

# Graduate Student Tip Sheet (Fall 2018)

University of Utah, Department of Mathematics

**About:** This is a candid list of tips created by and for graduate students in the mathematics department. The topics covered are vast (from advice for first time instructors, to how to approach research post-oral exam), and hopefully are helpful to all current graduate students. However, for precise degree requirements, students should refer to the most up-to-date Graduate Student Bulletin (<https://www.math.utah.edu/dept/gradbull.pdf>)

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## Advice for first time instructors:

- When in doubt, ask your course coordinator how to handle a specific student interaction or request.
- Older graduate students are your friends! Get course materials from someone who has taught the course previously.
- Get feedback about your teaching as often as you can. If possible, get written feedback about your teaching, as this will make it easier to get a teaching letter. Your course coordinator should be willing to sit in at least one to two classes a semester, and the Center for Teaching and Learning Excellence provides a variety of services, that include observations, and videotaping lectures (<https://ctle.utah.edu/services/index.php>).
- Learn to cater your teaching to your personality. Some people will tell you that you have to personality X in order to be a good teacher, but that's just not true.
- Teaching feels very immediate and important so it's easy to put lots of time into it. However, you can put an infinite amount of time into teaching, and not all of that time will help your students learn. It's important to figure out how to manage and protect your time so that teaching doesn't take over everything.
  - Practice setting time limits on the amount of time you spend on teaching work so that it doesn't absorb all of your time.
  - Pay attention to the ways you spend your time that have the greatest impact on student success. Generally, time spent interacting with students (office hours, review sessions, lectures) is much more effective for helping students learn than time spent preparing for interacting with students (writing long and detailed homework solutions, constructing course resources from scratch, etc.).
- Emphasize more on interaction with students, especially if you are an international grad student. It is more effective to discuss math in an interactive environment than just deliver or lecture it.
- It's ok to be vulnerable with your students. They will probably appreciate hearing about the struggles you've had learning math and find that encouraging.
- Stay organized. It can be very helpful to have electronic copies of all notes, quizzes, exams, and handouts. It was very useful to post some of these materials for students. In general, it made the second time teaching the same course quite a bit easier.
- Learn your students names, they will definitely appreciate it.
- Write a very detailed syllabus with a policy that the instructor can make modifications to the syllabus at ANY time during the semester. It is very challenging to predict what issues will come up during the semester. Don't try to. Just plan that there will be an issue that you didn't foresee.

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## General advice before starting your first year

- Although the first year or two can feel like an extension of undergrad because of a focus on coursework and exams, the majority of graduate school is not like that. Try to start switching into the research mindset when you can.
- Make sure to get help from a lot of people but also help others. Don't feel bad about asking any questions.
- Don't compare yourself to others! Nobody knows what they're doing. Sometimes people sound like they know way more than you, but are probably secretly just as insecure as you are. Performance during the first year is not at all indicative of overall success in grad school.
  - It doesn't matter if you "deserve" to be here, it only matters that you want to be here. (In other words, comparing yourself to other people is pointless and harmful.)
- Concentrate on your specialty. There are tons of cool stuff in the grad school, but our time is limited. It would be better strategy to specify your taste and dig in.
- Grades are not important anymore (within reason). What is important is understanding.
- The graduate students come from vastly different mathematical backgrounds and levels of preparation from undergrad. Don't be embarrassed about not knowing something or needing to ask for help from your fellow students and professors.

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## Tips regarding our health insurance

- Always go to the Student Health Center first, when possible. It is a \$10 copay, with the insurance covering the remaining costs, and they can refer you to specialists.
- If you have something semi-urgent but not a true emergency, there are many urgent care clinics (a far cheaper option for something like a broken leg or stitches).
- For more serious cases (e.g., surgery), the deductibles can be high (\$500 usually) and even after the deductible is paid, you have to put down 30% of the remaining bill—compared to the standard 20%.
- The dental coverage is not bad if you just get preventative care. For instance, your cleanings are free if you stay in the network (and you get 2 per year). The network is not very large, but there are a couple of dentists who accept the insurance near campus.

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## Funding advice

- Looking into all funding opportunities available to you is a very good idea (and something that academic positions look for in a candidate!).
  - There is departmental funding, university funding, NSF funding, SIAM funding, AWM funding, and more!
  - The math department travel fund usually runs out by the end of the fiscal year, so if you go to a conference in the fall you're more likely to get funding than if you go to a conference in the spring.
  - Professional society websites like the AMS and the MAA are a good place to start looking for opportunities.

- It can be hard to get such opportunities for international students. Save money and look for some advisor who can help you.
- Ask your advisor early if they have research funding for you in the summer. You don't want to wait until the last minute, not apply for summer teaching, and then worry about possibly not having funding.
- Most conferences in math have travel funding for young participants.
- Investigate opportunities early, and start early!
- If you want to seek for a career outside of academia, an internship is a great way to go. National labs are looking for lots of candidates at the PhD level and often have ample internship opportunities. Almost any internship you apply for will value computing skills.

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### Tips for written qualifying exams

- It's important to know who is writing the exam. All past exams are posted online: <http://www.math.utah.edu/grad/qualexams.html>.
- Do not go in with any "holes" in your background hoping that a certain question will not appear.
- Some spread them out and do only one at a time, and while this works for some students, others can attempt more than one at a time and get them done quicker.
- It's okay if you fail. Lots of people fail. It doesn't mean you are a bad mathematician. Also, most faculty won't judge you for failing qualifying exams. Many of them failed their first times around too. The more work you put in during the academic year, the better off you will be.

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### Tips for the oral exam

- IMPORTANT: There are two types of oral exams.
  - For applied/mathbio, the oral exam is a ~50 minute public presentation on your early research, and then an additional hour of questions with only your committee. In addition, you provide a write-up to your committee before your presentation.
  - For pure students, the oral exam is a ~hour long question and answer session on classes you have taken (including reading courses). Students typically provide a syllabus for your oral exam committee to approve at some point (the earlier the better, for you!) before the oral exam.
- Start an open dialogue with your advisor about the oral exam early on (don't wait until you feel ready, because you may never feel ready), so you know what they expect and because it can take a while to get it scheduled.
  - Specifically, communicate clearly with your community about their expectations. These vary drastically based on research group, so talking to friends outside of your research group about structure won't necessarily help.
  - Think about who you want to be on your oral exam committee and take classes from these people. And of course, aim to do well in these classes!
  - For the oral exam, you are allowed to have post-docs on your committee! Talk about it with your advisor-it may make you feel more comfortable.

- Try not to get frustrated about the differences in these exams - it won't do any good to dwell on it too much, and it might leave you feeling bitter.
- Applied/mathbio:
  - The most useful part of the oral exam might be the preparation, when you are drawing together your work and references and figuring out how to effectively communicate it.
  - The oral exam is really helpful in terms of reviewing literature, organizing the work you've done, and making a research plan for the future. Do it sooner rather than later (usually aim for the third year).
  - Doing a practice oral for your friends/other students makes an immense difference.
  - Think about using the thesis TeX template for the corresponding writeup. It's nice to get familiar with it ahead of thesis writing time.
- Pure:
  - You write a syllabus beforehand and send it out to your committee to approve. This is really nice, because if they ask you to add something to your syllabus, you know to study that topic in particular. (This is not exactly a tip so much as a fact).
- Try to stay calm - much of the time faculty are testing you on your ability to stay calm under pressure.

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### Advice for students entering the “final phase” of the program (i.e., post-oral exam)

- This is where it all begins. It's also the toughest phase. Early on, it's common to feel lost because of the lack of structure. Talk to as many people as you can about your work and to keep asking questions.
- Take advantage of your advisor's post-docs, if he or she has any.
- Be prepared for periods of drought.
- It is useful to make lists of tasks and to communicate with others about my work.
- Be proactive about going to conferences and workshops (while not always possible due to funding, aim for ~one per semester during this final phase portion).
- If you are looking for an academic job/postdoc - start early (~early summer)! Especially if you are applying for NSF postdoc, etc. You need to have a research statement, teaching statement, reference letters, and CV ready to go by September, and it takes a surprisingly long time and a lot of revision to get to that point.
- Pure math advice: You don't need to have published a paper to get a good job. It's more important to know people in your field (so you should go to conferences), and to have good letters of recommendation (so you should maintain a good relationship with your advisor and other faculty in your research group).
  - Once you have a thesis project talk about it with as many people as you possibly can, especially people outside of Utah. This will help you understand where your project fits into the grand scheme of math, and to get a sense for natural extensions of your project that you can tackle once you finish it.

- This also gives you a bit of a "brand," and people will start knowing you as the person who studies the thing in your thesis (and they will remember you that way).

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### Final thoughts (unedited responses)

- During graduate school, you will need people to serve the following three roles: advisor, mentor, and advocate. Most likely, one person will not fill all three of these roles! An advisor will help guide your research and your career, a mentor is someone you can confide in and discuss the gritty truth with, and an advocate is someone who will speak up on your behalf when you are not in the room.
- Work-life balance is important! Find something outside of school that you like to do, so your identity, self-worth, and happiness have a buffer against the ups and downs of graduate school.
- Work-life balance is important. What has worked for me: working every day of the week, but not doing too, too much on one day. I have found that it's really hard to recover from long days of working. Some people prefer to work a little harder 5 days of the week and take at least one full day off, but that doesn't work for me. You just have to figure out what works for you—keep doing something different until something works. Lastly, if you don't have time for 8 hours of sleep, you're doing it wrong.
- As someone who has now graduated, the main thing is that my experience as a graduate student at Utah was amazing, and it really is a special place. Take advantage of the wonderful community, get involved, and support each other. If you do, you will be very well prepared for whatever you want to do next, and you'll have a good time too.
- Work-Life Balance doesn't have to mean you have to have the same ratio of work and life every day. Some times you may want to work really hard for a couple weeks, and then take a couple of weeks easy. Or maybe your schedule is more like working very hard for several months, and then taking several weeks off. All of these things are ok- just find a balance that works for you!
- I would start thinking about what you'd like to do after graduating sooner, rather than later. If you're not sure what you want to do after you graduate, keep your options open and explore different classes/opportunities for industry, teaching, and research jobs post graduation. The summer time (when you're done with quals) is a great opportunity to attend short math courses on various topics, such as math-to-industry boot camps and teaching. During the semester, take a class outside the department in a discipline you're interested in. Data science classes are offered routinely, and an MStat looks great if you're thinking about industry. Try to get involved as soon as you can!