

The Lu Lab Research Philosophy

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Welcome

Welcome to the Lu lab! My goal as a Principal Investigator (PI) and mentor is to create and foster an environment in the lab where everyone can reach their full potential, achieve their career goal, and become a better person/scientist than they were before. This document describes my philosophy and how our lab should function to ensure we together achieve this goal. You should read it carefully before deciding to join the lab. If you have questions about any part of this document before and even after joining the lab, please feel free to come to see me. I will be happy to discuss it with you in more detail.

Research Philosophy

“Many flee from science because they think it barren and dry; they believe in the ‘myth of heroism’ of those who practise it as a ritual, and the ‘myth of altruism’ of those who renounce more lucrative undertakings in order to satisfy their scientific interest in the service of their native country and of humanity, and in the ‘myth of genius’ which pretends that, in order to achieve scientific discoveries, it is necessary to have a high level of intellect and marvellous cerebral organization. All these myths merit correction: Science is not arid and disagreeable, and the scientists need not be heroes, altruists, or geniuses. Sometimes it is sufficient that they be artists.”

- Pio del Rio-Hortega (1882 – 1945)

My responsibility as a PI and a mentor

My responsibility as a PI is to ensure our lab is an environment where EVERYONE can thrive. To achieve this goal, I need to secure our funding source (meaning writing grant proposals), manage the laboratory space to make it easy for everyone to perform their work, design research projects that are slightly above your skill level so you can grow and succeed, provide guidance when you struggle, be honest with your mistakes, and celebrate your achievements harder than you do. I do also have other responsibilities as a UVA faculty member, such as recruiting, teaching, and serving on other students’ thesis committees, but I will try my absolute best to set my priorities straight and be the best PI and the best mentor to you as I can. I am sure, as a human being, I will also sometimes get lost and make my own mistakes along the way. Do not hesitate to remind me (please do so nicely) if I fail to do my job as I will do the same thing for you.

Your responsibility as a lab member

You probably have noticed that I emphasized “EVERYONE” in my previous paragraph, and I hope you are not feeling surprised nor disgusted by the idea that making sure our lab is a

happy, comfortable, and safe place for every lab member to work productively is also your responsibility as a lab citizen. That means your responsibility as a lab member includes, but not limited to, always be polite and respectful of your lab mates, do your lab duties in a timely fashion, listen attentively when your lab members present in the lab meeting, communicate effectively about your need, apologize honestly when you make a mistake, and always clean up the shared lab space after you finish your experiments. The last point is often ignored but you should not. “I am busy with X numbers of important experiments currently running at the same time” is not an excuse for not cleaning it up afterwards. Cleaning is as important as setting up your experiments and should be planned into your schedule. You can perform your experiments in a shared lab space on time because people cleaned it up before you, and you should return the same favor that you receive. Being a decent human being should be before being a decent scientist.

Your responsibility as a trainee in learning to perform rigorous scientific studies

You might feel confused why I put the quote from Rio-Hortega upfront and why he concluded that artists are sufficient to be scientists – Think about it and let me know your reasons to the latter question by the time you are leaving this lab. I do sometimes see conducting good scientific studies is a kind of art that you can only learn through practice but not from textbooks – we are at the place that is beyond textbook knowledge and some of your research accomplishments may even one day re-write the textbooks that we know today anyways. Therefore, if you think of mastering the craft of conducting rigorous scientific studies (or publishing papers and graduate/land a tenure-track faculty job in 5 – 6 years) as a form of art, you should know that it is going to take practice, take efforts, and take sweats from you when you sit in front of the benches doing experiments. It also requires your undivided attention when you perform experiments, collect data, analyze results, and interpret their meaning. It does not mean you must work in front of your bench 24/7, including every weekend and holiday, but it definitely is not a 9-to-5 job. It just isn't. Like all the work that involves creativity, it also requires you to think, listen, and read from others to find new inspiration. Learning how to balance all the above acts and use your time efficiently in the lab while taking care of yourself and others is the most important thing that you need to learn to do as a trainee.

Everyone is different.

A research laboratory is one of the places where you can meet talented people from everywhere around the world. However, sharing the same passion for science does not necessarily mean sharing the same personality or philosophy for life. I will try my best to avoid having problematic and toxic personalities in the lab, but one thing that you need to learn, and I guarantee it will help you to go a long way in the future, is to work with people who you do not necessarily agree with. Be professional, as this is a place of work. Learn to distinguish issues between morally unacceptable ones or different personal preferences. Come to see me and let me know immediately if you think you encounter a morally unacceptable one. Please also feel free to come to see me if you are unsure and we will discuss it together.

I would also like to emphasize that since everyone has different strengths and weaknesses, with different goals in their lives, I will give individual lab members distinct kinds of help and guidance to suit their needs and achieve their goals. One thing that I learned and

helped me the most through graduate school is to not compare myself to other lab members/colleagues. Again, I will try my absolute best to avoid having a bad apple that makes our lab smell intolerable, and please do let me know if you think there is one in the lab as I may not spend all my time in the lab as a PI. But while I am dealing with bad apples, try to focus on what you need to achieve during your time in this place and maintain your standard. As the wisest Nietzsche once told us, “The worst enemy you can meet will always be yourself.”

Everyone is different, but experience has value *(This part is extracted and only slightly modified from the Freeman lab research philosophy, as my PhD mentor, Dr. Marc Freeman, has stated it perfectly. If you are interested in what else he said in his lab research philosophy, tell me, and I can send you a copy.)*

“The lab is as smart as everyone in it put together, and cumulatively our group has deep expertise in the things you will want to learn. Exploit this fact to your benefit. Ignore it at your peril. If you need to do something new, ask for help. Have others done this before? What is their protocol? Is there anything not written down on the protocol that I need to know? What are the most critical steps? Be persistent and always try to keep things going. Do not just grab a protocol and try it on your own. Go through it with someone with experience. It is good to try to be independent, that is encouraged. Trying to get things down efficiently so you do not have to ask a person the same question over and over shows respect for their time and effort mentoring you. But for experimental approaches, tools, or other lab-related procedures, it is prudent to ask others with more experience, and continue to ask questions until you really get it. This openness to learning from those that came before you could save you a lot of wasted time. Always be hungry to learn from the others around you. Be willing to say: “I have no idea, please teach me.” Be a productive receiver of information and tutelage. In the end, you will learn things more quickly, be shown the most efficient protocol on earth to do what you want, get the inside scoop on all its idiosyncrasies, and you will not run into as many protocol roadblocks.

Follow the directions. NEVER change a protocol before you have been through it the first time. It is written the way it is for a reason. Do not think you can just change whatever you want and expect success.” However, if you accidentally fail to follow the protocol, document it immediately as it is in your notebook. We are all fascinated by the stories of scientists who accidentally made breakthroughs by mistakes, but those are all under the premise that they kept their books and documented their mistakes well.

Things that you do not do unless you want to be kicked out from the lab immediately

1. Lie about your experiments and fake/fabricate your data
2. Sexually harass or abuse any other human being
3. Discriminate against your lab mates in any way possible
4. Physically attack your lab mates and anyone in the department under any circumstance

Appendix

Advice to young scientists by Dr. David Ho (6/14/2014 in Cambridge, MA)

1. The primary ingredient for success in science is **the passion for science**. In front of you is the century of science and medicine. Challenges and opportunities abound. A strong passion for science will sustain you.
2. **Do not be afraid to take a chance**. Success in research, as is the case in most endeavors, requires bold decision-making and a willingness to take informed risks. As so eloquently stated by Harold Shapiro, the former President of Princeton, “an excessive zeal to avoid all risks is, in the end, an acceptance of mediocrity and an abdication of leadership.”
3. It is a given that you must acquire the knowledge and develop the skills in your chosen field. However, I urge you to **read broadly**. Go to meetings and listen attentively. Talk science with colleagues from other disciplines. Do not narrowly focus only on your own field, for the breakthroughs may, seemingly and unpredictably, come from “left field.”
4. **Always maintain a deep commitment to excellence**. Never permit the quality of your work to be compromised. Never write a bad paper. Never give a bad talk. Never lower your standard of excellence.
5. **Always seek the truth and learn to challenge phony authority**. Blind respect for authority is the worst enemy of truth. Learn to distinguish between truth and dogma. Unsubstantiated dogma restricts the free thinking that is essential to arrive at the scientific truth. Send out “dogma alerts” in your own mind when you hear personal biases presented as established facts. Do not let yourself be boxed in by dogma.
6. **Know the difference between the words “could” and “should.”** Too often young scientists do the experiment they “could” do rather than the experiments they “should” do. Think about this distinction when you come to each critical juncture in your projects. The former could get you stuck in a rut while the latter could elevate you to new heights.
7. **Strike the right balance between thinking and experimenting, and between “vision” and “action.”** All of us were taught to work hard. Thus, too many young scientists grind away relentlessly, carrying out experiments one after another, without ever reserving sufficient time to read and think. Make regular appointments with yourself for a quiet time to think and to strategize. Remember this old Japanese proverb: “vision without action is a dream; action without vision is a nightmare.”