Connor Haynes

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RESEARCH INTERESTS

I am broadly interested in applying tools from a variety of fields to combinatorics, but I keep my mind open for interesting problems.

More specifically, I am interested in algebro-geometric connections (combinatorial Hodge theory and tropical geometry), topological connections (arrangements of varieties), and analytic connections (stability and negative dependence).

PROJECTS

Directed Reading Program

Ehrhart Theory *2025*

Engaged in independent study of Beck and Robins' *Computing the Continuous Discretely*. Met with a graduate student weekly to discuss material. Worked on resolving several open questions posed in Beck and Robins. Presented to faculty and students on basics of Ehrhart Theory and progress towards resolution of open questions.

Tropical Geometry *2024*

Engaged in independent study of Maclagan and Sturmfels' *Introduction to Tropical Geometry*. Met with a graduate student weekly to discuss consequences and applications. Presented to faculty and students on synergies between analytic, combinatorial, and algebraic interpretations of tropical curves.

Number Theory *2023*

Met weekly with a graduate student to discuss topics in Number Theory. Engaged in studies of Abstract Algebra and Number Theory with a focus on Fermat's Last Theorem. Worked with another student to present on special cases of Fermat's Last Theorem.

MATH 6441 - Algebraic Topology

Moduli Spaces of Algebraic Curves *2025*

Worked with another student to research moduli spaces. Wrote a survey article designed to introduce undergraduates to the study of moduli spaces from analytic and category-theoretic perspectives.

MATH 4803 - Nonlinear Algebra

Automatic Theorem Proving *2024*

Worked with a team of two other students to develop algorithms in Macaulay2 regarding the areas of cyclic polygons and Heron-Type Formulas. Utilized techniques from algebraic geometry to reproduce results of Robbins (1995). Presented to students and faculty on methods.

INVOLVEMENT

LSU RTG Workshop

Hyperplane Arrangements *2025*

Read Stanley's *An Introduction to Hyperplane Arrangements* under the supervision of a professor in the mathematics department. Gave three talks to fellow students on material, and presented with a group to entire program on applications of arrangements to computing the chromatic polynomial of a graph.

Center for Mathematics at Notre Dame

Thematic Program in Discrete Groups in Topology and Algebraic Geometry *2025*

Investigated geometric group theory and moduli of elliptic curves with a group of students. Studied the relationships between moduli of elliptic curves, the braid group, and rational tangles following Dr. Nick Salter's *Ropes, Fractions, and Moduli Spaces*.

Georgia Tech Club Math

Treasurer *2025*

Managed finances for Georgia Tech's most prominent student mathematics organization. Ensured allocation of funding for student events was accessible and appropriately allocated. Compiled reports on club spending for Georgia Tech administration. Was responsible for fundraising and bookkeeping.

EDUCATION

Georgia Institute of Technology
Bachelor of Science in Mathematics *2023-2026*
GPA: 3.94

TEACHING

School of Mathematics
Undergraduate Teaching Assistant *2024-2025*
Led 20-30 person recitation classes focused on real-time practice and course-correction. Led large-scale (40-50 people) review sessions.

- MATH 1554 - Linear Algebra
- MATH 1552 - Integral Calculus

Knack Tutoring
Freelance Tutor *2023-Present*
Hosted one-on-one tutoring targeted at content review and practice. Successfully and consistently improved student outcomes.