Zhuo Zhang

+1 (217)-991-2524
zhuoz4@illinois.edu

Education

Aug 2021 – May 2025 **B.S. in Mathematics, Minor in Computer Science**, *University of Illinois at Urbana-Champaign (UIUC)*, Champaign

- GPA: 4.0
- Edmund J. James Scholar, College of Liberal Arts and Sciences
- Dean's List in all semesters

Graduate Courses Taken

Spring 2023 Abstract Algebra, Real Analysis

Fall 2023 Differentiable Manifolds 1, Complex Variables, Analytic Number Theory 1

Spring 2024 (In Progress) Differentiable Manifolds 2, Intro to Algebraic Geometry, Representation Theory, Analytic Number Theory 2

Grades = A+ in all math courses taken in college.

Presentations and Talks

Oct 2023 *On the Distribution of Primes*, UIUC Analytic Number Theory Course, 3 talks, 90 minutes each

Aug 2023 *An Introduction to Bordism Homology*, UChicago Math REU, 25 minute talk

Sep 2022 *Continued Fractions and the Gauss-Kuzmin Distribution*, UIUC Undergraduate Friday Seminar, 60 minute talk

Aug 2022 *On the Continued Fraction Expansion of Random Real Numbers*, Young Mathematician Conference, 25 minute talk

Jun 2022 *Hecke Algebras and Kazhdan-Lusztig Polynomials*, UIUC ICLUE Seminar, 120 minute talk

Writings and Preprints

Jan 2023 *Pattern Formation with Fermat Quotients*, with Cristian Cobeli, Alexandru Zaharescu, Zhuo Zhang, in preparation

Dec 2023 *A Geometric View of Bordism Homology*, Zhuo Zhang

Dec 2023 *Notes on Smooth Manifolds*, Zhuo Zhang

May 2023 *On a Special Class of Primes and Their Primitive Roots*, Zhuo Zhang

Dec 2022 *On the Continued Fraction Expansion of Almost All Real Numbers*, with AJ Hildebrand, Alex Jin, Shreyas Singh, Zhuo Zhang, submitted

Research Experiences

June 2023 – Aug 2023 **UChicago Math Summer REU Program**,
Mentors: Peter May & Mark Behrens, UChicago
- Learned higher algebraic topology and differential topology.
- Wrote an expository paper on a geometric treatment of bordism homology.
- Gave a final presentation of the work done in the REU.

Jan 2023 – May 2023 **Independent Research Project at Honors Seminar**,
Mentor: Bruce Reznick, UIUC
- Defined a special class of primes known as "Z-primes."
- Studied the properties of Z-primes and their special primitive roots.
- Wrote a paper and proposed a conjecture about the asymptotic density of such special primitive roots, providing a heuristic argument.
- Wrote codes to collect numerical data, which provided very strong support of the conjecture.

Jan 2022 – Dec 2022 **Research Project on Continued Fractions at Illinois Geometry Lab**,
Mentor: AJ Hildebrand, UIUC
- Studied the Gauss-Kuzmin distribution underlying simple continued fraction expansion of random real numbers.
- Collected data on the distribution of continued fraction digits of π.
- Wrote a paper that summarized the research results.
- Presented the results of this work at seminars and local and national conferences.

May 2022 – Jul 2022 **Representation Theory Summer Program**,
Mentor: Alexander Yong, UIUC
- Read Serre's book *Linear Representations of Finite Groups* and learned related topics in algebraic combinatorics.
- Collaborated with team members to create 60 pages of LaTeX notes on representation theory.
- Gave a 2-hour presentation on Hecke algebras and Kazhdan-Lusztig polynomials.

Directed Readings

Jan 2024 – May 2024 **Differential Geometry**, *Mentor: Eugene Lerman*, UIUC
- In progress

Aug 2023 – Dec 2023 **Homotopy Theory**, *Mentor: Charles Rezk*, UIUC
- Learned advanced algebraic topology and homotopy theory
- Read the notes *Homotopy theories and model categories* by Dwyer and Spalinski.

Leadership Experiences

Aug 2022 – Present **President of the Illinois Geometry Lab Outreach Program**, UIUC
- Reach out to children and students from local communities and present to them interesting topics in mathematics.
- Introduce technologies involving math to students, such as 3D printing.
- Organize various outreach events and social events.
- Coordinate the work between group members.

Aug 2022 – Dec 2022 **James Scholar Mentor**, UIUC

- Mentored two first-year James Scholar honors students in mathematics.
- Organized mentorship meetings, study sessions and Q&A sessions to guide the mentees and help them have a smooth transition to college.
- Helped the mentees find resources for undergraduate research in mathematics and physical sciences.

Skills

Languages: Chinese (Native), English (Proficient)

Programming: Python (Proficient), C++ (Proficient), Mathematica (Proficient), LaTeX (Proficient), Java (Intermediate)

Honors and Awards

Apr 2023 LAS Get Experience Scholarship

Mar 2023 Lewis C. Hack Scholarship

Aug 2021 – Present Edmund J. James Scholar