

The Olson Lab Philosophy

Developed by Olson Lab Members.

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Adapted from Strassmann and Queller (Washington University)

The primary goal of the Olson lab is to train students and post-docs to be talented and successful scientists. To do this, Brad invests significant amounts time and effort in training students and post-docs in career management, laboratory and technical skills as well as developing trainees' intellect and critical thinking skills. One of the most difficult transitions any trainee makes is from one that has knowledge, into one that is independent. The training program in the Olson lab, for trainees from K-12, to undergraduate, to graduate and post-doctoral is focused on providing a comprehensive training program to develop individual success.

Lab Philosophy:

1. Ask and answer big questions.
2. Research and discovery are really fun.
3. Do careful science, with controls, appropriate statistics, and alternative hypotheses.
4. Analyze your results in a timely fashion to immediately spot any questionable data points in a timeframe so that the data point or sample can get re-analyzed!
5. Finish your work through to publication in a timely but thorough manner.
6. Learn the natural history of your organisms.
7. Understand the history of your question.
8. Read and re-read the literature. You will take away different things from additional readings.
9. Learn new techniques whether they be in the lab, field, genomics, cell biology, evolution, statistics, modeling, computer science or mathematics.
10. Writing is essential; is best learned by doing it frequently.
11. Never lose anything because it was not backed up properly
12. Everyone should be treated with dignity and respect.
13. People work best when they have a say in what they do.
14. Collaboration is synergistic and leads to great science.
15. Ask questions often; brainstorm with others on anything new.
16. Your time in this group is one of discovery. Make the most of it!
17. Everyone is an expert at something. All lab members, including PIs, can learn something new from each other.
18. Performing academic science, and being paid to do it, is a privilege. Treat all aspects of your training as such.

Points for Success:

1. **Read the literature.** You need to stay up to date with what is going on. Subscribe to tables of contents. Set up alerts on Google Scholar or Twitter for topics and journals that interest you, people's names, or whatever you like. Read the abstracts as they come in and read a paper or more every day. Collect your pdfs in a "references folder" in your dropbox folder that will be easily organized for writing papers and having with Brad and collaborators.
2. **Design careful experiments.** Consider alternative hypotheses. Run power analyses on dummy datasets. Do all the right controls. "To call in the statistician after the experiment is done may be no more than asking him to perform a post-mortem examination: he may be able to say what the experiment died of." Ronald Fisher. Go to our statistical consulting department to get advice especially in the early stages of experimental design.
3. **Visualize your hypotheses and your results effectively.** Become a master of clear figures, appropriate to the data and show distributions.
4. **Write your papers as soon as possible.** Getting your work done and out there is essential. The best plan is to write at least once a week, ideally every day. Write an introduction and methods before you begin and modify them as you go along. You should aim to publish at **LEAST** one per year as a first author, and perhaps one as a collaboration.
5. **Write up methods and protocols as you do them and share.** This is particularly important for undergrads and people new to the group and will help with ultimate paper writing.
6. **Accept mentoring and be a mentor and teacher.** We all have a lot to learn and can do this by helping others and learning ourselves. Mentoring a student is a responsibility. Keep careful track of your students and ask us for mentoring advice.
7. **Ask questions all the time!** If you are doing science and do not encounter something you do not know, you are doing it wrong.
8. **Be helpful.** You might know something that could be helpful to someone else that you realize before they do. Take the initiative and talk to them. Science is not a zero-sum game. Careers might be zero-sum because there are only so many positions. But even that is not a competition against your lab mates. It's a competition against everyone and one of the best ways to compete is cooperative collaboration with your lab mates.
9. **Learn new things.** Talk to other lab members and learn specific things all the time, whether they be techniques, approaches, or something else, planning active learning is always good. Take workshops regularly, either at the University or elsewhere associated with scientific meetings or stand-alone workshops. The college of Arts and Sciences has a generous travel grant program.

10. **Address authorship issues early.** Authorship in a collaborative lab group can be challenging. You should ideally be first author on work you lead and write. There can be ties and they should be discussed and resolved in ways fair to all. When in doubt, include someone as an author. Brad has final say on all authorship issues.
11. **Talk to people outside our research group.** There are people outside our group who know things we do not know and they can help.
12. **Apply for funding.** There are funding opportunities available for all levels of researchers from undergrad to postdoc. Apply for funding whenever possible. Be sure to review any proposals with the group and to give them to Brad with plenty of time for review. Grad students can apply for DDIG, GRFP and others. Postdocs can apply for USDA and NSF and others. There are also Sigma Xi grants at the chapter and national levels, as well as Kansas Academy of Science grants for grads and undergrads, Kansas wildflower society Bancroft awards and other society-level awards for grads and undergrads.
13. **Reach out to the public and grades K-12** to excite them about science! There are plenty of opportunities for this—Science Café, Science on tap and KAWSE for middle and high school science programs, judge a science fair, among others.

Structure of research and learning:

1. **Lab meeting:** The lab has a weekly lab meeting that lasts about an hour. All lab members are expected to present at least once per semester. The presentation should be prepared in PowerPoint format and uploaded to your personal folder on Dropbox. The format of the presentation should be a ~10 minute introduction to the Olson lab research, and to your specific research project. This introduction will be built over time such that when you are invited to present at conferences that your introduction will be a second nature to discuss. At this point, you should present each project. Generally, this will be split up into three sections. One section is “complete” data, data that is in essentially final figure form that supports your project, hypotheses and so forth. Generally, we will have discussed these data in some detail previously, but is important to present these data each time as a reminder as to what has been accomplished. Second, you should present data that is in progress. This includes failed experiments, experiments that are not fully complete, cloning experiments, clone designs, preliminary data and so forth. This is designed to be a time of intense discussion and criticism of how new data is working itself into a final figure form. Finally, you should present a brief overview of where your project is going, experiments that are upcoming and so forth. If you are working on multiple projects, you may have more than one part of your presentation that has these three sections. Generally, you should be making enough progress that you are completing at least one figure for a paper every lab meeting, if not more.
2. **Meet with Brad:** All laboratory personnel are required to meet with Brad minimally twice weekly. Cancellations, especially at that last minute are unacceptable unless there are scheduling issues. Otherwise, I have an open-door policy and am happy to talk any time.

I expect lab members to be in my office discussing progress frequently, especially when experiments are not working as intended or other difficulties are encountered. You should be using the lab Slack channel, texting, or stopping by Brad's office constantly to communicate with lab members and Brad.

3. **Individual Development Plans:** All trainees should develop and update an individual development plan, especially graduate students and post-docs. The lab uses IDPs from Science Careers (<http://myidp.sciencecareers.org>).
4. **Career Planning:** Your IDP will help you determine what your desired career outcome is, but a change in goals is not a problem. You should prepare yourself appropriately for your intended career path, but also have the flexibility to be successful in different career paths. Trainees are especially encouraged to pursue outside mentors or take on an internship to gain skills that will help you be successful. Never be afraid to reach for your goal, but make sure you have a diverse set of skills so that your traineeship in the lab has value beyond the experiments you do and papers you publish.
5. **Annual Reviews and Progress Reports:** All lab members will prepare an annual review form that will be also reviewed and filled out by Brad. Annual Reviews are a very important time for all lab members to sit down and discuss how the previous year went, make sure everyone is on the same track, and to discuss IDPs and career progress. The annual review form is posted on the Olson Lab website.
6. **Attendance and Work Ethic Expectations:** All members of the lab are expected to be in lab during "core" hours. It is only possible for me to be an effective mentor for you if you are present at the same time as the PI and your colleagues. All lab personnel are expected to put their schedules on the lab calendar. Additionally, academic science is a *highly* competitive field. We cannot expect to compete with other labs for very limited resources unless we work smarter and harder than everyone else. Lab core hours are, 9:30 am – 5p daily. Post-docs and graduate students are expected to work at the bench a minimum of 35 hours per week (unless otherwise agreed upon *in writing* with the PI). This does *not* include time spent teaching class, in class, studying for exams, reading papers and so forth. The goal of laboratory training for everyone to be successful. Academic science requires a lot of dedication to be successful, to balance out the rigors of how difficult laboratory science is, trainees should be mindful of using vacation time and flex time smartly.
7. **Vacation time:** Breaks from laboratory research are essential. Being a "pipette robot" is not what traineeship is all about – everyone needs breaks from traineeship. You can and should take time away. Unless you have an employment agreement that supersedes these guidelines, the following guidelines apply to all laboratory trainees at the graduate student level and above. All laboratory trainees are allowed 7 days of vacation over the Christmas/New Year break. Additionally, trainees may take an additional 7 days of vacation throughout the year. These do not include weekend days. All vacation time must be cleared at least two weeks in advance in writing with Brad. The lab recognizes

the following Holidays. New Year's Eve Day, New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, "Black Friday" after Thanksgiving. The lab also recognizes personal religious holidays not listed here, but please keep Brad informed if you plan to be absent these days.

8. **Flex Time:** Due to the intense nature of academic science, lab members who are making progress on their project are encouraged to "flex" their time. For example, assuming a laboratory trainee is making sufficient progress on their project, *and* working extra hours on their project, a trainee is encouraged to take a flex day or two during down times. Long weekends during slow times are especially encouraged. For example, if you have just finished a major push to finish a difficult experiment and have been putting in lots of time and effort, discuss with Brad the idea of taking a 4- or 5-day weekend when finished. It won't count against your vacation time and is a good way to balance out exceptional effort on projects with the ability to take a bit of time off and do something fun. This *must* be pre-cleared with Brad and is *only* an option for trainees making exceptional progress and effort on their projects. Using "flex" time should not be assumed nor abused.
9. **Get shared information.** This includes shared files like plot maps, experimental designs, protocols.
10. **Undergraduate traineeship investment expectations.** Investment in undergraduate training is an important resource for the laboratory. New undergrads to the lab should anticipate an initial training period of 6-12 months. During this time, students will primarily be focused on laboratory maintenance, and occasionally assisting with experiments. The Olson Lab has a maintenance manual that is the go-to resources for how to do things like prepare media and perform common procedures. During this time, students should become acquainted with the research projects in the lab and start learning to do experiments under the direction of a more senior trainee. Undergrads should be asking lots of questions, reading everything they can get their hands on. After this period, students should plan to commit to developing a research project and should expect to be fully supported in their research endeavors for the rest of their undergraduate career. Likewise, students at this point should commit to investing in their traineeship for at least 2 years including summers. Summer is a special time when students have their full time to invest in traineeship and can be expected to be paid for their summer training. During academic times, undergrad trainees should plan to invest 15-20 hours per week, and during the summer undergrads should effectively be the same as a graduate student. An undergraduate trainee's goal is to develop into an independent researcher and are given tools and academic freedom to work in the laboratory at the same level as a graduate student.
11. **Undergraduate Research Forum in Biology.** All undergrads in the lab are expected to take part in this activity that takes place in April every year. Undergrads are expected to present at other University-wide research fora.

12. **University Graduate Student Research Fora.** All graduate students are expected to present in the annual fall EEB Graduate Students on Parade 4 min presentation, the annual Biology Research Forum that takes place in March every year, the annual University-wide Research Symposium, Research and the State, and 3 minute thesis.
13. **Attend national meetings.** At the national level, graduate students should go to at least one appropriate national meeting each year. Undergraduates may benefit from this as well. Travel funds are available through the College of Arts and Sciences, Graduate Research Council, and Biology Grad Student Association etc. Seeking independent funding is required in order to travel. Writing these applications is excellent training grant writing
14. **Seminars.** attendance is required: Friday 4:00p departmental seminar, MCDB seminar is Monday at 4:00. There may be other seminars of interest in Agronomy, Plant Path, or Biochemistry.
15. **Journal Clubs:** You should attend at least one journal club per semester in an area relevant to your research.

Rules:

1. **Be safe at all times.** Stay up to date on safety training. Dress safely. Read equipment manuals and **Safety Data Sheets.** Do not eat or drink in the lab. Help others to stay safe by telling anyone immediately if they are doing something unsafe. Report any safety issue, large or small.
2. **Treat everyone with respect.** A friendly laboratory atmosphere is essential for productive, fun research. There are no stupid questions and everyone is deserving of support and help. Respect persons that a different from you and learn from their perspective!
3. **Benefit from the synergy of working when other people are in the group.** We do not want to tell you exactly what your hours should be, but they should overlap with normal business hours daily because cooperation and collaboration are facilitated in this way. If there are problems we will give you more specific instructions.
4. **Clean up after yourself and leave all areas neat and clean.** It is very important when working in shared areas that you do not leave a mess anywhere. Areas of particular concern are the balances, sink, the computer area, and other common areas. Samples and supplies should be labeled with your name and date.
5. **Do not begin a project without a careful plan approved by the PI.** This plan should be written and discussed with Brad. The work should address an important scientific question, should show deep familiarity of the background literature, show through power analyses that the sample sizes will be appropriate, alternative hypotheses considered, and the methods are feasible. Play with the system to be sure you can do the things you want to do, but the project needs discussion and approval. This is crucial for avoiding

problems in study design or inadvertent overlap among lab members. The design can take the form of part of the paper, intro and methods, for example, or a small grant proposal.

6. **Write everything in your laboratory notebook.** Your laboratory notebook should be a complete reflection of what you do in the laboratory. It should contain what you do, why you did it, and what you thought about the results. If you choose to do this using your computer, you must print out your work and put it in a loose leaf or other lab notebook at least once a month. Every page should be dated in a way. Scientific notation is day month year. Copying things into your lab book later is very bad. You should plan and execute your experiments in your lab notebook.
7. **Protect the integrity of your physical samples.** If you have collected biological material, isolated DNA, or have any other physical sample, make sure you have a list that includes where the samples are, -80 freezer, -20 freezer, cold storage and location. Everything should be labeled carefully, with your name, date, and other information as specified for your material. Preferably in boxes.
8. **All samples and lab notebooks remain in the laboratory.** Feel free to take a copy of sample lists, or your lab notebook, but originals remain with us. Lists of your material go to Brad and to the lab server. When you graduate or leave the group, we should have physical samples and entries in the master database.
9. **Protect your data and writing.** You must have a clear, automatic back up system, at least daily, and off-site, including cloud back ups for data and Time Machine for computers, or equivalent.
10. **Pay attention to your email.** There are many ways of communicating. Use them to your advantage, but you must be responsible for anything sent by email. Brad expects you to stay in daily communication by email.
11. **Do annual reports and update your CV.** Twice a year (at least), I will ask for an updated CV, a reflection on what you have done in the last 6 months and what you plan to do in the next 6 months. It is required that graduate students submit the annual report to the Division of Biology each January.
12. **Sign out for time outside the lab/office.** Let Brad know in advance if you are not in the office on any day.
13. **Make sure that anyone you are mentoring is practicing good science and following all the rules and guidelines.**
14. **It's everyone's responsibility to observe ethical conduct rules in scientific research.** It is your responsibility to report unethical conduct.
15. **Name any file you send to Brad beginning with your last name.**
16. **All abstracts, papers, posters, grant applications etc MUST be reviewed by Brad before submission as you are representing the lab as a whole, not just you.** Allow AT LEAST one week for Brad to review any text, longer if it is long document such as a paper or grant proposal. Please count on at least an additional week to provide time for

co-authors to review. If the document is longer than an abstract, you will need to allow longer. You need to allow AT LEAST a week for a letter of reference.

17. **If you are attending a meeting or conference, plan on going for the ENTIRE time of the meeting.** It's a pity to not benefit from all of it!
18. **If there is a problem of any kind, or something you do not know or understand, let me know.** I am committed to making our laboratory an excellent place for learning and discovery.

Additional rules for undergrads:

1. **Minimum number of hours is 15 per week during academic year. Hours counted as paid must be on research.** You may not do homework, read material unrelated to the lab, etc or any such things while being paid by us. **Always be really sure you understand your project.** Research is most fun if you understand it, what the big question is, the specific question, and how the actual research will address it. Keep learning and research gets more and more fun.
2. **Take graduate courses if you can.**
3. **Participate in the Undergraduate Research Symposium in the spring, and plan to present an 8 minute talk on your research each semester.**
4. **Be on time.** If you have an emergency, let your mentor know as soon as possible, certainly before you are late.
5. **Tell us if you don't plan to be in the lab.** We all worry about you if you do not show up when we expect you. Let us know if you plan to be absent as soon as you know.
6. **Tell us if you break or something goes wrong with your protocols and experiments.** It is a normal part of learning to break things and inadvertently something goes wrong. Try not to, but if you do, tell us immediately.

Additional rules for grad students:

1. **It is your responsibility to keep abreast of the requirements of your program.** This includes teaching assignments, required courses, timely committee meetings (at least 2 per yr), timely prelim exam scheduling, attending seminars and generally being a good grad student citizen.
2. **Work hour expectation. You are being paid through university or government funds.** Thus, it is the expectation that you should be on the premises **9am-5pm (at least!)**, either teaching, in your office or lab doing research, or taking classes. Weekends should be used for keeping up on your research/classes, and also to have some fun and keep a balanced life! No outside jobs of any kind allowed. See vacation policy above.
3. **Learn how to mentor undergrads well.** They should have a big question, should learn a set of techniques and then be given increasing levels of autonomy. They should not watch you do stuff except for first time learning. Get advice from more senior people in the group. A second or third year undergrad should be working on a project they can do

largely on their own. Do not take on a new summer undergrad if you are going to be too busy or gone to meetings.

4. **Figure out how to publish two papers a year, at least after the first 2 years of graduate school.** This is going to be challenging, but one can be something you take the lead on and the other can be something you help with. This is to your benefit. Always be alert to new discoveries or ideas that can lead to a paper. The more you write, read, and run statistics, the more quickly your research results can be transformed into a compelling publication.

Additional Rules For Postdocs:

1. Apply for internal and external funding as much as possible. It only makes your CV look better.
2. A base level of communication with the PI is expected. You have a larger degree of autonomy than a grad student or undergrad, but keeping everyone in the loop is still essential.
3. Think independently about your work and its trajectory. Eventually you will have to do this without your PI's help.
4. Set a good example for the younger trainees at the bench, in the office, and in lab meeting.

PI's Promises to Trainees:

1. I will respond to your text/email/Slack messages as soon as I can even after hours.
2. No question is too dumb to discuss.
3. I will challenge you to be your best version of you.
4. I frequently have a very busy schedule, but I will do everything I can to accommodate in person meetings, stopping by my office, or calling if after hours. Do not hesitate to get a hold of me if you need something.
5. Your success is my success. I will do everything I can to make sure your next career steps are successful.

Approval:

I have read this document and will ask questions if there are things I do not understand. I am up to date on all safety issues. I will treat everyone with respect.

Printed Name: _____

Date: _____

Signature: _____