

Applying for a Job at a Small Teaching-oriented Undergraduate Institution

As a newly minted PhD in mathematics, you probably enjoy *doing* mathematics. For many people this means traditional scholarship and publication. But another natural consequence of loving your discipline is the desire to tell others about it. For some of us, this takes the form of teaching at schools that focus on educating undergraduates. It's appealing to share the beauty of the subject with talented students who are experiencing it for the first time, and maybe turn some of them on to mathematics.

Careers in the Math Sciences

By Kurt Bryan

This article is directed to recent PhDs who are looking for positions at undergraduate-focused schools; it is based on my 17 years of experience in helping select and interview candidates for faculty positions at the Rose-Hulman Institute of Technology. One important thing I've observed is that the kind of application that will get you a position at a tier-one research school might not get you in the door at a school that focuses on undergraduates. In a short article, I can't tell you everything you might need to know, but I can highlight the salient differences between jobs of this type and more research-oriented positions, and ways in which your application should reflect this.

The Application

Obviously, at a school whose primary mission is educating undergraduates, most of your energy is invested in teaching! This doesn't mean that scholarship isn't important—it usually is. But it should be loud and clear, right up front in your cover letter, that you're looking for a position in which you can focus on teaching mathematics to undergraduates. Give evidence that this is in fact your passion by briefly highlighting your teaching experience in graduate school, as a postdoc, or in any other related setting. You can elaborate in a separate statement on your "teaching philosophy," as discussed below. Because departments at undergraduate schools are often relatively small, faculty cannot afford to be narrow specialists, especially when it comes to teaching. If your mathematical interests are broad and you're willing to teach a wide variety of courses, you should definitely highlight these qualities. Learn about the school and department, and state what it is about the school that appeals to you. The cover letter is also an appropriate place to mention your research area. Again, you can provide details in a separate statement.

Most schools ask candidates to write a brief statement on their "teaching philosophy." I've read a lot of these; many of them, though superficially well written, are rather general, lofty statements about inspiring, motivating, or empowering students. You're better off if you can give concrete examples that illustrate how you approach teaching mathematics. Do you like to bring modern applications of mathematics into the classroom, even at the introductory level? Give specific examples of how you've done so! Do you believe in running an active classroom that gets students involved beyond the level of listening to lectures? Again, give examples of successful class activities you've used. The more specific you can be in describing how your philosophy translates into action in the classroom and well-prepared students, the better. Two pages should give you plenty of space to explain your teaching philosophy.

The amount of scholarship expected from faculty at such schools varies considerably, but most will also want a statement concerning your research. Again, a few pages outlining what you've done and what you hope to accomplish in the next few years will be sufficient. Bear in mind that the faculty who read the statement are unlikely to be specialists in your area. Even if a Fields Medal isn't in your future, make it clear that you have a plan to develop as a scholar. And while scholarship at most undergraduate institutions is valued in and of itself, scholarship that improves undergraduate education—by trickling down into the classroom or senior theses, or by involving students as co-authors—is esteemed above all else. If you have plans to involve undergraduates in your research program or have already done so (perhaps, while still in grad school, you mentored undergraduates doing research—something I highly recommend) you should definitely mention this, in the research statement and cover letter!

Seek out recommendation letter writers who can meaningfully comment on your progress and abilities as a teacher, beyond simply summarizing the numerics of your teaching evaluations. But don't forget to include recommendations from people who are knowledgeable about your research.

The Interview

Let's say you've landed an on-campus interview—what now? First, learn all you can about the department (if you haven't already). Does the teaching load consist mostly of service courses for other majors? What upper-level courses does the department offer? What do math majors do after graduation? In the interview, emphasize that you're capable of and willing to contribute to the mission of the department—by teaching a wide variety of courses, advising undergraduates, performing other service activities, and taking the lead when leadership is needed.

Possibly the most difficult aspect of the on-campus interview at such a school (certainly at Rose-Hulman) is the ubiquitous "job talk." Find out what the department expects, and who will be in your audience. You usually have the daunting task of showing that you can connect with an audience of undergraduates and non-specialists while simultaneously making it clear that you're a serious mathematician, knowledgeable about your area and with substantial work to your credit. It's not an easy balancing act. One approach I've seen used successfully is to take a fundamental but accessible mathematical tool used in your research—e.g., fixed-point methods, Fourier analysis, numerical methods for linear systems—and revolve the talk around that idea. Begin by connecting to techniques undergraduates are likely to have seen in their coursework, give some examples, and then work your way up to how you use the tool in your research. If possible, give your talk to an undergraduate audience ahead of time!

Give concrete examples that illustrate how you approach teaching mathematics. Do you like to bring modern applications of mathematics into the classroom, even at the introductory level? Give specific examples of how you've done so!

If you were inspired by some of your college math professors, and if you want to follow in their footsteps, you'll find teaching at an undergraduate-focused school incredibly rewarding. If you choose to follow this path, I hope my advice helps you land your dream job!

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