

WU Research Opportunities in Biology and Biomedical Fields

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Why do research?

- To discover
- To understand
- To do your best in your classes
- To know a professor
- To understand the scientific method
- To guide your career choices
- To know a network of scientists
- To receive awards and honors
- To master techniques
- To learn how to evaluate evidence

Facts about WU Undergraduate Biomedical Research:

- ~ 70% of recent Bio graduates have participated in research
- ~ 80 students/semester register for Bio 200/500
- ≥ 300 research mentors at WU, WUMS, and affiliated institutions, including the Danforth Plant Science Center, Saint Louis Zoo, Missouri Botanical Garden
- Most faculty are interested in and enthusiastic about having undergraduates in their labs
- Most student researchers work in a lab for 10-12 h/week for 2-8 semesters and 1-3 summers.
- Honors in Biology requires ≥ 6 units of Research for Credit [Bio 500], a 3.5 GPA, & a thesis
- Mentors often write the strongest letters of recommendation

Ways to get involved in research:

- Work Study or non-WS paid position
- Research for credit: Biology 200/500
 - other Depts. have similar research for credit options
- Volunteer
 - Unpaid; often an entry into paid work
- Summer research opportunities and programs:
 - Summer Undergraduate Research Fellowships
 - Office of Undergraduate Research
 - Siteman Cancer Center
 - Danforth Plant Sciences Center
 - Many others – some at WU, some at other universities and institutions
- Summer Job
 - Usually paid by research mentor's grant

Other opportunities:

- Intro Bio Tutoring/study groups [Kathy Hafer, Biology]
- Experiences in the Life Sciences: Bio 365 [Dr. Joan Downey]
 - PEMRAP
 - Med Prep
 - Physician shadowing
 - Clinical research and other internships
- Volunteering at WU Med and other institutions, clinics
- Science Outreach volunteer opportunities for interactions with K-12 students

Resources for research opportunities and fellowships:

WU Office of Undergraduate Research (<http://ur.wustl.edu/>)

- HHMI SURF
- C-SURE
- Amgen Scholars Program
- Imaging Sciences pathway
- Children's Discovery Institute
- Tyson Research Station
- Environmental Studies Program
- Mentor funding
- BA/MAT Program

Biology Dept (biology.wustl.edu/)

- Natural Sciences Learning Center (nslc.wustl.edu/)
- Undergraduate Research Web page (nslc.wustl.edu/research.html)
- Research for Credit [Bio 200/500] (https://pages.wustl.edu/Bio_200-500_independent_research)

Division of Biology & Biomedical Sciences (<http://dbbs.wustl.edu/Pages/index.aspx>)

Division of Biology & Biomedical Sciences Faculty
(<http://dbbs.wustl.edu/faculty/Pages/DivisionFaculty.aspx>)

Finding research labs that interest you.

- 1) **Find labs in a particular research area.** The web and professors can be useful. Here are some sites where you can find research opportunities in different areas.

https://pages.wustl.edu/Bio_200-500_independent_research/find-mentor
<http://undergradresearch.wustl.edu/getting-started>
<http://dbbs.wustl.edu/divprograms/neuro/Pages/Faculty.aspx>
<http://www.nslc.wustl.edu/research.html>

From these listings, I suggest you send me the names of 4-10 investigators who interest you. I'll try to advise you on whether they would make good mentors for a student pursuing BIO 500 and honors.

- 2) **Contact the head of the lab (principal investigator, or PI).** Start with a brief email that explains why you are attracted to their research. Be *specific* and use some of the keywords that they use to describe their work; you might even download one of their papers. The most important thing is to make it clear why you are interested in *their research* specifically – generic form letters will not impress the PI. Tell them when you could start, whether you would be willing to volunteer, how many hours you would like to work and whether you would be interested in pursuing research for credit (e.g. BIO 200/500) or honors. You could give them a bit of background on yourself (e.g. year in school, GPA, major, relevant training or coursework). You might list a professor or someone the PI knows as a reference (but be sure to ask your reference in advance if this is OK).
- 3) **Be prepared for an interview.** If the PI has space in his or her lab and is impressed by your email exchanges, the PI may ask you to come in for an interview. These interviews tend to be less formal (in attire and content), but provide a chance for you and the PI to get to know each other, and for the PI to begin to evaluate your level of interest and motivation.

The PI might ask:

- 1) Why my lab?
- 2) What are your career goals?
- 3) When could you start? How much time will you commit?
- 4) Do you have any questions about the research we do?
- 5) Is there a specific area of research in my lab you are especially interested in?

You might ask:

- 1) How do you incorporate undergrads in your research program?
- 2) Could you explain ____ about your work on ____?
- 3) Could you recommend some further readings on ____?
- 4) Would you be my immediate supervisor, or would I be working with a graduate student/postdoc?
- 4) Ultimately, I'm interested in finding a lab for a ____ (e.g. thesis project or to prepare me for graduate/medical school). How would you support an undergrad pursuing these goals?
- 5) Have undergrads in your lab ever presented their research at conferences/meetings?
- 6) Have undergrads in your lab ever published their research?

After joining a lab.

1) ***Make sure you understand the lab's expectations of you.*** It should be clear to you how much time you are expected to spend in the lab each week. It should be clear to you what you should be working on. If not, see #3.

2) ***Honor your commitment.*** If you do not have the time to spend 10 hrs/week in the lab, then you should not agree to do so – you should do the work you promised to during the interview/evaluation process. All too often, when the demands of course work, extracurriculars, social life, and research become too much, it is the research that suffers. The PI will not be impressed if you do not spend as much time in the lab as you had agreed to, and if you are not as productive as you could be – and you want a good letter of recommendation from the PI, right? So, set aside a specific amount of time during each week and devote it to lab research – the best would be to agree on these times with your immediate supervisor (see #1 and #3). Large chunks of time are best. There will always be times when you are not able to spend as much time in lab (multiple mid-terms, personal problems, etc.), and a good PI should be understanding of this – but do not make a habit of skipping out on lab research.

3) ***Good communication is crucial.*** This is essential to understanding the lab's expectations (see #1). Further, neither the PI nor your immediate supervisor is a mind reader. If you tell them you understand something, then they will believe you. If you do not actually understand something but say that you do, then this will create major problems for your research and for your relationships with your supervisor and PI in the future – do not be shy about asking for clarification, help, or explanations. If you are having trouble understanding why you are doing the research, what your results mean, or what to do next, then talk to your immediate supervisor. If you are not enjoying the research, then talk to your immediate supervisor. If you disagree with a method or interpretation, then say so. Just make sure that you are respectful and acknowledge that you have less experience. If your immediate supervisor is not responsive or helpful, then you can try to schedule a meeting with the PI to discuss these issues. If you cannot make it into lab at your normal time, then be sure to tell your immediate supervisor and provide a reason (see #2).

4) ***Do not make any assumptions.*** Unless you have been directly told something, you cannot assume that it is true, however reasonable it may seem to you. Do not assume that there is a research position available for you in the summer or the following semester. Do not assume that the PI will write you a good letter of recommendation. Do not assume that you will be an author on a paper. Always ask about these and any other important issues (see #3).

5) ***Always strive to learn more.*** Scientists love talking about their work. Be respectful of their time, but take advantage of opportunities for interaction and discussion. A PI will be impressed if you take the initiative to read one of their papers and come to them with questions. Even better if you come up with your own ideas for new experiments (even very general ideas) – the experiments may not be feasible, but the effort counts for a lot. Ask others in the lab about their projects. Read papers from other labs on related topics.