Silbart Lab: Graduate Student Training - Philosophy and Guidelines:

Introduction: Embarking on an advanced degree in a scientific discipline is a difficult and courageous endeavor. Laboratory science is challenging on many levels, and can often be quite frustrating. Positive reinforcement often comes infrequently, especially early on in a project - thus a successful student must be disciplined, intelligent, industrious, self-confident, creative, and above all, patient. A student considering entry into research should consider these personality traits carefully, recognizing that shortcomings in any of these areas can lead to problems down the road.

Outlook: My outlook on graduate training is as follows: We embark on a challenging, yet potentially rewarding journey, as partners. Your project is your own, but I will help you as much as I can, (or as often as I am asked) provided that you are doing your part (explained below). I never want to be the rate-limiting step in your project, and if you believe that I am, please discuss this with me immediately. Ultimately, it is the student who is responsible for the success or failure of a project. The sooner a student comes to grips with this reality, the better off we both will be. In my mind, there is no such thing as a "bad project," although there will certainly be times that it seems that way. All projects are difficult - and it is the tenacity and creativity of the student that dictates success or failure. If you become unhappy or disenchanted with your project, it is critical that you communicate this to me immediately so that we can determine a course of action. Don't let emotions get the better of you. It is natural for everyone else's projects, and those of individuals in other labs, to look "much greener" when your work is going poorly. The temptation to "blame the advisor" can be quite high during times of trouble (and is quite natural), but have faith - with hard work and creativity, something good comes of every project, even if it's not what you expected at the outset. Don't underestimate the rewards. Once you have learned and applied your knowledge to a project, and have harnessed your creativity and hard work in solving the problem, a great sense of satisfaction, self-confidence and self-affirmation (and relief) awaits you. I view myself only as advisor and facilitator of your research - not an omniscient oracle. I will help guide you (or reign you in) from time-to-time, but I will not hold your hand or instruct you on what to do. Almost all aspects of your project are open to discussion - but remember, the discussion should be guided by data, both your own and what's in the scientific literature, not emotions.

Goal: My goals for you and your project are: (1) To train you as a scientist. This includes supporting you as you go through your graduate courses, in recognition of the fact that your productivity in the laboratory will ultimately hinge on the strength of your scientific underpinnings. Further fortification of your knowledge base will come from journal clubs and one-on-one discussions of your project (and the relevant literature). My goal is to develop in each of you the ability to **ask and answer an important scientific question**. I don't differentiate between a student studying for a Master's degree or Ph.D. in this regard. The only difference is the scope and depth (and thus amount) of data required to complete the project. In return, I expect you to be productive. This doesn't always translate into raw data, but we will both recognize it when we see it. I expect you to publish two high quality, first author manuscripts for a Ph.D., and one for a Master's degree.

Keys to success in the Silbart Lab:

1. **Read and think**. Look broadly at where the field of immunology and vaccine research is going. Scan the tables of contents of Science, Nature, PNAS, Infection and Immunity, Vaccine, Nature Immunology etc. for papers of broad interest. Discuss these papers with your peers and lab mates. Think broadly and maintain the intellectual framework that you established during your coursework.

2. **Directed reading**: Of equal or greater importance to knowing what's going on in the world of immunology and vaccine research is the necessity for more focused reading of papers relevant to your project. These papers must be read in detail, and you should know them "chapter and verse." For most projects there will be 30-50 such papers. The sooner you start reading these papers (in detail), the better. Highlight important parts of these papers, and re-visit them every couple of months (if only for a moment or two).

3. **Make a plan**. Lay out short and long-term goals. Discuss them with me. Communicate the issues that you perceive are standing between you and the successful completion of your project. Divide large and complex tasks into manageable smaller bits, then prioritize the bits. Keep me in the loop. If I don't know what you're thinking about or trying to accomplish, I can't help you much.

4. **Always work hard**. Projects only crack when they are given no choice. It comes down to a battle of wills - and nature is slow to give away her secrets. No one cracks a project with a cavalier attitude or casual work ethic. Do something in the lab every day, even if it's only to write in your laboratory notebook or make up a buffer.

5. **Be helpful to others**: Recognize that you are part of an institute of higher education. Everyone is at different stages of their training. As others helped you when you first got started, you are expected to help others. We work on a "pass the baton" system. If you feel that someone is making unreasonable demands on your time, or is uncooperative with respect to helping you, please bring it to my attention. We are all on the same team and there's plenty of competition elsewhere in the world; don't foster it in the lab. If you see someone doing something wrong, you must do something! Write them a note, tell Deb, tell me, tell them - but don't ignore it. Try to resolve any conflicts that may arise by first speaking to the person/people directly. Don't bad-mouth or gossip about them (or me). It only leads to unnecessary hard feelings later on.

6. **Be respectful of other people's time**: When questions pop up, do your homework first. Asking for help should be your second resort, not your first. Look in the literature or online for your answers. Be resourceful. Hone your skills at information gathering and problem-solving. If you are still stumped after a good-faith effort to solve a problem on your own, go ahead and ask a colleagues or advisor for help. Their first question will probably be "did you look at source X, Y, or Z?" If your answer is yes, they will be much more inclined to work with you. Try not to interrupt others when they are busy. Problem solving is a skill - develop it. It will lead to self-confidence rather than second-guessing. Don't interrupt someone who is working with "mindless chatter" or questions that can wait. Likewise, don't let the phone, email or the internet distract you from your work

7. **Have realistic expectations**: Don't put too much pressure on yourself, and don't compare your situation/project to those of others. All projects unfold at different rates, and all students mature as scientists at different times. It is unhealthy to presume that "everything is fair." As hard as I try, there will be times that it does not appear that way. Stick to task and everything will work out fine. Your "day in the sun" will come.

8. **Take control and responsibility for your project**: It's your baby, so make the best of it. Don't point fingers and blame anyone but yourself for either the success or failings of a project. "An error only becomes a mistake if you do nothing to correct it."

9. **Communicate**: Don't suffer in silence. Keep it professional, but express your frustrations and problems with your lab mates. They can serve as an important resource and sounding board. If I'm not hearing from you, I assume that everything is going along fine, and you are simply waiting until a set of experiments is completed to communicate the results. I can't read your mind. Don't rely on the "grapevine" to communicate information to me. If I seem really busy, send me an email and request an hour. I guarantee I will be happy to accommodate you within one week of your request - depending on the deadline I'm trying to meet. If I haven't gotten back to you regarding something important - please bug me! There's a good chance I've buried it. Be assertive. Your project is important and you shouldn't feel funny about demanding the attention it deserves. I often respond to deadlines rather than what's most important. Don't let this impact your project negatively.

10. **Prioritize, Prioritize and Prioritize**: Take your lab work seriously and get your priorities straight. Don’t let telephones and emails disrupt the flow of your work, and plan your day in such a way that experiments don’t get interrupted. Plan your life around the lab, not visa-versa.

How I measure the progress of a student:

1. **Work product**: First and foremost, it is work-product. Are you doing experiments? Do the experiments make sense? Are you analyzing the data properly? Have you done all of the appropriate homework (background reading)? Did you prepare for the experiment properly (collected all necessary supplies and reagents in advance)? Did you carry it through from start-to-finish without any "glitches?" (e.g. "I ran out of buffer _"X" so I couldn't complete the experiment."). Did you critically analyze the data before bringing it to me? Do you know what to do next?

2. **Are you reading?** Are you reading the "big 50" papers and are you showing me that you've thought about the long- and short-term progress of your project.

3. **Are you asking the right questions?** Whenever a person is having difficulty, a series of logical questions usually comes to my mind. Are these the questions you are asking (of yourself and of me)?

4. **Are we on the "same page?** Do we "more-or-less" agree that you are on the right track at any point in time.

5. **Do I see the commitment**? Nobody is "expected" to work nights and weekends, but a person committed to solving a problem puts that task as #1 in their life. This invariably requires a great deal of work outside the laboratory (computer, reading etc.). This isn't just a day job. Like any student, you have homework - and sometimes that homework can only be done at the lab. Your project is finished when you bring it to its logical conclusion. We can discuss (argue?) about what constitutes "finished," but a calendar has little to do with it.

What you can expect from me:

1. **Advice**: I will do as much as I can to help you be successful - but don't expect to have your hand held. If you don't know how to do something, ask. If I can't help you, I'll help you find the person who can.

2. **Support**: I will make every effort to get you what you need to be successful. Some things are outside of my control, but I should tell you about these. You will have the reagents, supplies and equipment you need to do your experiments. You will have the space, animals, and computer resources you need. To the extent possible, I will try to get you sufficient monies (stipend) to keep you from needing outside employment. This is not possible for every student and every project, but I'll do what I can.

3. **A knowledge base**: I don't know everything, but I should be able to guide your thinking - especially early on in a project. Feed me the papers and information you come upon so that I can stay abreast of this information. I'll do the same for you.

4. **A friend and colleague**: I hope to form a life-long bond with each of you. So far, that has held for all of my successful students, which constitutes about 50% of the students who have initiated projects in the lab. I hope to increase this percentage. Don't do things to undermine my faith in you as a student or as a person. Don't ask me for shortcuts or cop-outs. Do the work, harness your creativity and everything will work out fine!

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