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Congrats you're ABD! Now what?

Alissa Crans

Loyola Marymount University, acrans@lmu.edu

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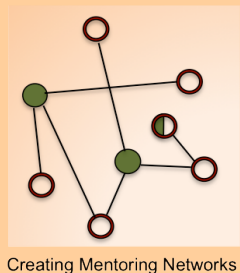
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E-MENTORING NETWORK IN THE MATHEMATICAL SCIENCES



Creating Mentoring Networks

Providing Mentoring to underrepresented groups in the Mathematical Sciences

Undergraduate * Graduate * Postdoctoral * Faculty

December 2012

I got accepted to a PhD program! How do I choose where to go?

Congrats – You are ABD! Now what?

Mentoring a postdoc can expect

Thoughts about promotion to Full professor

I got accepted to a PhD program! How do I choose where to go? *By Ricardo Cortez*

It is a good time of the year to discuss some of the considerations to keep in mind when deciding which graduate school to choose. I suggest that you take into consideration (a) the size of the PhD program, (b) options offered for students with your academic background, (c) the type of funding offered, and (d) your impression after a visit.

The size of the department: It is perfectly reasonable for entering graduate students not to have an exact idea of the topics they would like to address in their research. Some students have narrowed down their choices more than others, and this can make a difference when it comes to choosing a graduate program. A large department (a state school, for example) usually offers a larger variety of graduate courses than small departments and may have faculty research interests that span a larger list. This can be advantageous to students who need time to narrow down their own research interests. A large department also offers more choices of advisors once a specific area has been selected. On the other hand, students who already have more specific research interests before starting graduate school (e.g. they are interested in differential geometry), may benefit just as much from choosing a department that has a strong research group in that area even if the department is small and even if other research areas are not well represented.

Options they offer: Students entering a particular graduate program come from all over the world, which implies that they come with different academic backgrounds. A student that received a B.S. degree from a low-tiered institution and chooses one of the top 5 graduate programs is likely to have a different experience than another student who graduated from a highly-ranked institution. Some graduate programs understand this issue and have in place elements that support the students. For example, some programs offer a “pre-PhD” program (sometimes also called “Year 0”), which is a year of upper division math courses to strengthen the students’ academic background before they officially start the PhD program. This is tremendously beneficial to students taking a big step up relative to their undergraduate institution. All programs require that written and/or oral exams be taken during the first two years. All students, but especially those with incomplete academic backgrounds, benefit from exam preparation seminars or workshops that are offered in some departments. Teaching experience has become crucial when looking for jobs after the PhD. Simply having been a teaching assistant is not enough to demonstrate teaching experience. Many departments recognize this and make available to their graduate students opportunities to teach their own courses before they graduate.

Type of funding offered: You should not have to pay to get your PhD. Competitive programs will provide funding as part of their admissions package. I would strongly advise students to only consider offers with funding. The funding offers, however, can vary significantly. The best-case scenario is an offer that waives tuition (almost all offers do) and provides a fellowship for at least 4 years. The fellowship should be enough to cover your living expenses so that you can concentrate full time on your studies. Sometimes the offer includes 4-5 years of support as a combination of a fellowship some years and a teaching assistantship (TA) other years. A TA means that you have to work assisting an instructor by running lab sessions, holding office hours, and grading. This is still a good offer. A lesser offer is one that provides a fellowship or TA but only for 1 or 2 years and makes no promises about other years. You should interpret this to mean that some years you will be on your own to make enough money to live on. Anything that takes away time from your studies is undesirable. Finally, an offer that provides tuition waiver but no stipend at all is not competitive.

I suggest you consider two offers that provide the same number of years of support as equal even if the total amount they offer is different. If school X offers 5 years of support with \$20,000 per year and school Y offers 5 years of

Your impressions: When considering the graduate program to choose, make sure you visit them first. Many programs have organized visit days that they prepare for their prospective students. Try to go to them. If you can't go or the department does not offer an organized visit, call the graduate coordinator and tell him/her that you are very interested in their program but would like to visit before making the final decision. Ask them if they can pay for your visit. They are likely to agree. When you visit, talk to as many people as possible, in particular, talk to current graduate students of all levels (without professors present). They will tell you what it is like to be there as a student. Be aware that all organized activities are designed to make their department look great so ask quantitative questions too. If you ask "are graduate students generally happy here?" the answer will be "yes." But if you ask "how many students failed the written exams in the last 5 years?" then the answer has to be more factual and more informative. You should ask graduate students in your own undergraduate institution to help you generate some questions before you visit prospective graduate programs.

Congrats – You're ABD! Now what? *by Alissa Crans*

As you might suspect, I found this extremely overwhelming! Suddenly, I felt a complete lack of direction and focus. How could I ensure my list didn't degenerate into a mess like the one below?



In this unstructured post-exam period when your only job is to create new mathematics, it's easy to lose focus, become frustrated, doubt your abilities, and feel completely alone, any of which might be enough to convince yourself to leave your program. Fortunately, I had (and continue to have) wonderful mentors who offered valuable advice for this crucial, delicate time in a graduate student's life:

Break-up “write thesis” into smaller, manageable tasks

Of course, the beauty of my study lists was that they contained nice, bite-sized items, some of which I could accomplish in an afternoon, such as making sure I knew all the definitions from Chapter 5 of Hungerford. Having the single item “work on thesis” on my to-do list was too vague and overwhelming, so instead I listed concrete, specific tasks like “Write-up the proof to Theorem 1” or “Work out an example to illustrate Definition 3” or “Revise the first three paragraphs of the Introduction”. For times when I was really stuck on the mathematics, I gave myself a break and included “Add captions to Figures 1 – 10” on my list.

The daily triumvirate

My advisor always told me that every day I should

- a) work on new mathematics,
- b) write-up work I’d already done, and
- c) learn “old stuff” that had already been published.

While I thought this was great advice in theory, it didn’t work for me in practice. I found myself getting too caught up in any one of these activities to force myself to stop and begin working on the remaining two. I did, however, place a high priority on (b) and didn’t wait until after I had proven all my theorems to begin writing-up my results because I was afraid that I would forget the fine print and nuanced nature of some of my proofs.

Talk about your work

I found that articulating my work verbally to others – my graduate student friends and mathematical brothers, or during a department seminar or at an AMS Sectional Meeting – both formally and informally, helped with my writing. Talking about my work required thinking carefully about how to best explain material I knew better than anyone else in the world to others with different backgrounds. This definitely helped with my exposition and clarity.

Treat your thesis work as you would a class (or other obligation)

As suggested by the comic above, I found it very easy to let other activities take priority over writing my thesis. This isn’t surprising, as we tend to give our attention to that which is most urgent or right in front of us. For example, when a student showed up at my office with a question related to the material appearing on the quiz later in the day, I quickly and easily convinced myself to stop working and help them since I knew it would feel good to do so! But, if you want to finish your dissertation, you can’t do this on a regular basis. You wouldn’t ditch class or a meeting with your advisor to help a student that dropped by your office, would you? Thus, I decided to schedule my thesis work into my day as I did with my other obligations: classes, discussion sections, grading, etc. If your office is anything like mine was when I was a grad student, there are five other students in there with you, meaning that you likely don’t have much quiet, alone time. So, go to the library, sit in an empty classroom, stay at home—whatever you need to be productive!

Network!

While you’re working on your thesis, quite possibly the worst thing you can do is tell yourself that you’re just going to hunker down and chain yourself to your desk until you’re done! Go to conferences in and out of your field, AMS Sectional Meetings, and the Joint Math Meetings. Attend a summer program specifically for graduate students at places such as Park City, the Institute for Advanced Study, or one of the math institutes. At this stage in your career, you want to meet as many people as you can (in and out of your field)! This is a good way to find letter writers outside of your department, and, you never know who might offer you a job or know someone who knows someone that can offer you a job!

In addition to the advice I was given and have shared above, there’s plenty out there on the web. Some of my favorites are:

- <http://math.ucr.edu/home/baez/advice.html>
- <http://terrytao.wordpress.com/career-advice/> (be sure to click on all the links!)
- <http://terrytao.wordpress.com/advice-on-writing-papers/>

You’ll find what works for you. And when you do and you finish your dissertation, be sure to take a moment and relish the act of crossing it off *your* list.

Mentoring a postdoc can expect. *by Ricardo Cortez*

The type and quality of mentoring that a postdoctoral researcher receives varies substantially depending on several factors. The main factors are the faculty supervisor and the type of postdoctoral position. There are departmental

postdocs, which are positions offered and funded by the university. Depending on the size of the department there may be one or two postdocs of this type or dozens. In this case, it may not be clear who the faculty supervisor is as these postdocs are sometimes shared by research groups. On the other hand, postdoc positions funded by grants must have a clear supervisor who is responsible for the professional advancement of the postdoc.

Every National Science Foundation (NSF) grant that funds a postdoc requires a Postdoctoral Mentoring Plan. Part of the instructions read as follows:

*"Each proposal that requests funding to support **postdoctoral researcher** must include, [...] a description of the mentoring activities that will be provided for such individuals. [...], the mentoring plan must describe the mentoring that will be provided to all postdoctoral researchers supported by the project, [...].*

Examples of mentoring activities include, but are not limited to: career counseling; training in preparation of grant proposals, publications and presentations; guidance on ways to improve teaching and mentoring skills; guidance on how to effectively collaborate with researchers from diverse backgrounds and disciplinary areas; and training in responsible professional practices."

This means that every postdoc funded by an NSF grant can expect detailed mentoring of the type listed above. More specifically, the type of mentoring activities that researchers promise in their proposal are:

- 1. An Orientation** that includes discussion of expectations, amount of time and independence the postdoc will have, productivity in terms of publications and presentations, interactions with others, work habits, etc.
- 2. Career Counseling** that will be provided to the postdoc, including skills and experience that need to be developed. This may also include guidance in the preparation of publications and presentations.
- 3. Preparation of Grant Proposals** that the postdoc will submit. This may include attending workshops, learning best practices, identifying key research questions and objectives, etc. It may also include sharing successful proposals by the faculty supervisor with the postdoc.
- 4. Teaching and Mentoring Skills** that must be developed. These are often periodic meetings with other postdocs and graduate students that can share experiences and assist one another.
- 5. Job advice** when it comes time to apply for permanent jobs and going on interviews.
- 6. Technology Transfer** and other institutional policies at the university. The postdoc should become familiar with university confidentiality requirements and other policy.

If you are a current postdoc, keep in mind these points and ask your supervisor how to benefit from mentoring similar to the items described here.

Thoughts about promotion to Full professor. *by Rodrigo Bañuelos and Lisa Fauci*

Many so-called *Research One* departments require a large body of work and evidence of professional activity beyond publications to consider a person for promotion to full professor. This work typically includes

- (1) Research articles published in peer-reviewed journals
- (2) Invitations to speak at well recognized meetings, including a good number of international invitations
- (3) Excellent teaching record and further evidence of involvement with undergraduate and graduate teaching (development of courses or other class materials and the supervising of Ph.D. students)
- (4) Evidence of research funding as appropriate to the culture of the discipline (that is, a substantial amount of funding is expected in some areas while some others require less)
- (5) Evidence of interdisciplinary work (or the ability to work with others) is of great importance these days in many fields, including applied mathematics. But mathematicians working in pure areas can still get away with "little" evidence that they have done this
- (6) Many universities (and many committees) are paying much more attention to issues of diversity. If you have done substantial work in this area, make sure it is well organized and included in the appropriate place in your document

Letter writers: Promotion to Full professor requires external letters of support and you are usually asked to provide names of possible letter writers. You should know that only some letter writers will be chosen from your list and others will be chosen by your Department and by the Promotions Committee. It's extremely important that people who write your letters of recommendation are knowledgeable not only about your research activities but, if possible, about some of the many other aspects of your professional life. Getting letters from "famous" people is useless (and even counterproductive) if they do not know your work.

Talk to mentors: Having mentors in your department whom you trust, who know the system well and who are knowledgeable about the entire process - not only departmental but university-wide - is extremely, extremely, important. Mentors outside your university are also very valuable for getting general advice and getting "things off your chest." However, you should remember that they do not generally know the specifics of your department to be able to advise you on particular policies that may be in place at your institution. Different departments have different cultures for promotions and while university policies dictate certain uniformity, things can vary widely. Knowing the culture of your department and having someone you trust who is knowledgeable and can tell it to you straight is of paramount importance.

Avoid falling into the comparison trap: You might be tempted to think "I have as many articles, Ph.D. students, research dollars, etc., as X and they are promoting him/her now, but they are not promoting me!" Paying too much attention to colleagues' cases can make you very unhappy. The fact is that you usually do not know the details of their case. Perhaps another institution wants to hire X and your department decided that in order to keep her/him they have no choice but to promote. Fair or unfair, another comparable (or better) university's desire to hire X is a very strong argument when making cases for promotions. Because of this, always make sure you communicate to your department chair (head) any interest that colleagues at other universities may show in attracting you to their place. These "interests" do not have to be completely "official" (that is, you do not need an actual offer letter) for you to communicate them. *A word of caution:* do not use these "interests" as bargaining chips unless you are willing and ready to move to another institution.

Timing: While you don't want to wait more than the "necessary" time, don't pull the trigger too soon. Promotion from Associate to Full professor can be a real pain for many people (and it is in many departments). Many people make the mistake (because of wrong advice from some well intended colleagues) of requesting to be considered too early. I always tell people that it is not only the first step that counts (that is, you may be successful at the department or even the college level) but all steps are equally important because failure at one means total failure.

Persistence: If you have an unsuccessful attempt, it is extremely important to talk with as many people as you can in the university leadership structure who know exactly why your case was unsuccessful. This should include, at the very least, your department chair (head), the dean of your college, and possibly the provost. While you cannot ask (and they would not tell you anyhow) about specifics on votes, discussions, etc., you can ask questions about what were the deficiencies in your case that led to the failure. Document all this and discuss these issues with your mentors and with your department head. Have a plan to address the problems and discuss the plan with, again, mentors, chair and dean. Unless there were some minor problems (some work that was listed as submitted is now accepted and in print and this would have made all the difference), I never recommend trying again the following year. NOTE: It is extremely important that you understand university policies regarding second or third attempts. Many places require that the same people who wrote letters for you the first time write again (others can be included but the "original" writers must be asked), some places require that certain documentation from the first attempt be included in the second attempt, etc.

Summary by LF: Full professor in a research institution means you are internationally recognized for contributions to your field. You should be able to have clear answers to: *What is your main contribution that you are known for? Is there a cohesive body of work, more than one or two papers, that can be pointed to? Has your body of work expanded significantly from when you got tenure? Do you have grant funding and have you trained graduate students in your area -- evidence that you are indeed one of the world's experts in the field?* When there is clear evidence of the above, it is time to ask to be promoted. For research-active faculty, this is typically about 5 years after tenure.

Reader Resources

E-Mentoring Network in the Mathematical Sciences is designed to address relevant questions that students, postdoctoral researchers and junior faculty may have regarding their own advancement in mathematics. Its goal is to reach as many readers as possible, especially those who may not have sufficient mentoring at their current institution. We publish mentors' opinions as provided in order to stimulate discussion. We hope you will be active in this process.

The topics addressed in this publication are kept relevant by requesting suggestions from readers. Please send mentoring topics to mathmentoringnetwork@gmail.com and look for responses in future issues.

Visit <https://sites.google.com/site/mathmentoringnetwork/> for more information, resources, older issues and more. Follow us on [Facebook](#) for additional conversation and in-between-issues mentoring.

Do you find this publication useful?

Send your feedback to mathmentoringnetwork@gmail.com to help us improve this publication. If you are a mentor and would like to contribute to a future issue, we would like to hear from you.

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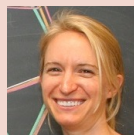
Issue Contributors



*Dr. Ricardo Cortez, Professor
Mathematics Department
Tulane University*
<http://129.81.170.14/~cortez/>



*Dr. Rodrigo Bañuelos, Professor
Mathematics Department
Purdue University*
<http://www.math.purdue.edu/~banuelos/site>



*Dr. Alissa Crans, Associate Professor
Mathematics Department
Loyola Marymount University*
<http://myweb.lmu.edu/acrans/>



*Dr. Lisa Fauci, Professor
Mathematics Department
Tulane University*
<http://tulane.edu/sse/math/faculty/lisa-fauci.cfm>