

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

Tim Hsu

You can do it!

The hard and
easy parts

Qualifications

How to apply

Final thoughts

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

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Updated Fall 2012

Recent SJSU math alums now in doctoral programs

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- **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)

Recent SJSU math alums with Ph.D.'s and where they are now

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- 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-Champagne): Postdoc, Pomona College
- Dr. Qiang Wang (UC Davis): Postdoc, UC Davis Center for Neuroscience

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

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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?

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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

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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

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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.

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How to build your portfolio

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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

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- 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

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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

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- 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

Overview of the fall application semester

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- **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**

The GREs: General exam

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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

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Deadlines for AY 2012–2013:

Test Date	Reg Deadline	Late Reg Deadline
Oct 13, 2012	too late	too late
Nov 10, 2012	Oct 5, 2012	Oct 12, 2012
Apr 20, 2013	Mar 15, 2013	Mar 22, 2013

The GREs: Math subject exam (cont.)

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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?

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- 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

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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?

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- Hard work
- Talent
- Passion
- Perseverance
- Patience
- Support from friends and family

Any more questions?

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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.