

What to Expect in Graduate School

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Contents

What is this document? 2

Time Expectations (you)..... 2

Time Expectations (me) 4

Authorship and Writing Scientific Papers 4

The Peer Review Process 6

Seminar/Meeting Attendance 8

Conferences and Workshops 8

Outreach and Public Engagement 11

What is this document?

This is not a nuts-and-bolts guide to policies within the Department of Earth and Spaces Sciences (ESS). The departmental handbook and website provide reliable information on programmatic expectations, course requirements, and procedures. Instead, this document is intended to be a more personal guide to what to expect as a graduate student working in my (Joshua Krissansen-Totton's) research group. It outlines what you can expect from me as a mentor and advisor, as well as what I will expect from you as a student and mentee. To those of you with prior research experience, much of its contents will hopefully be familiar. But every academic department has a distinct culture, and every advisor's expectations are uniquely shaped by their experiences and values, so I would encourage you to browse through it regardless of your prior research background. This document also provides my thoughts on how to navigate the challenges and milestones of academia such as going to conferences and writing scientific papers. Consequently, it may be overwhelming to read it all in one go, but it can instead be referred to when required as your graduate career progresses.

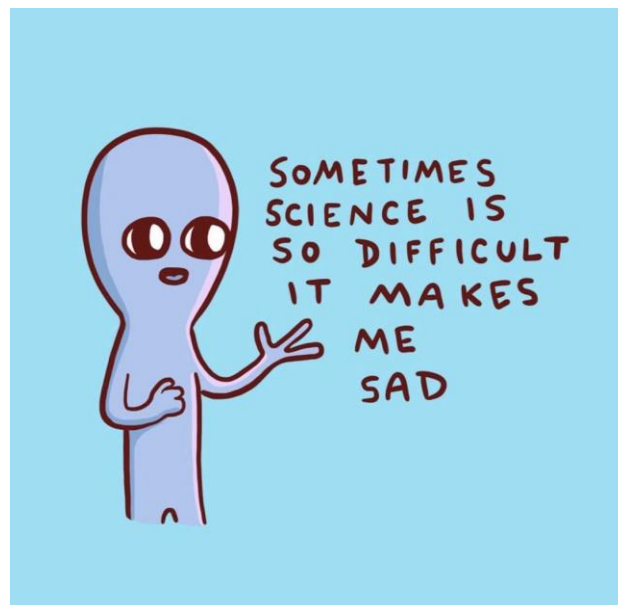
Obligatory relevant webcomics are also provided (all credit to [xkcd](#) and [Strange Planet](#)).

Time Expectations (you)

- During term time, I expect you to treat graduate school like a full-time job, meaning that total time spent on all grad school activities, including research, classes, assignments, meetings, attending seminars, and administrative task should add up to a typical work week. No one will be keeping track of this except you, but you may find that if you consistently devote less hours to your studies, then it will be difficult to gain mastery of the subject area and contribute new knowledge. While occasional long hours may be required for deadlines or time-sensitive lab work, consistently spending >40 hours per week on graduate school is not encouraged. This is unlikely to make you a better scientist, and could lead to burnout, or stunt your creativity and enthusiasm for your work.
- One of the benefits of being in graduate school is that you have a lot of discretion over how you choose to distribute those work hours. Some students thrive under a regular "9-to-5" structure, with focused productivity during the week and complete time off from work in the evenings and weekends. Other students take advantage of the flexibility to operate on a somewhat more relaxed weekday schedule, taking time during the day for fitness, socializing, and leisure, but then making up the hours in the evenings and/or weekends. I've done mixture of both over my career. Find what works for you.
- With that said, you are generally expected to be present and available on campus during work hours and respond to emails in a reasonable time frame. Sometimes I may send emails outside of work hours, but there is no expectation that you will read or respond

to work emails outside normal hours. You are welcome to send me emails at any time, but do not expect an immediate response from me outside normal work hours.

- Occasionally working from home when you have no on-campus commitments is permissible (and quite normal in academia). But more extensive or regular work-from-home arrangements should be discussed with me first since there are tradeoffs. A lot of the learning in graduate school happens in informal settings e.g. asking your officemates about a coding issue, a conversation over lunch with friends, or discussions after a thought-provoking seminar. Spending too much time off campus, especially in the early years of graduate school, will limit these opportunities for informal learning and potentially hinder your development as a scientist.
- Personal travel outside of term time is completely at your discretion. Occasional personal travel during term time is typically fine, although if you are going to be away for more than a few days please discuss with me first. The time-allocation principles described above apply to personal travel – if you are consistently putting in less than full time work hours, then your research will suffer. Obviously, if you have on-campus classes or teaching commitments, then (non-emergency) personal travel during term time is best avoided.
- One final note on time expectations – science is difficult. Extended focus and hard work are prerequisites for success. With that said, nothing we do here is more important than your physical and mental wellbeing. Graduate school will consume a significant fraction of your adult life, and so it's important to take time for yourself and maintain aspects of your identity beyond merely being a scientist. If you're feeling consistently burnt out or overwhelmed by the amount of work on your plate, then we should talk about it.



Time Expectations (me)

- At the start of each quarter, we will schedule weekly ~1 hour one-on-one meetings. These meetings will primarily be an opportunity for us to discuss your ongoing research, and progress with other day-to-day graduate school activities such as classes, TA-ing, and upcoming conferences. Additionally, weekly meetings can be an opportunity to talk about broader professional goals and challenges. While I will always be interested to hear how your work is progressing and what you've been discovering, weekly meetings are first-and-foremost your time to discuss whatever is on your mind - you get to set the agenda. Occasionally, you or I will need to cancel weekly meetings due to travel, illness, or other one-off commitments; when this occurs, we can reschedule or skip meeting that week as needed.
- Additionally, I have open door policy for my graduate students. If you are having issues between weekly meetings that are stopping you from making progress, please don't wait until our next meeting to bring it up. You should feel free to drop by my office to see if I am available or shoot me a quick email to arrange a Zoom call. It is especially important to take advantage of this "open door" at the start of new projects when the learning curve is steepest. Occasionally, I may be working on something time-sensitive or be overwhelmed by prior commitments, in which case I may have to tell you come back later. But your professional success is my top priority, and so don't hesitate to drop in and see if I am available if you need help.

Authorship and Writing Scientific Papers

- I expect that my graduate students will be lead authors of the publications based on their PhD research since they are designing and conducting the experiments, analyzing the results, and drafting the manuscripts. The addition of collaborators will be discussed with me, ideally at the inception of project, and revisited as necessary during the research and drafting process.
- Typically, PhD students in ESS work towards completing three first author papers corresponding to three chapters in their thesis. However, this is a loose guide, and progress will likely not be linear. Some papers represent incremental progress, and so may be faster to turnaround than more substantial projects. Be aware that first papers are usually the most time consuming.
- As the first author of scientific publications, you are expected to outline, draft, reference, and revise the text. However, as your advisor I will provide feedback on every step of the process, including detailed edits of drafts, suggestions for improving scientific writing, recommendations on what journals the paper should be submitted to etc. It is normal for papers to undergo multiple rounds of edits/rewrites before they are

ready for submission to a scientific journal. You can expect me to provide you with feedback on your draft manuscripts within about a week.

- Broad principles of paper authorship are available here:
<https://provost.yale.edu/policies/academic-integrity/guidance-authorship-scholarly-or-scientific-publications>

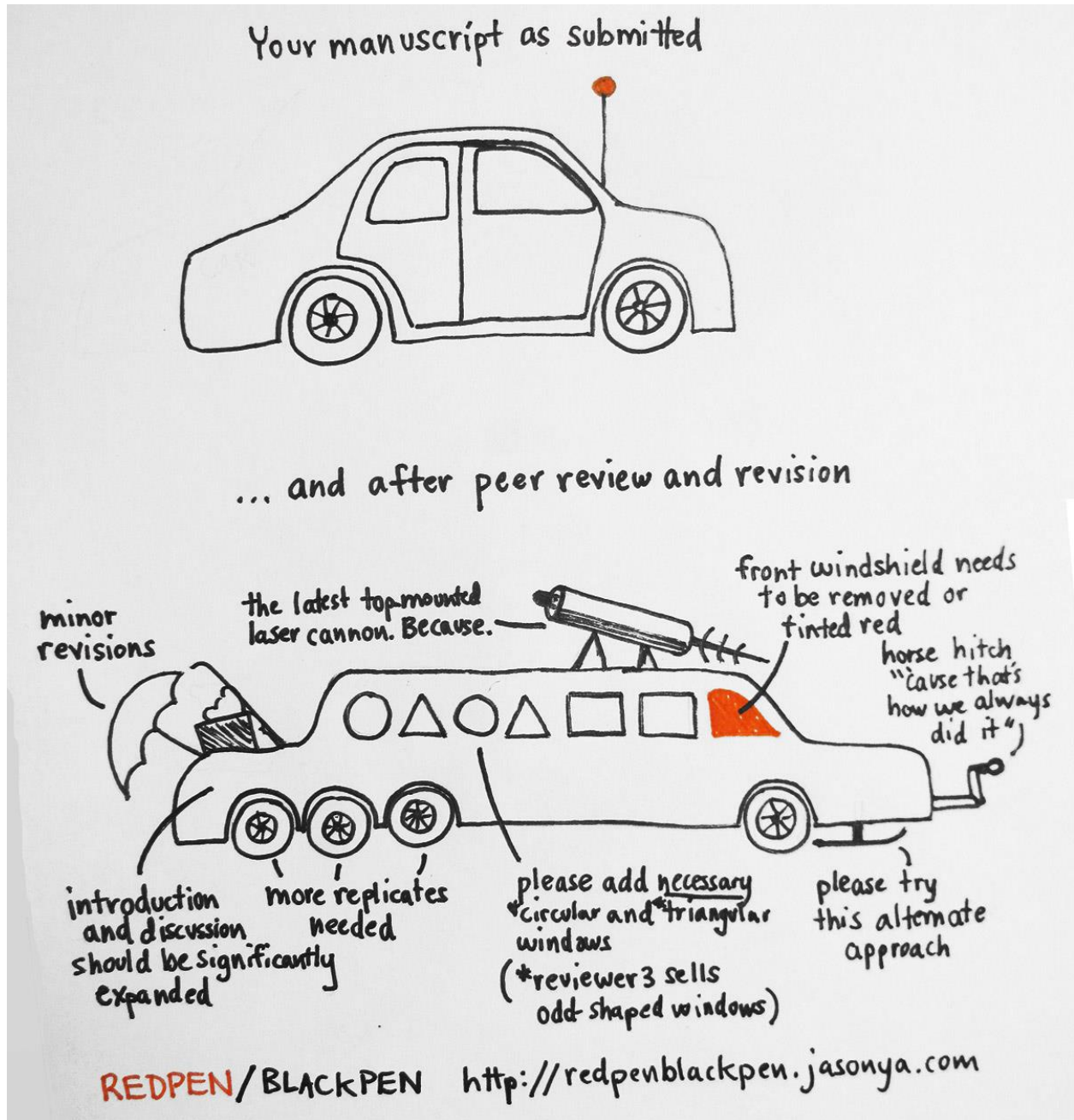


The Peer Review Process

- Navigating peer review is an important but sometimes challenging part of being a scientist. When you submit a paper to a scientific journal, the editor will send it to ~2-5 other experts in your field to provide critical—and most often anonymous—feedback on the significance, novelty, and validity of your work. Based largely on this feedback, the editor will then decide as to whether you will have the opportunity to address these criticisms and resubmit your paper, or whether the paper is unsuitable for publication by that particular journal. When you resubmit your revised paper (with itemized responses to reviewer criticisms), the editor will typically send it back to the reviewers for them to decide whether it is now suitable for publication. This process may repeat multiple times, although there are usually only 1-2 rounds of reviews + revisions before a paper is either accepted or rejected. If your paper is accepted, congratulations! If your paper is rejected, then it is normal to address the reviewer criticisms and submit it to another journal.
- Receiving reviews of your papers can be upsetting! After you've spent years of your life toiling away on a difficult project and many more months perfecting a compelling manuscript, receiving several pages of (sometimes) harsh criticisms about it can be a difficult experience. This is true no matter the validity or reasonableness of those criticisms. Even generally positive reviews full of constructive criticism can sometimes be jarring to read at first. My recommendation is that after reading your reviews for the first time you should set them aside and do something else for a few days. This will give your brain a chance to process those initial emotions so that you can return to the reviews with a clear head. I have often found that what initially seemed like damning criticisms turned out to be flawed arguments that were simple to refute.
- You can expect me to help you respond to reviewer criticisms. Once we have both had a chance to think about the reviews, we will meet to discuss the best strategy for responding to the overarching criticisms, and for addressing any especially difficult comments. While responding thoroughly to the substance of reviewer comments is the most important part of the process, it is also important to respond tactfully and strategically. Knowing when to push back against reviewer criticisms and when to make concessions is something that you learn with experience; you can expect me to provide guidance and detailed feedback on your draft responses.
- Peer review is an imperfect process and reviewers are human beings. They will sometimes misunderstand your work, have misconceptions that bias them against your findings, or be prejudiced against you/me/the discipline for reasons that have nothing to do with the soundness of your science. While the shortcomings of the peer review system can be incredibly frustrating, I find it helpful to keep the bigger picture in mind: Peer review is an important process that sets science apart from other knowledge

claims. And while it may be difficult to navigate as an individual, it helps ensure we can trust each other's work as a community.

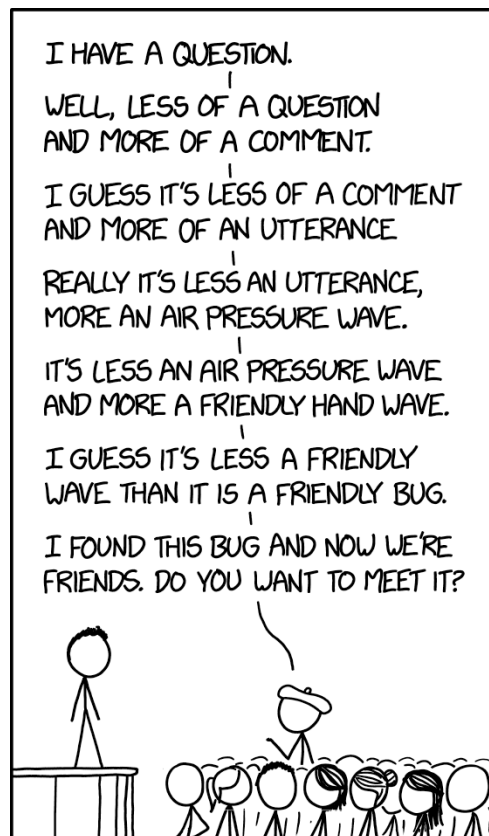
- While graduate students are not asked to review papers by most editors, I may ask for your help reviewing papers relevant to your area of expertise.



Seminar/Meeting Attendance

- It is generally expected that students will regularly attend departmental seminars, astrobiology seminars, planetary lunches, and other relevant UW events. While occasional absences due to travel, illness, or pressing deadlines are acceptable, regular participation is important for both the reputation of the department/program (it looks bad when a guest speaker has flown ~1000 miles to give a talk to an empty room), and for the learning opportunities seminars/talks provide. An engaging seminar can be an excellent way to get up to speed on another discipline, learn about ongoing work tangential to your own, or even inspire you to modify your own research direction.
- Students are also expected to take advantage of the networking opportunities provided by visiting speakers by signing up for free lunches and/or individual meetings with visitors in their field. Such meetings can often be a much cheaper and easier way of building your professional network than going to conferences.

Conferences and Workshops



- Scientific conferences are an opportunity to share ideas with colleagues, advertise your own research, and build your professional network. My expectation is that you will start attending conferences in your first year, and regularly attend conferences and workshops throughout your time in graduate school.

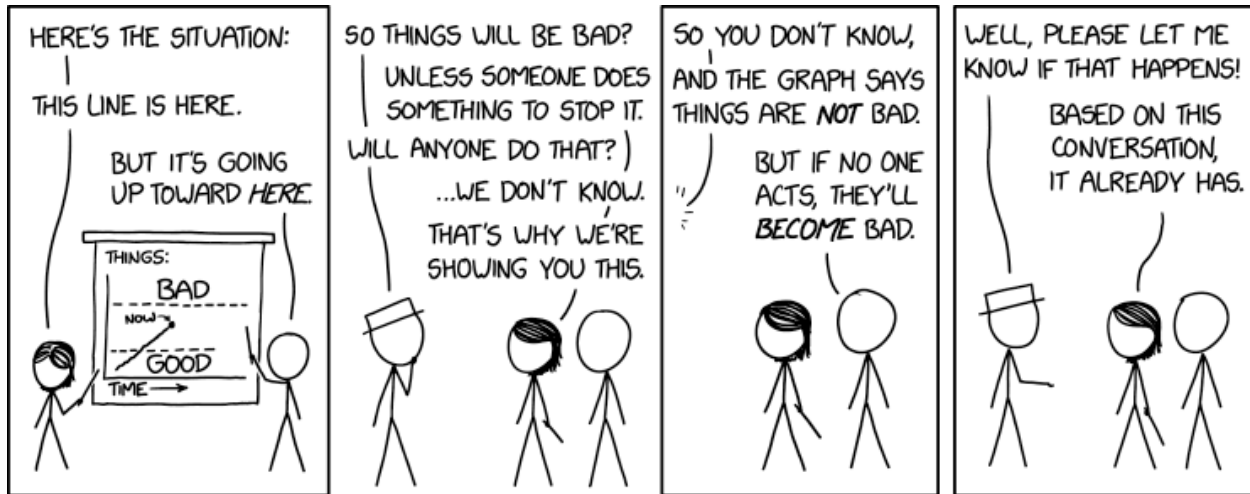
- You are not expected to pay for any aspect of attending a scientific conference. Conference registration/abstract fees, flights, accommodations, meals and incidentals will all be covered by research grants, fellowships, or departmental awards. Of course, if you want to attend an upcoming conference, make sure to ask if funds are available first before you book anything! If a conference/workshop is in a location that you would like to spend more time, it is generally OK to extend your trip by booking earlier/later flights. Your travel costs will still be fully reimbursed, but any expenses outside of the conference dates (extended accommodation etc.) are your responsibility. Similarly, if you want to add other destinations to your travel, you can typically be reimbursed for the equivalent cost of a return ticket to the conference destination. But please discuss with me ahead of time if you are unsure about reimbursement procedures for mixed personal and professional travel – there are sometimes weird rules with Federal funding (e.g. only certain airlines are allowed).
- Conference abstracts—a summary of the work you intend to present—should be circulated to all coauthors for feedback and approval before submission, in the same way you would a journal article with coauthors.
- When attending a conference, you will typically be expected to present either a poster or a talk highlighting your research. This is a sweeping generalization, but talks will communicate your research findings to a larger audience, whereas posters provide opportunities for more casual feedback and discussion. Posters are often better for works-in-progress where you are looking for feedback, whereas talks are better suited for broadcasting important findings or advertising your recent/upcoming papers. It does depend on the conference, however, and so it is always a good idea to discuss the poster/talk tradeoff before submitting an abstract and requesting a talk or poster. If you have never been to a scientific conference before, requesting a poster is often a more comfortable entry point.
- It is worthwhile to spend some time preparing for conferences beyond merely practicing your own talk or poster presentation. Useful preparations include examining the schedule and planning which talks and poster sessions you want to attend, looking at the list of attendees/presenters and deciding who you want to connect with, and signing up for any professional development or networking events that are of interest. It is not necessary or desirable to have every moment of every day planned out ahead of time – spontaneous opportunities will emerge that you'll want to take advantage of! But it is helpful to have a rough plan of what you want to accomplish each day. For large conferences like AGU, you also shouldn't feel like you need to be in a talk every minute of every day. It's a good idea to take some breaks both to give your brain a rest, and to connect with colleagues informally between sessions. You can expect me to help you

plan for upcoming conferences by offering suggestions on what sessions you might want to attend and who would be good to meet.

- Some generally useful suggestions for how to make the most of your time at academic conferences: <https://spie.org/news/advice-for-attending-a-conference?SSO=1>
- Conferences are unavoidably somewhat nerve-wracking experiences because your research is being evaluated by your peers in real time as you present it! However, you will generally find that most of your colleagues are encouraging and willing to provide thoughtful/constructive feedback. Of course, occasional negative interactions are inevitable – some people won't understand your science, they may be prejudiced against your subfield, or they may hold any number of other biases. This is especially true in Q&A sessions after talks; audience members may ask questions as thinly veiled criticisms rather than genuine enquiries. Learning how to navigate these situations is part of becoming a better scientist. But it's important to remind yourself that these criticisms are virtually never about your capabilities or talents, but are often expressions of ego, self-promotion, or are politically motivated.
- If negative conference interactions extend beyond mere scientific feedback and into the realm of harassment or inappropriate/unprofessional comments, then this is unacceptable behavior. Conferences are ostensibly egalitarian events where anyone can talk science and socialize with anyone else, but in reality, huge power imbalances exist between graduate students and senior scientists. This can create an environment that enables harassment. Most conferences have an explicit "code of conduct" with designated contacts and procedures for what to do if the code of conduct has been broken. You should not hesitate to report breaches of the code of conduct. You can also reach out to me or other senior mentors to help you navigate these situations or report incidents either anonymously or on your behalf.
- Even when everyone has the best of intentions, conferences are sometimes awkward. Trying to introduce yourself to senior colleagues, maintaining natural conversation, and attempting to come across as interested but not pushy is a lot to juggle! Moreover, your colleagues come from many different cultures, have diverse (and sometimes eccentric) personalities, and varying levels of social grace. Learning how to navigate this awkwardness is another part of becoming a scientist, but it gets easier the more people you meet, and as you learn your own comfort level for building connections. You can expect me to help you navigate these events by introducing you to colleagues, inviting you to social events, and enthusiastically promoting your science.
- Finally, don't forget to have fun! So much of science is solitary: conducting experiments, debugging code, and writing papers is mostly done alone. Conferences are an

opportunity to connect with your peers by sharing your excitement for your subject area, commiserating over common challenges, and exploring interesting new places together. I've made many wonderful friends at conferences over the years, and I hope you will too.

Outreach and Public Engagement



- While scientific outreach and public engagement is not a formal requirement for your graduate program, it is something I strongly encourage you to pursue.
- Outreach opportunities could take the form of out-of-the-blue invitations from individual schools or classroom teachers, established outreach programs/activities like *Rockin' Out*, Pacific Science Center events, pub talks such as *Astronomy on Tap*, Astrobiology program panels, or other UW events involving the broader campus community.
- I expect all my students to do at least some outreach because there are many potential benefits. Planetary science and astrobiology provide a powerful perspective for engaging the public with science – it's typically not difficult to get people excited about planets and the search for life elsewhere! Moreover, in an educational setting, giving students an opportunity to engage with scientists as human beings can make STEM careers more tangible and attainable. Ultimately, taxpayers are supporting our science either directly or indirectly, and so it is in our collective best interests to communicate why our science is exciting and important! But aside from these community/societal benefits, doing outreach also benefits you, the graduate student. Outreach enables you to practice distilling your science for different groups and to think about how to connect with audiences through humor, anecdotes, or shared personal experiences. Public outreach is especially good preparation for many private sector jobs where effective

communication skills are highly valued. Finally, public outreach has been shown to broaden graduate student perspectives on DEI-issues.

- How much time you should devote to outreach and public engagement is open for discussion, and largely depends on your professional goals. If you want to become a research scientist, then a few events per year probably strikes a reasonable balance, whereas if you are considering a more public-facing and/or private sector career, then incorporating regular public engagement activities into your professional development could be appropriate.
- While I have limited formal training in scientific communication, I am always happy to discuss outreach opportunities, provide feedback on your planned activities, and offer suggestions for following evidence-based strategies for equity-minded outreach.