

# Zachary Porat

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Department of Mathematics and Computer Science  
Wesleyan University  
Exley Science Center, 6<sup>th</sup> Floor  
265 Church Street  
Middletown, CT 06459

✉ [zporat@wesleyan.edu](mailto:zporat@wesleyan.edu)  
↗ <https://zporat.github.io>  
🌐 U.S. Citizen  
📅 Last Updated December 9, 2025

## EDUCATION

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**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

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**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

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- [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  $\mathrm{SL}(3, \mathbb{Z})$** , *Mathematics of Computation* (2025). [[Code](#)]  DOI: [10.1090/mcom/4155](https://doi.org/10.1090/mcom/4155)
- [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, 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

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<b>Instructor of Record   WESLEYAN UNIVERSITY</b>	Fall 2022 – Present
<ul style="list-style-type: none"> <li>• MATH 500 - Graduate Pedagogy (Fall 2025)</li> <li>• MATH 121 - Calculus I (Fall 2024)</li> <li>• MATH 132 - Elementary Statistics (Fall 2022)</li> </ul>	
<b>Teaching Assistant   WESLEYAN UNIVERSITY</b>	Fall 2021 – Present
<ul style="list-style-type: none"> <li>• MATH 261 - Introduction to Abstract Algebra (Fall 2023, Fall 2025)</li> <li>• MATH 225 - Introduction to Real Analysis (Spring 2022, Spring 2023, Spring 2025)</li> <li>• MATH 262 - Advanced Topics in Abstract Algebra (Spring 2024)</li> <li>• MATH 228 - Discrete Mathematics (Fall 2021)</li> </ul>	
<b>Math Workshop Tutor   WESLEYAN UNIVERSITY</b>	Fall 2020 – Spring 2021
<ul style="list-style-type: none"> <li>• Covers the entire selection of undergraduate math courses at Wesleyan</li> </ul>	
<b>Course Assistant   UNION COLLEGE</b>	Fall 2017 – Winter 2020
<ul style="list-style-type: none"> <li>• MTH 340 - Linear Algebra (Winter 2020)</li> <li>• MTH 110 - Calculus I (Fall 2017, Fall 2018, Fall 2019)</li> <li>• MTH 112 - Calculus II (Winter 2018, Winter 2019)</li> <li>• MTH 115 - Differential Vector Calculus and Matrix Theory (Spring 2018)</li> </ul>	
<b>Calculus Help Center Tutor   UNION COLLEGE</b>	Fall 2019 – Winter 2020
<ul style="list-style-type: none"> <li>• Covers Calculus I, Calculus II, and Multivariable Calculus with Linear Algebra</li> </ul>	

## MENTORSHIP AND OUTREACH

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<b>Directed Reading Program Mentor   WESLEYAN UNIVERSITY</b>	Spring 2023 – Present
<ul style="list-style-type: none"> <li>• William Allen, Elliptic Curves (Spring 2025)           <ul style="list-style-type: none"> <li>◦ Talk Title: “Elliptic Curve Cryptography: Data Encryption through Math”</li> </ul> </li> <li>• William Dollhopf, Mathematical Cryptography (Fall 2023)           <ul style="list-style-type: none"> <li>◦ Talk Title: “Introduction to Cryptography and the ElGamal Key Cryptosystem”</li> </ul> </li> <li>• Emily Bennett, Mathematical Cryptography (Spring 2023)           <ul style="list-style-type: none"> <li>◦ Talk Title: “Understanding Public Key Cryptography: The Diffie-Hellman Key Exchange”</li> </ul> </li> <li>• Stefan Hesseling, Mathematical Cryptography (Spring 2023)           <ul style="list-style-type: none"> <li>◦ Talk Title: “RSA and Integer Factorization”</li> </ul> </li> </ul>	
<b>Project Leader   RETHINKING NUMBER THEORY</b>	June 22 – July 3, 2026
<ul style="list-style-type: none"> <li>• Project Topic: Comparing <math>a_p</math> Values of Elliptic Curves Modulo <math>\ell</math> [<a href="#">Link</a>]</li> </ul>	
<b>Project Assistant   ARITHMETIC GEOMETRY AT THE UNIVERSITY OF NORTH TEXAS</b>	May 5-9, 2025
<ul style="list-style-type: none"> <li>• Course Title: “Iwasawa Theory and its Applications” [<a href="#">Link</a>]</li> </ul>	

**Mini-Course Lecturer | STUDENT WORKSHOP IN MATHEMATICS**

March 29-30, 2025

- Course Title: "A Crash Course in Cryptology: Securing Electronic Communications" [Link]

**INVITED TALKS**

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- **Computations on the Cuspidal Cohomology of Congruence Subgroups of  $\mathrm{SL}(3, \mathbb{Z})$**   
Five College Number Theory Seminar - February 10, 2026
- **On the Cuspidal 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**

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- **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  $\mathrm{SL}(3, \mathbb{Z})$**   
37<sup>th</sup> 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  $\mathrm{SL}(3, \mathbb{Z})$**   
36<sup>th</sup> 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

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- **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<sup>†</sup>** (University of North Texas), May 5-9, 2025.
- **37<sup>th</sup> 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.
- **36<sup>th</sup> 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 Wesleyan 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 Wesleyan 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

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

## 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

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- Magma, SageMath, Python, Linux

## REFERENCES

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### RESEARCH

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

### TEACHING

- **Alex Kruckman**, [akruckman@wesleyan.edu](mailto:akruckman@wesleyan.edu)  
Assistant Professor of Mathematics, Wesleyan University
- **Felipe Ramírez**, [framirez@wesleyan.edu](mailto:framirez@wesleyan.edu)  
Associate Professor of Mathematics, Wesleyan University