

Ryan C. Chen

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Education **Massachusetts Institute of Technology**

2020–
Ph.D. in Mathematics (expected 2025)
Advisor: Wei Zhang

University of Cambridge

2019–2020
Churchill College
MASt in Mathematics (Part III)

Princeton University

2015–2019
A.B. in Mathematics, summa cum laude

Interests Number theory, arithmetic geometry

Papers*

Co-rank 1 Arithmetic Siegel–Weil

Preliminary version (2024), pp. 1–223.
https://rycchen.github.io/papers/corank1_ASW (2024).

A refined conjecture for the variance of Gaussian primes across sectors

with Yujin H. Kim, Jared D. Lichtman, Steven J. Miller, Alina Shubina, Shannon Sweetzer,
Ezra Waxman, Eric Winsor, and Jianing Yang.
Experimental Mathematics, vol. 32 no. 1 (2023), pp. 33–53.
<https://arxiv.org/abs/1901.07386> (2019).

p -adic Properties of Hauptmoduln with Applications to Moonshine

with Samuel Marks and Matt Tyler.
Symmetry, Integrability, and Geometry: Methods and Applications (SIGMA), vol. 15 (2019), pp. 1–35.
<https://arxiv.org/abs/1809.02913> (2018).

Lower-Order Biases in the Second Moment of Dirichlet Coefficients in Families of L -functions

with Megumi Asada, Eva Fourakis, Yujin Hong Kim, Andrew Kwon, Jared Duker Lichtman,
Blake Mackall, Steven J. Miller, Eric Winsor, Karl Winsor, Jianing Yang, and Kevin Yang.
Experimental Mathematics, vol. 32 no. 3 (2023), pp. 431–456.
<https://arxiv.org/abs/1808.06056> (2018).

Spectral statistics of non-Hermitian random matrix ensembles

with Yujin H. Kim, Jared D. Lichtman, Steven J. Miller, Shannon Sweetzer, and Eric Winsor.
Random Matrices: Theory and Applications, vol. 8, no. 2 (2019), pp. 1–40.
<https://arxiv.org/abs/1803.08127> (2018).

On Reay’s relaxed Tverberg conjecture and generalizations of Conway’s thrackle conjecture

with Megumi Asada, Florian Frick, Frederick Huang, Maxwell Poley, David Stoner
Ling Hei Tsang, and Zoe Wellner.
The Electronic Journal of Combinatorics, vol. 25, no. 3 (2018), pp. 1–14.
<https://arxiv.org/abs/1608.04279> (2016).

*Listed in reverse order of first arXiv appearance (with arXiv year also indicated).
arXiv author ID link: https://arxiv.org/a/chen_r_2.

Honors and Awards	2019	MIT Presidential Fellowship
	2019	NSF Graduate Research Fellowship
	2019	Churchill Scholarship
	2018	Barry M. Goldwater Scholarship
	2017	Shapiro Prize for Academic Excellence, Princeton University
	2016	Manfred Pyka Memorial Prize in Physics, Princeton University
Research talks	2024	MIT number theory seminar <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2024	Arithmetic intersection theory on Shimura varieties (AIM workshop) <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2019	MAA Undergraduate Poster Session at JMM <i>p-adic Properties of Hauptmoduln with Applications to Moonshine</i>
	2017	Ohio State Young Mathematicians Conference <i>Spectral statistics of non-Hermitian random matrix ensembles</i>
	2017	Ohio State Young Mathematicians Conference <i>Bounds for vanishing of L-functions at the central point</i>
	2017	MAA Undergraduate Poster Session at JMM <i>On Reay’s relaxed Tverberg conjecture</i>
Other talks	2024	Spring internal seminar on Xiao–Zhu at MIT <i>Introduction to “Cycles on Shimura varieties via Geometric Satake” by L. Xiao and X. Zhu</i>
	2024	Spring internal seminar at MIT <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2023	Fall learning seminar at MIT <i>Integral canonical models of orthogonal Shimura varieties</i>
	2023	Fall learning seminar at MIT <i>Integral models of orthogonal Shimura varieties and $K3$ surfaces</i>
	2022	Program associate seminar at SLMath/MSRI <i>Rapoport–Zink uniformization and Kudla–Rapoport cycles</i>
	2022	Fall learning seminar at MIT <i>Introduction to Kudla’s program</i>
	2022	Summer learning seminar on Gross–Zagier at MIT <i>Archimedean local heights</i>
	2022	MIT graduate student seminar (PUMAGRASS) <i>Polytopes and toric varieties</i>
	2021	Seminar on Topics in Arithmetic, Geometry, etc. (STAGE) at MIT <i>Moduli spaces of curves and abelian varieties</i>
	2021	Fall learning seminar on p -adic shtukas at MIT <i>Perfectoid spaces</i>

- 2021 Summer learning seminar on moduli of p -divisible groups at MIT
Local models for Rapoport-Zink spaces
- 2020 University of Cambridge Part III Seminar Series
Integer points, rationality, and moduli spaces
- 2019 Princeton Undergraduate Colloquium
Integer points, Diophantine geometry, and moduli spaces
- 2019 Arithmetic geometry internal seminar at Princeton
Diophantine problems and p -adic period mappings

Undergraduate Research

Princeton undergraduate work

2018–2019 Advisor for undergraduate senior thesis: Shou-Wu Zhang
Integer points on complements of dual curves and on genus one modular curves

2018 Advisor for undergraduate junior paper: Christopher Skinner

2018 Emory REU in mathematics

Advisors: Ken Ono and John F. R. Duncan

2017 SMALL REU in mathematics at Williams College

Advisors: Steven J. Miller and Ezra Waxman

2016 Summer Program for Undergraduate Research in mathematics at Cornell University

Advisor: Florian Frick

Mentoring

2021 Polymath Jr. Mentor

Co-mentored two undergraduate student projects in number theory, with Steven J. Miller and Ezra Waxman.

One-level density for a family of L -functions associated to super-even characters over function fields.
Dang Dang, Hari Iyer, Sanford Lu, Steven J. Miller, Ezra Waxman. In preparation.

A Hardy–Littlewood Conjecture for Artin Primes.
Mengzhen Liu and Ezra Waxman. In preparation.

Mentor, Grad-Undergrad Math Mentoring Initiative (GUMMI) at MIT

2020 – present

Conferences, Programs, and Workshops

- 2024 [AIM workshop: Arithmetic intersection theory on Shimura varieties](#)
- 2023 [Conference on Global Langlands, Shimura varieties, and shtukas](#)
- 2023 [Coates Memorial Conference \(Iwasawa 2023\)](#)
- 2023 [SLMath/MSRI program: Algebraic Cycles, \$L\$ -values, and Euler Systems](#)
- 2022 [Arizona Winter School: Automorphic forms beyond \$GL_2\$](#)