The Hapless Undergraduates' Guide to Research: One-Page Summary

By Aaron Gertler

Science is wonderful, and research can be a lot of fun! **But to have the most fun, you should remember that:**

1) You should keep your mind on improving lab processes whenever possible. Your time is valuable, but it's easy for undergraduate work to be a secondary focus for experienced lab veterans. To get full value from your research experience, you'll need to ask lots of questions and look for ways to make your work more effective.
2) Be very careful on the job. It's easy for scientists, especially new research assistants, to make mistakes and not notice them until later. Ask lots of questions (again) to find out the most common pitfalls in your research, and pay attention to anything that seems wrong or confusing. (This includes both procedural and ethical matters.)
3) Lab is for learning. You should work hard and accomplish the things your bosses tell you to accomplish, but also ask lots of questions (again, again) to the expert scientists all around you, and take lots of notes on the research. This will help you become better-informed about your field, make friends, and find research questions of your own.

Before you start the process of research, you should ask lots of questions (again x3) to both the experts in your lab and to people who have done similar work before.

Good questions for the experts:

1) What's the final goal of this project? What does "finished" look like? Is there a deadline?
2) Which information is *definitely, definitely not,* or *potentially* relevant?
3) What similar research to this project has been done before? What are some ways we could improve on that? Who was involved in the previous research?

Good questions for others who worked on similar projects (including other RAs):

1) What problems did you encounter while you worked on this? How did you solve them?
2) What are some non-obvious "tricks" you use to improve speed and/or precision?

Also: Before you start working, make sure you can explain the project's goals and methods clearly, preferable so that someone who doesn't know much about your science can understand them. Knowing what your goal is, and how to reach it properly, will help prevent you from making mistakes along the way.

(Three pages of specific advice on meta-analysis and data entry, not useful for other projects)

Other advice: Store all your data in more than one place so information doesn't get lost; keep the answers to all the questions you're asking on a single Google Doc for ease of access; make sure you know all the data you have to find/record before you start collecting it to minimize redundant work; *ask lots of questions when you are unsure.*

For more information: General (awesome!), quick, physics, chemistry, your own project, comics