Helpful Tips for Navigating Graduate School

Graduate School should be an exciting and stimulating time in your life – where you get to immerse yourself in science. Through your research, classes, group meetings, literature meetings, seminar speakers and presentations (at OSU & external conferences), you have a unique opportunity to become the world's expert in a topic. This is a journey that you must decide to take, as it is not for everyone and no one else can (or should) make you do it. You should be excited about starting your PhD at OSU. I am honored that you have chosen to work with me on a project and serve as your dissertation advisor. I would like to provide you with some helpful tips that I have as we enter into this endeavor together.

1. This project is ultimately yours. While I expect initially that I will need to provide you with more guidance and technical advice as you begin your research, I expect you to transition over time (usually by the end of your second year / beginning of your third year) to providing the intellectual leadership for the project's direction. I often call this "driving" or "taking over" the project. This would include independently identifying solutions to address problems and recognizing additional applications of your discoveries to related areas. For example, I come into lab one day to talk to you and you tell me "We have been having this problem and here is the solution" or "We have developed this concept and it is also applicable to this problem." I will continue to provide guidance and support throughout your PhD career and you are always welcome to come ask me for assistance and suggestions.

2. Maintain a proper laboratory technique. It is important for your science, your own safety and your future career that you learn and maintain proper laboratory technique. This would include always wearing safety glasses in lab, wearing appropriate attire, conducting experiments safely, asking for help when you don't know how to do something, keeping a well-documented lab notebook that you write your experiments in as you do them (not before or after) and properly / completely characterizing compounds that you make. Guidelines for keeping a good lab notebook and characterization requirements are posted on our group website's "Useful Links" webpage.

3. Make consistent progress on your research. The important aspect here is the setting of short, medium and long range goals for yourself (For example: today I want to make compound **X**. By next week, I hope to make intermediate **Y.** By the end of the year, I want to make natural product **Z**). When working in lab, it is easy to get lost in the minutia of the day-to-day experiments. Once you have set these short, medium and long range goals, it is important to plan out what you want to accomplish when you enter lab each day. It is also helpful to plan what you will be doing in the immediate future (1-2 weeks) – as a key chemical can

take time to arrive from the manufacturer and characterization needs on instrumentation will likely need to be juggled with the demands of your colleagues. For example, if you need to do a key $LiAlH_4$ reduction in 3 days and we do not have any $LiAlH_4$; you may be waiting for it to arrive as it can only come via a truck due to shipping restrictions. Also, you made need to get a key carbon spectra on a unstable intermediate, but someone else has reserved the NMR for the next 4 nights.

Each individual needs to find which tools work best for them to make consistent progress on his/her research. Personally, I try to plan out a "To Do" list the night before what I plan to accomplish the next day – sometimes in my head if those tasks are easy to remember and sometimes in writing. When I come in, I try to make a concerted effort to accomplish each one of the tasks I assigned to myself. If I fail to get to them all, I try to reflect back on what went wrong and learn from that for future planning.

4. This is your education – not a job. Please do not call me "Boss" – I am not your boss, I am your graduate advisor. It is fortunate that attending graduate school is able to provide you with a stipend to support your education; however, you should view your time at OSU as a training opportunity.

Related to this point, please do call me Rich and not Professor Carter or Dr. Carter. Respect is determined by one's actions – not by the absence or presence of a title. This is true not only in graduate school, but in life.

5. A PhD is not a time served degree. Some of the most common questions I get asked are "How much time do I need to spend in lab?" and "How long does it take to get a PhD?" My response to both these questions is "I cannot tell you a definite answer." While this answer is surely unsatisfying, it is true. Obtaining a PhD is not about the number of reactions you run or the number of hours you put in lab, it is about the knowledge and skills you gain. Now, it is true that the more experiments you run, the more likely you are to make progress. That said, those experiments need to be well thought-out and scientifically sound. For example, screening substrate scope on a reaction when you have not found the optimum conditions yet is pointless. I am happy to help you with this planning and analysis. Growth in this area is often a key sign of a maturing PhD student.

6. Learning how to present in public is key to success in life. Students often view presenting (at group meeting, literature meeting, organic seminars, public presentations, oral exam and dissertation defense) as simply hurdles that they have to jump over. I would encourage you to embrace these activities as important learning opportunities. We provide you with far more opportunities to hone your public speaking skills than at most schools. For example, your experiences presenting at literature meeting provide you with the chance to learn

about a new topic while answering questions "on the spot" in an environment where there are no material consequences to making mistakes (e.g. there is no grade associated with it, it is not required for graduation). Your experiences presenting your own science – both at OSU and outside OSU – will serve you well when you get a job and need to stand up in front of a group to present your research / project where serious consequences can occur (projects being cut, funding disappearing).

You are not expected to know how to give the perfect presentation when you arrive at OSU. Guidelines for a giving a good presentation are posted on our group website's "Useful Links" webpage. In addition, I am always willing to sit down and listen to your practice talk, go over your slides and give you honest feedback on your strengths and weaknesses. I strive to give these comments in a constructive, helpful manner, but it is important that you be willing to take the feedback as the assistance it is intended to be.

Other minor questions that often come up.

Lab Technique Questions

• Safety first! Do not work alone in lab or when you are tired or impaired (e.g. have been consuming alcohol). Make sure to let your labmates know if you are doing something unusual. Ask for help if you do not know or are even a little unsure how to handle a reagent or do a procedure! Follow posted Standard Operating Procedures (SOP's). Make sure to know where the eye washes, fire extinguishers, safety shower are in the lab. Pay attention in the safety seminars and training sessions put on by the Department and EH&S. Be vigilant – pay attention to things around you. Don't be afraid to say something if you see someone being unsafe. Related to that point, you may not use HMPA, HMPT, CO, TMSCN, HCN or large amount of alkyl lithiums (over 20 mL in a syringe) without specific approval from me.

Project Related Questions

• I typically make "rounds" through the lab every afternoon. Please be prepared to tell me about what you have been working on – both the good and the bad. I often used to write out what I did in lab each day to talk to my PhD advisor, but that is by no means required. (Many people can explain it equally well through verbal communication while writing on a white board / chalk board etc.) My goal in these regular conversations is to help – NOT to check up on you. Tell me when you have the exciting result so I can be excited too, but also tell me when you have that frustrating result so I can offer suggestions and be supportive. In many ways, the role of an advisor is a cheerleader. (FYI - First year students and new postdocs: I will not come talk to you each day so that you can have time to

settle into your new space. Please don't think I am avoiding you because of something you did. I just want you to get comfortable first. Just ask if you want to talk to me about something.)

• Do not be afraid to come to talk to me about your project in my office. I am here for you! Often students are afraid to bother me because I am busy. I will tell you if I have a deadline or prior commitment that makes it impossible for me to talk. Otherwise, I welcome the interruption – talking science is always the best part of my day!

• Most graduate students start presenting in group meeting (Tuesdays at noon in LPSC 239) in Spring or Summer of their first year. I will let you know significantly in advance (usually at least 4 weeks) when you need to start presenting so that you can be prepared. Make sure you bring a one-page summary of your project as a handout to give to everyone at that first meeting. Detailed instructions and a schedule for group meetings are posted on our group website's "Group Meeting" webpage.

Miscellaneous Research Questions

• Weekly reports are due Monday morning (8 am). You can slide them under my door or post on my bulletin board outside my LPSC 251 office. Please note I will not always comment on your report, but I always do read them. The goal here is to provide me with a good understanding on the progress you are making and issues that I can help to address. Please do not waste material (e.g. synthesized compound) by running a poorly thought out reaction simply so that you can put it on the sheet. I am not fixated the progress on one week, but rather looking for treads over time.

• Annual reports are due September 15 of each year. Detailed instructions are posted on our group website's "Useful Links" webpage.

• I often get asked "How will I know if I am not making enough progress in my research?" I consider myself to be a very straight forward person, so the answer is simple – I will tell you directly "You are not making enough progress" and I will help you to outline what together we think is reasonable progress. If you are concerned about something, just ask and I will do my best to give you an answer.

Miscellaneous Group Questions

• Group lunch is every Friday around 11:30 am. All group members are welcome to attend. We have one rule – you may not talk about your research at lunch. The goal of this activity is to build camaraderie and respect amongst everyone.

• Treat your labmates, fellow students, faculty, staff and everyone else with respect. This is important for maintaining a healthy work environment. I am not asking you to like everyone, but is important that each person has the opportunity to pursue his/her education in a positive environment.

• Please post your schedule above your hood. Also, it is important that you are regularly available during the normal business hours so that we can have the opportunity to interact on a regular basis.

• Don't leave me a voicemail. I am terrible about listening to them. If you don't want to put your message in writing, just drop me a quick note via email that you want to chat.

Balancing Education, Research and Your Outside Life

• Life balance. Graduate school is an important time in your life and I would strongly encourage you to take it seriously and to study hard. I love Chemistry and it is a passion that provides considerable fulfillment in my life. That said, Chemistry does not define me and I value my time doing other activities. You must find the same balance between your efforts in graduate school and your life. Take care of yourself; stay healthy and active. Not only is this good for you as a person, but it also makes you a better researcher because you are more focused and refreshed in lab. OSU refers to this as life balance and has a website dedicated to this effort: http://oregonstate.edu/admin/hr/LifeBalanceOSU/

• You are welcome to continue to conduct research during the week between Christmas and New Year's (December 24-January 1); however, I do not expect you to be here then. That said, do not conduct experiments if you are the only person in lab.

• I respect all religions and will honor your request for religious holidays – just let me know. All major US holidays are of course honored as well.

• Please let me know if you need to go out of town, take vacation, are ill etc. Also, I ask if you plan to travel to visit your family internationally, that you try to limit your trip to no longer than three weeks. If there is a compelling reason that it needs to be a longer stay, please let me know and I am happy to try to be accommodating.