

Advice for PhD students

David Rolnick

Grad school will suck some of the time, and it's not your fault. Every PhD student I know (including me) has had periods where things feel terrible. Often, this takes the form of a year or so right in the middle of grad school. When this happens to you, it doesn't mean that you're doing anything wrong. A PhD is intrinsically difficult psychologically. Generally, it's the first time in your life when the things with deadlines, like courses, are not the most important things. The important thing is research, which is vast and amorphous and comes with a deadline of several years. You are (hopefully) surrounded by people whose achievements and abilities can easily make you feel small and incompetent. On top of that, the time of life that many people pursue PhDs is often a time where other things are also making you stressed. You will almost certainly have low points. People around you will too, even if they don't show it.

Never resign yourself. If something is making you consistently unhappy, remember (a) it's not your fault, (b) you probably can change it at least a bit. Don't wait and hope that it gets better. Something doesn't have to be objectively bad for it to be wrong *for you* at that moment. For example, just because other people are excited by a research problem doesn't mean you have to be. I think most PhD students resign themselves to feeling low-level unhappy. This is the fault of the grad school system – but you can fight against it by identifying what makes you unhappy and trying to make it better.

Research is not your life. Especially in the US, there is pressure to love your research so much that you neglect everything else. That's dangerous. First, because you don't have to love your work - and research is work like anything else. Second, because you have to take care of yourself even if you do love your work.

Seek out mentors. Role models and guidance are amazing, and can be hard to find. Your advisor may or may not end up being a mentor. Regardless, don't rely on any single person, but try to find several people you respect who speak to different aspects of you and understand what you want to become. Talk to them when you need help and also when you don't; just like a friendship, a good mentoring relationship takes time together to build.

Travel. For those of you who know me, I overdid this one. But I think that travel has huge benefits for research, and it's also just fun. Sometimes one needs the breath of fresh air that comes from being in a different intellectual atmosphere – and also just a different physical place. I'd recommend going to conferences as soon as possible. Don't worry if you don't understand the talks (I still don't understand many talks I go to). The important thing is talking with people. Conferences are a great way to find friends who do similar things in other places, and to meet potential collaborators. If you are lucky enough to end up with a collaborator who works somewhere else, then ask if you can visit them. It's a chance to visit somewhere new and will probably strengthen the collaboration and give you new ideas.

Communicate your work. Take every opportunity to talk (or write) about what you are working on. I find that explaining my research to other people helps me understand things more deeply myself. I also learn what my audience finds confusing or interesting. Unfortunately, science or engineering PhD programs generally don't teach you how to communicate your work. But regardless of what you do with your PhD, it will involve explaining stuff to other people - whether through academic papers, internal corporate meetings, or public advocacy. Grad school is a great time to practice these skills, and the stakes are probably lower than they will be later on.

Build a foundation for your dreams. When you think big, and the people around you think big, it's very easy to start working on a glorious frontier like the neuroscience of art. Your advisor will probably have dream problems that they've been waiting for someone to work on - they will be happy to give them to you. Don't work on them right away though. I've seen many excellent young researchers go all out for one of those problems and then be disillusioned when the project crumbles because it was built on joy and excitement and good but vague intuitions. You need a foundation to work on the moonshots. Work on small, well-defined problems first. Remember your goals and your dream problems. Remember them every day. Let them guide you in picking the small, foundational problems. Once you've laid enough bricks in the foundation, you'll find yourself seeing ways to the moonshots - and they won't be moonshots anymore, because you'll have concrete ideas for how to get there.