* Lyrics: ***TW Cen MT***
* Titles:

Focus for this draft: work on finishing up all letters, talking more like to my PhD like a person. Don’t be afraid to ask it questions, responding if I have some thoughts, or just leaving the question there for people to think about. And come up with analogies to describe how you’re feeling. Even basic ones are totally fine

**Why I’m writing this chapter**

A PhD ends in a finish full of triumphs: a published paper that will be used to inform the world of your research and a final defense that allows you to showcase all you’ve learned as an expert in your field. These triumphs are the fruits of intense labor and rigorous mental fortitude, but often research is presented without mentioning the mental toll and strain on life that it took to succeed. Throughout graduate school I’ve missed out on holidays with family and friends, weddings and other important moments in the lives of those around me. I’ve willingly put myself through this experience because of how big this opportunity feels to me: the first person in my family to receive a PhD, in a field as prestigious as science. An opportunity to become another minority in a field that is still growing in diversity. I write this chapter to identify with anyone who has ever felt inadequate, who has suffered from imposter syndrome, and who throughout failure nearly gave up. This chapter highlights my journey into a world of knowledge that I never thought I would have the opportunity to take, and I hope it gives you some perspective on the daunting process that it takes to become an expert in an area of learning.

The rest of the thesis is research and work, but when I saw this opportunity to write a personal chapter, I couldn’t say no. I wanted to have a way to share more of my experiences with the people who haven’t gone through it and anyone who is curious about both the blessings of graduate school and the anxieties that it takes to complete a PhD. Of course, this experience is my own and likely isn’t universal, but if you’re at all interested in the anxieties and reflections that some may experience in graduate school, I hope to give you a bit of perspective.

I’ve always been a fan of writing letters. There’s something deeply personal about letters, allowing me to reflect on parts of my being that I am discovering at the time of writing. I thought it would be best to write letters to share my thoughts, allowing me to be most vulnerable. In combination with letters, I love discovering music. Every month I create a new playlist for the songs I’ve discovered, allowing me to go back and reflect on what I listened to in that part of my life. Paired with each letter is a song that I discovered during my PhD, embodying each part of my journey. These letters are filled with the joys, the despairs, and most importantly, the learning that I’ve personally experienced throughout my PhD. Feel free to read through however you like (I recommend reading and listening to the song at the same time!), and I hope you enjoy the music and stories that I’ve shared here. Thanks again for reading, and best of luck on whatever journey you are currently facing. Sending love and good vibes your way :D.

Dear PhD,

And so we begin. We’re going to be together for the next 5, 6, maybe 7 years, so I thought that it would be a good idea to start writing. I know that writing to my PhD is a bit strange, and that you can’t really respond, but something about this process feels cathartic. You’re going to be one of the longest relationships I’ve ever had outside of my family and close friends. Kinda wild to think about right? So I’m going to share my intimate thoughts and ideas while on this journey with you. For better or for worse.

I guess first off: I strongly dislike idioms. Much of the time, I feel that people use them without knowing where they come from, and sometimes their origins are kinda bland and uninteresting. But for better or for worse is a good one, and it works well for us. It originates as part of the 16th century English Reformation with the splitting of the Protestant and Catholic Church. In 1549, the Book of Common Prayer was written to reinterpret Catholic sacraments, including marriage: "With this ring I thee wed, …. for better or worse, til death do us part."

Thank you for accepting me. I never imagined that I could do a PhD. When my undergrad mentor told me that it might be a good fit for me, I was bewildered. No one in my family is a scientist, I’d been rejected from several scientific lab opportunities throughout my college career, and I didn’t even know that PhD programs existed until junior year of college. But despite all of this I’ve been accepted, and my surprise has become a bit closer to joy amidst questioning how this is possible.

“What do you want to be when you grow up?”

We get asked this question when we’re kids, but it gets asked in different ways throughout our lives. What major are you going into? What’s next after college? Where do you want to work? Fundamentally it all goes back to that initial question. My earliest memory of this question was as a beaming little boy, responding to my loving mother.

“A doctor!”

Doctors heal people, take care of their ailments, and make a difference by saving lives. They study for years to get to that point, learning so much about the human body to be able to make a difference. And now that I’m here with the ability to study for a PhD, I’m beginning to realize that maybe the learning is the part that attracted me to it the most. I know that this PhD doctor isn’t exactly the same, but to be able to see kind of a similar path adjacent to something that I imagined years ago coming into view is surprisingly validating. It’s like going to the grocery store to get your favorite chips (Salt and Vinegar), but when you get to the chip aisle you see the rarest, only there once every 6 months brand (Hawaiian) and get those instead. Slightly different, but just as satisfying.

I still know so little about a PhD: What’s the end goal here? How much will I have to learn? What will I actually learn? A lot of the interviews talked about doing independent research on a project. I’ve dabbled with my own project in undergrad, but how is this process different? I probably won’t know what it means to be a PhD until I start, but I’m excited to meet people who are just as passionate about learning.

Another thing about me: I love music. I’m constantly impressed by the sounds people are able to create to convey subtle emotions that are difficult to explain with words. And I’m sure some of these letters will be more convoluted than others, so I hope that the music helps you understand how I’m feeling.

***I do***

*Flipside-postlude* by Kid Quill

This song follows an argument between two people, where one person doesn’t seem to understand the importance of musical records to another. It eventually culminates in this passionate exchange:

“Who cares about what’s on the flip side of a record?”

“I do!”

To me, this song is about having ideas, passions, and experiences that you want to share, but not feeling like you’re having the opportunities to do so. It’s about wanting to be heard. I’m hoping that a PhD will allow me to cultivate ideas, determine my strengths in learning, and allow me to eventually share something that I’m passionate about with the world. But most importantly, I hope that they help you understand our relationship a bit better, and that these letters will help me reflect on the experiences that you, my PhD, are putting me through.

Gilbert

Dear PhD,

While here in my first year, I noticed something different about the classes. Instead of lectures, professors hold classes as an open conversation; the lesson plan isn’t strict, aiming to maximize the time we had to discuss what we as students were most curious about. In one particular class, one of our professors gave us an opportunity to share some personal goals in an open space.

“What are your goals with your graduate education?”

No one raised a hand.

“Gilbert, what about you?”

“…I’m not sure”

“That’s okay, just say anything that feels right.”

*After what felt like 5 minutes of silence*

“I want to find a way to replace PowerPoint.”

“Okay! Why is that?”

“I feel like there are some weaknesses in how it communicates concepts and I think there would be some benefits to having something better.”

How would you have wanted me to answer? I’ll likely never revolutionize the way that presentations are being done, and I won’t be the one to come up with a PowerPoint replacement. But what really struck me was being given the opportunity to speak my mind: to share an idea of an idea. By my professor asking “why” instead of “what?”, my mind was allowed to drift toward something creative and fantastical. It’s an open-ended question, like being asked “why is the sky blue?” in elementary school and getting to come up with radical ideas: water is blue, and it rains down from the sky, therefore it must be related to the way the sun reflects off of the ocean. Answers that aren’t exactly right, but that allow your brain to problem solve, using the knowledge that you currently know to come up with something that sounds reasonable.

In biochemistry, there’s a technique that we use called polymerase chain reaction, or PCR, where we’ve applied our knowledge of the biological conditions of DNA replication to effectively duplicate DNA. If you’re curious, feel free to read more! (link) And it’s not just used in basic research, but in forensics to identify criminals and victims of …, …, and …. But how did we come up with something that is now so fundamental in scientific research? Kary Mullis, the inventor of PCR said it best: “I was looking for something else…PCR was the possible outcome of a solution to a hypothetical problem that didn’t really exist.” In order to develop revolutionary research, things aren’t always straightforward. We need to be creative thinkers, trying to see things that haven’t yet been imagined. That’s where some of the best science comes from.

A lot of questions in graduate school haven’t been looking for a particular answer, but rather having me question why things are as they are. And that brings me to my research. “How is membrane protein association influenced be van der Waals packing?” is quite a complex one. I’m beginning to wonder what the why’s of my research might be, and it’s emboldening to know that I’ll have an answer to that in the future.

***'Cause getting made you want more  
And hoping made you hurt more  
Oh, there must be  
Something wrong with me***

*Something Comforting* by Porter Robinson

To me, personal growth is best when outside of our comfort zone. Whether it’s getting called out in a class and answering with something that sounds outlandish, or moving to a state where it’s insanely cold, there are a variety of ways to get outside of your comfort zone to grow. I feel like this song kind of fits this idea of growth out of your comfort zone, and then matches that with a feeling of doubt. I’m excited to learn, and happy to ask why. But at the same time I think there are likely going to be some difficult times ahead. What are the biggest lessons that I’ll learn in graduate school? How will I navigate them? Whatever those are, I hope that I’ll be ready for them.

Gilbert

Hey PhD,

I just had my preliminary exam, which is the test that puts me on track to be trusted to successfully get my PhD. The exam puts me into a room with 5 professors who have many scientific publications to each of their names. For an hour and a half, I stood in front of them talking about the beginnings of my project that I’m supposed to be the expert of AND complete within the next 4-6 years. They asked me questions about tiny details I hadn’t yet thought about, and expected me to tell them the right answers:

Replace below with actual questions asked, or come up with more absurd things like the tree one

“What’s the definition of van der Waals?”

“What will you do if this experiment doesn’t work as you expect?”

“If a tree falls in a forest and no one is around to hear it, does it make a sound?”

I left the room to allow my mentors to discuss how I did.

*Deflated, exasperated, mind afloat*, *I finally remembered to breathe.*

“Did you just finish your prelim?”

I nod to the student passing by in the hall.

“Congratulations, the worst part is over.”

After a what felt like an hour, I’m called back into the room.

“Gilbert we’d like to thank you for the presentation. We think your progress has promise, but we can’t give you a pass at this time. There are some weaknesses…”

I started tuning the rest out. They didn’t say the word, but I knew what it meant. *I failed.*

“…However, we do think that you’re making progress and look forward to seeing you have another opportunity next year.”

In my last letter I said that I expected some difficult times ahead…but this is far from anything I could have imagined. Not only do I not pass, but I actually get another opportunity to try again? For many prelim exam failures, there is no second chance. And even with this second opportunity, knowing I have to move on from this grueling, heartbreaking moment just to do it all again admittedly just makes me more anxious. And with this anxiety comes along many suppressed observations creeping into my head: I’m one of the few black people in my research program, one of the few people who fail prelim, one of the few people who gets a second chance. Is there something inherently wrong with being a minority in science? Do I even belong here?

***I don’t belong here, let me start over***

***I wanna sleep so wake me up when I’m older***

*atlas* by Keshi

I think this song fits how I’m feeling: wanting to cry all the time, this feeling of being overwhelmed, with a hint of just wanting to be better. Keshi alludes to these feelings by using the titan Atlas, known in Greek mythology for being condemned to hold up the sky. Having an immense and what feels like impossible weight on your shoulders and having to live with it forever. These lyrics play in the second verse, and I feel them constantly pulsing through my head. I have to live with this failure forever. Will these feelings of not belonging ever go away?

Gilbert

Hey PhD,

I was chatting with a friend recently about TV shows. They were surprised that I had never watched How I Met Your Mother and Arrested Development.

“Why not?”

“Honestly, there are too many white people in them.”

A couple of days later, they recalled the conversation: “I looked up the demographics in those shows, and they don’t skew too far from the population in the US.”

But that’s not what I meant. I haven’t watched because I don’t think they’re likely to portray experiences that I can relate to.

Have you ever felt insecure because you’ve been misunderstood? Like you said something wrong and it’s your fault? I’ve been insecure about my wording since a young age, and I find it difficult to communicate what I’m feeling with others without being misconstrued. And in my experience, this can sometimes become amplified when talking to people with a drastically different background. As a person of mixed descent, I find it difficult to find my place much of the time. Why do I need to be so careful with my wording? If some people can understand what I’m saying, how am I supposed to know what situations I need to change how I communicate?

A comic strip of a person

Description automatically generatedIn graduate school in Madison, Wisconsin, I’m finding that this is one of the most difficult things to navigate. When I moved here, I knew that I would be one of few people of color. But I never expected to experience this barrier of communication. It’s been happening with my peers, and it’s beginning to happen with the research as well. Coming from a biology background into a biochemistry program, the transition has been more arduous than I expected. I’m finding it difficult to communicate how I understand science with the wording and depth that people need to understand it. What am I missing in my knowledge? Do I have the ability to navigate the field of biochemistry? Do I even belong here?

These questions echo the same sentiments in my previous letter. Did I get accepted because of my differences and not my own merit? Imposter syndrome: a persistent, unjustified feeling that one’s success is fraudulent. I attribute both successes (this program) and failures (prelim) to my identity rather than my own ability. Because I know how the world perceives me, I sometimes fall into this trap of perceiving myself in the same way. When these thoughts arise, they quickly spiral into a mix of other negatives: I’m a token black person for my program to look good, people don’t understand me because I’m just not smart enough to be understood, I don’t deserve to be here.

***Terrified, paranoid, I'll put you over everything to fill the void  
And when you’re gone, will I have anything or will I be destroyed?***

*p r i d e . i s . t h e . d e v i l* by J. Cole

I must relinquish my pride. I know that I’m not special, and sure I’m in a PhD program, but I haven’t gotten here because of natural intelligence. I have to focus, to work hard, to envelope myself in the science to pass. I know that. But at the end of all of this focus, this grinding to learn and teach myself what I need to succeed here, what will I be? I feel like part of this process is destroying myself to be built anew for success. But afterwards, if all I am is a slave to my PhD, what will I be after I finish? I recognize that you’re pushing me both emotionally and intellectually more than I’ve ever been pushed before. I just wish I could confidently say that’s a good thing.

Gilbert

Hey PhD,

A few months ago as I was waiting for the bus, I had this dark notion. My head felt heavy and everything appeared to go black. I could feel that my eyes were open, yet things looked motionless, grayscale. Intrusive thoughts flitted in and out while I waited for the bus.

“What if” *you’re just tired*

*you’ll be okay soon*, “you could just” *wait* *a bit longer*

*don’t* “jump” *to conclusions*, *there’s a lot left* “in front of” *you to do*

*Should you eat today? Oh* “the bus” *is here*

I’ve had bouts with depression in the past, but this time was different. Life felt hollow, empty. It felt like I was stuck in a dark room where all I could see was a door with light popping through the cracks. The door was locked from the inside, but I couldn’t find the strength to open it. I’ve wanted to disappear before, but never to the extent that inner thoughts of suicidal ideation were so clear and relentless. And after a month of being unable to shake this idea of wanting to feel something by jumping headfirst into oncoming traffic, I returned to therapy.

Stating things is freeing. Usually I’m able to listen to the thoughts in my head, rationalize and reflect on them. But after something as devastating as failing prelim, I’ve been a shell of myself. I have no desire to spend time searching for new things to do, and I’ve lost a lot of enjoyment in the things I loved. I’ve struggled to hold myself together: friendships are dying because I feel inadequately supported, I don’t eat anything because I’m too focused on getting passed this event by working to learn my shortcomings, my mental health is fading and I can feel myself losing motivation to live. I’m not sure if it’s a result of a combination of these things or something entirely different, but I’ve recently found myself having moments of paralysis: Moments where I’m unable to get my brain to move my body. It’s a scary thing: to be able to think “Move”, “get up”, “go over there” but my body instead lies motionless, unresponsive.

In therapy I’ve been able to share these thoughts with another person, to voice them out loud and hear feedback from an unbiased party. I told my therapist that I wasn’t eating, that I found it difficult to move, … that even though I don’t know what type of support I need to be better, my lab, family, and the right friends around me have really helped. After a couple months of sessions, my therapist was able to help me start my journey back to myself with two words of advice: “Take risks”.

And now I pose this question that I asked myself to you: Is it riskier to remove myself from this situation and leave grad school OR to stay and continue down this difficult road I have ahead and give myself the opportunity to see what happens in my second prelim? I decided on the latter. Rather than give up now and find a way to regain some semblance of comfort in my life, I decided that the riskier decision is to push away from comfort and continue on. If sacrificing my mental health for this isn’t riskier, then I’m not sure what is. This could have been a goodbye letter, but I guess I’m not ready to let go just yet.

***You build it to a high to say goodbye***

***Because you’re not the same as them***

*I Always Wanna Die (Sometimes)* by The 1975

My limits are being tested here, mentally, physically, emotionally. But I’m still here. I’ve never acted on my intrusive thoughts, and I hope that it continues this way. But the risk is there. Outside of the obviousness of the song title and the lyrics alluding to suicide, the sounds of this song are what really resonate with me. The strings fill me with a hopeful melancholy, accentuated by the strain in Matty Healy’s voice. It makes me picture the first stages of growth of a daisy where the seed roots out of the ground and the petals begin to take shape. But the daisy isn’t always happy. It flops around in the wind, taking the force of nature head first.

Gilbert

Dear reader,

A video game screen capture

Description automatically generated

Hi! Thanks for indulging me and reading through these letters. I appreciate you taking the time to share a bit of my journey with me and thought this would be a nice place for a break. As you likely know now, graduate school has been quite a pensive and emotional journey, one that has taught me many things. There have been times when I’ve been completely lost and broken by the PhD, and others where I’ve been excited for what’s to come.

*Into the Woods* by Mree

Yet, despite how different those feelings are, I’ve found myself closing my eyes and finding respite in listening to this song on repeat. To me it channels both the fear of walking through a foggy set of woods as well as the excitement of the discovery waiting ahead. Whether you’ve read through and identify with me in some way, are just curious and wanted to understand a graduate school experience, or if you’re a random person reading this for entertainment, thanks for being here now. I hope that wherever you are on your journey that you’re able to find some solace and happiness.

Thanks for reading, I’m sending much love and support your way,

Gilbert

Dear PhD,

Know what you don’t know. I went for a walk before my prelim, and the following question came to mind: Did you ever think of how you could impact humanity as a child? I remember wondering how I could make some contribution and if that’s even possible for me to do. With the world currently involved in a global pandemic, why is my research important?

*Why is understanding how proteins interact important? If we could understand how these viruses interact with proteins at the membrane, could we engineer proteins that prevent this from happening?*

As a student of the sciences, it’s truly a bizarre thing to know that I’m living through this piece of history, and it’s given me a lot of perspective while preparing for my prelim. For anyone studying virology in this time they get to see the applicability of their research in real time. Could understanding how membrane proteins pack and fold ever save lives?

*But how do you engineer proteins to prevent this? Well, you’d have to have a really good understanding of the forces causing proteins interact. By understanding and simulating the little details of how and why these forces influence an interaction, we get closer to understanding how to influences these interactions in reality.*

Maybe those thoughts are what I needed to really be zoned in to take my prelim. I’ve learned a lot about membrane proteins, about biophysical forces, and about why those two are different inside versus outside of membranes. I’ve learned to question what I don’t know about a subject, reading papers critically and marking any paragraph, sentence, word that I can’t fully grasp in my brain. I find that information, usually with more things I don’t know, and continue to go back, like peeling the layers of an onion away until I find the core bit of knowledge that should stick with me for me to feel like I understand.

*And if you can simulate these interactions in a computer and then test them with an experiment, you can see how our current understanding is (the predicted simulation) to what we want to understand (the experimental results)!*

I joined my mentors on a zoom call, pitched my research to them, and after 40 minutes of defending my research my prelim exam was over.

*No one has explored the extent of the effect of van der Waals packing, this force that occurs between atoms in close contact, in membrane protein structures. Is it a strong force in membrane protein interactions? My research is focused on understanding how impactful it is.*

I passed…and for now, I stopped feeling empty. Did I really do that much better? Was I that much more prepared? Yes and yes. But unfortunately, you’ve taught me to dig even deeper. What don’t I know? With the police brutality and empowerment of the Black Lives Matter movement happening right now, did I pass because it would look bad if one of the few black people in the program gets kicked out for failure?

***Time has come, take it all in***

*5 Year Plan* by Chance the Rapper

A black background with a black square

Description automatically generated with medium confidenceA PhD is usually 5 years, but who can plan for failing a prelim OR for a global pandemic. The chords remind me of a sunshower: a sprinkle of refracted sunlight, dancing on your skin. It feels like a prescription of hope for the future. And when Randy Newman, the singer of *You’ve Got A Friend in Me* sings this lyric, it brings nostalgia. Even if a plan doesn’t work out completely, you can still appreciate what happened because you’re around to do so. At least that’s how it makes me feel: an optimism for your future nostalgia about the present.

I feel like I deserved to pass this time, but my feelings of my identity driving my success still weigh heavy on me. There are a lot of things that I still don’t understand about my project, but I’m now trusted to take it to completion, and that’s what I must focus on despite my inner doubts, and despite all the wrongdoing in the world. It’s not the biggest thing, and it likely isn’t going to be used for anything impactful. But just the fact that it’ll be a small bubble on the expansion of human knowledge is enough for me for now. And hopefully I can be some sort of example for other minorities to show that a higher education degree is possible.

Gilbert

Dear PhD,

It’s been six years now, and our time together is coming to an end.

At my most recent committee meeting, I was given the acknowledgement of my mentors that I’m close to finishing up. “We can see the story forming, and we think you’ll be able to graduate next spring or summer.” For once on this grand journey, the end is actually near.

We’ve built this kind of intense relationship: I do what I can to fulfill your needs, give you all the time that I have, and don’t allow my feelings or needs to prevent me from focusing on you. You’ve become my reason for living. But now that I’m getting close to the end, and you’re starting to treat me with respect, it feels like you’re pushing me away more than ever.

***'Cause is it really love if it don't tear you apart?  
Now somethin' is different  
You're sayin' you're all in  
But I think I like you better when you're breakin' my heart***

*When You’re Breaking My Heart* by Gatlin

In this song, Gatlin realizes that she loved the chase of a relationship with someone more than the person itself. This whole time, I didn’t know that the idea of you is what kept me going, more so than the feeling of being fulfilled by you. Prior to this most recent meeting, I knew I had my best data, and likely the closest chance of being finished. Yet all I could think about was leaving. Should I quit now? Even as I started to get some love back from with some successful experiments, I wanted to quit. The work, the learning, and the chase of it all is what kept me here. And I never realized that near the end, it would lead to such an intense combination of depression and burnout.

[Burnout](https://www.psychologytoday.com/us/basics/burnout): state of emotional, mental, and physical exhaustion brought on by prolonged/repeated stress. I like to picture it as the fire burning inside me slowly fading out. With the chase nearing its end, I find myself getting up after another sleepless night making efforts to start my day. I browse reddit and Youtube, my alarm goes off around 9am, then I continue lying in bed. Hours pass. I try to go back to sleep, I mess around on my phone, I try to tell myself to just do one thing at a time. Everyday feels like I’m searching for something: what’s the one thing that will pull me out of bed? What about the goals that I want to accomplish; another thing to chase.

A fire in the sky

Description automatically generated*Today I’m going to analyze this set of data, I’m going to write this part of my thesis.*

The goals get smaller as time passes.

*I’ll just prepare for my presentation next week, I’ll take out the trash and go grocery shopping, do my laundry for the first time this month, clean the kitchen and wash the dishes from the fried rice I made 2 weeks ago, feed my cat, eat SOMETHING, shower, brush my teeth.*

So small until only one goal is left.

*I just want to get up and leave the comfort of my bed.*

But instead, my mind just drifts to dispel the worries about all the things I need to do. It’s 2pm.

*I guess it’s finally time for me to start my day.*

Maybe some will call it the privilege of academia, or say that I’m unfit to be a part of American working culture. With all these anxieties bogging down my mind, it’s difficult to tell myself every day that I’ve done enough. But I do it anyway. It’s a nasty trick that I use to slow my intrusive thoughts and allows me to keep up my productivity in short bursts. You’ve been the chase that I’ve had for years, and I’m losing myself because you’re threatening to leave me. Funny right? I want to leave because I know that I’ll be better for it, but I’m unable to do so because there are still parts of you that make me feel like I should stay. But I’m ready to say goodbye.

Gilbert

Dear PhD,

Sometimes I feel robotic.

In my first 3 years of graduate school, nothing worked. All of my experiments went poorly, and I had to get accustomed to the idea of things always failing.

*Phew. It’s going to work this time. Otherwise I’ll just do it again, no problem. And it’ll definitely work next time.*

I would always think that the first experiment would fail, and I’d be successful the second time. But that’s not how it worked.

*Okay third times the charm. I’ll just change this one thing that I did. Otherwise, fourth or fifth is pretty good too.*

But I’ve finally reached the point in my graduate career where I’m confident. Either my experiment will work well because I know exactly what I’m doing, or I’ll be able to figure out the reason it didn’t work within a couple of tries. I’m no longer anxious about having to do them and the potential of messing them up. I can plan 2 or 3 experiments around one another, able to do things well and efficiently.

And today I think I’m starting to understand why: I’ve done this same experiment 100s of times, getting better with my hands and my thought process while doing it. Although this isn’t all that my PhD is built on, this experiment is one of the most fundamental parts of my research. So here is kind of how it works:

Transformation

This process imports DNA of interest into a cell. In order to test the proteins that I design on a computer, we can translate their protein language into DNA. This DNA is then inserted into cells through transformation.

Miniprep

This extracts DNA of interest from a cell. To make sure that the protein we have is actually coded for in our cells, we extract the DNA and send it for DNA sequencing.

TOXGREEN

This measures the amount of protein association for the protein that the DNA codes for.

image

…

Autopilot by Tiffany Day

Gilbert

Dear PhD,

Recently my mind has felt hazy. My mind has been constantly active, thinking of new ideas and wanting to work. I’ve been frantically working to finish up final experiments, cleaning up my data and code, and writing my thesis. But my brain reached a point where it was too full. I close my eyes to sleep, but the thoughts keep ringing around, drowning out my tinnitus. 12:19. I readjusted, pulled the sheets a little closer. I don’t enjoy sleeping tight. It feels restrictive and reminds me of being unable to force my body to move. 3:13. I stare at my eyelids, no rest or reprieve. I firmly understand what it means to have a restless night.

Insomnia is for me is like the optical illusion of circles that appear to move. It seems to originate from stress, but then the amount of effort to sleep is stressful. It becomes a hypnotizing cycle that perpetuates itself with less sleep and productivity on my mind thoughts.

*Why aren’t I writing right now? Couldn’t I be finishing up some experiments?*

Instead of sitting in bed and doing nothing, I succumbed.

*If I can’t do anything else right now, might as well get some work done in lab.*

Have you ever worked odd hours? When the traffic lights are blinking yellow, and you’re one of the few beings filling the silence in the air? Throughout my graduate career I’ve had a multitude of unorthodox workdays, typically when things are going wrong. But recently, I’ve noticed I feel more steady. Less anxious about getting data before a major meeting, and despite how tired I’ve been, confident that I’m going to do my experiments well. From taking an hour to mentally prepare to do an experiment to 5 minutes. I’m not sure if it’s just knowing there’s an ending to this research or something else, but it’s allowing me to look back on these days a bit more fondly. To appreciate the stillness, and to truly cherish the freedom of graduate school. I’ll miss taking days to think and test different ideas, to decide how and when to do experiments, to be able to leave lab as the sun begins to shine on the lakes.

***You don't cross my mind, you live in it***

*Off Day* by Lyn Lapid

A couple of letters ago, I mentioned that I would miss the chase, miss the ways that I’ve been forced to push myself past my limits just to learn. But I’m beginning to realize that the enjoyment has been a bit more than just the chase. This environment has pushed me towards discovery: time to allow my brain to acclimate to the idea of working at the boundary of human knowledge, allowing me to excise biases in pursuit of truth. It reminds me of the days when I was a kid and I would stare at the sky, allowing thoughts about everything to freely flow in and out of my mind. I feel like graduate school harnesses this latent ability, allowing for deeper exploration within our understanding of anything you find interesting.

This song feels like it bundles you up in a freshly washed blanket on a snowy winter day. A blend of tranquil and reassuring warmth. I’ve questioned myself and my capabilities for the past 7 years, but I’ve finally made it to a place of what feels like mutual respect. After that rough spell at the start, we’ve kind of figured each other out. You’ve lived in my mind, balancing out how I’ve treated myself to make it through. Pushed me to grow by finding comfort outside of my comfort zone. Pulled me out of the ebbs of 36-hour water diets, to the flows of buying Babcock ice cream as a reward for accomplishing tiny goals I set for myself. You’ve been that warm blanket for me, and I never expected it to be so comfortable. Which means it’s probably about time for me to move on.

Gilbert

Dear PhD,

University of Wisconsin-Madison finds itself on an isthmus: a strip of land between the two lakes Monona and Mendota. Comprised of about 50000 students and 25000 staff, 3 out of every 10 people you see in and around the city are affiliated with the school. I had never visited Wisconsin before I first arrived here to interview for my PhD program. I quickly learned to love cheese curds, spicy cheese bread,

When I first arrived here to interview for grad school, my hosts took us out for a night walk around the city. The showing us what types of things you can do in Madison

But on this particularly night, it was cold and quiet, and they took us for a walk on the frozen lake. I stared into the darkness and then closed my eyes, the only differences being the chill against my eyeballs and the phosphenes on the backs of my eyelids.

The end of my PhD journey has been extremely isolating. lI actively choose to work, to write, to think about research. There is nary a thought of allowing myself time for anything else. And a lot has changed in the last 7 years. This year, the lake is frozen, but due to global warming the temperatures haven’t reached the same chilling, biting cold, and it’s not safe enough for many of the winter activities of the past. I won’t get the opportunity to relive that moment on the lake before I leave, but that memory sticks out to me. I couldn’t have imagined the path that a PhD would take me: from failing my prelim, to developing an algorithm that creates membrane protein structures, from feeling like I knew and understood myself, to wanting to have more time to really learn about my needs and desires. From knowing basic biochemistry to becoming what many would consider an expert in my field.

***Beware of people that say that they know everything about a subject  
Because, people that think that they know everything  
Are the ones that know nothing***

*Even If It’s Lonely* by Hazlett

But if graduate school has taught me anything, it’s that I don’t know much at all. I’ve poured so much of my mental energy to learn the intricacies of how membrane proteins fold, that I know how little I know about it. My PhD doesn’t mean that I’m an expert in a scientific field, but rather that I’ve become an expert in how to learn and discover things that I didn’t know before. As you’re reading this, I haven’t yet defended, the thesis isn’t submitted, and I’m not even sure if my committee will award me my PhD. But I know that I’ve learned … on this journey, and I’m ready to move on to something else. Ever since I became a biology major, I wondered if I actually loved science. And I think when I came to graduate school, I knew that I did. I wanted to become a professor that minorities could look up to, to be able to teach others how to learn, to inspire the curiosities of the next generation. But years later, I can feel that desire fading away.

Can you imagine knowing that you loved something, and then wondering years later where the love went? Time is a fickle thing. Like any relationship, you need reminders about why you fell in love in the first place. Graduate school for me was a grueling experience. As I’m sure many former graduate students understand, constant failure, trying an experiment again, failing, and learning to finally find an answer is extremely demoralizing. It takes a special kind of person to continue that journey. And right now, I don’t know if I’m it.

For now, I’ve used up all of my passion and determination.

***I’d rather be free***

*Escapism* from Steven Universe

My relationship with my PhD has me thinking about how to regain that kind of love: when will I be inspired again, not by some external force like graduation, but by an intense drive and passion to learn? I’m not yet sure what I’ll be doing next, or if I’ll even want to be in science. But I recall something my dad told me when I was a little boy: “If you put your mind to it, you can learn anything.” Thank you PhD for teaching me how to learn at the highest level. I’m not the smartest or most brilliant person, and this journey wasn’t anywhere near a perfect PhD. But I think it was perfect for me because it made me grow into the person that I am: a tryhard, a thinker, and someone who now knows I can make a difference somewhere, someway if I just put my mind to it to learn enough.

Gilbert

Other writing options:

**First day my design program worked**

* Details:
  + Days I would lay on my floor, imagining how atoms move and then crying because I’m unsure if I understand things properly

Admissions committee

SciMed

Finally a short list of the pros and cons of a PhD that I came up with

Pros:

* Learn more then you probably ever imagined could be learned
* Become a foundation for creating new knowledge
* Hone your ability to learn and know what you don’t know
* Freedom to work at your own pace and on your own time schedule

Cons:

* Low pay and LONG hours

Channel of negative thoughts. Sometimes it flips on and every channel is it

**Key questions:**

* How does it feel to almost receive a PhD as a minority in stem? What would you say surprised you the most about the experience?
* When did you most feel like an imposter?
* What did you learn from yourself whenever you burned out?
  + Kind works of encouragement for myself are needed/talking to myself through my problems and issues

**Guidelines for my writing**

* I think after here, it’s about getting punchy titles that work well with my song choice. It would be nice if the titles were tied to lessons of the stories that I aim to tell. This first example below is more of a lesson than a story, so I’ll have to change that around a bit.
* One thing that I’ve found myself not doing well is SHOWING the story. I think my memory right now is hinging on an experience rather than actually drawing out a specific portion of the memory. Draw out that first and then expound upon it.
* I think I figured it out. I’m going to picture I’m writing to TA, the person who I’ve wrote the most letters to in my life. I think that voice will flow out a bit more freely.
* And finally, end it with how the song fits by describing and picturing the sound (close your eyes, listen, and sing along)

Burnout must be written about:

* This feeling of wanting to do things but being unable because too many things are going on in your mind
* Feeling of failing people (friends, family, lab mates, pi) because you’re unable to do the things that you want to do
* Culminating in tears, long stays in bed, restless nights of sleep, insomnia, banging head against the wall
* There are so many things to do to get closer to the end, and deciding what to do first is draining because organizing it all is draining because then the end is closer and closer but also feels farther. Like you can see the light at the end of the tunnel, but when you put all the things up that you need to do, it just feels like that light is getting farther away and it prevents you from doing anything

Other things could write about:

* Being in the middle of black lives matter and stop Asian hate

My favorite PhD Comics shorts:

A cartoon of a person in bed

Description automatically generated

That time I thought I left the Bunsen burner on and would burn down the entire building and I couldn’t sleep at all because of it

<https://phdcomics.com/comics/archive.php?comicid=1991>

A cartoon of a person walking towards a building

Description automatically generated

Every. Single. Time. <https://phdcomics.com/comics/archive.php?comicid=1965>

A comic of a person with her hair pulled back

Description automatically generated

<https://phdcomics.com/comics/archive.php?comicid=1975>

Citations

For better or for worse: https://7esl.com/for-better-or-for-worse/

Kary Mullis quote: https://www.youtube.com/watch?v=xd4De47ldYs&ab\_channel=NobelPrize