

Ryan C. Chen

Department of Mathematics
Massachusetts Institute of Technology
182 Memorial Dr., Cambridge, MA 02139

Email: rcchen@mit.edu
Website: rycchen.github.io
May 2024

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. 1–67.
<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 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).

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 learning 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 internal 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 <i>Integer points on complements of dual curves and on genus one modular curves</i> |
| | 2018 | Advisor for undergraduate junior paper: Christopher Skinner |
| | 2018 Emory REU in mathematics | |
| | Advisors: Ken Ono and John F. R. Duncan | |
| Mentoring | 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 | |
| | 2021 Polymath Jr. Mentor | |
| 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 |
| | 2021 | Theta Series: Representation Theory, Geometry, and Arithmetic (Kudla 70th) |
| | Mentor, Grad-Undergrad Math Mentoring Initiative (GUMMI) at MIT | |
| | 2020 – present | |