

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 IV: Analytic local-to-global
Preprint, pp. 1–69.
<https://arxiv.org/abs/2405.01429> (2024).

Co-rank 1 Arithmetic Siegel–Weil III: Geometric local-to-global
Preprint, pp. 1–68.
<https://arxiv.org/abs/2405.01428> (2024).

Co-rank 1 Arithmetic Siegel–Weil II: Local Archimedean
Preprint, pp. 1–29.
<https://arxiv.org/abs/2405.01427> (2024).

Co-rank 1 Arithmetic Siegel–Weil I: Local non-Archimedean
Preprint, pp. 1–111.
<https://arxiv.org/abs/2405.01426> (2024).
Combined I–IV: https://rycchen.github.io/papers/corank1_ASW.pdf (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 Sweitzer,
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).

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

- Spectral statistics of non-Hermitian random matrix ensembles*
 with Yujin H. Kim, Jared D. Lichtman, Steven J. Miller, Shannon Sweitzer, 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 Polevy, 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).

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](#)
Co-rank 1 Arithmetic Siegel–Weil
- 2024 [Arithmetic intersection theory on Shimura varieties \(AIM workshop\)](#)
Co-rank 1 Arithmetic Siegel–Weil
- 2019 [MAA Undergraduate Poster Session at JMM](#)
p-adic Properties of Hauptmoduln with Applications to Moonshine
- 2017 [Ohio State Young Mathematicians Conference](#)
Spectral statistics of non-Hermitian random matrix ensembles
- 2017 [Ohio State Young Mathematicians Conference](#)
Bounds for vanishing of L-functions at the central point
- 2017 [MAA Undergraduate Poster Session at JMM](#)
On Reay's relaxed Tverberg conjecture

- Other talks
- 2024 Spring internal seminar on Xiao–Zhu at MIT
Introduction to “Cycles on Shimura varieties via Geometric Satake” by L. Xiao and X. Zhu
 - 2024 Spring internal seminar at MIT
Co-rank 1 Arithmetic Siegel–Weil
 - 2023 Fall learning seminar at MIT
Integral canonical models of orthogonal Shimura varieties
 - 2023 Fall learning seminar at MIT
Integral models of orthogonal Shimura varieties and K3 surfaces
 - 2022 Program associate seminar at SLMATH/MSRI
Rapoport–Zink uniformization and Kudla–Rapoport cycles
 - 2022 Fall learning seminar at MIT
Introduction to Kudla’s program
 - 2022 Summer learning seminar on Gross–Zagier at MIT
Archimedean local heights
 - 2022 MIT graduate student seminar (PUMAGRASS)
Polytopes and toric varieties
 - 2021 Seminar on Topics in Arithmetic, Geometry, etc. (STAGE) at MIT
Moduli spaces of curves and abelian varieties
 - 2021 Fall learning seminar on p -adic shtukas at MIT
Perfectoid spaces
 - 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\$](#)