Trevor Gunn

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EMPLOYMENT

Doctoral Lecturer	College of Staten Island,
Aug 2023–present	City University of New York (CUNY)
Research/Teaching Assistant	Georgia Institute of Technology
Aug 2017–Aug 2023	

EDUCATION

PhD	Georgia Institute of Technology
Aug 2017–Aug 2023	Thesis: *Divisors and Multiplicities Under Tropical and Signed Shadows*
	Advisor: Prof. Matthew Baker
Bachelor of Mathematics	University of Waterloo
Sept 2013–June 2017	*Honours Pure Math & Combinatorics and Optimization (With Distinction – Dean's Honours List)*

AREA OF INTEREST

I am interested in connections between combinatorics and algebraic geometry. In particular, tropical geometry, matroids, hyperfields and ordered blueprints. My current work involves studying polynomials over hyperfields/blueprints.

TECHNICAL SKILLS

- ▶ Git source control management

    https://github.com/trevorgunn

- ▶ R – used extensively in teaching Introduction to Probability and Statistics
- ▶ Python – for open source contributions (e.g. SageMath)

    https://trac.sagemath.org/ticket/33173

- ▶ Javascript – for open source contributions (e.g. LaTeX Workshop

    https://github.com/James-Yu/LaTeX-Workshop/commits?author=trevorgunn

- ▶ HTML/CSS/PreTeXt – for my website and online notes
- ▶ LaTeX – for technical writing

Last update: February 27, 2024

Teaching and Outreach

Course Instructor, College of Staten Island   Fall 2023–Present Class sizes of about 30-40 students

(337)	Applied Combinatorics & Graph Theory	Sp 2024
(231)	Analytic Geometry and Calculus I	Fa 2023, Sp 2024
(229)	Calculus Computer Labratory (with Julia)	Fa 2023, Sp 2024
(125)	College Algebra and Trigonometry	Fa 2023, Sp 2024
(123)	College Algebra and Trigonometry	Fa 2023

Note: MTH 125 is a version of MTH 123 with more class time. I have been running a problem-oriented recitation for this class with another instructor running the lecture section

High School Math Competition Organizer, Georgia Tech   Fall 2021–Summer 2022

Responsibilities:

- ▶ Create a syllabus for the competition based on public school curricula.
- ▶ Communicate to the volunteers the number of problems/level of difficulty/topic selection.
- ▶ Organize meetings with volunteer problem writers.
- ▶ Ensure that every problem has a level-appropriate solution written.
- ▶ Manage volunteer graders and communicate the solutions to them.
- ▶ Answer email questions regarding registration.
- ▶ Update the competition website and registration form.
- ▶ Create the online competition in Gradescope and make sure the participants have access to it.
- ▶ Run the competition: introduction and awards speeches, answer questions during exams.

High School Math Day Co-organizer, Georgia Tech   Fall 2022–Summer 2023

The shift from "Math Competition" to "Math Day" represents a push to make the event more attractive and accessible to non-STEM students and underrepresented groups. In addition to the responsibilities associated to the competition, we are also in the process of redesigning the event from the ground up and advertising to a broader selection of schools in the Atlanta area.

Course Instructor, Georgia Tech

Responsibilities:

- ▶ Decide the textbook/syllabus/assessments.
- ▶ Plan and present lectures.
- ▶ Write and grade the problem sets/exams/course projects.
- ▶ Hold office hours, answer emails, answer Piazza.
- ▶ Manage the assistant grader/TA.

Class sizes of about 50–80 students.

| (3215) | Introduction to Probability and Statistics | Summer 2022 |
| (3012) | Applied Combinatorics | Summer 2021 |

Teaching Assistant, Georgia Tech

Responsibilities:

▶ Teach bi/triweekly exercise-focused classes.
▶ Hold weekly office hours—combined with tutoring center hours.
▶ Grade homeworks and exams.
▶ Work with the course instructor to stay up to date on the course schedule.
▶ For some classes, writing exercise sheets and solutions.

Class sizes of about 20–30 students

(3012)	Applied Combinatorics	Sp 2022, Sp 2020, Sp 2018, Fa 2018
(2603)	Introduction to Discrete Mathematics	Su 2018
(2551)	Multivariable Calculus	Sp 2019
(2550)	Introduction to Multivariable Calculus	Fa 2018
(1564)	Linear Algebra with Abstract Vector Spaces	Fa 2021
(1554)	Linear Algebra	Fa 2020
(1553)	Introduction to Linear Algebra	Su 2019, Fa 2019
(1552)	Integral Calculus	Sp 2018
(1803)	Precalculus	Su 2020
(1711)	Finite Mathematics	Fa 2017

Directed Reading Mentor, Georgia Tech   Fall 2019–Fall 2022

Our Directed Reading Program consists of weekly 1 hour meetings with one or two students (per semester) to guide them through extracurricular mathematics material. The students are expected to complete about 3 to 4 hours of reading outside of the weekly meetings. Projects I have mentored on include: algebraic number theory (over two semesters), additional topics in combinatorics, and an introduction to ordinary and exponential generating functions.

PROFESSIONAL SERVICE

2019–2023	co-organizer	Georgia Tech Algebraic Student Seminar
2022–2023	co-organizer	Graduate Student Colloquium
2022–2023	member	Graduate Student Council
2022–2023	co-organizer	Georgia Tech High School Math Day
2021–2022	lead organizer	Georgia Tech High School Math Competition
2017–2021	volunteer	Georgia Tech High School Math Competition

Nov. 11 & 18, 2021	co-organizer	Tropical Geometry Seminar
Fall 2019	co-organizer	Learning Seminar on Lorentzian Polynomials
Fall 2018 & Spring 2019	co-organizer	Georgia Tech Research Horizons Seminar

Conference Talks

August 2022	*Factoring Polynomials over Hyperfields*	Universität Regensburg
August 2019	*Construction of Fully Faithful Tropicalizations for Curves*	Universität Regensburg

Publications

[1] Andreas Gross and Trevor Gunn. *Factoring multivariate polynomials over hyperfields and the multivariable Descartes' problem*. July 2023. arXiv: 2307.09400 [math.AG].

[2] Trevor Gunn. *Tropical Extensions and Baker-Lorscheid Multiplicities for Idylls*. Nov. 2022. arXiv: 2211.06480 [math.RA].

[3] Trevor Gunn and Philipp Jell. *Construction of Fully Faithful Tropicalizations for Curves in Ambient Dimension 3*. Dec. 2019. arXiv: 1912.02648 [math.AG].

[4] Trevor Gunn. *A Newton Polygon Rule for Formally-Real Valued Fields and Multiplicities over the Signed Tropical Hyperfield*. Nov. 2019. arXiv: 1911.12274 [math.RA].

Conferences and Workshops Attended

2022	Aug 1–5	Young Researchers' Conference on Nonarchimedean and Tropical Geometry	Universität Regensburg
	Apr 1–3, 2022	Georgia Algebraic Geometry Symposium	Emory University
2021	Nov 11 & 18	Tropical Geometry Seminar	Georgia Tech
	Apr 12–16	Algebraic Geometry and Polyhedra	ICERM (virtual)
2020	Mar 7–11	Arizona Winter School (Non-Abelian Chabauty)	University of Arizona
2019	Fall (Weekly)	Learning Seminar on Lorentzian Polynomials	Georgia Tech
	Fall (Weekly)	Learning Seminar on Non-Abelian Chabauty	Emory University
	Jul 29–Aug 2	Young Researchers' Conference on Nonarchimedean and Tropical Geometry	Universität Regensburg
	Apr 13 & 14	Meeting on Applied Algebraic Geometry	Georgia Tech
	Mar 30–31	Georgia Tech Tropical, Arithmetic and Combinatorial Algebraic-geometry	Georgia Tech

	Mar 2–6	Arizona Winter School (Topology and Arithmetic)	University of Arizona
2018	June 28–29	Summer School on Hyperbolic Polynomials, Sums of Squares, and Optimization	Georgia Tech
	Mar. 2–6	Arizona Winter School (Iwasawa Theory)	University of Arizona
	Feb 23–25	Georgia Algebraic Geometry Symposium	Georgia Tech

Scholarships & Awards

2022   Outstanding TA Award

2020   FESTA Fellowship

2020   Outstanding Math Lab Tutor

2017   NSERC Undergraduate Student Research Award
       Topic: *Tropical scheme theory*

2016   NSERC Undergraduate Student Research Award
       Topic: *Enumerating maps via symmetric functions*

2013   University of Waterloo President's Scholarship