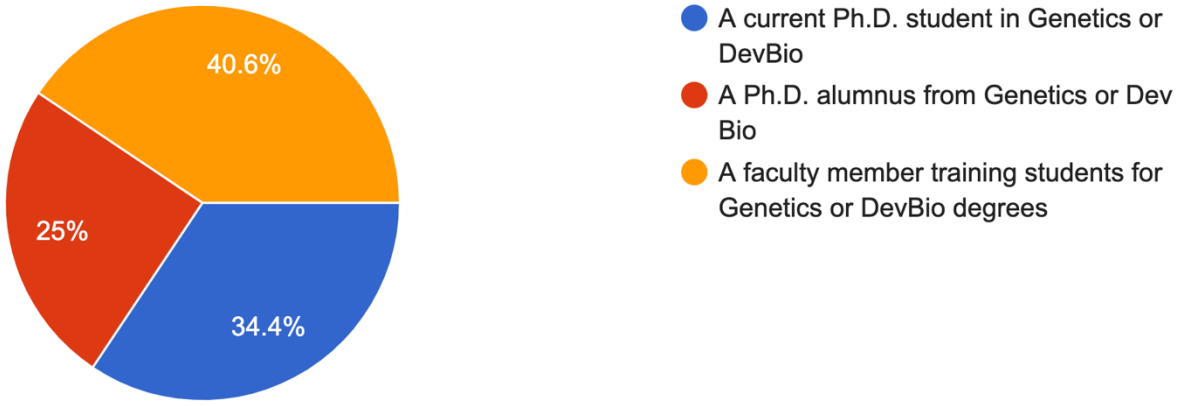
In October 2020 Genetics and Developmental Biology training grant students read and discussed Thompson's "ON BEING A SUCCESSFUL GRADUATE STUDENT IN THE SCIENCES"
(https://cpb-us-e1.wpmucdn.com/sites.ucsc.edu/dist/4/216/files/2019/12/Thompson-On-being-a-successful-graduate-student-version-9-1.pdf)

To collect additional advice and perspectives, we asked our own students, department alumni, and our current Genetics and Dev Bio training faculty two simple questions.

1) When I was in Ph.D. training, I wish I had known earlier that:
2) My own biggest pieces of advice for success in graduate school and beyond would be:

Thirty-one people answered our anonymous survey (well distributed across students, alumni and faculty).



Here is the complete text of the single or dual answers we received from each respondent.

Current Ph.D. students:

#1: It was normal to have impostor syndrome and feel like I was the only one that didn't know what was going on. I also wish I had sought out mental health help earlier (preventatively?) instead of waiting until my anxiety got the better of me. I later learned this is common in grad school.

Take your mental health seriously.

#2: All of Stanford's resources are for me. Your thesis should be a fraction of what you do; extracurriculars might be equally valuable in the end. Also, it's never too early to start...get your lab notebook system set up NOW, a detailed literature management system, with a place for your notes, set up NOW; have a scary or tough conversation with your advisor NOW etc, etc...putting anything off until later in grad school almost never has a benefit.

Don't let others define success; the pervasive definition of it at Stanford is toxic. Also, get a therapist. CAPS is really good.

#3: If I am unhappy with my current research it isn't necessarily a sign that I am not right for science/academia, but that I may need to step back and find a new project

Find questions that make you excited and curious and infuse them into your projects. 99% of the time things will fail, or you think you understand something when you don't- biology is complicated!! Establish a schedule that works for you and your collaborators/lab, and don't work simply to fill time.

#4: Five years goes by faster than you think. Make an effort to have regular meetings with your advisor(s) and committee to keep you on track. Also, even though funding is "guaranteed" keep in mind that if you get a fellowship, and it expires, you'll need to figure out how to fund the rest of your degree.

Try to decide as early as possible what your goals are for after graduate school, and build your grad school experience (this includes things like which lab you join) around achieving those goals. Get advice from as many difference sources as possible--your PI, your committee, and postdocs and students both inside and outside of your lab. Find a role model whose experience you want to emulate, and find out what they did to get where they are. Keep in mind that what you're trying to do is hard, and you will need to communicate your problems and seek out help at times.

#5: Everyone works at a different pace. Don't get stuck in a mindset of benchmarking yourself against others; their successes are your successes, celebrate them together!

#6: Beyond documenting code well (three cheers for GitHub), add more (and more detailed) README files to folders where you save files and analysis. What is this folder for? What are the links you used to download publicly available files? For ambiguous column names, what do they mean? In line with careful documentation, frequently update a personal file with a summary of all of the contributions you have made to each project you're working on, especially if they're collaborative projects. Link Google Slides presentations and other files there so you can easily find them again. It's crazy what you'll forget a couple of years later!

PhD studies are largely self-paced. Set boundaries and expectations for yourself so that you don't end up working too much or too little. Set aside time for things you enjoy, whether that's hanging out with friends, working out, or watching Netflix. I find it helpful to have fun things to look forward to, both in terms of motivation and avoiding burnout.

#7: No one expects me to know anything and I should be more okay asking questions and pushing myself to be confused more often. I would have learned more.

Ask for help when you need it. People want to help but won't know to offer.

#8: Science is really a multimillion-dollar business predicated on competition with others rather than expanding knowledge and exploring curiosity. Production and popularity are the currency of the realm—it’s not really about the science.

If you want to do science based on merit, skip the bureaucracy, bullshit, and heartache of graduate school and work from your garage or basement.

#9: It's important early on to think about what you want your advisor to do for you and to communicate that to them.

#10: It's more efficient to ask for help sometimes

Keep an organized notebook and make schedules for experiments

#11: I should be good at writing

Write a lot

Alumni from Genetics and Developmental Biology departments

#12: You are in charge of your own training. Seek out technical expertise and career advice. Take advantage of the course work available to you at Stanford to take Stats, CS, etc classes that aren't required for your degree program but that will prepare you better after you finish your PhD. Make an IDP and evaluate your progress with your mentor every 6 months. Build a network of collaborators and mentors outside of your lab or even your department--the connections you make at Stanford can sustain you outside of that environment.

Learn project management skills and pursue the "fail fast" strategy. Don't be afraid to identify the bottleneck or weakpoint in an approach and figure out ASAP if something is feasible (experimentally, computationally, etc).

#13: Most of the time, it is fine to read only parts of papers I find interesting. Deciding how deeply I will read a paper is a very critical decision that I should make intentionally.

Know why your work is important to the scientific community: how it relates to recent similar work by others, how it moves your field forward, and why it is competitive for top journals (you should know the journals that could be a home for your manuscripts!). If you aren't making progress towards a paper that is important, question whether you should change what you're doing: skills or knowledge can be valuable long term even if they don't immediately relate to your research, but you should be confident that what you are learning is valuable.

#14: Stanford has incredible resources available for graduate students outside of your normal bubble. Joining programs like SPARK can give you a hands-on experience in drug development that is really rather unique. Similarly, as a grad student you can actually take courses in almost any field. There are crazy courses (for example, wine tasting or equestrian classes, french cooking, the design school crash courses) and there are courses that would otherwise be extremely expensive and almost impossible to access (touchy feely in the graduate school of business, some of the entrepreneurship incubators). I did these mostly to find cognitive relief from the intense pressure of a stagnant project or a project-ending result. Ultimately they ended up leading to bigger things and introduced me to fascinating people who have gone on to shape my career.

#15: Mentorship and collaborations beyond your PI are very useful. I figured this out as a postdoc and it's been invaluable to my career. Make friends with scientists at all levels, you never know when you'll need their advice or want to start a collaboration.

Don't work 70 hrs a week, ever. Don't stress over goal setting or reading "survivor bias" pieces like Thompson's, just get your shit done at the pace that works for you. If your colleagues can't handle that, find new colleagues. Learn about other types of universities beyond Stanford. I'm very happy as an associate professor doing 50-50 research and teaching at a "less prestigious" place and I'll be watching Netflix tonight. :)

#16: Choose interesting and important problems but design experiments and use tools and experimental models that give you a short feedback loop (fail fast). Balance ambition and risk: pluck lower hanging fruit that give you a stable base from which to reach for high-risk high-reward goals. Start with the end in mind: am I interested in a fundamental discovery or developing a treatment/tool/commercial application? These are not exclusive but could influence your focus and experimental designs. - Xinhong Lim
Always strive for excellence with integrity, be proactive, stay curious and keep an open mind. With each step in your career, prioritize opportunities that will enable you to learn new problems and acquire new skills and networks. - Xinhong Lim

#17: The importance of work / life balance. Even though it's important to get lab work done, it is also important to take care of your health, fitness, and relax from work.

It is important to get to know your peers and colleagues. Networking (both for academia and industry) is super important.

#18: I spent way too much time worrying that I didn't belong. It's a circular inferiority complex firing squad. You'll do fine. Enjoy your time - it'll be the best time of your life. Really.

Read broadly and think critically. Talk to everyone. Listen hard.

#19: I wish I had known earlier to take care of my body better. At 27, I started later than most people, but I was biking 5 or 10 miles a day and feeling pretty fit. Wear and tear happened gradually. I had this old Lenovo laptop with a badly-designed track pad. Actually it wasn't a track pad at all but this little nubbin thing in the middle of the keyboard. As a first-year I didn't know much coding, so I foolishly did a lot of text processing manually in Excel using this weird nubbin thing that gave me pain in the wrist, which I thought would go away but did not, and turned out to be an indicator of some fairly serious ligament and tendon damage. It's healed up a bit over the years, but it'll never be quite 100% again. When they tell you in those lab safety courses that you should be careful about repetitive strain injuries, you should listen. And just listen to your body in general. Take care of yourself. Also get a Mac. They're better.

Good research areas are a dime a dozen but good advisors are few and far between. Don't join a lab just because you were impressed by their papers. Choose based on how the advisor seems to you as a person, how you communicate together, and how the lab culture feels to you. Pay attention to little things that could be red flags. When I interviewed at Stanford, I applied to Biology but there was a professor in another department whose research I found really cool, so I requested an interview with him. But during our interview he said something weird like, "So you applied to Biology but you're interested in [topic X]? Oh I see why... it's easier to get admitted to Biology than our department, but you can join whatever lab you want afterwards." I was taken aback because that had not been my thought process at all (I just had rather scattered interests), but I realized later that it revealed a lot about his attitude towards his students, and probably towards his colleagues as well. Actually I didn't recall this episode until years later when a friend of mine who joined his lab had to transfer to a different lab as a third-year because of the toxic work environment. At the time, I just felt vaguely off-put by the interview and chose not to pursue a rotation there in the Fall. It didn't occur to me that that interaction had been a major red flag. Don't ignore stuff like this. Don't just assume everyone can be a good advisor for you. I've been lucky, and have had excellent advisors at the undergrad, PhD, and postdoc levels, but things could have gone very differently. If you haven't already, you need to learn to evaluate people for who they really are, not for who you want them to be.

Stanford faculty training students for Ph.D. degrees in Genetics and Developmental Biology

#20: When a project is going poorly, kill it instead of trying endlessly to revive a dying beast. -Lucy O'Brien

Learn how to write prose that is compelling and engaging. - Lucy O'Brien

#21: My PI would not have the answer to all questions/problems :)

Keep at it and try your very best!

#22: version management software exists

Find science you enjoy and don't take yourself too seriously.

#23: Get comfortable with asking for others to read or listen to unfinished projects. I wasted a lot of time trying to make something perfect before I showed it to anyone, and then learning that I was on the wrong track; a quick course correction earlier would have been much more efficient. Along with this, I was terrified to ask people for help/advice but now, as a professor, I realize that I don't mind giving this help or advice at all! And if it's something I can do in 20 minutes or less, then it usually gets done. So ask for guidance early on, and for a discrete project.

#24: It's a marathon not a sprint. There will be ups and downs along the way but if you put in the time regularly the rewards will come.

Take care of the science and the science will take care of you. Don't obsess over a 20 step master plan for the perfect career. If you keep chasing interesting problems the rest will (nearly) take care of itself. And you'll have a lot more fun along the way.

#25: PIs actually like to be approached by students, their own or others'.

You have all the reasons to be confident in (and not to be worried about) succeeding in your career. Do not be intimated by the statistics out there (things like <10% of trainees can become a PI).

#26: some experimental approaches simply won't work to address a problem

Always be persistent when addressing a scientific problem but learn to know when it is time to take a new strategy or to let go of an idea

#27: it is possible to completely switch project

set up a work routine and stick to it

#28: Doing 1 project very well at the get go sets you up to do a lot later on. Don't worry about narrowing and focusing, it's part of the training to be a broader thinker.

Be flexible with respect to career path. For me, flexibility enabled me to get a dual faculty offer at an R01 school with my partner, something we never predicted could or would happen. I was ready to work in any job and lead a fulfilling life, and somehow that mindset helped me be able to reach the dreams I didn't dare to dream.

#29: The importance of learning how to write grant applications (not just scientific papers)

Find a mentor who will champion not just your scientific growth, but also your personal and professional growth

#30: My most important long-term relationships would be colleagues doing their PhDs with me. A lot of learning is highly self-motivated. Find a way to celebrate accomplishments for yourself.

Be organized in whatever way works for you. Work with others to help them achieve their potentials - you make friends, learn and share in their success. Share your ideas and write out your plans for tackling experiments and various expected outcomes. Draft paper plans early. Continually work on your talk and share your science often. Focus on and be passionate to finish things you start - if you don't care about your work, why should others. Don't ignore things you don't fully understand or feel confident in - explore why/be critical of your own work but don't let perfect be the enemy of the good either. Be comfortable to try things, make and acknowledge mistakes. Know that you are your own worst enemy and you are competing with your own expectations for yourself but you are currently on a well-trod path to great outcomes.

#31: The opinions of others, including faculty, isn't always about the science itself, but their own part of science. Trust yourself if you have new findings.

Focus on experiments, and don't just try to test your favorite notion, but follow the results when observations are not the same as expectations.

Our thanks to everyone who participated in the survey and discussion!