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HOW TO GET
YOUR PHD

*A Handbook
for the Journey*

OXFORD



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Things that *will* happen

Depending on when you're reading this (before your PhD, at the start, midway, or towards the end), you will recognise one or more of the following things. I guess that most people reading this will already be in the PhD process, and so should simply take these as reassurance that it's all ok, and it's normal to experience this stuff.

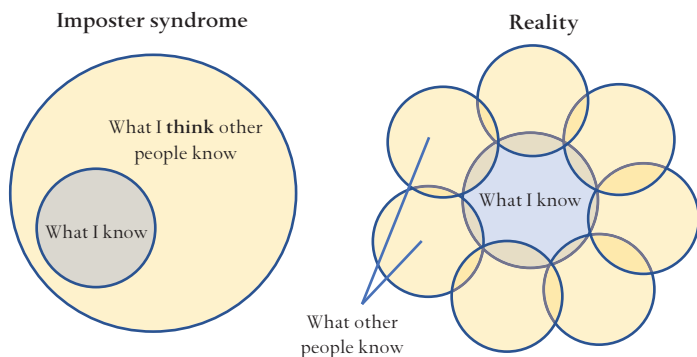
You will feel complete joy

I am being as truthful as I can with this book. PhDs are challenging in lots of ways, but they are also immensely rewarding when you hit the highs. One day, you will wake up having slept on some problem you were trying to solve, and somehow the solution will present itself to you, perhaps over breakfast, in the shower, or on the walk to work. You will run into the lab, keen to try out your latest idea, and excitedly tell people about it. And it will work, exactly as you hoped. So, remember those days. Enjoy the success. Whatever it is, I'm sure you have achieved a Big Thing, of which you should be very proud.



You will feel immensely inadequate and stupid

I'm a full professor of computer science, and I *regularly* feel stupid and uneducated. It seems my colleagues (and my students) are **so much smarter**, and more hard-working, than I am. Even though I've had some (pretty great) successes, I feel quite often that I'm burnt out, like I've published my last good paper, and I have no more good ideas left. In effect, I feel like I'm an imposter in my role. I feel like that less often nowadays but, during my PhD, it was most days. This is normal. It's so normal, in fact, that there's a recognised condition, **imposter syndrome**. Seriously, look it up—there are lots of resources. Let me make something else clear: this feeling is not unique to doing a PhD. This is what happens in research, no matter what stage you're at, and indeed it's what happens in **life**, no matter what career you're in. Everyone from Richard Feynman to Michelle Obama feels or has felt this at some time. So yes, you, and I, and the professor down the corridor (even if she doesn't admit it), are going to encounter situations where we're lost, and feel quite inadequate for the challenge. The very nature of research is that you are going off-the-syllabus, away from where people know what they're doing, and into your own specialist area. The first step to dealing with imposter syndrome is to remember this—that you **do** have

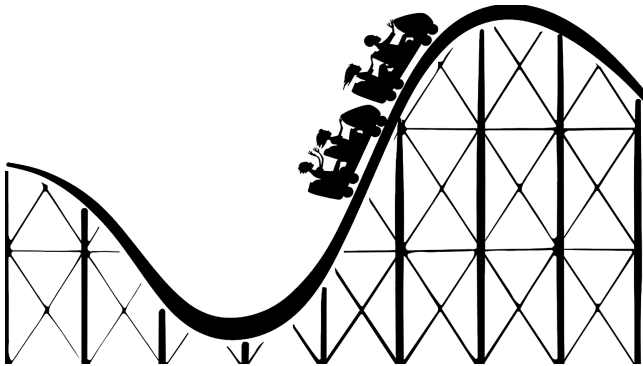


a specialist area—and what you think when you are feeling down might not be reality. . . .

In chapter 6, you'll find some more thoughts on dealing with imposter syndrome, and the various mental health challenges that come with being a researcher.¹ Overall, try to remember: if you're *not* feeling insecure, you're probably not trying hard enough. Doing research is all about pushing boundaries. So, by definition, that means you are right at the edge of your abilities, and should **expect** to feel a little uncomfortable.

You will ride the rollercoaster

You will go up, you will come down, and you will come up again. This will happen. Welcome to the PhD motivational rollercoaster.



You'll start out on a massive high. You've made it! PhD student. Well done. Your parents are so proud. You're doing an exciting thing, and you can't wait to get going. You'll probably find the whole of the first year will be spent lost in the literature, intimidated by the

¹ There are more, e.g. Kevin Whipps, '20 Ways to Combat Impostor Syndrome Every Day', Creative Market Blog (26 Jun. 2020), <http://creativemarket.com/blog/combator-impostor-syndrome>, accessed 21 Oct. 2020.

gaping chasm of PhD time ahead of you, yet somehow feeling it's already almost over. You'll understand a few things, and get a few 'wins' in whatever technical area you are in. But, at some point, an idea will just flop. Or someone will show you how your idea is flawed, or you've misunderstood something critical. And you'll come crashing **down**. It will feel terrible. And, at that point, you will think you are the only person in the world experiencing this... that your particular circumstances make this unique. Sorry to disappoint you... but this happens to everyone.

But then, a few weeks later, you'll feel the highs again. This is normal, and it will continue for most (if not all) of the PhD. The worst part is probably the middle of the second year. This is mainly because you realise quite how much you don't know. If you're lucky, you'll have written a paper, and submitted it. If you're very lucky, it might be accepted. Or not. One way or the other, you're going wayyyyy up, or wayyyyy down. It will feel wonderful, or **terrible**. But then, a few months later, things will even out, and you'll be back to the usual grind.

The ups and downs might be triggered by anything. Maybe immense frustration from your supervisor not liking your idea, or not finding time to even read it. Maybe the experiment you did just didn't do what you expected. Maybe the student on the desk next to you has a big success and you feel inadequate sat next to them. Or maybe it's just... Wednesday. Once again, let me emphasise, this is completely normal. It's how *all* PhDs go. A critical thing to remember is that... when you go down, **you will come back up**. So, be sure to remember the good times.

Perhaps, when you have a high point, write down the date and time, and *why* you are feeling so good. Then, when you feel low, read it. The way I cope is just to say to myself *'oh well, I'm not working*

well today'. Why does that help? Because tomorrow I will be better. Tomorrow, I will realise I can do this. Tomorrow, I will find the right equation, or the right paper, or the right person to talk to. And things will feel better. A little bit of blind optimism never hurt anyone.

You will compare yourself to others

All PhD students worry that they're not achieving enough. The biggest cause of this is from *comparing* themselves to other students around them. You'll inevitably meet students who are in their final year, or have completed their PhD who show you their papers or thesis. Your immediate thought will be one of intimidation, something like '*Aaargghh! How will I ever make something like that??!*'. But you have to remember that's what a PhD looks like at the END, not where you are now.



So, what's the solution? Well, how about you **compare yourself, with . . . you**. This seems flippant, but it's really important. Consider the things you knew, and the way you were working . . . one month ago, or six months ago, or even one year ago. Have you improved as a researcher? I think it's highly likely that,

if you compare the **you** now with the **you** of six months ago, you will think '*wow, I was so naïve then!*'. Look back further, to maybe a year ago, and you'll see quite how much you've learnt. An easy way to do this is **to keep a research diary with dates**. In this, you write your opinions and thoughts on your work, maybe write down what challenges you are currently having—but always remember to write the date in the corner of the page. Then, at any point, you can turn back a few pages, to one month ago, six months ago, or more—and see quite how far you have come. That should give reassurance that you are on a good trajectory.

You won't know what to do with your day

When you're into the unknown, and every direction looks the same as every other, it's quite paralysing. In this instance, students often freeze, and panic, not knowing what they should do. My advice is simply this: **learn one thing every day**. Doesn't matter what it is, just learn something. A good practice to offset this is to always leave something fun to do in the morning—don't do the easy stuff just before you leave—save it for the morning, and that way you'll start your day with a success.

You will procrastinate

Oh yes. You will. I found SOOO many ways to procrastinate. From solving puzzles entirely unrelated to my research, to firing elastic bands at my officemate, to learning British Sign Language and how to drive a bus, I did it. But, and I stress this here, *that's ok, and I didn't feel guilty for it*. Sometimes your brain just needs downtime. **Productive procrastination** is a term used by people (life coaches, psychologists, etc.) to describe when you avoid doing

the task you really should do, by doing something else, but you make sure that something else is ‘useful’ in some way. *But I mean something far more profound.* I think you should feel free to just procrastinate on totally pointless things, to let your brain rest, just like an athlete does when they take time away from the gym to let their muscles heal. **Obviously, this has to be balanced against the real work**, but a bit of downtime is good for your brain-muscles, and you shouldn’t feel guilty. The physicist Richard Feynman had hobbies like no scientist before him—playing bongos, learning the steel drums, picking safe locks—all of which were absolutely nothing to do with his research on quantum mechanics, but it gave him the necessary downtime to be ten times more productive the next day. And sometimes inspiration really does come at the oddest of times—allowing your brain to rest will push it into different contexts that may just spark your big idea.

You will feel like you’ve wasted time

What I mean here is, you’ll have done a bunch of work, and then, for some reason or another, have to abandon it—such that it seems like it will never make its way into your thesis. This could happen because you find someone has already done what you wanted, or because it turns out to be infeasible, or other reasons. But here’s the thing: **YOU HAVE NOT WASTED TIME**. You have learnt lessons and developed skills that will be useful further down the line, such that you will be able to move faster because of this experience. And, ultimately, everything is contributing to the development of the most important thing in your PhD process—you. I know that sounds cheesy, but I really believe it to be true. The most important thing to come out of most PhDs is the person, with the transferable skills and knowledge they have amassed.

You will feel guilty

Maybe you'll have taken a day to yourself, to go out with friends, or to see some family. You'll suddenly hear this little voice . . . '*You should be working. Everyone else on a PhD is working—why aren't **you**?*'. You'll find it hard to shift this internal voice telling you that you *should* work. For some reason, you feel a weight of responsibility: maybe to your supervisor, your parents, or your partner. Something inside you will think you **owe** it to these people to work all the hours there are, because you've been given this chance. **It's not true.** A favourite quote of mine is the following:

You have no responsibility to live up to what other people think you ought to accomplish. I have no responsibility to be like they expect me to be. It's their mistake, not my failing.

This quote is due to Richard P. Feynman, a Nobel Prize-winning physicist. From the number of mentions in this book so far, you may have figured out that Feynman is kind of a personal hero of mine. He wrote a couple of books that show his approach to life and work, which were quite inspirational to me. The quote is from one of them,² where he recounts a nice story about being appointed to a prestigious position at Caltech and feeling guilty, that he didn't deserve the post. The lesson in the quote is that you should only feel a responsibility to *yourself*. Don't live life by someone else's expectations. Set *your own* expectations and ambitions.

You will want more meetings with your supervisor

Doing a PhD is frustrating. To some extent, the supervisor is there precisely to help you with that—to mentor you through the difficult times. As such, at some point, you will likely feel

² Richard P. Feynman and Ralph Leighton, "*Surely You're Joking, Mr. Feynman! Adventures of a Curious Character*". (London: Vintage, 1992).

you want much more time with them. If you're lucky, you will get it. If your supervisor is very busy (usually a sign of a very successful researcher), then it may be difficult to schedule, and you'll probably get annoyed with them. It's important to remember, they are not the ultimate solution to your frustration.



You will want fewer meetings with your supervisor

This happens to most people, and they start to avoid their supervisor. You might feel guilty for not doing enough work, or simply think they can't help you, since they haven't read the latest literature that you might have. I mentioned earlier that it is not the supervisor's responsibility to 'know more stuff' than you. Their role is to challenge you, and to help you figure out a good next step when *nobody* knows the answers (i.e., when you're doing research!). Another part of their role is to know more than you on *strategy*, on the research *process* in general, and on how to construct a coherent research story from your ideas/results. Your supervisor will also, almost certainly, do things for you that you are unaware of—behind the scenes—such as creating opportunities for you, or resolving problems in your research strategy that you are not yet experienced enough to see. If you doubt what I'm saying here, think again—there is a *reason* why this person has a successful research career—they know what they're doing.

If you choose to withdraw from communicating, and not **trust** your supervisor, you'll miss out on all this other critical stuff. Whatever your reasoning, be honest with your supervisor—and the sooner you get past this stage, the better.

You will feel overwhelmed by the literature

Doing a literature review at the start of your PhD is like digging into a pit of infinity. There seems to be a limitless supply of papers, and things that you don't know. **This is all completely normal.** It's not your fault. It's just what research feels like when you start in a new area. My recommended way to cope is to start by reading *survey articles* for the field or, even better, some recent PhD theses in this area. And, as a bonus of reading such survey documents, you will often find a section called 'Future Work', or 'Open Questions for the Field' . . . which might give you a good direction to follow for your own research.



Photo by Sear Greyson on Unsplash

You will think it's trivial—it's not

At some point, you'll have mastered the literature, and come up with your own new idea. But then, you start to doubt whether your Big Idea is really 'Big' at all. It seems sooooo obvious—so simple! So, is this really a research contribution? It seems trivial. But it's really **not**—not at all. Why? Think about it. You're smart, and you've spent a long time studying this idea. There is a good *reason* it took you so long to understand this much—because it's **difficult**; it's genuinely a hard problem. It only *seems* trivial to you, as you've had your head buried in it for so long. Everyone else, in order to get the depth of understanding you have, would have to spend the same months or years studying, too. It's not trivial.

You will have your work rejected

At some point, you will do a piece of work, and you will be told... *it's not good enough*. This might be a formal 'rejection' from a publication venue, or an informal snub from a collaborator or other academic who finds issue with your work. You **have** to bounce back—get back on the intellectual horse and start riding again. This is a normal part of the research life cycle. When you see a piece of work by a famous research group, remember that it's the end product. Behind every successful experiment are ten failed ones. Academic research careers do tend to involve more of this than industrial research careers, but accepting *criticism* of your work is inevitable if you want to push the boundaries of a field.

You will think about quitting

You will, at some point, think, '*Is this really worth it?*'. I certainly did, several times. This is, again, normal. For *most* people, this is

a thought that comes, and eventually (after a lot of hard work and emotional turmoil) goes away. But for some people... maybe you're right. Maybe, in fact, this is not for you, and you shouldn't continue. This is a very individual decision, obviously, so I cannot offer much generic advice. The answer to this question has been considered in great detail, by many others.³ So, I'll say only this: **how would you feel if the choice were taken out of your hands?** What if someone *forced* you to leave your PhD, and you were not able to solve the research problem you started on? Think hard before you answer.

If your answer is one of *indifference*, that you wouldn't mind at all, and you know you could exercise your skills better somewhere else... it might, in fact, be time to move on. **And that's ok.** You have many skills, and you are much more than a single extra degree certificate. But, if you would feel a sense of disappointment, that you really wanted to solve that problem, then... stick with it. PhDs are tough. They are meant to be tough. Carry on and you'll make it through this stage.

So, assuming you've decided that completing the PhD is in fact for you... let's move onto the final thing that will happen...

You will succeed

If you keep trying, you *will* have successes, both small and large. At some point, you will break through the wall of rejections and you'll stop feeling the ups and downs so much. You will feel wonderful. So, just keep going, and you will succeed.

³ Katie Langin, 'It's OK To Quit your Ph.D.', Science (25 Jun 2019), <http://www.sciencemag.org/careers/2019/06/it-s-ok-quit-your-phd>, accessed 21 Oct. 2020.

PhD Bingo! Check them off as they happen!

- ☒ You will read this book!
- ☐ You will feel complete joy.
- ☐ You will feel immensely inadequate and stupid.
- ☐ You will ride the rollercoaster.
- ☐ You will compare yourself to others.
- ☐ You won't know what to do with your day.
- ☐ You will procrastinate.
- ☐ You will feel like you've wasted time.
- ☐ You will feel guilty.
- ☐ You will want more meetings with your supervisor.
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