So you want to get a Ph.D. in math....

Tim Hsu

Updated Fall 2012
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You can do it!

The hard and easy parts

Qualifications

How to apply

Final thoughts

Recent SJSU math alums now in doctoral programs

- **UC Berkeley**: Michael Pejic
- **UCLA**: Sid Kanungo
- **UC San Diego**: Robert McGuigan, David Zimmerman
- **UC Davis**: Alex Huang, Kate Isaacs (CS), Efrem Rensi, Alex Tsui (CS), Alex Waagen
- **UC Santa Cruz**: Caleb Wright (Stats)
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Recent SJSU math alums with Ph.D.’s and where they are now

- Dr. Marian Farah (UC Santa Cruz, Stats): Postdoc, Cambridge Univ.
- Dr. Tracy Holsclaw (UC Santa Cruz, Stats): Postdoc, UC Irvine
- Dr. Earvin Balderama (UCLA, Stats): Postdoc, NC State
- Dr. Dash Fryer (U. Ill. Urbana-Champaign): Postdoc, Pomona College
- Dr. Qiang Wang (UC Davis): Postdoc, UC Davis Center for Neuroscience
The hardest part about going to graduate school, especially to a doctoral program, is asking yourself the question:

Why do I want to get a Ph.D.?

If you’re going to spend 5–7 years of your life doing this, you need to know the answer!
How much does it cost?

The easiest part of going to a doctoral program in any technical subject (math, CS, science, engineering) is paying for it.

**GRAD SCHOOL IS FREE**

In fact, they pay you (nearly) a living wage to go to school!
Things that are necessary to get in

To make sure your application doesn’t go in the trash, you need:

- **Straight A’s** (more or less).
- A record of **challenging coursework**.
- Good score on the **math subject GRE**. Top 50% is a good goal, though some of our alums have missed that mark and still gotten in. **Note:** Not all applied programs require the subject GRE; many stats programs don’t.
- Some qualification beyond regular classroom work, esp. **research experience**.
The thing that gets you admitted

The most important factor is:

3–4 letters of recommendation from profs

- **Phrases you want in your letter**: “Best student in 5, 10, 20 years” “Better than X, who just finished your program and is now at U. Washington” (etc.)

- **Things that matter very little**: Whether you are a nice person or even a member of the human species.

- **A good test**: Ask your prof, “Where should I apply?” Get letters from the profs whose answers you like.
Other things that can be very helpful

- A published research paper (prob. co-authored)
- REU (Research Experience for Undergraduates); see list at NSF
- Experience as a TA, facilitator, or tutor
- A good personal statement (a.k.a. goat-herding story)

SJSU students have an advantage on personal statements: Lots of grad students have gone to fancy prep schools and have parents who are professors. Very few grad students have parents who are truck-drivers or construction workers; very few grad students have had to work at a gas station or manage a McDonald’s to make a living. “Goat-herding” shows that you persevere through difficulty.
How to build your portfolio

Again, the core things to do are:

- Take hard classes and get A’s
- Impress 3–4 profs who will write you great letters
Get research experience

- **REU**: Summer program at another university, 6–8 weeks. Start by taking short intense classes, finish with a co-authored research paper.
- **CAMCOS (Math 203)** at SJSU: Work in a student team on an applied problem from business, industry, or government.
- Work on a problem with an SJSU faculty member.

If you have the chance, present your work at conferences, in talk or poster form. No Cal Undergrad Math Conf is a great opportunity; for that conf, doesn’t have to be a research presentation.
Attend conferences and talks

At SJSU, we go to lots of conferences in groups:

- BAD (Bay Area Discrete) Math Day, Sat Nov 17, St. Mary’s of Moraga
- Joint Math Mtgs, Jan 9–13, 2013, San Diego
- MAA Section Mtg, Sat in late Feb
- BAD Math Day, Spring 2012
- No. Cal. Undergrad Math Conf, Spring 2013, Chico State
- Coll of Sci Research Day (poster sessions), May 2013, SJSU
- MAA Mathfest, Aug 1–3, 2013, Hartford, CT

And SJSU Math Colloquium, Wed 3–4pm! (Next: Wed Oct 3)
Things to do before applying

- Learn about graduate school programs (websites)
- Talk to faculty and graduate students, here and at schools you’re looking at
- Consider interdisciplinary programs: e.g., mathematical engineering, math finance
- Get a master’s degree at SJSU (not necessary but may be helpful in some cases)
- Teach or TA at least once
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Before

Fall

Spring

Final thoughts

Overview of the fall application semester

- **Aug/Sep:** Sign up for the GREs
- Study hard for the math subject GRE
- **Oct/Nov:** Take GREs
- Draft essay, get feedback
- Prepare packet for letter writers
- Fill out the applications ($50-100 each)
- Identify and apply for fellowships and scholarships: NSF Graduate Research Scholarship deadline is **Nov 14, 2012**
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Before Fall Spring

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The GREs: General exam

You can take this once a month up to 5 times in a calendar year.

- Test is automated
- Sections: Analytic (writing), Verbal, Quantitative
- There is a testing center in San Jose (off 280, Saratoga exit)
- “The new GRE”: Fri Sep 21, 12:30, DH415
The GREs: Math subject exam

Deadlines for AY 2012–2013:

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Reg Deadline</th>
<th>Late Reg Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 13, 2012</td>
<td>too late</td>
<td>too late</td>
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</table>
The GREs: Math subject exam (cont.)

What’s in it?

- Calculus: 50%. Relative to SJSU, this is more like analysis = Math 131A.
- Algebra: 25%. Abstract algebra, linear algebra, a little precalc.
- Additional Topics: 25%. Includes:
  - More real analysis
  - Discrete mathematics: logic, set theory, combinatorics, graph theory, and algorithms
  - Other topics: general topology, geometry, complex variables, probability and statistics, and numerical analysis

Warning: It’s HARD!
What do you do once you get in?

- Visit schools (or email current grad students). What to find out:
  - How much attention do grad students get from faculty?
  - How much teaching do grad students do?
  - What kind of jobs are students getting after they finish their degrees?
  - How miserable are the grad students?
- Consider summer prep/boot camp programs, e.g., at the grad school you’ll attend. National programs include: EDGE for Women, IMMERSE, Park City Math Institute
Recap of fall calendar

**Sept:**
- Start writing your statement of purpose
- Narrow down your list of universities
- Find 3–4 profs who will write excellent letters of recommendation
- Review for the GRE
- Look for scholarships

**Oct–Nov:** Take the GREs: general and math subject

**Nov 14:** Application deadline for NSF Graduate Fellowship

**Nov–Jan:** Submit applications (check university and department sites for deadlines)
What does it take to finish?

- Hard work
- Talent
- Passion
- Perseverance
- Patience
- Support from friends and family
Any more questions?

Email or contact:

- Tim Hsu, tim.hsu@sjsu.edu
- Andrea Gottlieb (stats), andrea.gottlieb@sjsu.edu
- Bem Cayco (applied), bem.cayco@sjsu.edu

And check out: http://www.phdcomics.com
For what it’s worth, those comics (especially the early ones) give a pretty good idea of what life in a doctoral program is like.