

# Zachary Porat

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Department of Mathematics and Computer Science  
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🖱 <https://zporat.github.io>  
🌐 U.S. Citizen  
📅 Last Updated March 10, 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 on  $GL(3)$ , cohomology of arithmetic groups, computational aspects of number theory and arithmetic geometry

## PUBLICATIONS AND PREPRINTS

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

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### 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

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### 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

Upcoming

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

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

Upcoming

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

## INVITED TALKS

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- **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), Upcoming.
- **The Evolving Role of Computers in Mathematics**, AMS New England Graduate Student Conference (Brown University), Upcoming.
- **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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- **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  $SL(3, \mathbb{Z})$** , 36<sup>th</sup> Automorphic Forms Workshop (Oklahoma State University), May 24, 2024.
- **Death at 20: The Story of Évariste Galois**, Graduate Student Seminar (Wesleyan University), March 9, 2023.
- **An Introduction to Cryptography**, Graduate Student Seminar (Wesleyan University), February 10, 2022.
- **An Introduction to Elliptic Curves**, Graduate Student Seminar (Wesleyan University), October 14, 2021.

## WORKSHOPS

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Arithmetic Geometry at UNT 📍 University of North Texas	Upcoming
37 <sup>th</sup> Automorphic Forms Workshop 📍 University of North Texas	Upcoming
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
Connecticut Summer School in Number Theory 📍 University of Connecticut	June 6-12, 2022
Connecticut Summer School in Number Theory 📍 Online due to COVID-19	June 8-14, 2020

## 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 – Present     |
| • 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 <a href="#">[Link]</a> | May 2020   |
| • Phi Beta Kappa Membership                       | May 2020   |
| • Pi Mu Epsilon Membership                        | April 2019 |

## TECHNICAL SKILLS

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- Magma, SageMath, Python

## REFERENCES

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### Research

- David Pollack, [dpollack@wesleyan.edu](mailto:dpollack@wesleyan.edu)

### Teaching

- Alex Kruckman, [akruckman@wesleyan.edu](mailto:akruckman@wesleyan.edu)
- Felipe Ramírez, [framirez@wesleyan.edu](mailto:framirez@wesleyan.edu)