

What You Need to Know about doing a PhD

If you have already decided that you are attending graduate school to pursue a doctorate then my congratulations to you. After battling the GRE, writing your personal statement, sending in your applications and braving the waiting game like you did in your senior year of high school, hopefully one of the letters you will get back will be an admission letter to the program of your choice. This letter will mark the beginning of an exciting and rewarding but grueling as well as exhausting journey to become the very people you despised when you had to keep the midnight oil burning on a Friday night while your friends were out partying. Yes, you will become one of those esteemed “*producers of knowledge*”, those whose names, stamped on otherworldly reactions, prompted fear in you in organic chemistry classes or had you wonder the meaning of life.

Parallely, if you are unsure, or simply weighting your options as to whether a doctorate is the next logical step for your educational career, I hope this opinion piece gives you some insights to help you make the right decision for yourself. To help you through, whether you are thinking from a practical perspective i.e. why would this make me attractive on the job market, or in a more romantic light i.e. will my name end up in one of the books I carried around campus, the following points may help you prepare for the must-knows of graduate school.

Do you even need a PhD?

First things first, let's get a few things out of the way. If you are hoping to work in a STEM related field and one day head a R&D section at a pharmaceutical company, petrochemical company or any research-oriented industrial company, a PhD is a must. The same goes for anyone hoping to go into academia becoming a professor at a university somewhere. For most other professions requiring highly qualified and educated candidates, getting a PhD is advantageous but not a definitive must, a MBA, MEng or M.Sc. with the right experience would be more than enough. Now, that we have cleared that, let's get started with what a PhD consist of while pointing out along the way the things you should know to make your experience worthwhile or things you may want to know which may impact your decision to pursue a doctorate altogether.

What is a PhD?

A PhD simply put is a document attesting of the fact that you are a scholar who has received and demonstrated the capabilities to use scientific reasoning tools to push the boundaries of human knowledge. It implies independent, logical, quantitative and rational thinking with the ability to formulate sound theories, systematically test them or design appropriate approaches to do so and effectively communicate the results in a way that spurs improvement upon the current state of the human condition.

How are PhD program structured or run?

PhD programs are academic programs lasting on average 5-6 years. They may last longer or be shorter depending on your level of investment in the research work you will undertake, the specific topic of your dissertation, and the requirements of your institution and adviser. Academically, you will be, during your first year, for all intended purposes, a “super-senior”. You will be taking graduate level courses and completing a qualifier exam or Q-exam while doing minimal amount of research. The qualifier exam, if your intended program requires it, may take an oral or written format and determine if you should be allowed to stay in the PhD program. Aside from preparing for the Q-exam, your time will be scarcely

spent on actual research work. If you did research or a thesis in your undergraduate career, this first year in graduate school will simply be *deja-vu*. You will choose an adviser if you did not do so during your application since some schools admit to the department or the graduate field rather than to a specific lab or faculty's research group. This choice is extremely important since it will literally dictate the next five to six years of your life for the following reasons:

1. You will be financially dependent on your adviser since he or she will be paying your tuition as well as your stipend. A lab in need of funding will add stress to your already strained work-life balance. Wondering day in and day out if your lab will run out of funding or how or if you will have your stipend disbursed in the following month or year will impede on your productivity and may even cause you to be subjected to working long hours for extended amount of time if your adviser is writing grants and in need of data. While this case is extreme, parts of the cited issues may happen to you so do your homework and apply for any graduate fellowships you qualify for.
2. The personality of your adviser will greatly dictate your experience as a graduate student. On one hand, working for an adviser who disregards independence, champions continual and total oversight as well as a constant high performance on the job may impair your ability to work independently with minimal directions and put you in a state of constant anxiety and stress as well as undermine your social life. However, this same attitude may help you strive under high stress environment where performance is constantly being monitored. On the other hand, working for a laid-back adviser, while pushing you to strive independently, may lengthen your graduate career if you keep taking the wrong turns without appropriate guidance and doing you a disservice later when working in a high stress environment.
3. Your adviser's dedication to helping you fulfill your post-doctorate plans will impact how prepared you will be for life after a PhD. Finding a supportive adviser will help you especially if you will need to find some time off for industrial experience or extracurricular work such as consulting.

On an intellectual level, being in a PhD program is a paradigm shift in the way the educational system has been set up from the moment you cried in the hands of your kindergarten teacher until the day you walked across the podium at your university or college graduation. For the better majority of that life, you spent time sitting, facing the teacher/professor being a "*consumer of knowledge*". You learned theories after theories, memorized facts after facts, learned to do things by memory while contributing nothing to the fields you learned from. As a graduate student, the tables are turned. Most of your time will be spent finding a niche in the field of your choice-a niche so little that it pales in comparison to a grain of salt in the ocean – a niche nonetheless, one that is yours only and where you will make valuable contributions to advancing the boundaries of human knowledge. That said a few pieces of advice to make that experience worthwhile:

1. Never wait on your adviser or professors to fill in the blanks in your understanding. As a graduate student, it will be implied that "you have learned how to learn". This philosophy is reflected in the fact as a graduate student, all pre-requisites for courses offered at your institution will be waived allowing you to essentially sign up for virtually any course unless limited to certain student populations like MBA student or law student for example.

2. Never stop reading. The field you are interested in is ever-changing and you should keep up.
3. Read outside of your field. The creativity or ingenuity that will shine through your work or research may end up originating from a field at the opposite end of your current interests.
4. Attend talks from a variety of departments. This is a great way to keep yourself educated about how society is moving as a whole. The relevance of your work will be put in some contexts you may never have expected.

Furthermore, by doing research which will start full throttle during your second year, you will build unprecedented confidence from rising back up after countless failures. You will challenge your intellectual acumen and that of others and cross intellectual swords with the very individuals you have learnt from, admired or even feared for their intimidating scholastic success. You will stand tall among them and at the end of all these years of hard work, you may end up having your name in journals or books, have theories named after you or people referring to you and your work across the globe or even in the same classes you sat in as a student. To achieve this level of success you will need to:

1. Constantly formulate and test hypotheses. A personal intellectual battle is the best way to attain and maintain a high standard of creativity.
2. Voice your opinions and don't be scared to be wrong. The intellectual debate is one which is revered in research. Getting published may be an end goal in itself but the continuous receipt of feedback is what success in research is based upon. If you are unable to accept constant challenges you may find that doing a PhD is very unnerving.
3. Challenge others. By doing so not only will you quickly learn but fruitful collaboration will be born and bring out the best in you and your collaborators.
4. Collaborate. Research is an interdisciplinary undertaking which requires intellectual participation from various areas of the sciences, arts and humanities.

But what would all this cost you?

Firstly, **financially** for the next 5 to 6 years your only source of income will be your PhD stipend which will be disbursed by the advisor you would do well to carefully pick. In fact, while your peers may be working and earning three to four times or more the amount you will be living on, you will be carefully budgeting \$25,000-35,000/year.

1. If you are uncomfortable with this fact, or need to make a lot of money fast for one way or another, a PhD career may not be the best choice for you at this point.
2. You may supplement this stipend by working on-campus jobs as a Graduate Resident Fellow or GRF for example (usually provides free apartment housing and meal plan) allowing you to save money in the process.
3. Your university will have services which may teach graduate students how to be financially

literate and responsibly manage and invest their PhD stipend. Take advantage of these services!

However, if you are okay with \$25,000-35,000/year, just know that for most graduate students, this stipend, if carefully budgeted, is more than enough to cover rent, necessities, a small family, the occasional vacation trips (if your adviser is supportive and approves of you taking time-off for a short while). While it will be difficult to get a mortgage on house or buy a car outright, with great foresight and responsible management, your stipend will take you a long way and even set you up for a financially stable transition into your first job which will for the most part pay well.

Secondly, **socially** i.e. referring to marriage, kids and starting a family, your life could be on a hold depending on a couple of factors such as your ability to manage strained relationships as well as your work ethic and that of your adviser.

1. When deciding an adviser, you will need to explicitly account for your desire to start a family if you are thinking about it
2. If you have a family already, you will need to discuss the implications of having a PhD stipend and working lab/research hours will have on your home and your relationship with your adviser

If you aren't married yet but engaged or thinking about getting engaged, know that most graduate students date, carrying over relationships from their undergraduate years or starting new ones while in graduate school. These romantic involvements sometimes do culminate in civil unions. Depending on your partner, getting married while in graduate school does not necessarily add additional stress. The benefits of marriage do apply even in graduate school i.e. expenses are shared and emotional support which may culminate in a work-life balance is constantly provided. However, if you have a demanding adviser or would like to spend the minimal amount of time in graduate school it may be a good idea to hold off for the duration of your PhD.

What will ultimately set you apart?

Doing research, if managed the right way is an experience that is extremely rewarding while bestowing upon you valued skills for the job market. Indeed, taking aside the fact that not only curious minds will benefit from your work but also millions of people who may end being saved from sickness, poverty, ignorance or a technological scarcity, you yourself will acquire incredible writing, public speaking, analytical, and quantitative skills as well as the lightning reasoning ability to problem-solve. You will be more than attractive on the job market for any positions you will end up seeking if you leverage these skills because your doctorate would imply the ability to adapt, perseverance in the face of countless failures, discipline which knows no bounds and an immeasurable ability to learn anything fast and thoroughly. That said, like at any stage in your education, the fruits you will rip of your graduate student career will depend on the commitment and diligence you displayed throughout your graduate school years. This diligence will take many shapes and forms for example:

1. Staying active professionally through participation in professional clubs: consulting, entrepreneurship and more.
2. Visiting career services occasionally to get your resume worked on and being proactive in

building it up. Just having a PhD will not exempt you from required knowledge and experience of working in an actual corporate environment. This is especially true for people in STEM wanting to work in fields such as consulting or finance for example.

3. Networking. Conferences are a great way to go if you are attending. You will meet faculties you may want to work for as a post-doc, or representatives of companies you may want to interview for.

Closing remarks

Knowing this information now, if you have decided that you are all in for a PhD career then I hope you become as successful as humanly possible. Carefully chose the programs you will apply for based not only on their success on paper but also on their location, the quality of the advisers and the financial situation of the labs you will be signing up for. Do not underestimate how important your extracurricular life is to you and your well-being especially since it will influence your productivity and success. So take care to research and question how committed these programs and their faculties are to your success in and out of the lab.