

should be included, but nothing essential should be left out. Also, make sure that you do not overload a slide with too much information. Remember that the audience can only view one slide at a time; you need to think carefully about the flow of information to ensure that our archetypical spaced-out audience member can follow. Finally, try your hardest to make your slides look nice.

Questions from the audience

Receiving a question from the audience can be very stressful, particularly if someone is challenging a statement you made. It is easy to get defensive or nervous. Make sure to relax and try to put yourself and others at ease. If you need to take half a minute to gather your thoughts, then do it! It might help if you prepare the answers for some likely questions in advance, but you should also expect some surprises.

The correct mindset while receiving questions is respect—respect for the question and respect for the questioner. The first step is to listen carefully to the question. It can be useful to repeat the question to ensure that you are understanding it correctly—this will also give you a chance to formulate an answer. If you don't understand it, then ask a clarifying question. Make sure that your answer addresses the question. (Occasionally it might be appropriate to go off on a tangent, but make sure you answer the question first!) If you don't know the answer, it is usually best to be honest about it. On the other hand, you will sometimes receive nonsensical questions, in which case you should do your best to respectfully explain the confusion.

It is not appropriate to get into a lengthy discussion with the person asking the question. If your talk is getting sidetracked, offer to continue the discussion after your talk is finished. And of course, if someone does catch you out in a mistake, be gracious and thankful. It shows they were paying attention!

Final Thoughts

Job talks are stressful experiences. Nevertheless, I would encourage you to view your talk as an opportunity rather than a pitfall. Remember that the audience is on your side—everyone likes to hear a good talk and to be informed about exciting research. And with practice and careful preparation you can put yourself in an excellent position to succeed. Good luck!

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Mentoring for Tenure-Track Interviews

Anthony Várilly-Alvarado

Job interviews for academic positions really matter, and interviewing poorly is easy. Ask anyone who has served in a department's Appointments Committee. For better or worse, our profession is full of informal interactions and inadequately planned talks. Most of us learn by example, and every-day life in a mathematics department can leave a student or postdoc woefully unprepared for tackling the intensity and formality of a job interview. As a mentor to a graduate student or postdoc, it is part of your job to make sure a mentee is ready to tow the fine line between behaving professionally in a formal setting, and letting their personality shine through.

Questions

Most interviews have a similar structure: individual or small group meetings with faculty members, a discussion with the department chair, a meeting with a dean, a talk, and usually one or two meals with department members (typically lunch and dinner). As a mentor, it is important to prepare your mentees to have questions for all occasions, and to encourage them to *ask the same questions to different people in the same department*. It is surprising how inconsistent answers can be! These differences are useful: the interview cuts both ways, and it is important for your student or postdoc to understand if *they'd* like to join a particular department. Differences in the answers to questions can simply reflect the personal style of the people answering questions, or they can be symptomatic of a certain amount of dysfunction. Your mentee will have to decide how much dysfunction they can live with.

Some questions I have either asked or have suggested to a mentee are: are assistant professors expected to advise bachelor/masters theses? How about doctoral students? Do you have regular seminars? How do you fund them? Are there opportunities to teach specialized courses in your field with some regularity? What is your current teaching load for research-active faculty? For administrators: How do you see the Math Department developing/growing over the next five years? Do you fund student/postdoc/faculty

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travel if necessary? Are there dedicated funds to broadly support intellectual activity in the department? What steps towards developing an inclusive faculty have you and the department taken in the last decade? How do you expect to help the department sustain its current undergraduate/graduate program?

Questions go both ways. Your mentee will be expected to answer some as well. Encourage your mentee to look up the work of people who are natural points of mathematical contact in the department where the person is going to interview, and be prepared to engage in mathematical discussions with these people. It's surprising how often there are at least tenuous connections with what your mentee does. This can help both your mentee and the interviewing department assess mathematical fit. Fit can go in many directions: large departments look to have clusters of mathematicians with vibrant intellectual atmospheres. Small departments often prize span. The same candidate can be a great fit at two different departments for opposite reasons. Help your mentee figure out what kind of atmosphere would be best for *them*.

Doing a practice "meeting with a faculty member" with a mentee can help, because sometimes these meetings are very intense. A candidate might be grilled at the board. Not in a qualifying-exam kind of way, but in a way that probes a candidate's vision for the future of their field, and how their research fits into said field and moves said future forward. These meetings are more fun than they sound, as a candidate is really in the driver's seat most of the time. A practice session with your mentee, while likely stressful for both of you, can help them cope later with the natural initial anxiety these meetings bring.

The Talk

A job interview talk is neither a seminar talk nor a conference talk. And although it is usually scheduled during a department colloquium slot, a job talk is not a colloquium talk. A job talk is a story, your mentee is the heroine, their main theorem is the central plot. In general, mathematicians err on the side of modesty in talks, spending a lot of time describing past work on a subject, often at the expense of explaining their own work due to poor time management. Your mentee has a Herculean task that doesn't match the average template of many talks they have been to or given before: they must keep much of the talk truly accessible to an audience with wildly different backgrounds, explain the landscape their work fits into (wherein all due deference to the historical record can be detailed), and convince the audience that their work represents a significant contribution to knowledge, worthy enough for an appointment that could turn into a 40-year connection to a department. At many institutions, the talk is also a way for the faculty to get an idea of how your mentee might be as a teacher. Bad teaching sinks all but the strongest of researchers at a faculty meeting to pick out an offer.

It is therefore imperative to have your mentee practice the talk in front of you. More than once. I find it helpful to invite graduate students, other postdocs, and mathematicians in your department well outside your field as audience members. After a practice talk, the post-mortem takes place in two phases. I first invite audience members, but not the speaker, to tell me their frank assessment of the talk in my office. In the second phase, I talk to the speaker alone, and I try to channel the feedback from the first phase, as well as my own, in a constructive way. Without wanting to, I have brought people to tears. Whether this happens or not, it is paramount to explain to a mentee that they have not let you down, that the point of the conversation is improvement. Mentees spend substantial amounts of time preparing a talk, even a practice talk. They are terrified of letting you down. Recognize this effort, and help a mentee channel their energy in future efforts, in a way that respects their mathematical personality.

To beamer or not to beamer? There is no cookie-cutter answer. You know your mentee; play to their strengths. Some mentees can turn a board into a stunning tapestry, sweeping up the audience with their story-telling. Some do much better with carefully crafted slides. *Importantly: slides do not have to stand alone.* They are a prop, meant to help the audience follow the thread of the story our heroine is telling. The center of the talk should be the speaker, not the slides. To orient this center, there should be *very few words or symbols* in a slide, and each slide should be available for a long time. As a rule of thumb, there should be at most one slide for every two minutes of the talk.

Your own department likely hires in some regular way. Encourage your students and postdocs to attend job talks! Every year, when I send out an announcement for a job talk, I include the following paragraph in my email: "Graduate students: please remember that attendance to these lectures is expected. Please observe them carefully, and engage in discussions of them with fellow students and faculty members (including postdocs!) when they are over. These are real life examples of a situation you may find yourselves in one day. Learning early on what works and what doesn't in these talks is a crucial part of your career development."

Social Aspects

Dinner. Interviews are very tiring: each one lasts 11–14 hours. A candidate is in the spotlight the whole time. Even at dinner. *Especially at dinner.* I encourage students and postdocs to be themselves, and let people see them for who they are, defects and all. A department wants to know what they are getting into if they hire them. That being said, I encourage mentees to be polite and not bad-mouth people or other departments.

Prepare to be shocked. Perhaps due to the informality of our profession, it is not uncommon for a candidate to be asked questions that are *not OK*, and can border on illegal, e.g., are you married? Do you have kids? What does your

significant other do? I encourage students and postdocs to be ready with an answer for these questions (I don't mean they should answer the questions: I mean they should have a response ready to go, e.g., "It is not appropriate to ask that question during a job interview.") It is hard to muster the courage on the spot to say something like this; practicing the answer beforehand can help deliver it when the time comes. These situations are unpleasant and they *will* happen. In my case, when they did, I politely informed the chair of the situation before leaving campus.

Rolling With It

Interviewing is stressful. All the preparation in the world won't eliminate the anxiety a candidate feels the night before or the morning of. But once an interview starts, there is little time to think. Preparing your students and postdocs for the experience will help them successfully navigate the day.



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Credits

Author photo is by Joe Rabinoff.

Keeping Perspective While on the Job Search

Rafe Jones

Applying for jobs is disconcerting—and occasionally exhilarating—even in a normal job cycle. Randomness plays a large role at several junctures in the process, including which positions are open, what kind of candidate each hiring committee seeks, and which applications (often out of hundreds) make it through the early cuts where they frequently are read by only one or two people. Euphoria can accompany an invitation to visit a campus for a job near the top of your list, perhaps followed by despair if the offer goes to another candidate. These tendencies grow more

pronounced in a cycle with a smaller than usual number of jobs, where each open position feels particularly precious.

My goal is to help you push back the tide of stress. First, take the long view. You're playing an elaborate game of chance, and it's only natural that it takes a few spins—and thus a few annual job cycles—for you to get a result that you really want. The path from receiving your doctoral hood to settling into a job you're content to do for the foreseeable future is rarely linear. When the poet Joseph Brodsky wrote, "What should I say about my life? That it's long and abhors transparency," he could have been writing about academic career arcs.

So don't let it get you down when one job cycle doesn't lead to the tenure-track position you'd been dreaming about. This is common, and when it happens you typically have two options. First, you can figure out a way to stay at your current institution for another year; second, you can take a temporary (often one-year) appointment at another institution.

If you're finishing graduate school and there's a graceful way to remain there and get your degree one year later, there are many benefits to doing so. In my experience it is an unspoken convention that $t=0$ in your career occurs when you receive your doctorate. Spending an extra year as a graduate student should only help your future career, as you get another year to beef up your scholarship and teaching. Financial considerations might make this option less attractive, however. If you're no longer a graduate student, it might be harder to stay on at your current position, but sometimes a need for someone to cover additional courses emerges in late spring or summer.

Taking a temporary appointment at another institution has many benefits as well, though it comes with some risks. Benefits include forming new professional relationships and gaining broader experience that can strengthen your application in future job cycles. If your temporary appointment is the kind of position you would like long-term, a letter of recommendation from a new colleague can be quite useful—especially if your colleague is well connected in the math community or well known for excellent teaching. A letter with detailed first-hand comments carries the most weight, so make sure to arrange for your letter-writer to observe your teaching, preferably more than once. If you're teaching online, you might consider inviting your letter-writer to sit in on a virtual class meeting, or providing sample course materials.

On the other hand, temporary appointments often come with heavy teaching loads that can make it a challenge to maintain research momentum. It's also natural to want to pour yourself into your new institution: to not only teach brilliantly but also be a departmental hero who organizes extra events, takes on independent studies, and has the evening office hours students love. These activities will be massively—and sincerely—appreciated by the faculty and students at your new institution. But you should be

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