

Zachary Porat

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🖱 <https://zporat.github.io>
🌐 U.S. Citizen
📅 Last Updated June 17, 2025

EDUCATION

Wesleyan University | MIDDLETOWN, CT 2020 – Present

- Ph.D. Candidate in Mathematics (Expected 2026)
- Advisor: David Pollack

Union College | SCHENECTADY, NY 2016 – 2020

- Bachelor of Science in Mathematics with Honors, *summa cum laude*
 - Honors Thesis: “Classification of Torsion Subgroups for Mordell Curves” [[Link](#)]
- Physics Minor, Phi Beta Kappa, Scholars Program

RESEARCH INTERESTS

Broad: number theory, arithmetic geometry

Specific: automorphic forms, cohomology of congruence subgroups of $SL(3, \mathbb{Z})$, computational aspects of number theory and arithmetic geometry

PUBLICATIONS AND PREPRINTS

[4] **Heuristics for (Ir)reducibility of p-Rank Strata of the Moduli Space of Hyperelliptic Curves** (with Thomas Bouchet, Erik Davis, Steven Groen, and Benjamin York), submitted. [[Code](#)]

🔗 [arXiv:2506.06457](https://arxiv.org/abs/2506.06457)

[3] **Computations Directly on the Cuspidal Cohomology of Congruence Subgroups of $SL(3, \mathbb{Z})$** , submitted. [[Code](#)]

🔗 [arXiv:2410.02734](https://arxiv.org/abs/2410.02734)

[2] **Family Sizes for Complete Multipartite Graphs** (with Danielle Gregg, Thomas Mattman, and George Todd), *Involve, a Journal of Mathematics*, Vol. 15, No. 4 (2022), 669-686.

🔗 [MR4536581](https://doi.org/10.2140/involve.2022.15.669), DOI: [10.2140/involve.2022.15.669](https://doi.org/10.2140/involve.2022.15.669)

[1] **PIXE Analysis of Synthetic Turf** (with Sajju Chalise, Morgan Clark, Skye Conlan, Scott LaBrake, and Michael Vineyard), *Environment and Ecology Research*, Vol. 6, No. 1 (2018), 60-65.

🔗 DOI: [10.13189/eer.2018.060105](https://doi.org/10.13189/eer.2018.060105)

TEACHING EXPERIENCE

Instructor of Record | WESLEYAN UNIVERSITY

Fall 2022 – Present

- MATH 121 - Calculus I (Fall 2024)
- MATH 132 - Elementary Statistics (Fall 2022)

Teaching Assistant | WESLEYAN UNIVERSITY

Fall 2021 – Present

- MATH 225 - Introduction to Real Analysis (Spring 2022, Spring 2023, Spring 2025)
- MATH 262 - Advanced Topics in Abstract Algebra (Spring 2024)
- MATH 261 - Introduction to Abstract Algebra (Fall 2023)
- MATH 228 - Discrete Mathematics (Fall 2021)

Math Workshop Tutor | WESLEYAN UNIVERSITY

Fall 2020 – Spring 2021

- Covers the entire selection of undergraduate math courses at Wesleyan

Course Assistant | UNION COLLEGE

Fall 2017 – Winter 2020

- MTH 340 - Linear Algebra (Winter 2020)
- MTH 110 - Calculus I (Fall 2017, Fall 2018, Fall 2019)
- MTH 112 - Calculus II (Winter 2018, Winter 2019)
- MTH 115 - Differential Vector Calculus and Matrix Theory (Spring 2018)

Calculus Help Center Tutor | UNION COLLEGE

Fall 2019 – Winter 2020

- Covers Calculus I, Calculus II, and Multivariable Calculus with Linear Algebra

MENTORSHIP AND OUTREACH

Directed Reading Program Mentor | WESLEYAN UNIVERSITY

Spring 2023 – Present

- William Allen, Elliptic Curves (Spring 2025)
 - Talk Title: “Elliptic Curve Cryptography: Data Encryption through Math”
- William Dollhopf, Mathematical Cryptography (Fall 2023)
 - Talk Title: “Introduction to Cryptography and the ElGamal Key Cryptosystem”
- Emily Bennett, Mathematical Cryptography (Spring 2023)
 - Talk Title: “Understanding Public Key Cryptography: The Diffie-Hellman Key Exchange”
- Stefan Hesseling, Mathematical Cryptography (Spring 2023)
 - Talk Title: “RSA and Integer Factorization”

Project Assistant | ARITHMETIC GEOMETRY AT UNIVERSITY OF NORTH TEXAS

May 5-9, 2025

- Course Title: “Iwasawa Theory and its Applications” [[Link](#)]

Mini-Course Lecturer | STUDENT WORKSHOP IN MATHEMATICS

March 29-30, 2025

- Course Title: “A Crash Course in Cryptology: Securing Electronic Communications” [[Link](#)]

INVITED TALKS

- **Heuristics for (Ir)reducibility of Strata of the Moduli Space of Hyperelliptic Curves**
AWM Research Symposium: Special Session on Curves and Abelian Varieties in Characteristic p (University of Wisconsin-Madison) | May 16, 2025
- **The Evolving Role of Computers in Mathematics**
AMS New England Graduate Student Conference (Brown University) | April 19, 2025
- **How Computers are Shaping Math**
Manhattan College Math Seminar | November 15, 2023
- **The Search for Large Prime Numbers**
Union College Math Seminar | January 12, 2023

CONTRIBUTED TALKS

- **Computing the Hecke Action Directly on the Cuspidal Cohomology of Congruence Subgroups of $SL(3, \mathbb{Z})$**
33^{èmes} Journées Arithmétiques (Université du Luxembourg) | Upcoming
- **Advances in Computations on the Cohomology of Congruence Subgroups of $SL(3, \mathbb{Z})$**
37th Automorphic Forms Workshop (University of North Texas) | May 4, 2025
- **Computations Directly on the Cuspidal Cohomology of Congruence Subgroups of $SL(3, \mathbb{Z})$**
Conférence de Théorie des Nombres Québec-Maine (Université Laval) | October 6, 2024
- **Additional Computations of the Hecke Action on the Cuspidal Cohomology of Congruence Subgroups of $SL(3, \mathbb{Z})$**
36th Automorphic Forms Workshop (Oklahoma State University) | May 24, 2024
- **Death at 20: The Story and Math of Évariste Galois**
Graduate Student Seminar (Wesleyan University) | March 9, 2023
- **An Introduction to Elliptic Curves**
Graduate Student Seminar (Wesleyan University) | October 14, 2021

SELECT WORKSHOPS AND CONFERENCES

- **LMFDB, Computation, and Number Theory 2025** (ICERM), Upcoming.
- **33^{èmes} Journées Arithmétiques** (Université du Luxembourg), Upcoming.
- **AWM Research Symposium: Special Session on Curves and Abelian Varieties in Characteristic p** (University of Wisconsin-Madison), May 16-18, 2025.
- **Arithmetic Geometry at UNT[†]** (University of North Texas), May 5-9, 2025.
- **37th Automorphic Forms Workshop** (University of North Texas), April 30 – May 4, 2025.

[†]Denotes that I served as a project assistant at this workshop. See [Mentorship and Outreach](#) for additional details.

- **Conférence de Théorie des Nombres Québec-Maine** (Université Laval), October 5-6, 2024.
- **Algorithmic Number Theory Symposium XVI** (MIT), July 15-19, 2024.
- **36th Automorphic Forms Workshop** (Oklahoma State University), May 20-24, 2024.
- **Arizona Winter School: Abelian Varieties** (University of Arizona), March 2-6, 2024.

SERVICE

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|---|-------------------------|
| • Co-organizer of the Directed Reading Program | Spring 2023 – Present |
| • President of the Wesleyan AMS Graduate Student Chapter | Fall 2023 – Spring 2025 |
| • Co-organizer of the 2025 Student Workshop in Mathematics [Link] | Spring 2025 |
| • Co-organizer of the departmental Graduate Student Seminar | Spring 2022 – Fall 2023 |
| • Vice President of the Wesleyan AMS Graduate Student Chapter | Fall 2021 – Spring 2023 |

HONORS AND AWARDS

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|---|------------|
| • Martin Terry Resch Prize [Link] | May 2020 |
| • Phi Beta Kappa Membership | May 2020 |
| • Pi Mu Epsilon Membership | April 2019 |

TECHNICAL SKILLS

- Magma, SageMath, Python

REFERENCES

Research

- David Pollack, dpollack@wesleyan.edu

Teaching

- Alex Kruckman, akruckman@wesleyan.edu
- Felipe Ramírez, framirez@wesleyan.edu