

Zachary Porat

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🌐 U.S. Citizen
📅 Last Updated October 30, 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 $\mathrm{SL}(3, \mathbb{Z})$, 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 $\mathrm{SL}(3, \mathbb{Z})$,** to appear in *Mathematics of Computation*. [[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), *Involv., a Journal of Mathematics*, Vol. 15, No. 4 (2022), 669-686.  [MR4536581](https://mathscinet.ams.org/mathscinet-getitem?mr=4536581), DOI: [10.2140/involv.2022.15.669](https://doi.org/10.2140/involv.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
<ul style="list-style-type: none"> • MATH 500 - Graduate Pedagogy (Fall 2025) • MATH 121 - Calculus I (Fall 2024) • MATH 132 - Elementary Statistics (Fall 2022) 	
Teaching Assistant WESLEYAN UNIVERSITY	Fall 2021 – Present
<ul style="list-style-type: none"> • MATH 261 - Introduction to Abstract Algebra (Fall 2023, Fall 2025) • MATH 225 - Introduction to Real Analysis (Spring 2022, Spring 2023, Spring 2025) • MATH 262 - Advanced Topics in Abstract Algebra (Spring 2024) • MATH 228 - Discrete Mathematics (Fall 2021) 	
Math Workshop Tutor WESLEYAN UNIVERSITY	Fall 2020 – Spring 2021
<ul style="list-style-type: none"> • Covers the entire selection of undergraduate math courses at Wesleyan 	
Course Assistant UNION COLLEGE	Fall 2017 – Winter 2020
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Covers Calculus I, Calculus II, and Multivariable Calculus with Linear Algebra 	

MENTORSHIP AND OUTREACH

Directed Reading Program Mentor WESLEYAN UNIVERSITY	Spring 2023 – Present
<ul style="list-style-type: none"> • William Allen, Elliptic Curves (Spring 2025) <ul style="list-style-type: none"> ◦ Talk Title: “Elliptic Curve Cryptography: Data Encryption through Math” • William Dollhopf, Mathematical Cryptography (Fall 2023) <ul style="list-style-type: none"> ◦ Talk Title: “Introduction to Cryptography and the ElGamal Key Cryptosystem” • Emily Bennett, Mathematical Cryptography (Spring 2023) <ul style="list-style-type: none"> ◦ Talk Title: “Understanding Public Key Cryptography: The Diffie-Hellman Key Exchange” • Stefan Hesseling, Mathematical Cryptography (Spring 2023) <ul style="list-style-type: none"> ◦ Talk Title: “RSA and Integer Factorization” 	
Project Assistant ARITHMETIC GEOMETRY AT UNIVERSITY OF NORTH TEXAS	May 5-9, 2025
<ul style="list-style-type: none"> • Course Title: “Iwasawa Theory and its Applications” [Link] 	
Mini-Course Lecturer STUDENT WORKSHOP IN MATHEMATICS	March 29-30, 2025
<ul style="list-style-type: none"> • Course Title: “A Crash Course in Cryptology: Securing Electronic Communications” [Link] 	

INVITED TALKS

- **Computations on the Cuspidal Cohomology of Congruence Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
Five College Number Theory Seminar - February 10, 2026
- **Computations on the Cohomology of Congruence Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
UConn Algebra Seminar - December 3, 2025
- **Computations on the Cohomology of Iwahori Congruence Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
Special Session on Unveiling Connections: Number Theory Meets Algebraic Geometry
AMS Fall Eastern Sectional Meeting (Virtual) - October 25, 2025
- **Computations on the Cohomology of Iwahori Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
Special Session on Modular Forms in Combinatorics and Number Theory
AMS Fall Southeastern Sectional Meeting (Tulane University) - October 4, 2025
- **Heuristics for (Ir)reducibility of Strata of the Moduli Space of Hyperelliptic Curves**
Special Session on Curves and Abelian Varieties in Characteristic p
AWM Research Symposium (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 $\mathrm{SL}(3, \mathbb{Z})$**
33èmes Journées Arithmétiques (Université du Luxembourg) - July 4, 2025
- **Advances in Computations on the Cohomology of Congruence Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
37th Automorphic Forms Workshop (University of North Texas) - May 4, 2025
- **Computations Directly on the Cuspidal Cohomology of Congruence Subgroups of $\mathrm{SL}(3, \mathbb{Z})$**
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 $\mathrm{SL}(3, \mathbb{Z})$**
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

- **AMS Fall Eastern Sectional Meeting**, Special Session on Unveiling Connections: Number Theory Meets Algebraic Geometry (Virtual), October 25-26, 2025.
- **AMS Fall Southeastern Sectional Meeting**, Special Session on Modular Forms in Combinatorics and Number Theory (Tulane University), October 3-5, 2025.
- **LMFDB, Computation, and Number Theory 2025** (ICERM), July 7-11, 2025.
- **33èmes Journées Arithmétiques** (Université du Luxembourg), June 30 – July 4, 2025.
- **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.
- **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 |

GRANTS

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|---------------------------------------|--------------|
| • AMS Sectional Travel Grant | October 2025 |
| • AWM Research Symposium Travel Grant | May 2025 |

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 |

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

TECHNICAL SKILLS

- Magma, SageMath, Python

REFERENCES

RESEARCH

- **David Pollack**, dpollack@wesleyan.edu
Associate Professor of Mathematics, Wesleyan University
- **Avner Ash**, ashav@bc.edu
Professor of Mathematics, Boston College
- **Chris Williams**, chris.williams1@nottingham.ac.uk
Assistant Professor of Pure Mathematics, University of Nottingham

TEACHING

- **Alex Kruckman**, akruckman@wesleyan.edu
Assistant Professor of Mathematics, Wesleyan University
- **Felipe Ramírez**, framirez@wesleyan.edu
Associate Professor of Mathematics, Wesleyan University