

Getting involved in biological 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, you will find information that can 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. Of course, you can contact any faculty member to talk about all of these issues in more detail—just send one of us an email and we can chat. It is as simple as that.

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 in order to join 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!

Remember that the Bowdoin faculty joined the college in large part because we enjoy mentoring and working together with students. We all wanted this to be a part of our careers, so we applied for jobs at a place where this is an integral part of the educational experience. Working with students as they do research is not some sort of onerous obligation for us, but is instead something that we find very rewarding. You should definitely not feel like you would be imposing on our time if you ask us about opportunities for doing research; in fact, we are always hoping that students will join us so we can work together!

Please feel free to contact one of us, even if you are just beginning to think about whether you might want to do research, and even if it might not be something you would do right away (or end up doing at all). Of course, it can be intimidating to take the plunge and contact a professor about this sort of thing, but keep in mind that we are excited to tell you about what is going on in our labs. After all, we are a pretty obsessed bunch when it comes to our research topics, so it is always fun to have someone's ear to chat about how cool our research is! Also, just because you contact one of us to ask some questions, there is absolutely no obligation to actually start

working in our labs. In fact, we encourage you to get as much information as you can before making that decision. This includes contacting and chatting with multiple professors right from the beginning. We all expect that you will do so, and we all agree that this is a good idea. None of us will be the least offended if you decide that research is not for you, or that you have too many other demands on your time, or that someone else's research program is your favorite option. Of course, each of us thinks our own research is the most fascinating topic in the world (that whole "we are obsessed" thing again), but everyone here has an excellent research program, and the important thing is to get involved if that is the right decision for you.

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 independent studies, summer research fellowships, and even a senior Honors thesis. Many possible combinations of these are possible.

One common route for getting started is to enroll in a semester-long independent study with a professor. You register for this "class" just like any other, and 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—no more, and no less. 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, but does not fulfill any major requirements (at least in Biology). 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 often you will 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. That is fine! In fact, we consider that a very reasonable decision. 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 biology strikes you as even more interesting. Biology is a huge field, and you should work on what you find the most fascinating! Again, 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.

Another possibility is that you would apply for a fellowship to work with a professor during the summer months. Indeed, some faculty require (or at least 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.

Some fellowships are specifically available to conduct biology field work at the Bowdoin Scientific Station on Kent Island for the summer. Kent Island is a small island off the coast of New Brunswick, Canada that is a small but busy field station with researchers from all over the US and Canada. Kent Island summer fellowships have an application due in February, there is more information available on the Bowdoin Kent Island website.

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) to contact about working in their lab(s). This may be based in part on prior experiences you have had with professors in courses—perhaps you found a professor especially engaging and approachable, and also that their research area sounded interesting. It may also be based on simply poking around on the faculty webpages. Each of us has our own college webpage, containing a short description of our research, and also a list of some publications that have come out of our lab. Which professor's research sounds interesting to you? Maybe more than one, in which case contact all of those you find interesting before making a decision.

If you decide that you might want to consider working with a professor, simply send them an email. It need not be a long, detailed message—simply stating that you are thinking about getting involved in research is enough to get the ball rolling! We will respond and set up a one-

on-one meeting to discuss the research we are doing and what opportunities are available for students in our lab. Sometimes a professor is already fully-committed to working with other students at that particular point in time—it is nothing personal! We can only do a good job mentoring students if we do not work with too many people at once, so sometimes "space" is limiting. If that happens, hopefully the research program of another professor looks interesting to you, and you simply move on to contact them about opportunities. Students can usually find something available that they will find interesting and rewarding.

Once you and the professor have both agreed that joining their lab is a good idea, the next steps vary depending on whether you are aiming for an independent study or a summer fellowship. As always, the professor(s) you contact can help to walk you through the process.

For an independent study, it is very simple—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, you should probably contact professors well before registration (maybe a month or so beforehand?), since there is the issue of available space in a given lab, and you might want to "reserve" a spot. On the other hand, do not hesitate to contact us even if it is later than that—many of us might still have space available in our labs for the following semester, and the independent-study course can even be added during the add/drop period at the beginning of the following semester. During registration, 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!

For a summer fellowships, the process is somewhat more involved, but not too onerous. 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, so the whole "space is limited" issue comes up again. In general, contacting prospective professors who you might want to work with should happen in November (no later than December) for the following summer. You can always contact professors later than that, but be prepared for the possibility that their lab is already "full." There is a summer research information session held in November, and also an online "application" form (available via the Biology Department website) that you should fill out in order to provide some information about yourself as well for you to list your preferred labs to join for summer research.

The application process itself is not too time-consuming, and I won't go into details here. Suffice it to say that it will involve writing a short document (about 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 help you with this, and it is due a few weeks into the spring semester. 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.

If you intend to try and complete an Honors project, then 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), although I will not go into the details here. Otherwise, an Honors project is much like any other independent study. Some faculty feel strongly that an Honors student should have had some prior experience working in their lab (independent study or summer research), 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 at least consider trying out a research experience here 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 as well as 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. Please contact one of us if you have additional questions or think that you might be interested.