

**2009**  
**Undergraduate Research Handbook**

**Department of Biological Sciences**  
**University of Pittsburgh**

This booklet was designed and assembled by undergraduates in the HHMI Fellowship Program in the Department of Biological Sciences.

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## **BENEFITS OF UNDERGRADUATE RESEARCH**

- Research helps you decide which paths you plan to pursue after your undergraduate career
- If graduate school is in your future it helps you prepare for graduate school, and most graduate schools want to see that you have had research experience
- Undergraduate research is a great resume builder no matter what your career goals are
- In addition, you will get to work with faculty and graduate students that will be great references in the future
- You will learn problem solving skills that cannot be learned by reading a textbook, and you will become especially adept at using the scientific method
- Research aids in your understanding of class material
- You will read many journal articles during your research experience, and thus you will develop the ability to understand scientific articles
- You will sharpen writing and presentation skills by presenting your research
- Research can be done on a volunteer basis, for credit, or sometimes it is paid

## **STARTING RESEARCH**

### *Assess your availability*

Research projects can vary in the time commitment they require. Before you begin searching for a project you need to understand how much time that you have to dedicate to a project. This availability should be clearly communicated with any professors you contact. Consider making a representation of your schedule including classes, out of class commitments, and time which you feel could be dedicated to research.

### *Explore current research*

The most important step is to familiarize yourself with the research being conducted in various labs. This information will help you to determine which labs you're interested in.

For the Department of Biological Sciences, read the faculty descriptions of their work at <http://www.pitt.edu/~biohome/Dept/Frame/faculty.htm>. Take notes on labs that interest you. You can even view abstracts and papers from the lab at the bottom of the webpage. You don't need to understand it all, but it may help to focus your interests. For suggestions of other departments, see below.

Attend the Department of Biological Sciences Undergraduate Research Fair in February. Current undergraduate researchers will present posters of their research, and an abstract book will be available.

Attend university poster sessions such as the annual Science 200X Symposium in the fall and the Undergraduate Research Fair sponsored by the Honors College in the spring.

### *Prepare a resume/C.V. or a brief description of yourself and your scientific interests*

Professors realize that students in their first or second years may not have the experience necessary to generate a meaningful resume/C.V. This should not discourage underclassmen. For such students, a statement including relevant personal information and scientific interest is sufficient. Additionally, some professors may request a copy of your transcript.

*Contact the professor(s) whose research interests you*

For most professors, the best way to contact them is by e-mail. Make sure that your e-mail clearly states who you are and why you're interested in the lab. Additionally, you may request a meeting with the professor to talk about the possibility of working in the lab. Be sure to include contact information such as a telephone number and/or e-mail address. If you do not hear back from one particular lab, do not be discouraged as many professors keep busy schedules.

\*\* Note that professors can get flooded with requests for laboratory positions making it difficult for them to respond. Be sure to plan accordingly. If you would like to start research in the fall semester, do not wait until the fall to contact professors; instead, start making contacts in the spring or summer for these positions. \*\*

*Prepare to meet with the professor*

During your meeting with the professor you may want to find out some more information about the expectations for undergraduates in the lab. These expectations differ from lab to lab. Getting answers to your questions will ensure that the lab is in fact a good fit for you.

Questions to consider:

- How many hours do undergraduates usually work?
- Are hours flexible if I have other academic obligations?
- Will I be able to work independently or will I be supervised?
- Will I be able to work on a project?
- Are there any papers I must read before starting?
- What funding opportunities exist?

This list is not meant to be comprehensive. You will undoubtedly have your own unique questions. Remember that these first meetings should really be a discussion of your goals and the professor's goals and expectations.

**FINDING BIOLOGY LABS OF INTEREST OUTSIDE OF THE DEPARTMENT OF BIOLOGICAL SCIENCES**

There are many places besides the Department of Biological Sciences where you can do biology research.

*Other departments in the School of Arts and Sciences*

- Neuroscience
- Chemistry

*Other University of Pittsburgh schools*

- School of Dental Medicine
- School of Engineering (Department of Bioengineering)
- School of Health and Rehabilitation Sciences
- School of Medicine
- School of Nursing
- School of Pharmacy
- School of Public Health

You can search the sites below for research labs at UPMC or University of Pittsburgh labs. You'll need to enter keywords of biology topics that have interested you such as "cytoskeleton." This will give you the names of lab heads doing research in that area. Follow the links to read more about their research to determine if it interests you. You can even read papers they have published by following the PubMed links.

UPMC health science portal <http://www.health.pitt.edu/> (the search engine is at the very top of the page).

<http://frfp.health.pitt.edu/search.jsp>

Search University of Pittsburgh Faculty Expertise Database. Enter your keyword in "All Fields" and then click "Do the Search" at the bottom of the page.

<http://expertise.cos.com/cgi-bin/searchexp?code=197>

Search here to get involved in clinical research trials.

<http://www.clinicalresearch.pitt.edu/>

A great site for undergraduate research is administered by the Office of Experiential Learning.

<http://www.as.pitt.edu/undergraduate/experience/research-ops.html>

### *Other institutions*

Many universities have undergraduate summer research programs for undergraduates from any university or college. These are a fabulous way to gain research experience, see if a graduate program interests you, make new friends, and see the world outside of Pittsburgh. The programs typically include airfare, a stipend, and housing.

Places include:

- Cold Spring Harbor Laboratories (New York)
- University of North Carolina-Chapel Hill
- University of California-San Diego
- University of Wisconsin-Madison
- Princeton University (New Jersey)
- Harvard University (Massachusetts)
- Caltech (California)
- Fred Hutchinson Cancer Research Center (Washington)
- Duquesne University
- Carnegie Mellon University

You can find an extensive list of summer programs at

<http://www.the-aps.org/education/ugsr/SumResLINKs.htm>

or search online for "biology summer undergraduate research programs".

## **FUNDING FOR RESEARCH**

So now that you know about all of the benefits of doing research and all of the exciting research taking place in the department and elsewhere, you might also be interested to know that you can be awarded funding for research, both during the year and during the summer!

### *Summer funding*

During the summer many undergraduate researchers are paid by the lab. In addition, however, there are several fellowships available. These fellowships are great resume builders, often

provide other learning opportunities beyond your lab work (e.g. journal clubs or seminars), and can provide a source of money if the lab does not have money for you.

*Departmental level*

HHMI Undergraduate Research Fellowships

\$5000 for the summer

Application due February 26, 2009 for summer 2009

<http://www.pitt.edu/~biohome/Dept/Frame/hhmisummerresearch.htm>

Samuel D. Colella Award

\$4000 for the summer

Application due February 26, 2009 for summer 2009

<http://www.pitt.edu/~biohome/Dept/Frame/hhmisummerresearch.htm>

*University level*

Brackenridge Undergraduate Fellowship

\$3500 for the summer

Application due March 6, 2009 for summer 2009

<http://www.honorscollege.pitt.edu/opportunities/brackenridge.html>

Arts and Sciences Summer Undergraduate Research Awards

\$3500 for the summer

Application due March 3, 2009 for summer 2009

<http://www.as.pitt.edu/undergraduate/experience/summer-awards.html>

*Academic year*

During the academic year many undergrads do research for credit or on a volunteer basis. Some labs may have money to pay undergraduates. Other labs do not pay because grant money is tight and/or undergraduate research is considered an educational experience more than a job. The only way to find out is to ask. If you qualify for work-study, make sure to mention it. There are a few other sources of money:

*Departmental level*

HHMI Undergraduate Research Fellowships

\$3200-4000 for the academic year

Application due August/September

Contact Dr. Nancy Kaufmann at [nkaufman@pitt.edu](mailto:nkaufman@pitt.edu)

Norman H. Horowitz Fellowship

\$3000 for the academic year plus \$500 for supplies

Application due in the spring for the following academic year

Must ask faculty member for nomination

Contact Dr. Lydia Daniels at [lydiad@pitt.edu](mailto:lydiad@pitt.edu)

<http://www.pitt.edu/~biohome/Dept/Frame/horowitzfellowship.htm>

*University level*

Chancellor's Undergraduate Research Fellowship  
\$600 for the fall or spring term  
Application due October 31 for the following spring semester  
Application due April 15 for the following fall semester  
<http://www.honorscollege.pitt.edu/opportunities/urf.html>

Chancellor's Undergraduate Teaching Fellowship  
\$600 for the fall or spring term  
Application due October 31 for the following spring semester  
Application due April 15 for the following fall semester  
<http://www.honorscollege.pitt.edu/opportunities/utf.html>

Office of Experiential Learning Small Grants  
\$500 –reviewed as received  
<http://www.as.pitt.edu/undergraduate/financial/smallgrants.html>

*Other funding information*

The dates and amounts given above are based on 2008-2009. Make sure to research the sources with ample time.

During the summer money may be available from the professor's grant (e.g. NSF supplements for undergraduate research) or from a society (e.g. American Society for Microbiology). Ask your research advisor about these sources.

During the academic year money may be available from the professor's grant. Ask your research advisor.

During the academic year you can get academic credit for research. Talk to the Department of Biological Sciences undergraduate advisors about how to register.