Curriculum Vitae: Preston Tranbarger

Professional Email: preston.tranbarger@rutgers.edu
Webpage: **https://prestontranbarger.github.io***

Education

Rutgers University

Doctorate of Mathematics;
Expected Graduation *Spring 2028*

> More information about the mathematics doctoral program at Rutgers University can be found here:
>> **https://math.rutgers.edu/academics/graduate-program**

Texas A&M University

Bachelor of Science in Mathematics, ***Master of Science in Mathematics***;
Overall GPA: *3.933*[†]; **Mathematics GPA:** *3.922*[†]; **Graduated** *Spring 2024*

> Finished a 3+2 Bachelors & Masters of Science program in Mathematics at Texas A&M University. This was done through the university's FastTrack program, more information can be found here:
>> **https://www.math.tamu.edu/graduate/fasttrack/**.

Employment

National Science Foundation

Graduate Research Fellow; **August 2024 - May 2029**

> Employed as a graduate research fellow as per the National Science Foundation's Graduate Research Fellowship.

Rutgers University

Graduate Fellow; **August 2024 - May 2027**

> Employed as a fellow by the Rutgers University math department while under full financial support from the National Science Foundation's Graduate Research Fellowship.

Texas A&M University

Graduate Student Researcher; **May 2023 - May 2024**

> Helping with a variety of research projects in the Texas A&M University mathematics department and beyond. See the below *Research Experience* section for more details.

Student Grader; **August 2021 - December 2021, January 2023 - Present**

> Assisting professors by grading papers and providing feedback for hundreds of students across various courses including linear algebra, differential equations, and communications and cryptography (MATH 304, 308, and 470 respectively).

Assistant Student Editor; **January 2022 - May 2024**

> Assisting a professor in editing practice problems for a fully online calculus textbook and developing fully interactive Geogebra applets to quiz students on their calculus knowledge.

Undergraduate Student Researcher; **August 2021 - May 2023**

> Helped with a variety of research projects in the Texas A&M University mathematics department and beyond. See the below *Research Experience* section for more details.

Paid Intern; **May 2020 - April 2022**

> Created a novel computer application intended to streamline various common methodologies of repeat photography by utilizing an array of modern programming techniques.

---

*Contains more detailed information on many of the sections within this document.
[†]Combined undergraduate and graduate GPA including hours not counted towards my degree.

Research Experience

Texas A&M University

Advisor: *Dr. Matthew Young*; **August 2022 - August 2024;**
Topic: *Generalized Dedekind Sums Arising from Specialized Eichler-Shimura Type Integrals*

> As a follow up project to the summer 2022 REU at Texas A&M University, this research project generalizes the concept of Dedekind sums by examining Eichler-Shimura type integrals of higher weight holomorphic Eisenstein series attached to characters. Some interesting results arise, such as two diverging generalizations each preserving one of the two main properties of the weight two case.

Advisors: *Dr. Philip Yasskin, Dr. Wei Yan*; **January 2022 - August 2024;**
Topic: *Teaching Rotations Through Augmented Reality*

> This research project examines the ability for augmented reality to serve as a supplemental instruction method to further develop student's geometric intuition on rotations in three dimensional space.

Advisor: *Dr. Matthew Young*; **May 2022 - July 2022;**
Topic: *REU in Number Theory, Fast Computation of Generalized Dedekind Sums*

> Developed the first polynomial time algorithm to compute generalized Dedekind sums by utilizing a well engineered group rewriting process. This represents a significant improvement over previous exponential time algorithms.

Advisor: *Dr. Matthew Young*; **August 2021 - May 2022;**
Topic: *The Eigenvalue Distribution for Cubic Large Sieve Matrices*

> This project sought to expand upon the results of Dunn and Radziwiłł in their paper *Bias in Cubic Gauss Sums: Patterson's Conjecture* by better understanding the eigenvalue distribution of the cubic large sieve matrix.

Publications

Writing in Progress

Higher Weight Generalized Dedekind Sums

> Publication due to ongoing research with Dr. Matthew Young between August 2022 and August 2024. Soon to be available on the arXiv.

Published Articles

Fast Computation of Generalized Dedekind Sums (with **J. Wang**);
Published 3/20/2024 to *International Journal of Number Theory*

> Publication due to the research produced during the summer 2022 REU at Texas A&M University. It is available here: `https://www.worldscientific.com/doi/10.1142/S179304212450060X`.

Conferences and Presentations

11. *Joint Mathematics Meetings 2024 (Presenter)*; **1/3-6/2024**
10. *Texas A&M Undergraduate Mathematics Research Expo (Presenter)*; **9/26/2023**
9. *MAA MathFest 2023 (Presenter)*; **8/2-5/2023**
8. *Texas Undergraduate Groups and Dynamics Conference (Presenter)*; **3/31-4/1/2023**
7. *TX-LA Undergraduate Mathematics Conference (Presenter)*; **3/25-26/2023**
6. *Southern Regional Number Theory Conference (Attendee)*; **3/11-12/2023**
5. *Joint Mathematics Meetings 2023 (Presenter)*; **1/4-7/2023**
4. *Texas Undergraduate Mathematics Conference (Presenter)*; **10/28-29/2022**
3. *Texas A&M Undergraduate Mathematics Research Expo (Presenter)*; **10/20/2022**
2. *Young Mathematicians Conference (Presenter)*; **8/12-14/2022**
1. *LAUNCH Undergraduate Research Summer Poster Session (Presenter)*; **8/3/2022**

Service

Ongoing Service

Rutgers University Directed Reading Program (Instructor); **August 2024 - Present**

Directed advanced students through a reading course on various topics in mathematics.

Rutgers University Math Department Welcoming Committee; **August 2024 - Present**

Organized events for prospective students touring the Rutgers University mathematics department.

Previous Service

Texas A&M University Math Club (Vice President); **August 2022 - May 2024**

Helped organize biweekly math club meetings and also developed the club's biweekly math problem solving competition as an outreach activity for undergraduates interested in higher mathematics.

Texas A&M University High School Math Competition (Grader); **November 2021, 2022, and 2023**

Assisted in the grading of the yearly Texas A&M University High School Math Competition alongside graduate students and professors. Planning to participate once more in the grading process after the 2023 competition date is announced.

Texas A&M University Math Circle (Facilitator/Instructor); **August 2021 - May 2024**

The Texas A&M University Math Circle is an organization which seeks to help students grades 5-12 gain exposure to interesting topics which otherwise may not be presented in regular coursework. Assisting in both the facilitation and instruction of the learning environment created by the Texas A&M University Math Circle.

Awards/Distinctions

National Science Foundation Graduate Research Fellow; **August 2024 - May 2029**

The National Science Foundation's Graduate Research Fellowship provides an estimated $200,000 total in tuition waivers and stipend funding towards my PhD. More information can be found here: `https://www.nsfgrfp.org/`

Rutgers University Presidential Fellowship; **August 2024 - May 2027**

The Rutgers University Presidential Fellowship provides an estimated $30,000 in supplementary funding towards my PhD. More information can be found here:
`https://grad.rutgers.edu/diversity-and-outreach/fellowships-and-funding`

Member of the American Mathematical Society; **August 2024 - Present**

Mary and Robert N. Walker Endowed Scholarship; **August 2021 - May 2024**

This scholarship is awarded to a freshman mathematics major by the Texas A&M University mathematics department. More information can be found here: `https://www.math.tamu.edu/undergraduate/scholarships/`.