# JAKE ZUMMO

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jzummo.github.io

## 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

- 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