Overview of PhD Programs

School of Mathematics, Georgia Tech

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Director of Graduate Studies

Outline

Graduate degrees

Teaching and Research Assistantships

Advantages of Georgia Tech Program

Department Profile

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Degrees offered by the School of Mathematics

- PhD
  - Mathematics (MATH)
  - Algorithms, Combinatorics, and Optimization (ACO)
  - Computational Sciences and Engineering (CSE)
  - Bioinformatics (BINF)
  - Quantitative Biosciences (QBios)
  - Machine Learning (ML)
- Masters
  - Mathematics (MATH)
  - Computational Sciences and Engineering (CSE)
  - Statistics
  - Quantitative and Computational Finance (QCF)

Requirements for a PhD

All PhD programs require the following elements:

- Course work
- Written comprehensive exams
- Oral comprehensive exam
- Minor — 6 or 9 hours of course work outside area of specialization.
- Dissertation

But each item is interpreted a little differently depending on the program.

Requirements for a PhD

Course work

- MATH PhD:
  - 30 credit hours of course work at the 6000-level or higher.
  - Breadth Requirements must be satisfied.
  - Additional 6 credit hours to form the doctoral minor field of study.

- ACO PhD:
  - 7 Core Courses (2 in CS, 2 in ISyE and 3 in Math).
  - 15 credit hours of additional coursework at the 6000 level. or above (including some specific math courses).
  - 9 credit hours for doctoral minor.

Requirements for a PhD

Course work

- CSE PhD:
  - 1 credit hour course “Intro to CSE" , and 12 credit hours of core courses
  - 9 credit hours of computation specialization, 9 credit hours of application specialization, and 9 credit hours of MATH courses not cross-listed with another department.
  - 9 credit hours for doctoral minor.
- ML PhD:
  - 12 credit hours of core courses
  - 15 credit hours of electives from a large list of courses
  - 6 credit hours for doctoral minor.

Requirements for a PhD

Course work

- BINF PhD:
  - 9 credit hours of courses from each of the following groups: Bioinformatics and Computational Bioscience; Biology, Biochemistry or Biomedical Engineering; Mathematics and Computer Science
  - 9 credit hours of courses in an approved minor, and 24 research credit hours.
  - 9 credit hours for doctoral minor.
- QBioS PhD:
  - 4 credit hours of Foundations of Quantitative Biosciences, 2 credit hours of Seminars in Quantitative Biosciences
  - Three courses from Quantitative Modeling Core; Two courses from Bioscience Disciplinary Electives; One course from Quantitative Models in the Biosciences
  - One elective for the “interface” minor requirement

Requirements for a PhD

Written comprehensive exams

- MATH: Pass 2 exams chosen from 7 subjects.
- ACO: The exam has two parts and contains questions based on the material in the ACO core courses
- CSE: Select 2 exams from among 5 subjects.
- BINF: Two exams, one in bioinformatics and one in home School.

For all above programs, students must pass the comp exams within 2 years of starting program.

Requirements for a PhD

Oral comprehensive exams

- MATH:
  - Short written proposal concerning area of research.
  - 40 minute oral presentation to committee, plus questions and feedback from committee.
- ACO:
  - Write 3-6 page proposal about research.
  - 20 minute oral presentation to a committee followed by questions from the committee.
- CSE:
  - Create a computational artifact, and write a proposal.
  - Oral presentation to committee.

Must be completed by end of 3rd year.

Requirements for a PhD

Oral comprehensive exams

- ML:
  - Take a one-semester course and submit a summary report.
  - Closed oral exam with committee (with a short presentation).
- BINF:
  - Write proposal.
  - Oral presentation to committee.
- QBioS:
  - Write a proposal.
  - 30 minute oral presentation to committee.

Requirements for a Master's degree

A masters in Mathematics, CSE, or Statistics requires:

- $\sim$30 credit hours of course work (with some required courses and some elective course), **or**
- at least 21 credit hours of course work and a thesis (total of 30 credit hours of work)

Many students get a master's degree (or 2) on their way to a PhD.

Graduate Courses

The coursework for all our degrees is very broad:

- Every semester we offer around 30 graduate level courses, including topics courses.
- Huge number of courses offered in departments across Georgia Tech that are relevant to mathematics graduate students.
- We usually teach about 1,300 graduate students per year in graduate math courses!

Graduate Courses Link

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Teaching Assistantships

All PhD students are offered TA positions.

- TAs stipend is $3,125 per month for the 9 month academic year; they may also work in the summer if desired (for a 12 month stipend $37,500).
- TAs get tuition waiver, which reduces the tuition cost to $25 per semester. (There are still some fees a student must pay: around $748 per semester. TAs must also have medical insurance: around $462 per year.)
- The TA contract is for one year at a time, but will be renewed for 5 years of support (subject to satisfactory progress toward your degree and satisfactory performance of teaching duties where required).

Teaching Assistantships

- In a normal semester a TA runs 2 studio sections (about 35 students each) that each meets twice a week. They will also need to hold office hours, prepare for teaching, grade homework/exams.
- We expect the time devoted to TAing to be about 12-14 hours per week (for 2 studios).
- *In the Summers the teaching load is only one studio.*
- In your first semester you will have reduced teaching duty, so that you can take a TA training class.
- Once you have passed your comprehensive exams you have the opportunity to teach your own classes.

TA Training

- The week before your first semester on campus we run an intensive TA training class that helps get you ready for teaching Georgia Tech students.
- During the first semester (while you have a lighter teaching load) you also take a 1 hour course that focuses on teaching. This is to help your first semester go smoothly and lay the ground work for teaching your own class.
- For international students we also have language training if necessary.
- We have a lead instructor seminar to help you transition from studio sessions to teaching your own class.
- There are many optional classes offered by Center for Teaching and Learning (CTL) that you can take to learn more about teaching, pedagogy, technology in the classroom and many other skills.

Research Assistantships

- Research assistantships (RAs) have the same stipend and tuition waiver as a TA but the only duties when you are an RA is to pursue your research.
- Many faculty members can support RAs through their research grants.
- *In the past, approximately 1/4 of our students have had RA support.*

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Why Georgia Tech?

- One of the largest and most distinguished faculty in the nation with very broad range of expertise.
- Plenty of personal attention (with a low student to faculty ratio).
- "Introduction to Graduate Mathematics" class which all first year students take together.
- Peer Mentoring Program run by the Graduate Student Council.
- Comprehensive exam preparation classes in the Summer.
- Dynamic research environment with numerous seminars and colloquia.
- Sustained upward trajectory (for more than two decades the School of Math has been rising steadily in all national and worldwide rankings.)

Why Georgia Tech(Cont'd)

- Part of an institute which is focused exclusively on math, science, and Engineering (half of Georgia Tech's 18,000+ undegrads takes courses in the School of Math every semester!)
- Superior TA and instructor training.
- 100% post PhD employment.
- Different carrer paths: academia, industry, government.
- Located in a vibrant, cosmopolitan, and dynamic city—the capital of the Southeast, and an increasingly walkable, bikable, livable environment, offering extraordinary cultural and recreational opportunities.

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Faculty Profile

- 61 tenured or tenure-track faculty (one of the largest in the nation).
- 30+ postdocs and visiting faculty every semester.
- Wide variety of expertise:
  - Algebra
  - Analysis
  - Applied and Comp. Math
  - Differential Equations
  - Discrete Mathematics
  - Dynamical Systems
  - Geometry and Topology
  - Mathematical Biology
  - Mathematical Physics
  - Probability and Statistics
- Our faculty is highly visible world wide. Speaking in national and international conferences, supported by numerous grants, and recognized by numerous awards.

Faculty Profile (Cont'd)

- One of the most active in the world.
- 16 faculty members have been honored with AMS Fellowships!
- New Assistant Professors have already garnered 6 NSF CAREER awards, and 2 Sloan Fellowships, within the last 5 years!
- Our faculty are among the most diverse: 13 permanent female faculty members plus a number of female postdocs.

Awards won by our Faculty

Faculty Research Interests

Student Profile

- Diverse international student body.
- 125 PhD students and 20 MS students.
- All PhD students have office space.
- On average, one or two students, win prestigious NSF fellowships each year.
- All PhD students receive full financial support (stipends plus tuition waiver)

Academic life

- Assigned an "initial mentor" as soon as you arrive.
- Professional development course *Introduction to Graduate Math* and *Grad Groups*, taken by all first year students.
- *Research Horizons Seminar*: organized by students for students.
- Departmental colloquia and numerous research seminars.
- Each year there are several conferences held at Ga Tech, some organized by students.
- Multitude of Campus-wide clubs and activities, as well as Job Fairs.
- Students chapters of AMS, SIAM, AWM; as well as other activities like the High School Math Competition, and activities organized by the Graduate Student Council.
- Friendly environment.

Post PhD Employment since 2020

- Academia
  • Postdoc at Harvard • Postdoc at University of Chicago • Postdoc at MIT • Instructor at Princeton • Postdoc at ICERM Institute • Postdoc at Fields Institute • Postdoc at Max Planck Institute • Postdoc at MSRI • Postdoc at IPAM • Postdoc at Duke • Postdoc at Caltech • Postdoc at UCLA • Postdoc at University of Washington • Postdoc at University of Michigan • Postdoctor at University of Rome • Postdoc at Technion • Postdoc at University of Barcelona • Postdoc at Fudan University • Postdoc at TU Berlin • Postdoc at University of Luxembourg

- Industry
  • Uber (Applied Scientist) • Google (Software Engineer, Research Scientist) • 3M (Data Scientist) • Hudson River Trading • Amazon (Data Scientist) • Amazon (AI Research Scientist) • Meta (Research Scientist) • Microsoft (Data Scientist) • Susquehanna (Quantitative Researcher) • Citadel LLC (Quantitative Researcher) • Wells Fargo Securities (Quantitative Associate) • Goldman Sachs (Quantitative Associate) • Two Sigma Investments (Quantitative Associate)

Alumni Employment Webpage

For more info please check:

School of Math's Graduate Program Page

or send us an email at:

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Thank you for considering Georgia Tech!