

## ADVICE AND EXPECTATIONS FOR NEW LAB MEMBERS

Welcome to the Attardo Lab! My goal is to provide a deep undergraduate research experience in which students discover and grow in their scientific capabilities to develop independence, competence and passion for science. We will focus on developing skills critical for a career in science including: searching and reading the literature in a critical manner, developing testable hypotheses, designing and executing experiments, analyzing and interpreting data/results, presenting and publishing the results and conclusions derived from that data. Students will explore an independent subproject within the context of a larger project being worked on by the lab as a whole. This provides students with something to call their own and an understanding of how it fits into the big-picture. Initially students will work closely with Dr. Attardo or other senior members of the lab. Once a student has worked one or more semesters in the lab, they can take on increasingly independent research, including a potential thesis project.

One of the most exciting things about science is that everyone in the lab, at all levels of education, can make important discoveries and contribute new and exciting ideas. Achieving this requires hard work and that you follow your passion, intuition and the advice of your lab mates. Interaction with members of the lab and other labs is essential to effective research. Collaboration and critique are the essence of innovative research—so talk regularly with your lab mates and mentor, and listen to their suggestions and criticisms. Ultimately, no one (including the boss) knows the answers to the questions that are being addressed, but through smart experimental design and analysis you can discover new facets of scientific knowledge that will advance the project and insect vector biology as a whole.

### While you are a student in the Attardo Lab, you are expected to:

- **Plan:** Develop a set of written objectives with me. We will sit down and discuss current projects in the lab and tailor your project with considerations to your interests, previous knowledge/experience and your career goals.
- **Communicate:** Work closely in consultation with me and other senior lab members. Weekly meetings will be scheduled to discuss ideas, work plans, results and any roadblocks you may be running into. Also remember that I do not have all the answers and may not be as well versed in a topic that you may be researching. Don't be afraid to disagree with me on an idea. I would not be doing my job if I wasn't encouraging independent thought from the people in my lab. The beauty of science is that we can debate and learn new things from each other. The important this is to stay respectful and back up your position with evidence.
- **Be Safe:** Everyone in the lab is responsible for safety. In the lab we work with a number of potentially dangerous chemicals, items and materials that demand your respect. Ensure that you have taken all the appropriate training, utilize the appropriate personal protective equipment (PPE), follow the safety rules and use common sense. This includes disposing of waste properly, wearing proper attire (no shorts or open toed shoes) and PPE, using a fume hood when necessary, not bringing or consuming food in the lab, etc. As with everything else, if you are not sure about something ask someone. Also if you see another lab member being unsafe let them know. If they refuse to change their behavior talk to me and I will resolve the situation.
- **Maintain and care for lab equipment:** A lot of time and money goes into the purchase and maintenance of lab equipment and it is very costly to repair/replace broken equipment. Please

learn to properly use and take care of lab equipment. Most lab equipment can be easily broken or made dysfunctional through neglect and improper usage. Before using equipment have someone who knows how to use it train you. If in doubt about how something works, ask someone in the lab. Don't be afraid to ask questions.

- **Learn from your mistakes:** Remember that everyone makes mistakes and more often than not experiments do not work as planned. Be aware of any problems that may arise and freely communicate these with other lab members and myself. While mistakes can be discouraging, they are a valuable tool that can teach you lessons about how things work (When a mistake costs you a week of work it is a lesson you don't soon forget!). With that said, repeating the same mistake over and over means that nothing is being gained from these lessons and time and money are being lost needlessly. So when something does go wrong don't be afraid to consult with others and learn from the experience.
- **Be a contributing citizen of the lab:** Contribute to shared lab duties which include regular maintenance tasks and assistance with the lab insect colony. Each lab member will be assigned specific duties within the lab and they are responsible for completing those duties in a timely manner.
- **Be timely and fulfill personal responsibilities:** Make a schedule and stick to it (with flexibility, of course). Obviously, there will be times when classwork will be intense and time will be limited. However, it is important to communicate when you will be in the lab and if you will not be able to keep to your scheduled time. Many experiments and lab responsibilities are time sensitive and if they are not maintained properly will fail, waste time and money and potentially have negative impacts on other peoples work. This is especially important when dealing with living organisms such as insects. Duties associated with feeding and maintaining colony insects are essential and must be covered one way or the other. Notify me in advance if you cannot come in when scheduled, and please be on time.
- **Stay informed and curious:** Be inquisitive and think critically! Ask questions about your work, dig deep into the literature and see what you can find out. This will inform you of what is currently known about the topic you are researching and will define the boundaries of the known versus unknown. You want to target your efforts to exploit the current knowledge on your topic to expand into unknown territories. This type of research will also help you understand the bigger picture of why the research is important and what needs it is addressing. Also don't be afraid to take your research outside of the system you are working on. For example, often times in molecular biology a finding in mammals or microorganisms can give you important clues as to how a related protein or system is working in insects. Finally, never assume that just because something is published that it is correct. Often time's studies in the literature can suffer from flawed logic, improperly controlled experiments or conclusions based on weak or inconclusive data. It is important to critically evaluate the quality of the literature and weigh the value of that information appropriately.
- **Present your work:** Presenting your work in lab meeting is an important part of participating in the lab. Learning to present and communicate your work to others is a critical skill in science and is something that only comes from practice. It is important to be able to communicate what you are doing to other scientists as well as the public at large in a clear and concise manner. This is

particularly important lately as public understanding and trust in science is at a low point (climate change denial, anti-vaccine campaigns, flat earth conspiracies, etc...).

- **Be honest and maintain your integrity:** Academic integrity is a fundamental part of science. The pressures to produce data publishable in high impact journals and to get grants tempt some people to be less than honest in their scientific pursuits. Actions such as faking data, sabotaging experiments, “cherry-picking” data or plagiarizing are inexcusable offenses in science. If scientists are not honest with their results it undermines then entire scientific foundation. As the PI of the lab I am responsible for the integrity of the data derived from the lab. Given that is the case I require that I go through all the raw/original data that you and everyone else in the lab produce. This is not because I do not trust you, but I need to ensure that the raw data was analyzed and interpreted properly to ensure that what we publish is of the highest quality and integrity.
- **Be good to yourself and others:** A lab ideally is a community of people all working toward a common goal. It is important that everyone in the community is happy and healthy. Science at times can be frustrating, tedious, and time-consuming. If you are having a tough time with something specific (or in general) talk to someone about it. It’s important to enjoy what you are doing and joking and having fun are part of that. I just request that you make sure it is safe, in good taste and considerate of others feelings. Intentionally hurtful remarks or gossiping will not be tolerated. If you see someone else in the lab having a tough time offer them your support and help where you can. Be a mentor to others in the lab. If you see or hear something in the lab that makes you uncomfortable (this could range from unsafe work practices to difficult interactions with other lab members) please feel free to speak with me. My door is always open and if I cannot speak immediately I will get back to you as soon as possible. I will do everything in my power to make the lab a safe and enjoyable place to be.

#### **WHAT CAN YOU EXPECT FROM ME?**

- I will be available to meet with you weekly and will be accessible during your lab hours. My door is always open, so don’t be afraid to ask questions or for advice. If for some reason I am not able to talk immediately due to other activities or time pressures I will get back to you as soon as possible.
- I will provide the equipment and supplies that you need to complete your work. If you want to do something for which we are not equipped I will identify core facilities and other faculty with whom we can collaborate.
- Mentorship to help you grow as a scientist, including guidance on your project, experimental design, data analysis, publishing, strategies for applying to graduate school or other career paths, best scientific practices, etc. I will also do my best to make connections for you with other colleagues to expand your network and provide exposure to career opportunities.
- Help you do your work—not to hold your hand, but to give you the tools and knowledge to be successful and problem-solve for yourself.
- Help in preparing your work for presentation, in lab meeting and at research symposia.

**What will you get from all this hard work?**

The opportunity to work in a lab is an amazing educational experience. It will give you a feel for what the reality of being a scientist is about and help you determine if you think a career in science is for you. A lab based experience will provide the opportunity to learn things that are impossible to teach in a traditional course format. You will learn unique and valuable skills which will be useful for a future career in science or in other fields. An education in science teaches fundamental skills such as logical thinking, problem solving, data analysis and the ability to digest and communicate complex knowledge and ideas to others. These are skills required not only in science but for life in general. You will also meet great people in and out of the lab that will establish important connections in your professional and personal life. I am excited to have you in the lab and I look forward to our journey together!