

Putting Your Best Foot Forward: What is Important for Your Graduate School Application

IMPACT Summer Camp

Preparing for Graduate School
in the Mathematical Sciences

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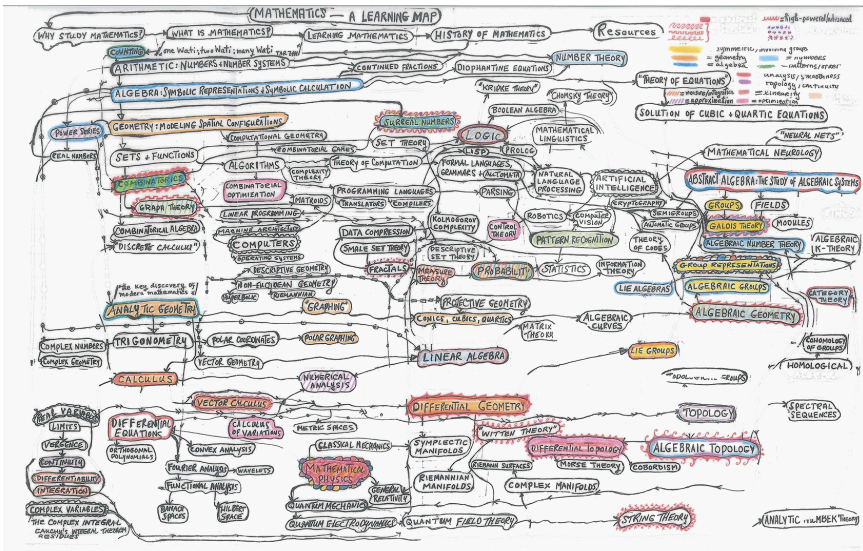


Overview

- 1 **WWW: Which Way to Walk?**
- 2 **Careers: Where do I want to end up?**
- 3 **Applying: Showing off your fancy footwork**



Which Way to Walk?



A web of mathematics

Which Way to Walk: Graduate Programs

1 Degrees

- Undergraduate to graduate bridge programs
- Masters [to prepare for industrial career]
- Masters [to prepare for strong PhD program]
- PhD [focus: original research]

2 Mathematical Sciences Graduate Programs

- Mathematics
- Computational and Applied Mathematics
- Statistics
- Data Science
- Financial Mathematics
- Institutes for Computational Engineering, Sciences, and Medicine

3 Research specialties represented?

Which Way to Walk: Institutions & Depts

The Institution

- 1 Public or private
- 2 Texas or far-from-Texas
- 3 Big city or rural college town

The Department

- 1 Size, mission, and scope of department
- 2 A supportive environment?
- 3 Where do MS/PhD students get jobs?
- 4 Faculty research groupings and interests
- 5 Composition of faculty and students:
 - Are there people like me, and do I care about that?

Which Way to Walk: Financial Support

- ① Teaching assistantships [20 hours per week as TA]
- ② Research assistantships [100% research]
- ③ University or national fellowships
- ④ NSF graduate research fellowships
 - Apply prior to grad school or in 1st year
 - End of October deadline.

Don't pay a penny for graduate school in STEM!

Which Way to Walk: The Environment

- ① What proportion of students are on a TA vs RA?
- ② How demanding are TA duties?
- ③ How much emphasis is given to coursework?
- ④ How (well) does the qualifying exam system work?
- ⑤ What proportion of students publish?
- ⑥ \exists Professional development opportunities?

Apply to programs that will support your success!

Which Way to Walk: Some Resources

- 1 Professors at your current institution!
- 2 AMS: Finding a Graduate Program
- 3 Gather information prior to applying
- 4 Ask lots of hard questions when you get an offer
- 5 Be prepared for a First Year Adjustment
- 6 Switch if the environment is not supportive

Educate Yourself

Is a graduate degree worth the effort for me?

Where do I want to end up?

Graduate school is both

- A stage in your intellectual journey
- A stepping stone to a satisfying career

Post PhD Employment¹

- **B**usiness & **I**ndustry [34%]
- Academia: PhD-granting depts [27%]
- Academia: MS/BS/2YR [17%]
- Other academic depts and institutes [13%]
- **G**overnment [5%]
- Stat/Biostat [5%]
- Overall 35% are in Postdocs

¹2015-16 AMS Annual Survey; USC in USA

Where do I want to end up?

- Let your desired career path inform but not overly constrain your choices in graduate school
- Do what you love the most
- Be swept off your feet by a variety of math
- The web of mathematics connects many fields to employment options
- However, **BIG** careers may be facilitated by computational and applied fields

Expect the unexpected!

Where do I want to end up?: Resources

- Talk to Professors at your current institution
- Start networking
- AMS: The Profession
- AMS: Career Information
- SIAM: Careers in Applied Mathematics
- BIG Math Network

Showing off your fancy footwork

The Application Package²

- ① Application form
- ② Academic **Transcripts** (including GPA)
- ③ **Letters** of recommendation (3)
- ④ General (maybe also Math Subject) GRE scores
- ⑤ Statement of Purpose
- ⑥ Resume: awards, honors, with focus on math

²Deadlines: Dec 15-Mar1

Commonly Recommended Coursework

- ① Calculus sequence, linear algebra, and D.E.'s
- ② Proof-based analysis [2 semesters]
- ③ For more **theoretical programs**:
 - Proof-based abstract algebra [2 semesters]
 - Point set topology
 - Courses like complex analysis, differential geometry
- ④ For more **computational programs**:
 - Numerical methods
 - Physics and computer science
 - Familiarity with computer programming

“The best predictor of success in any graduate program is success in one or more introductory graduate courses.”

Letters of Reference

- 1 Engage letter writers early in process
- 2 They can advise on where to apply
 - Personal connections often increase credibility
- 3 Ask if they can write you a strong letter
- 4 **“From professors in mathematics or a closely related field who have supervised the applicant in class or research”**
 - From upper-division, conceptually oriented mathematics classes
 - At least one about proof-based courses: abstract algebra, analysis
 - For applied math: At least one in numerical analysis or computational math courses

Statement of Purpose⁴

- 1 Motivation for **grad school**³
- 2 Why you are a good fit for **this** program
- 3 Possible research interests
- 4 Potential advisors
- 5 **Evidence** of potential for success
- 6 Undergraduate research experiences
- 7 Career plans & professional goals
- 8 Teaching experience

Address failures honestly and coherently

³Don't talk about how you have loved math since grade 3

⁴Not required by some top tier programs [e.g. Harvard, Berkeley]

What Applications Committees Look For

- 1 Evidence of fit for program
- 2 Success in several proof-based courses
- 3 Evidence can pass Qualifying Exams
- 4 Evidence of independent work as predictor of aptitude for research
- 5 Evidence of verbal and written communication skills
- 6 Evidence of interpersonal skills
- 7 Honest explanations of early failures/gaps

A consistent story told by transcripts, letter writers, and applicant