both semesters of your senior year. There are a few additional expectations (on top of the typical ones for a "regular" independent study). Otherwise, an Honors project is much like any other independent study. For Honors in Neuroscience, students generally should plan to start their research in the summer, since it can take some time to get up to speed and the academic year always passes by quickly.

Hopefully all of this is helpful, and encourages you to consider trying out a research experience while you are a student at Bowdoin. The benefits of getting involved include: it will help you to decide whether a career involving research is right for you; you will form long-lasting friendships with both your fellow research students and your faculty mentor; doing research will help you grow as a scientist in ways that are just not possible in the framework of a traditional class; and the extended one-on-one time as you work with a professor means that they will be much better-prepared to provide a detailed recommendation as you pursue future career opportunities. You could even end up as one of the authors on a published scientific paper! We hope you will take a look around at the faculty webpages, and give some serious thought to joining us in our labs.

However, as noted above, space in labs is limited by our equipment and time – and so you might not be assigned to a lab after you fill out the interest form. In that case, you can always apply again the next year – and you might think about broadening your exposure to neuroscience by doing an internship or REU program at another institution. Information on such experiences is available from Dani Calles in CxD and on this website listing neuroscience opportunities:

https://www.funfaculty.org/undergrad_internships.