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A Guide to Starting Research

Rapid methods to find the best research opportunity for you

INTRODUCTION

This guide is meant to act as a general reference to support you in finding research opportunities at the University of Pennsylvania as an undergraduate student. It contains first-hand advice from professors, and it has been reviewed by upperclassmen currently involved in research. We hope you find it a useful starting point in beginning research. We encourage you to explore the many resources offered at Penn, particularly by the Center of Undergraduate Research (CURF) as well.

1. WHAT DO I WANT TO DO RESEARCH IN?

First, for those who have no research experience, **it is perfectly fine!** When they say that all bioengineers should consider research, they really mean everyone. To quote Professor Ducheyne, "one has to start sometime."

Begin by making a list of the research areas you are interested in. Considering broad fields i.e., tissue engineering or systems biology, is advisable because it allows for flexibility. Perhaps there is a certain disease you are interested in. Do not worry if you lack experience in a certain area, the fact that you are interested is what counts.

The "Bioengineering Research Areas" on the Department's site may give you some ideas: http://www.be.seas.upenn.edu/about-research/index.php[1]

Another brilliant resource is your professors. Attend office hours or schedule an appointment to discuss what bioengineering offers. You may find something you would never have thought about. And do not be intimidated to talk to professors about research. After all, they chose a career in it.

The SEAS Research Peer Advisors (RPA) conducts the Lab Rats program, in which undergraduates currently working in research labs give a tour of their lab and discuss their research. This is a good way to learn more about a lab or research area you are interested in.

2. WHO DOES THIS RESEARCH ON CAMPUS?

Once you have narrowed down your interests, you can start to find labs on campus involved in these areas. Apart from the standard Google search, you can try the following two options:

a) **The Penn Bioengineering Graduate Group Faculty List** available here: http://www.be.seas.upenn.edu/about-research/grad-group.php. This is an under-utilized resource that lists faculty by their research area, rank, and their primary department.

   Click on the faculty members' name to view their profile, go to their personal websites, and get an idea of the work they are involved in. See how this matches with your interests and remember not to jump into something you are not interested in! Make note of their e-mail address.

   Next, get to know their research better. Look through their personal webpage or lab group's page to find recent publications or search their name on PubMed.gov to see what they are involved in. Do not be afraid that you are unable to understand the papers. Make a list of questions that you can potentially discuss with the professor. **They want to know that you are interested, aware, and inquisitive.**

b) **National Institutes of Health Research Portfolio Online Reporting Tools (NIH RePORTER)** available here: http://projectreporter.nih.gov/reporter.cfm[2]

This is a database that is constantly updated by the NIH and has information about both intramural and extramural NIH-funded research projects, and provides access to research supported by CDC, AHRQ, HRSA, SAMHSA and VA[3].

Utilize this query form to search for projects or labs that match your interests. These are the following points to search for when using this form:

- Keywords and/or phrases from the list you created in step 1
- Names of Project Leaders (PIs)
- Geographic Location – PA Congressional District 2, Philadelphia
- Organization – University of Pennsylvania

There are many options available; be open-minded because it is possible to find research almost anywhere. Explore and use this tool to its full potential.

For more information about how to use the RePORTER and FAQs go to these links: http://projectreporter.nih.gov/RePORTER_Manual_files/RePORTERManual.pdf[4]

http://report.nih.gov/faq.aspx?sid=2[5]

3. THE E-MAIL

The first e-mail sent to a professor is the most important part of this whole process. This is not meant to scare you, but to make sure you put a lot of effort into it and personalize each e-mail. It seems very trivial, but we tend to miss important information that professors expect. Along with attaching your resume, you want to cover the following main points in your e-mail:

1) **Introductory information:** Name, class and major (bioengineering in your case).
2) **"Why my lab?"**
   a) Professors want specificity but brevity. This is where the reading in the previous step comes into play.
   b) If applicable, briefly state any past experience that may be influencing your choice.
   c) Talking to undergraduates who are currently working in the lab you are interested in can help give you a better idea about what you are trying to get into.
3) **What work are you looking for?**
   a) **Volunteer/ paid/ work-study:** Professors generally accept freshmen as volunteers. So freshmen are not paid unless they are work-study, but usually get paid after working for a semester or a summer. **Make sure to tell them if you are work-study.**
   b) **Credit:** Students can conduct research in laboratories for credit. The course numbers are BE 099 (for freshmen), and BE 490 and BE 492 (for upperclassmen). Please consult your faculty advisor if you are interested.
   c) **Timeframe:** Specify exactly when you want to work. It may be during the next semester, or a few months during the summer if not the whole summer. The key is to plan in advance. Professors generally hire undergraduates for the Fall and the Summer. Think carefully about when you are sending your e-mail to maximize its effect. Send e-mails during the following time periods:
      i. **For the summer: February-March**
      ii. **For the fall: June-July**
      iii. **For the spring: October-November**

      Do not send e-mails less than 3 weeks before the timeframe you want to begin research.
   d) **Full-time/ part-time:** Mention the approximate number of hours you are willing to work for in a week. Professor preferences range from 4-10 hours

during the semester, and 20-40 hours during the summer depending on whether you are doing any summer courses. As Professor Mauck emphasizes, "just be realistic," since there are a lot of other things you need to manage as a Penn student. Research requires a lot of time and effort, and it is not recommended to do it simultaneously with many other activities.

4) **Concluding Statements and Miscellaneous Information:**
   a) You can mention how well you are doing in your courses, and if you have taken any specialized courses (e.g.: EAS105) that may be utilized in your research area of interest. Also you can talk about advance placements, which shows the flexibility of your schedule, and the ability to dedicate more time to the lab.
   b) Mention any particular skill, such as programming or lab skills, that pertain specifically to the research theme of the lab you are interested in.
   c) **Concluding statements**: Thank the professor for taking the time to read your e-mail. Show some interest to meet and discuss potential opportunities. Finally, remember to say that your résumé is attached.

5) **THE RÉSUMÉ**

Career Services is the best resource available. Review their website and schedule an appointment in advance before you start sending e-mails out. Your résumé requires a lot of time and feedback to make sure you can display all of your skills, i.e., lab and computer skills, past experiences and achievements, in the most coherent and concise way.

Career Services' site linked below provides useful information regarding résumé format as well as cover letters, and follow-ups:

http://www.vpul.upenn.edu/careerservices/writtenmaterials/ [6]

6) **E-MAIL ETTIQUETTE**

Are follow-ups forbidden? Everyone at Penn is busy. Sometimes professors are not able to reply to e-mails immediately. Be patient. They would like to respond to all of their e-mails, but realistically this is not feasible. That is why a follow-up is perfectly fine. They act as reminders and indicate interest. On average you should send a follow-up after 2 weeks or so. These e-mails should be even briefer, stating that you are still interested and that you would like to meet. Send this with your previous e-mail below as a reference, and remember to attach your résumé again. Try to paraphrase instead of copy-pasting. Also, another way to follow-up is attending office hours. Professors enjoy talking to students, especially those who show genuine interest.

Be concise. The last thing to remember regarding the e-mail – honestly the hardest part – is that you need to condense all this information into 2-3 paragraphs with only a few sentences each; Professor Margulies recommends, "5-6 sentences in total". The best way to achieve this is by proof-reading several times and cutting out "fluff".

CONCLUSION

To quote Professor Meaney, "there are always opportunities available." Keep the following words in mind when you strive to find the research area that fits you the best: specificity, brevity, dedication, interest, relevance, and commitment. We wish you the best of luck in pursuing your research endeavors and hope this will help you navigate the immeasurable opportunities at Penn.

Special note for International Students:

Being an international student does not mean you should not apply for research. However, there are certain points that you must keep in mind if you would like a paid/unpaid internship.

Since working without proper employment authorization is considered a serious immigration violation, do thorough research, and remember the following important facts:

- The definition of "paid" or "unpaid" internship is not as simple as you might think. So, your first step should be to **meet with an advisor** at the International Student and Scholar Services (ISSS).
- While school is in session, you may work **up to 20 hours per week** (not an average of 20 hours per week). During official school break, you may work for more than 20 hours per week.
- To be considered "on-campus employment" for F-1 and J-1 purposes, the work must **(1) be for Penn, (2) on Penn payroll, AND (3) on Penn premises**. Note that not all Penn affiliates and Penn Medicine entities are considered on-campus employment sites for immigration purposes. For example, The Wistar Institute and the Children's Hospital of Philadelphia are not considered on-campus employment sites. The best way to find out if you can work at an institute is to ask the ISSS. For more information, visit http://global.upenn.edu/isss/f1employment
- A Social Security Number (SSN) is required for employment in the United States. The ISSS provides excellent advice regarding the process of acquiring a Social Security Number**. You must first receive an employment offer before applying for a SSN.** Please refer to the following website for more information: http://global.upenn.edu/isss/ssn, and visit the ISSS for more advice.

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