Lab guide for new undergraduate researchers

Greg Crowther, UW Dept. of Medicine

Last updated on September 25, 2012

OVERVIEW OF EMPLOYMENT

Undergraduate students are hired and retained on a quarter-by-quarter basis, depending on funding and student interest and performance. The first quarter, in particular, serves as a sort of trial period, although it is hoped that things will go well and that you will stay for an entire year (or longer, if appropriate). Ideally, you would work full-time during the summer months and then continue part-time during the following academic year.

WORK SCHEDULE

In the summer, you are encouraged to work a lot of hours (30-40 per week). Exceptions can be made for those who are taking classes or have other unusual circumstances. Vacations for family trips, etc. are OK if sufficient advance notice is given. Some flexibility is possible in summer work hours; e.g., you may choose to work four long days each week or five shorter ones. You are free to decide when to take coffee breaks, when to have lunch, etc., although on your timesheets no more than 4 hours may be worked without a break recorded.

During the school year it is expected that you will work 9-15 hours per week. (The maximum allowed by UW rules is 19.5 hours per week while classes are in session.) You are welcome to work in the lab during final exam weeks and/or during breaks between quarters, but that is not required. In scheduling lab work, you are encouraged to look for "chunks" of 3-4 hours, since it can be hard to accomplish much during a block of only 1-2 hours.

It is expected that you will generally work during normal work hours, when others are around. Evening or weekend visits to the lab are possible but discouraged unless the supervising scientist is also present.

POSSIBLE BENEFITS OF WORKING IN OUR LAB

1. Salary ($9.04/hour) or academic credit. Most students choose to be paid during the summer; some also get paid during the school year, while others enroll in an independent research course such as Microbiology 499 (depts.washington.edu/micro/academics/undergrad/research.htm). Switching from credit to pay between quarters, or vice versa, is not a problem. Your responsibilities will not be significantly affected by whether you are working for credit or pay, and you should keep track of your hours either way. If you are working for pay, you will need to enter your hours into an online timesheet which will be set up for you through the payroll office once you are in the system. The timesheet will then be accessed through Employee Self Service on your MyUW page (myuw.washington.edu).

2. Firsthand exposure to a lab research environment. Learn what it's really like to work at the bench! And how to design experiments, analyze data, and read technical literature, all useful skills for anyone with a future in a science-related field.

3. Acquisition of knowledge about infectious disease in general and particular diseases like malaria. What you'll be doing is only a tiny, tiny part of the world's current research on global health. You are encouraged to explore related topics via online reading, conversations with lab-mates, etc.

4. Exploration of career options. You are welcome to talk to people about their current jobs -- what they like and dislike, how they got into the positions they're in today, etc. Our group includes people with bachelor's degrees, master's degrees, PhD's, and MD's, so there are plenty of diverse viewpoints on which to draw.

5. A letter of recommendation. If you do good work, Wes and I will be happy to write a letter in support of your application for grad school, med school, pharmacy school, a real-world job, or whatever. Wes and I may write it together, since he has more letter-writing experience and his name carries more weight than mine but I will have more firsthand familiarity with your work. If you are consistently

thorough in performing and documenting your experiments, ask questions when uncertain about what to do but also take the initiative in suggesting possible solutions/tasks, work well with your fellow researchers, and generally do what is asked of you, we'll be happy to mention all of these things in our letter.

6. Coauthorship on a scientific publication. There are no hard and fast rules as to who gets listed as authors of a paper and who simply gets thanked in the Acknowledgments section. However, if you spend a long time (say, a year) on a project that leads to a publication, you will likely be given coauthorship on that publication. Many of our papers represent large collaborative efforts, so you may wind up as author #9, but this will still look good on your resume.

7. Assistance in applying for fellowships and scholarships to get honorary and monetary support for your research. Two examples are the Mary Gates undergraduate research program (www.washington.edu/uaa/mge/apply/research/) and the HHMI integrative research internship (www.biology.washington.edu/HHMI/undergrad.php#internship), but you may find other local, regional, and national fellowships to support research for undergrads. The research funding service in the Health Sciences library (healthlinks.washington.edu/rfs/) is a good source of information about these.

8. Participation in formal and informal research meetings. You may elect to talk to our group at a lab meeting (faculty.washington.edu/crowther/Research/lab_meetings.shtml), present at the annual undergraduate research symposium (www.washington.edu/research/urp/symp/), etc.

FORMS

Before starting work in the lab, you will need to fill out a number of forms: Personal Data Form, Form W-4, Form I-9 (Employment Eligibility Verification), Conviction/Criminal History Information form, and Animal Use Medical Screening Form.

LAB SAFETY AND LAB MAINTENANCE

We will eventually have an official lab safety packet for all new lab members. For now, here is an abbreviated list of considerations.

1. The Department of Environmental Health and Safety maintains a comprehensive online lab safety manual: www.ehs.washington.edu/manuals/lsm. Chapter 9, Emergency Preparedness and Response, is especially useful.

2. Your experiments will not generally be that hazardous, but you are encouraged to wear whatever protection (gloves? goggles? lab coats?) is appropriate. In general, take special care when handling strong acids, strong bases, and organic reagents. Dispose of waste properly, noting that plastic waste, glass, and biohazard sharps go in separate containers.

3. Food and beverages are not allowed in the lab at any time. Use of the lab microwave for food is an especially bad idea.

4. All workers in our lab are required to complete the following courses: Biosafety Training; Fume Hoods; General Asbestos Awareness; and Managing Laboratory Chemicals. For the fume hood course, it is necessary to know that our hoods are 2-speed fume hoods. The URL to access these courses is www.ehs.washington.edu/psotrain/onlineclass.shtm. Finally, because our principal investigators are also medical doctors, you will be required to take a Health Insurance Portability and Accountability Act (HIPAA) training course (on protecting the confidentiality of patient medical records). Access to this course will come from one of our fiscal personnel. In documenting your participation in all of these courses, you should list your supervisor as Lynn Barrett (lynnbob@uw.edu).

5. Proper labeling of chemicals and solutions is essential! Solutions should be labeled with the solute identity and concentration, solvent, your initials, and the date.

6. Keep your work area clean and free of extraneous paper and waste. When a box of plastic waste (no glass) is full, tape it up with "LABORATORY GLASS" tape (even though no glass is in the box!), label it (Van Voorhis Lab, I104, 543-0821, non-hazardous plastic waste for disposal), and put it in the hallway.

7. You are strongly encouraged to contribute to general lab tasks such as autoclaving and refilling of pipet tip boxes. These tasks can often be done during an extended centrifugation or incubation period.

LAB NOTEBOOK GUIDELINES

1. Use a notebook (not a three-ring binder) with thick non-perforated pages.

2. Leave the first few pages of your notebook blank so that you can add a table of contents. Prepare this table of contents in Microsoft Word or a similar word-processing program. For each entry, list a page number and date. Maintain a single table-of-contents file covering all of your notebooks in order to facilitate keyword searches; e.g., a search for "methionine aminopeptidase 1" or "MAP1" should reveal whether you've worked on that enzyme at any point.

3. Write in pen. Write legibly. If you make a mistake, cross out the mistake and write the correct thing next to the incorrect thing. Don't use WhiteOut. (This provides some assurance of integrity.)

4. For each experiment, include a date, title, rationale/background (what is the goal? why is this being done?) methods, and results/conclusion (did the experiment work? how do you know?). These can often be brief, but it's helpful to have a verbal description of what a gel or graph "says."

5. Record experiments in your lab notebook as you do them – not later! If you have to stop in the middle of a protocol, note where you stopped.

6. In general, err on the side of being too detailed. If studying an enzyme, list the particular batch, stock, or source used, since different stocks may behave differently. If working with a 96-well plate, clearly explain the layout of samples in the plate.

7. Feel free to tape protocols, data tables, etc. into your notebook as an alternative to recopying everything. (Citing electronic protocol files is also OK, but be specific!) Including graphs is strongly encouraged. Fasten everything; do not include loose pages. Label figures carefully – what are the units for the X and Y axes? What does each lane of the gel represent?

8. As a general rule, your lab notebook belongs to the lab whose grant supported the work. Your notebook may be photocopied, so maintain your notebook in a manner that facilitates photocopying. This includes not writing or pasting anything near the edges of pages.

9. Often, the most difficult thing to describe in a lab notebook is how equipment is set up. Digital photos or sketches may be useful in capturing this information.

10. You may work on several projects simultaneously, return to a project after several days away from it, and/or follow up on the unfinished work of someone else in the lab. For this reason, it is very helpful to include "continued on" and "continued from" page numbers (like newpaper stories) to link together related entries on a given project – even if they are from different people's notebooks.

11. To sum up: your lab notebook should be sufficiently detailed and clear that your superviser can retrieve experimental details and data <u>even when you are not around</u>. If your notebook cannot be used in this way, <u>it is inadequate</u>. If you are unsure as to whether your notebook is meeting this standard, <u>please ask</u>!

YOUR FIRST DAY

Here are some things we'll do on your first day of work.

1. Talk about our general plan and goals for the next quarter.
2. Go over this document.
3. Exchange contact information.
4. Assign you a lab bench area, desk, and lab notebook.
5. Arrange to obtain lab keys (from lab manager Lynn Barrett).
6. Tour the Van Voorhis labs and those of close collaborators: I104, I204, J014a, T163, K418. Sites for retrieving commonly used materials and disposing of waste will be pointed out.
7. Watch an online video of Wes' malaria lecture: www.uwtv.org/programs/displayevent.aspx?rid=23438.

8. Review pipetting with Pipetmen: setting the volume, practicing with samples of water, noting the marks on pipet tips, keeping track of multiple samples, what to do with empty tip boxes, etc.

ODDS AND ENDS

Please back up your computer files at least once a month by copying them onto the "X drive." The X drive is not to be used for storing non-work-related movies, music, etc.

Lab meetings are generally held on the first and third Mondays of the month from 10 to 11 AM. You are not required to attend these meetings, but are encouraged to come whenever possible. A complete schedule of lab meetings is available at faculty.washington.edu/crowther/Research/lab_meetings.shtml.

Much communication between lab members occurs via email, so you are encouraged to check your email regularly. Likewise, it is expected that you will frequently use the Internet for finding scientific papers, looking up information on hazardous chemicals, etc. Use of the Internet for non-work tasks is OK but should be limited to brief break periods.

If problems about any issue arise while you are here, please talk to me about them! If I am not able to help you resolve the problems, you would next want to talk to either Lynn or Wes.