

## On-campus Research Internships & Jobs and How to Find Them UMass Amherst Physics Department

*We would like to make this document as current and complete as possible, so please send email to Professor Dinsmore at [upd@physics.umass.edu](mailto:upd@physics.umass.edu) if you have suggestions or new contacts.)*

Engaging in cutting-edge research is a valuable experience that can help you decide what you want to do for your career and likely enhance your excitement about studying physics. Research provides valuable training that complements your coursework and is an important component of your resumé if you apply for graduate school or technical jobs. In general, research opportunities can be found here on campus, or at non-profit institutions, government-run national labs, private companies, or other universities. There are a great many programs because so many institutions value the opportunity to train and recruit students like you. Research positions are generally paid, last for a summer (9-10 weeks), and sometimes are continued the following summer. Sometimes internships at companies or national labs lead to job offers. Internships can be taken by undergraduate students or graduate students.

Internships are most often in research or development but they could also be in teaching or other areas. This list focuses on research. If you are looking for **teaching opportunities**, then you can find more information from Brokk Toggerson (who teaches a class on teaching physics, Phys390T), or the UMass School of Education, or the Amherst Regional Public Schools or other local public school systems. If you are looking for outreach opportunities, then an excellent place to start is the UMass Science Outreach Club. (<https://umassamherst.campuslabs.com/engage/organization/thescienceoutreachclub>)

Here at UMass, joining an on-campus research group in physics are very common.<sup>1</sup> The Physics department has approximately 30 faculty and most of them engage in original research. Most of the faculty work with undergraduate students either part-time during the semester or full-time during the summer (or both). During the semester, research experience is most commonly arranged as an Independent Study course (Physics 196, 296, 396 or 496) for academic credit. Sometimes these projects are full-time during the summer for pay. These experiences are effectively internships, even though we don't always refer to them as such.

This document provides a summary of the many internship opportunities (on- and off-campus) that the physics faculty know about, with some advice about how best to apply for these positions. Here is the overview:

**I. Some general advice** on planning for your career and on applying for internships

**II. How to join a research lab on campus**

**(A related topic, Where to look for off-campus internships**, is covered in a separate document, which can also be found online at the Physics Dept website. It includes National Labs, Companies, and summer programs at universities called REUs. )

---

**I. Some general advice** on planning for your career and on applying for internships:

- 1) Attend department colloquia and presentations that are part of the department's "Physicists in Industry" series. The department periodically hosts visitors (who are sometimes UMass graduates) who come to campus to meet with students and talk about their career path and offer advice.
- 2) While you are at UMass, get to know at least one professor well in addition to your academic advisor. This is best done by working on a project with him or her (e.g. by an independent study course – see below). But this is not the only way; you should talk to professors after class, stop by

---

<sup>1</sup> The graduating class of 2016 reported that 70% of students had a research experience here on campus.

their offices, etc. If you get to know a professor this semester, then you have someone to ask for advice later. This person might also then be well poised to write a strong (*i.e.*, detailed) reference letter. Professors have a lot to offer beyond the classroom, and UMass professors are quite approachable...even if we don't always appear to be so.

- 3) If an internship or research opportunity sounds interesting, then apply. **Do not doubt your fit.** Internships are for training and the faculty/employers are looking broadly for students that have basic skills, a good work ethic, and an open mind. Physicists are generally valued in many fields that are outside of physics even if "physicist" is not specified in the ad. (This is really true; we hear this from employers.)
- 4) Apply to many places in parallel, not in series. That is, do not wait to hear back from one before you apply to the next. Consider that, after you apply, it would be ideal to have a choice (*i.e.* more than one offer); this won't happen if you apply one by one. In addition, there tend to be deadlines, (e.g., Jan- Feb); by the time you hear from your 1st place the deadlines may have passed.
- 5) To apply off campus: There is a separate document with lots of advice, called "Off-campus\_internships..." at the Physics Dept website or sent to you by email. It describes off-campus internships with companies, national labs, and REUs (university-based research in the summer). Here are some of the points:
  - A) Maintain a resume. You learn about this in Physics 381 and you can ask your research advisor (if you have one) about it too. You can also consult with Career Services, your friends, and your instructors. A resume is usually one page long. (A *curriculum vitae*, or cv, is longer and comprehensive; it is more commonly used in academic settings)
  - B) Write a good but brief cover letter. Tell what your interests are, which could include things you want to learn as well as where you want to be in your future career, and also tell what your strengths are. Ask someone else to read it for comments.
  - C) Find contacts (faculty, employers) and tell them that you have applied or ask them for advice. LinkedIn is good for this.

## II. How to join a research lab on campus:

Many physics majors work in faculty labs here on campus. Finding such opportunities is not difficult but it requires persistence. The process is quite different from signing up for courses. The main difference is that you have to take the initiative in reaching out to professors. Here's what we recommend:

- 1) Take Physics 185 and/or 186 to get an overview of research and to see some details about some of the faculty. Also look at the department's web page and follow the research link. You will see a fairly brief (and vague) listing of faculty by the broad areas of research. You can also look at other departments; physics students have worked in Chemistry, Polymer Science and Engineering, and various departments in our Engineering college.
- 2) When you find something that looks interesting (even if don't know much about it and don't know if you are qualified!), then send an email to the professor. In your email, express an interest in the general topic of research, summarize courses you have taken (if any), and ask for a time to meet in person so that you (the student) can learn more about the science. In that first letter, it's best not to ask for a job via email because the professor might not be ready to answer that right way; that question will delay the process rather than helping it.

Feel free to send more than one such letter in parallel. If you don't receive a reply, then write again a few days later and/or stop by the professor's office.
- 3) After you meet with the professor and talk about the science, then decide if you want to ask for an independent study and/or summer job. Go ahead and ask. Many groups work with first-

semester freshmen, so don't second-guess your experience level. Again, you can ask more than one professor and then choose if you receive multiple offers. No one will feel insulted if you turn down an offer.

- 4) To sign up for an independent study (if this is the mechanism you and your research advisor choose), you should send an email to the Undergraduate Program Director ([upd@physics.umass.edu](mailto:upd@physics.umass.edu)). Your research advisor will know what information is needed.
- 5) To sign up for hourly pay – if this is the mechanism that you and your research advisor choose – then ask your advisor to initiate the paperwork. If you are on a work-study program, then these funds can apply to lab research. Most often, paid research jobs (or internships) are supported by a research grant managed by the professor. Sometimes, though, students can obtain their own funding, which is *(i)* appreciated by the professor, *(ii)* a great addition to your *c.v.*, and *(iii)* might allow a project to proceed when it could not without the funding.

**Internal (UMass) support for summer research:**

- (1) **The Edward S. Chang Endowed Fund for Undergraduate Research** is a merit-based fund that supports summer research. Application requires a short proposal and the support of a member of the physics faculty. Applications are due annually in February. Check your email for a description, or contact [upd@physics.umass.edu](mailto:upd@physics.umass.edu)
- (2) The Commonwealth Honors College has awards that can support research. Some provide stipends (your salary), and others provide funds for the research itself (travel, equipment, supplies, etc). Ask CHC for information.