

Austin Lei

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Education

Columbia University

PhD Student in Math

Fall 2023 – Spring 2028 (expected)

University of California Berkeley

BA in Math/Computer Science

GPA: 4.0

Fall 2019 – Spring 2023

Research Interests

Probabilistic number theory, automorphic forms, analytic number theory.

Publications

William Frendreiss, Jennifer Gao, Austin Lei, Amy Woodall, Hui Xue, and Daozhou Zhu. Interlacing properties for zeros of a family of modular forms. *International Journal of Number Theory*, 20(02):441–470, 2024.

Austin Lei, Tianyu Ni, and Hui Xue. Linear independence of odd periods of modular forms. *Research in Number Theory*, 9(2):33, 2023.

Austin Lei, Tianyu Ni, and Hui Xue. Linear independence of even periods of modular forms. *Journal of Number Theory*, 248:120–139, 2023.

William Frendreiss, Jennifer Gao, Austin Lei, Amy Woodall, Hui Xue, and Daozhou Zhu. A stieltjes separation property of zeros of eisenstein series. *Kyushu Journal of Mathematics*, 76(2):407–439, 2022.

William Frendreiss, Jennifer Gao, Austin Lei, Amy Woodall, Hui Xue, and Daozhou Zhu. Cuspidal projections of products of eisenstein series. *Journal of Number Theory*, 234:48–73, 2022.

William Frendreiss, Jennifer Gao, Austin Lei, Amy Woodall, Hui Xue, and Daozhou Zhu. Stieltjes interlacing of the zeros of j_n . *Canadian Mathematical Bulletin*, page 1–18, 2022.

Selected Coursework

MATH 6657GR - Algebraic Number Theory

Spring 2024

○ Graduate-level algebraic number theory and class field theory course with Professor Eric Urban.

MATH 6262GR - Algebraic Geometry

Spring 2024

○ Graduate-level algebraic geometry course with Professor Robert Friedman.

MATH 6153GR - Probability II

Spring 2024

○ Graduate-level probability course using Le Gall's *Brownian Motion, Martingales, and Stochastic Calculus* with Professor Julien Dubedat.

MATH 6343GR - Lie Groups and Representations I

Fall 2023

○ Graduate-level Lie groups and representation theory class with Professor Andrei Okounkov.

MATH 6261GR - Commutative Algebra

Fall 2023

○ Graduate-level commutative algebra course with Professor Robert Friedman.

MATH 6175GR - Complex Analysis and Riemann Surfaces

Fall 2023

○ Graduate-level complex analysis and Riemann surfaces course with Professor Duong Phong.

- Math 256A - Graduate Algebraic Geometry** **Fall 2022**
 ○ Graduate-level algebraic geometry course using Hartshorne's *Algebraic Geometry* with Professor Yunqing Tang.
- Math 202B - Graduate Introduction to Analysis** **Spring 2022**
 ○ Graduate-level analysis course using with Folland's *Real Analysis* with Professor Francis Michael Christ.
- Reading Course on Modular Forms** **Spring 2022**
 ○ Reading course with Professor Sug-Woo Shin using Milne's *Modular Forms*.
- Math 254A - Graduate Algebraic Number Theory** **Fall 2021**
 ○ Graduate-level algebraic number theory course using Neukirch's *Algebraic Number Theory* with Professor Paul Vojta.
- Math 202A - Graduate Introduction to Analysis** **Fall 2021**
 ○ Graduate-level analysis course with Professor Marc Rieffel.
- Math 250B - Graduate Commutative Algebra** **Spring 2021**
 ○ Graduate-level commutative algebra course using Eisenbud's *Commutative Algebra with a View Toward Algebraic Geometry* with Professor Richard Borcherds.
- Math 250A - Graduate Algebra** **Fall 2020**
 ○ Graduate-level abstract algebra course using Lang's *Algebra* with Professor Ken Ribet.

Experiences

- Honor Thesis** **Fall 2022**
 ○ Wrote expository paper under guidance of Professor Sug Woo Shin, discussing the paper "Effective equidistribution of eigenvalues of Hecke operators" by Murty and Sinha.
- SIG Trading Intern** **Summer 2022**
- Independent Research** **Spring 2022**
 ○ Continued original research from REU, published two papers with Professor Hui Xue and Tianyu Ni.
- Clemson REU** **Summer 2021**
 ○ Did original research and published four papers with Professor Hui Xue, William Frenreiss, Jennifer Gao, Amy Woodall, and Daozhou Zhu.

Conferences

- Analytic Number Theory and Arithmetic Statistics** **August 2024**
- SCHOLAR II - A Scientific Celebration Highlighting Open Lines of Arithmetic Research** **May 2024**
- 36th Automorphic Forms Workshop** **May 2024**
- Joint Mathematical Meetings** **Jan 2024**
- Berkeley Undergraduate Number Theory Conference** **Apr 2023**
- 41st Bay Area Discrete Math Day** **Apr 2021**
- 40th Bay Area Discrete Math Day** **Nov 2020**
- Berkeley Undergraduate Number Theory Conference** **Nov 2020**

Teaching

Columbia Directed Reading Program

Fall 2023 – Spring 2024

- Held weekly meetings to read and discuss mathematical topics of student's choice. In Fall 2023 and Spring 2024, discussed elliptic curves, number theory, and mathematical cryptography, using "An Introduction to Mathematical Cryptography" by Silverman, Piper, and Hoffstein.

CS 70 Reader/TA

2020 – 2022

- TA/Reader for a discrete math and probability course at UC Berkeley. As TA, taught hour-long discussion sessions to ~30 students each week, hosted weekly office hours, and tutored students at homework parties. As reader, graded homework weekly for ~700 students and tutored students at homework parties.

EECS 126 Reader

Fall 2020

- Wrote exam questions for a probability course at UC Berkeley. Tutored students at office hours and graded homework for ~150 students.

Berkeley Computer Science Mentors CS 70 Content/Junior Mentor

Spring 2020 – Fall 2020

- Content Mentor in Fall 2020. Created worksheets for mentors to tutor students in discrete mathematics.
- Junior Mentor in Spring 2020. Tutored group of five students in discrete mathematics.

Activities

Columbia Journal of Undergraduate Math Editor

Spring 2024

- Refereed and edited submissions for Columbia's undergraduate math journal.

Columbia Integration Bee Organizer

Spring 2024

- Wrote questions and organized a live bracket tournament for Columbia undergraduate students.

Berkeley Math Tournament Head Problem Writer

Fall 2019 – Spring 2022

- Wrote questions, organized problem writers and tests, and ensured problem quality for an annual high school and an annual middle school contest.

Berkeley Mathematics Undergraduate Student Association Officer

Spring 2020 – Spring 2022

- Held and organized events for the mathematical community at Berkeley and surrounding areas.

Berkeley Computer Science Undergraduate Association Officer

Fall 2019 – Fall 2022

- Facilitated company info sessions and increased outreach to computer science students.

Awards

Putnam Honorable Mention

2019

- National Rank: 101st