Curriculum Vitae: Preston Walker

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

Education

Rutgers University:

***Doctorate of Mathematics (w/ Advisor: Dr. Alex Kontorovich)*;**
Overall/Mathematics GPA: *3.875*; 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 (w/ Advisor: Dr. Matthew Young)*;**
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**

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.

***Student Grader*; August 2021 - December 2021, January 2023 - May 2024**

Assisted 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**

Assisted 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.

Last Updated 1/28/26

*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

Rutgers University:

Advisor: *Dr. Alex Kontorovich*; January 2025 - Present;
Topic: *Strong Prime Number Theorem in LEAN*

Assisted in formalizing a handful of lemmas and theorems for the ongoing strong prime number theorem formalization effort in the LEAN theorem prover.

Texas A&M University:

Advisor: *Dr. Matthew Young*; August 2022 - August 2024;
Topic: *Higher Weight Generalized Dedekind Sums*

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 period integrals of higher weight holomorphic Eisenstein series attached to characters. We also demonstrate quantum modularity, and many arithmetic and analytic properties.

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.

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Publications/Formalizations

Journal Articles:

AR-Classroom: Integrating Conversational Artificial Intelligence with Augmented Reality Technology for Learning Spatial Transformations and Their Matrix Representation **(with U. Monjoree, S. D. Aguilar, et al.); Published 10/13/2024 to *2024 IEEE Frontiers in Education Conference***

Publication due to the research on teaching rotations through augmented Reality. It is available here:
`https://ieeexplore.ieee.org/document/10893308`.

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`.

Preprint Articles:

Higher Weight Generalized Dedekind Sums

Publication due to self-guided research under the supervision of Dr. Matthew Young while at Texas A&M University. It is available here:
`https://arxiv.org/abs/2512.17139`.

Formalizations:

Prime Number Theorem and... **(with A. Kontorovich, T. Tao, et al.)**

Formalization due to my involvement in the ongoing effort to formalize the strong prime number theorem (with the traditional $O(x\exp(-c\sqrt{\log x}))$ error term) in LEAN. It is available here:
`https://github.com/AlexKontorovich/PrimeNumberTheoremAnd`.

Conferences, Workshops, and Presentations

14. ***Arizona Winter School 2026 (Attendee)*; 3/7-11/2026**
13. ***Joint Mathematics Meetings 2026 (Attendee)*; 1/4-7/2026**
12. ***MPS Workshop on LEAN (Attendee)*; 6/16-27/2025**
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

***Seminar Organizer*; August 2025 - Present**

Organized a variety of seminars within the Rutgers University mathematics department to enrich my peer's education.

***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 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

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

***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/funding/fellowships-grants/presidential-fellowships`

***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/`.