Curriculum Vitae: Preston Tranbarger

Professional Email: prestontranbarger@tamu.edu
Webpage: http://people.tamu.edu/~prestontranbarger*

Education

Texas A&M University

***Bachelor of Science in Mathematics*, *Master of Science in Mathematics*;**
Current GPA: *3.900*; Current Mathematics GPA: *3.872*; Expected Graduation: *Spring 2024*

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

Employment

Texas A&M University

***Assistant Student Editor*; January 2022 - Present**

Assisted a professor in editing practice problems for a fully online calculus textbook. Unfortunately needed a leave in October 2022 due to coursework, but there is hope to continue further work on this project in the future.

***Undergraduate Student Researcher*; August 2021 - Present**

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 - May 2023**

Assisted professors by grading papers and providing feedback for about 110 students in both the Fall '21 and Spring '23 semesters. My assistance spanned the subjects of Linear Algebra and Differential Equations.

***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.

University of North Texas

***Undergraduate Student Researcher*; March 2020 - April 2021**

Devised a novel methodology of solving linear Diophantine equations in addition to quantifying and highlighting the solution's intriguing and useful properties. See the below *Research Experience* section for more details.

Research Experience

Texas A&M University

Advisor: *Dr. Matthew Young*; August 2022 - Present;
Topic: *New Dedekind Sums Arising from Eichler-Shimura Type Integrals of Higher Weight Holomorphic Eisenstein Series Attached to Characters*

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 - Present;
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.

Last Updated 6/12/23

*Contains more detailed information on many of the sections within this document.

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 Distribution of Eigenvalues of Matrices of Cubic Residue Symbols*

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.

University of North Texas

Advisor: *Dr. Stephen Jackson*; March 2020 - May 2021;
Topic: *A Particular Solution to Linear Diophantine Equations*

This research project's purpose was to examine the properties of a novel recursive method of solving a specific class of linear Diophantine equations. Served mostly as an introduction to the research process in early undergraduate studies.

Publications

Submitted, In Review

***Fast Computation of Generalized Dedekind Sums*;**
Submitted 10/8/2022 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 on the arXiv here: `https://arxiv.org/abs/2210.01172`.

Conferences and Presentations

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

Service

Ongoing Service

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

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/Power-Team 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 - Present**

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

***Honors Distinction*; Texas A&M University Mathematics**

Attained honors status for my undergraduate degree at Texas A&M University.

***Pi Mu Epsilon*; Spring 2022 - Present**

Member of the Pi Mu Epsilon national mathematics honor society.

***Mary and Robert N. Walker Endowed Scholarship*; Fall 2021 - Spring 2025**

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/`.