

proofs. After understanding the main new idea in a proof, Rob would often zero in on some key technical aspect trying to make sure that not only it is absolutely correct, but also explained in the most efficient way possible. Once again he would encourage us to keep our audience in mind and make our arguments clear enough to convince a graduate student and sound enough to withstand careful inspection by a senior mathematician who is in a very bad mood.

On applying for jobs. In addition to helping students navigate graduate school, a good advisor will also assist them as they move through the next steps of their careers. Some of Rob's advice includes:

Complete the transition to postdoc quickly and fully: "Go to this conference as a young mathematician, not a student. Saying that the theorem is from your thesis makes you sound like a student. You are a junior mathematician now."

A good research statement should be easy to read and appeal to a wide audience: "Make your research statement shorter. Use bigger font. Get your main theorem on the first page."

When deciding where to apply and ultimately accept a job offer, he reminds students to look beyond what they see on paper and try to make evidence-based decisions. If you are unsure about accepting an offer, you may visit or make a phone call to a senior faculty member and have a candid conversation where you can make a human connection.

On advising. One of the aspects of Rob's advising that is most commonly praised is his constant generosity in sharing his ideas and insights and his determination to give credit where credit is due, to colleagues and students alike. Listening to him discuss his own students' work during his talks is particularly instructive. For example, in a talk in which he mentioned a result describing the multiplier ideal of a monomial ideal, he referred to it simply as "a beautiful result of Howald," thus letting the theorem stand on its own, as the result of a fellow mathematician, instead of referring to it as something proved by "my student." We will remember the long hours that Rob devoted to teaching us mathematics and helping us along with his advice and ideas, but maybe more importantly we will also remember how he let us and our results stand on our own.



Christopher Hacon



Jessica Sidman

Credits

Photo of Christopher Hacon is courtesy of Ana Jovanovic-Hacon.

Photo of Jessica Sidman is by Jordan Tirrell.

Advice for the Virtual Job Market

Kristin DeVleming

While I am in no way an expert on the topic, I successfully navigated a remote academic job market in 2020–2021. Thus, I have compiled some advice for the job market, particularly in the virtual setting. The pandemic has offered unique opportunities for academic change, and it is important now more than ever to be technologically capable and adaptable to new circumstances. As we anticipate future change, we should be prepared for more virtual seminars, classes, and even interviews, and experience with these types of online communities is a valuable attribute for job candidates. Much of the advice below applies to the job market in general, but I have tried to suggest skills and tools to develop that pertain especially to the virtual world.

Pre-application Season

If you do not already have one, make a website. In the words of a wise collaborator of mine, "If you don't have a website, you don't exist!" The existence of a website dedicated to YOU means that interested parties can find out who you are, where you are, and the types of things that you think about. It is also a place for you to advertise your own work and the fact that you are on the job market. At a minimum, your website should include:

- Your name, university, and status (like: "third year graduate student" or "postdoc") and a *picture of yourself*. Having a picture is incredibly valuable for those looking at your website—they may realize that they recognize you from some conference/talk/class/etc.
- Some key words describing your research and links to your preprints and publications, if you have already written papers. If not, you can include lecture notes that you've taken, expository pieces that you've written, brief descriptions of your current work, or simply summarize some problems that interest you!
- Other relevant information: are you involved with outreach? graduate student seminars? community activities? Your website should be a snapshot of

Kristin DeVleming is a postdoc at the University of California, San Diego. Her email address is kdevleming@ucsd.edu.

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you, and anything that you think is important for others to know should be included.

Beyond this, you may wish to include recordings of talks that you have given, student evaluations from courses that you have taught, or personal information that you would like others to know. Having a clear, professional website indicates a level of technological competence especially valued in current times.

If you're not part of the MySpace generation and reading this with worry that you know next to nothing about HTML, don't panic! There are many things that can help with this: for example, you can use tools like Google Sites¹ to build a website in a way that requires minimal computer know-how. Once your website is made, make sure it is linked to your university's site, so that someone can look you up directly from just knowing your institution.

Once you exist on the internet, begin to work on your application materials. For US positions, you will generally need a **research statement** summarizing your past, current, and future work; a **teaching statement** that describes your teaching experience and philosophy; a **diversity statement** on your commitment to and efforts to improve diversity, equity, and inclusion in the mathematics community; a **cover letter** specific to each position that you are applying for; a **CV**; and **letters of recommendation**. For your letters, you should ask your writers well in advance of any deadlines.

In general, start early and get as much feedback as possible, particularly on your research statement. Give your research statement to your advisors, mentors, and colleagues or classmates, including those outside of your subject area, and ask for their comments. In your teaching statement, you can use this opportunity to discuss your experience (and experiments) with online teaching. You may wish to compare your in-person and online teaching styles, with student evaluations as evidence for your successes. For the diversity statement, I encourage you to read an excellent guide from Rice University, "Suggestions for composing a Statement for Diversity, Inclusion, and Equity."² The past year has brought unique opportunities for self-reflection, and your lived experiences may be an excellent source of inspiration for this statement.

Once your materials are close to completion, post them on your website! Even if you do not want to post your materials publicly, you can include a page on your website with the material that is not linked anywhere from the rest of the site. When you apply for jobs, you can then include the link to this page in emails to different faculty members, and they can find all of your information in one convenient place.

As you prepare for applications, you should also begin to advertise your work. This will typically come in the form of

giving seminar and conference talks. As a graduate student or postdoc, you will be invited to speak in different places: say yes!³ You may also need to invite yourself to speak. Especially in the virtual world, our interaction with the rest of the mathematics community has changed dramatically. While in-person conferences came with the opportunity to informally discuss research with more established mathematicians, that does not exist in the same form online. For better or worse, this means that you need to put yourself out there in new ways. You can reach out to collaborators asking to speak at their seminars or similarly contact the organizers of seminars that you regularly attend. If you ask to speak and let the organizers know what you would like to speak about, as long as there are available slots on the seminar calendar, there is essentially no cost to them to say yes.

If you are scheduled to give a talk, especially if you are a graduate student with less experience speaking, practice! Invite your classmates or colleagues to listen and take their feedback seriously. If this is virtual, you will need to practice not only the talk, but also your method of delivery (more on this later).

Finally, begin to seriously reflect on your job priorities, so that you are prepared come application season. If you are willing to go anywhere and everywhere, great. However, it is most realistic to have some restrictions: you may be an international student wanting to leave the US (where the market is very different) or stay (where visa issues will come up), you may have location restrictions based on where you feel safe and welcome or nearby family/caretaker responsibilities, or may be facing a two-body problem moving with a partner and navigating their career needs. Knowing your personal priorities, needs, and deal breakers upfront is important before you even apply for a job.

Applying and Interviewing

As of now, most US positions are advertised and applied to on mathjobs.org.⁴ New positions are added regularly during peak application season, and most application deadlines range from mid-October to mid-January. You can continually update your application materials on mathjobs and your letter-writers will also upload their letters directly to mathjobs.

In-person, you may have had opportunities to advertise your job-seeking status at conferences. Without the same type of interaction, you should still notify people! If you are applying for postdocs, email the person that you would be interested in having as a mentor. Be professional and include your research statement or most recent paper. You will not always get a reply, but that doesn't mean that your message was unread! If you are applying for tenure-track or

¹<https://support.google.com/sites/answer/6372878?hl=en>

²<https://math.rice.edu/sites/g/files/bxs3121/files/inline-files/DIE-statement-suggestions-2.pdf>

³Say yes within reason. Do not say yes beyond your personal and professional bandwidth.

⁴<https://www.mathjobs.org>

other positions, email faculty with similar research interests notifying them that you are applying and drawing their attention to your application.

When you get to the interview stage, prepare by researching details of the department and institution before putting together a list of questions tailored to the specific place. You will be given the opportunity to ask questions and you should not waste this; it enables you to learn important information and demonstrate how much you know about the institution. For example, you may wish to ask questions about teaching or the tenure process, or more specific questions like, "I noticed that you don't offer an algebraic geometry course every year. Is this something that you would be open to adding to your curriculum?"

When you are giving a job talk, practice and prepare. In most settings, you should have a short description of your research that you can deliver to anyone in five minutes or less. If you are interviewing for tenure-track positions, you should have multiple versions of this: one for those with some familiarity with your field, one for mathematicians in all fields, and one for non-mathematical people that you may meet (like Deans!). If you are giving a job talk, which is often a colloquium-style general audience talk, ensure that your talk is accessible to mathematicians far from your field. A great way to do this is to invite your fellow classmates or postdocs, from all fields, to a practice talk. If the talk is virtual, you will have to determine the best method of delivery: slides, handwritten on a tablet or projected via a document camera, or some combination. If you are planning on using a camera that records you at a blackboard, test it and focus it early. If it is too far away or out of focus, it will be difficult to read the board. You should also test your camera and microphone in advance.

For a virtual interview, be prepared with fully charged devices in a well-lit, relatively private and quiet space. Some institutions may even offer you funding to access such a space (e.g., funding to check into a hotel room for a two-day interview). You should be given a schedule ahead of time and can suggest your own edits, based on the realities of your own home life. You should also be sure to get an emergency contact phone or email in case of an internet outage or other technical difficulty.

After submitting your application or after interviewing, be patient! It seems that everything is moving at a different speed in the virtual world. Just because you don't hear anything immediately doesn't imply bad news.

Post-market

Did you get an offer? Great! Congratulations! If your interview was virtual, see if you can get an opportunity and funding to visit the campus. Enjoy basking in the glow of employment! If you get more than one offer, be considerate in your decision time: other applicants next in line are waiting for you to accept or reject the position. If you did not get an offer, keep your head high. The job market can be

absolutely defeating, and there is an unfortunate amount of luck needed during the process. You have gleaned valuable experience just going through the application cycle. No matter what the outcome, reflect on the process. You may be on the market again in a few years. If you had new ideas to include in your research statement or teaching statement, add them now! You can revise your materials again in a few years when you need them, which will be easier than starting from scratch. Include any job talks that you gave on your CV. Thank your letter writers for their time and effort. You also may have discovered things that you are looking for in a job or location (or, new deal breakers) as you talked to faculty at different institutions. Keep these in mind for future applications!

While the full consequences of the COVID-19 pandemic are yet to be understood, it is clear that skills navigating the virtual world are necessary in the current market. It is important to make yourself visible online, and supplement this visibility with evidence of your technical competency. While this may feel like one more daunting thing on top of a mountain of job application to-dos, I hope that we as a community realize the difficulty of this process and come together to support each other now more than ever.



Kristin DeVleming

Credits

Photo of Kristin DeVleming is courtesy of Kristin DeVleming.

Applying for a Postdoctoral Research Assistant Professorship

Dick Canary

In this brief article, I will offer advice on how to apply for a postdoctoral assistant professorship at a research-oriented university. I will base my advice on my experience supervising the postdoctoral hiring process at the University of Michigan in the academic years 2005–2007, 2008–2011,

Dick Canary is a professor of mathematics at the University of Michigan. His email address is canary@umich.edu.

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