

THE ACADEMIC JOB SEARCH IN MATHEMATICS

ABSTRACT. The purpose of this document is to help graduate students about to graduate to prepare for the postdoctoral application process. More, non-math focused information can be found, e.g. on <https://www.gradstudies.pitt.edu/career-planning-roadmap-doctoral-students>, and Pitt students have access to <https://www.interstride.com/>

TLDR:

- **Apply for everything.** Applying does not mean you are committed to accept. If you have applied for fewer than 100 places, you need to do more.
- Letters of reference: Positive people write positive letters. Negative ones write negative letters. Self-absorbed people write about themselves, etc. **Ask positive people who know you.** Give them a 1-page list of important points in your record that you hope they will stress.
- Faculty are lazy: most won't download your full application. Most will google you and check your webpage instead. **Have a great professional web page!**
- You have an idea now where you want to go, but it will change when you actually visit. So... **Apply for everything!**

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3.10. Japan

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Now that you have almost finished your PhD, the next step is to get your first job. This document is an attempt to offer orientation in how to approach the job application process. We focus mainly on postdoctoral jobs, but also discuss faculty job applications.

Your PhD advisor is your primary resource for exiting the PhD program by successfully obtaining an academic job.

1. BASIC IDEAS

What is a postdoc? “Postdoc” can refer to any term-limited academic job that does not have an expectation of renewal¹. There are a wide variety of kinds of postdoc jobs. The typical candidate for a postdoc is a newly graduated PhD or within a few years of graduation. In principle, a postdoc is meant for mathematicians to mature in their research and educational work to the point that they can qualify for a faculty position. There are many different flavors of postdocs with varying emphasis between research and teaching. Some are not even called postdocs.

What do you mean that some postdocs are not called postdocs? There have been unfortunate cases in which a newly graduated PhD student did not apply for any job that did not have the word “postdoc” in the title. Really “postdoc” is a catch-all term, and the actual job title can vary over many of the following options.

- Postdoctoral associate/fellow
- Research fellow
- Visiting/Acting/Temporary/Term assistant professor
- Assistant professor (!!)²
- Instructor (or postdoctoral instructor, etc)
- [*Fancy-sounding name*] assistant professor, e.g.
 - C.L.E. Moore instructor (at MIT)
 - Veblen research instructor (at Princeton)
 - Zassenhaus assistant professor (at Ohio State)

The last category of “named” postdoc jobs can be tricky because the other jobs that have fancy names are big-deal professorships. You just have to read the job ad to tell these apart.

What are the main types of postdocs? There are many kinds of postdoctoral jobs. Which types you should apply for depends on what sort of career direction you are aiming for.

¹This is a rather distinct meaning of the term than in the natural sciences, so if you discuss math postdocs with them, be prepared for the difference. Postdocs in natural sciences are considered to be research trainees, are usually grant funded, and work under the direction of a professor and on research projects that the professor is willing to support. In contrast, postdocs in the mathematical sciences are generally expected to own their own research projects, and are only loosely considered to be trainees

²As you probably know, at least in the US assistant professor is generally a title for a normal tenure-track faculty appointment.

- *Postdoctoral fellowships.* Postdoctoral fellowships, as opposed to a postdoctoral job, refers to a funding source that someone applies for and can carry to an institution of their choice. In the USA, the most common postdoctoral fellowship is sponsored by the NSF³ Mathematical Sciences Postdoctoral Research Fellowship (MSPRF). The NSF MSPRF is open only to US citizens and permanent residents. There are various postdoctoral fellowships around the world, such as the Marie Curie in the EU.
- *Departmental research postdocs.* This is the most common kind of postdoc job in the USA and Canada. They typically carry a teaching load of no more than 2 courses per academic term, though some require less teaching than this. These jobs are offered on a departmental basis.
- *Departmental teaching postdocs.* Often at liberal arts colleges but also at universities, these are teaching-focused postdocs. As far as distinguishing these from research postdocs, you can make this distinction by either reading the job ad carefully and/or noting the teaching load: even if the job ad does not declare itself as a “teaching” postdoc, a job with 5 or more semester-length courses per academic year would generally be considered to be a teaching postdoc.
- *Grant-funded postdocs.* In this case, some professor holds a research grant that has funds to employ a research postdoc working on grant-related research. These job ads usually name the grant holder and the particular kind of grant-related research the postdoc should be working on, though it usually does not imply that this postdoc must work on a project selected by the grant holder. In some countries professor positions come with a ‘personal’ postdoc.
- *Postdocs at research institutes.* The most common such postdocs in the US are at the Institute for Advanced Study and SLMATH (formerly MSRI). These research institutes do not have students, so there is no teaching load for these postdocs.
- *Postdocs related to industry.* Institutes which focus on projects and applications can also hold postdocs position. One example will be the Flatiron Institute, which is part of the Simons Foundation. Many tech companies, such as Google and Microsoft, have either their own postdoc fellowship, or joint postdoc fellowship with universities.
- *Research fellowships.* These are much like the postdocs at research institutes, above, but they are typically hosted by universities and open to *all* academic fields. Examples include the Junior Fellowship at the Harvard University Society of Fellows, and research fellowships hosted by the many constituent colleges of the University of Oxford and the University of Cambridge. Because these research fellowships are not specific to math or the mathematical sciences, they are not posted on mathjobs!

Further sources include:

- <https://irinagain.github.io/resources/> (bottom of page)

What do I do to find a postdoc? You need to arrange for references, prepare your application, find job ads, and apply to them.

³NSF = National Science Foundation of the USA.

How do I find postdoc job postings? When are they due? The most comprehensive source of postdoc jobs is the website

<https://www.mathjobs.org/>

Some international postdoctoral jobs do not appear on `mathjobs`, and we will mention these below.

Among those jobs posted on `mathjobs`, some allow applications on `mathjobs` and some require applications through other websites that are linked to from the `mathjobs` posting. One of the most common websites that hosts many job ads off `mathjobs` is Interfolio.

Now that you have looked at job ads, you have some idea of the deadlines. Many of the deadlines for postdoctoral jobs in North America are between November and January, and they begin at the start of the next academic year. Note that this means that

if you want to graduate from your PhD into a postdoc job, you
have to start filing applications about ten months before the job
may begin.

This is also a good thing to keep in mind as you think about your PhD graduation timeline.

What kind of references are needed for postdoc jobs? First, we should point out that the approach to references is something that you should get your PhD advisor's advice on. They will typically write a reference and give substantial advice about who else to ask for a reference.

Most postdocs in North America require three reference letters, and some may require four. If you are applying to research postdocs, it is typical and sufficient to get three research reference letter and one teaching reference letter. If you are applying to a teaching postdoc, it probably makes sense to get multiple teaching reference letters.

Teaching reference letters are typically written by a faculty member who has supervised your teaching or education-related work in some way.

It is polite to give your reference writers as much notice as possible before deadlines. Two months is ideal. Some academics have posted lengthy and useful guidance for people who want to ask them for a reference letter. Here is one from Ravi Vakil.

So what documents do I have to prepare to include in my application?

This is a big question, so we start a new section to address it.

2. COMPONENTS OF A JOB APPLICATION

A typical postdoctoral or faculty job application involves the following components.

- (1) Cover letter
- (2) Curriculum vitae (CV)
- (3) Research statement
- (4) Teaching statement
- (5) Reference letters
- (6) Publication list (sometimes)
- (7) Other statements (sometimes)

(8) Teaching portfolio/materials (sometimes)

2.1. Cover letter. The cover letter is often the first part of the application the committee sees. Make it look somewhat nice. State that you are applying, what your area of research is, if possible who you want to work with. If there are any special circumstances (partner is working here, I am from that city etc., you can state that).

While you do not have to personalize the cover letter too much, make sure it somehow looks like it is written for that institution. A cover letter with “I want to apply to YOUR INSTITUTION” looks silly. At least write the name of the university.

State who you want to work with, if you know someone there. If you don’t know anyone, but know someone you would like to work with, write them an email.

Spellcheck!

2.2. Curriculum vitae (CV). Don’t forget to write

- Appointments held (where did you do your PhD, undergrad etc.)
- Courses taught (make sure to classify: instructor of record, term (summer?), what year)
- Publications, with clear indication if preprint or accepted for publication. Some people write ‘in preparation’ and ‘submitted to Journal Name’ – other people think this looks bad. Mention your coauthors.
- Any sort of distinction you received.
- If you are on a grant by your advisor, that is not your grant. GSR is not a distinction.
- Talks you gave.
- Extracurricular, such as organizing seminars, can be included if it is related to the position you are applying. Do not simply list everything you did.

Look at CVs of some serious academics so you can get some sense of what a good (and not so good) academic CV looks like.

2.3. Research statement. Explain your research: what you have done, why it is interesting, and what you would like to work on in the near future. Don’t write more than five pages, but write at least one, better two, three.

While you can go into some technicalities, keep in mind the committee might not be an expert and will not necessarily understand, so make it comprehensive. You want to convince people to work with you.

2.4. Teaching statement. This should serve as an evidence that you have sufficient teaching experience to fulfill the teaching duty reliably, and that you have a coherent philosophy underpinning your teaching work. If the position is teaching orientated with specific teaching requirement, justify your qualification for this position. If the position is a teaching postdoc or other teaching-focused job, you should talk about all the ways that you have taken extra opportunities to improve and exercise your teaching.

2.5. How and whom to ask for a letter of recommendation.

- You should ideally only ask people that know you or your work. A letter of recommendation from someone who does not know you well (while they

might write one) could be very short, and thus not helpful for your application. While it is not unusual for a graduating PhD student to ask for a letter from a professor that they have not previously met, based on what written work they have produced up to this point, this would typically be suggested and arranged by the PhD student's advisor.

- It helps if not all letters are from people at your institution.
- Every research-active professor is used to being asked to write a letter of recommendation for research postdocs. Don't be shy asking. But take a hint if they say they are very busy: a not-so-positive letter is not in your interest. Almost nobody writes a bad letter, but rather people can write a short letter which is often considered a bad letter.
- Many postdoc jobs require a letter that addresses teaching: in order to get one, make sure your advisor or some other professor or teaching professor visits your classes (well ahead of the deadline!), so they can write about concrete observations of your teaching. Often the undergraduate or graduate director can write a teaching letter (based on your evaluations, teaching observations by peers etc.), but this is not as good as a letter based on first-hand observations.

2.6. A research talk. Practice giving research talks, this can make and break your application if you get shortlisted.

See e.g. here: [How to Give a 20 Minute Talk](#) by William Layton

3. POSTDOC SYSTEM AND OPPORTUNITIES BY COUNTRY/REGION

3.1. **United States, Canada.** Tips:

- “Visiting Professor”, “XXX Assistant Professor”, “XXX Instructor” often refers to postdoc positions (often fancy ones)

Where to look for positions

- Most postdoctoral positions are advertised on www.mathjobs.org.
- In applied mathematics, opportunities are often advised on SIAM activity groups mailing list. Joining SIAM is typically free for full time students (and \$25 in other cases). As a SIAM student member you can join two activity groups for free.
- (US citizen/LPR): NSF Postdoc Fellowship
- Fulbright Scholarship (to go abroad)

3.2. Europe/European Union. Europe has many postdoc positions, in part due to the ERC (European Research Council)-funds. They are not necessarily well advertised, so you might want to contact professors directly. Professors with ERC funding usually have an abundance of postdoc positions.

- Some postdoctoral positions are advertised on www.mathjobs.org.
- One of the fanciest postdoc position in the EU (to go to any EU university): Marie Curie
- Analysis positions in Europe are often advertised here: [Centro De Giorgi/Pisa](#)

3.3. **Germany/Austria/Switzerland.** Tips:

- Postdoc positions are often Professor-bound, and sometimes not advertised at all. Write to a professor you want to work with, they might just have a position lying around

Where to look for positions

- contact professors directly, not all positions are advertised
- Scholarships database (Germany): DAAD
- Humboldt Foundation (to go to any German university)
- There are three main research-only institutes: the Max Planck Society, Fraunhofer Institute, and the Helmholtz society. For Math, check these
 - Max Planck Institute Bonn (more pure math)
 - Max Planck Institute Leipzig (more Analysis/Applied)
- Swiss National Science Foundation
- (Austria) ISTA

3.4. **United Kingdom.** Observe that 'lecturer' means assistant professor, 'reader' is associate professor, and only 'professor' is a 'full professor'.

- Engineering and Physical Sciences Research Council: EPSRC fellowships (comparable to NSF postdocs, but without citizenship requirements) , possibly replaced by Mathematical sciences postdoctoral fellowship

3.5. **Poland.** Poland has several fellowships, but they are typically administered via the universities or the academy of sciences (IMPAN), so contact the universities.

- <https://nawa.gov.pl/en/scientists/the-ulam-programme/about-the-programme>

3.6. **France.**

- <http://postes.smai.emath.fr/postdoc/>

3.7. **Italy.**

3.8. **Spain.**

3.9. **China.**

3.10. **Japan.**

- Okinawa Institute of Science and Technology
- JSPS Postdoc Fellowships