JAKE ZUMMO

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EDUCATION

The University of Chicago
B.S. in Mathematics with Honors (Expected June 2025)
Minor: Computer Science
GPA: 3.85/4.00

Phillips Academy Andover
High School Diploma

RESEARCH EXPERIENCE

Summer 2023 Math REU at Clemson University
Student Participant June 2023 – July 2023

- Research Area: Number Theory and Modular Forms
- Program Mentor: Professor Hui Xue, Department of Mathematics, Clemson University
- Accomplishments: Published an original research paper in the *Journal of Number Theory*. Proved that the quadratic elementary symmetric polynomial of the eigenvalues of the second Hecke operator acting on the space of cusp forms of level N is asymptotically nonzero in the case that N is odd.

The University of Chicago Mathematics REU 2022
Apprentice Program Participant June 2022 - August 2022

- Research Area: Individualized study in Geometric Group Theory; base curriculum in Combinatorics, Number Theory, Hyperbolic Geometry, and Group Theory.
- Graduate Student Mentor: Elizaveta Shuvaeva

PUBLICATIONS & PREPRINTS

- *Non-repetition of second coefficients of Hecke polynomials* (with A. Clayton, H. Dai, E. Ross T. Ni, H. Xue), *arXiv:2411.18419* (November 2024), submitted
- *Nonvanishing of second coefficients of Hecke polynomials* (with A. Clayton, H. Dai, T. Ni, H. Xue) Journal of Number Theory (September, 2024) vol. 262, pp. 186-221

EXPOSITORY

- *An introduction to geometric group theory*
  The University of Chicago Mathematics REU (August, 2022)

TEACHING ASSISTANT & GRADING EXPERIENCE

- TTIC 31020 *Introduction to Machine Learning*, Winter 2025, Grader (Professor Nati Srebro)
- STAT 24300 *Numerical Linear Algebra*, Winter 2025, Grader
- MATH 27300 *Basic Theory of Ordinary Differential Equations*, Autumn 2024, TA (Professor S. Filip)
- MPCS 50103 *Mathematics for CS: Discrete Mathematics*, Autumn 2024, Grader (Professor I. Agarwal)
- MATH 16310 *Honors Calculus III: IBL*, Spring 2024, TA, (Dr. O. Propp)
- MATH 16110 *Honors Calculus I: IBL*, Autumn 2023, TA (Dr. O. Propp)

WORK EXPERIENCE

Capital Fund Management
Predictor Research Intern June 2024 – September 2024

- Responsibilities/Achievements: Built a data processing and machine learning pipeline to transform alternative data into forecasts on the E&P sector for downstream use in quantitative trading strategies. Work involved statistical analysis, relational database management, and machine learning with a SLURM cluster.
- Professional Contact: Dr. Yves Lempérière, Head of Alpha Predictor Research, CFM

AWARDS

- NSA MSP grant H98230-23-1-0020 (with the Summer 2023 Math REU at Clemson University)

SKILLS

- Programming: Python (numpy, pandas, sklearn, pytorch), R, SQL, Java, C
- Languages: Proficiency in Latin; beginner in Ancient Greek and French

PRESENTATIONS & POSTERS

"Properties of Second Coefficients of Hecke Polynomials"
Summer Undergraduate Research Symposium, Clemson University July 2023

"A Taste of Algebraic Geometry"
Spring 2024 Math DRP Presentation, University of Chicago October 2024

ACTIVITIES & EXTRACURRICULARS

Machine Learning and Optimization (MLO) Reading Group
Participant October 2024 - December 2024

- Research Area: Statistical and Computational Learning Theory
- Group Head: Professor Nathan Srebro

Spring 2024 Math Directed Reading Program
Mentee March 2024 - May 2024

- Subject: Commutative Algebra
- Graduate Student Mentor: Xinchun Ma
- Textbook: *Introduction to Commutative Algebra* (M. Atiyah, I. Macdonald)

Winter 2023 Math Directed Reading Program
Mentee January 2024 - March 2024

- Subject: Functional Analysis
- Graduate Student Mentor: David Bowman
- Textbook: *Introductory Real Analysis* (A. Kolmogorov, S. Fomin)

Derivatives Group Quant Trading Club
Member October 2021 - June 2022

- Description: Attended lectures on financial derivatives, time series, statistics, and programming. Contributed to a capstone project implementing and comparing various time series models in Python with data from Yahoo finance