

Ryan C. Chen

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Education **Massachusetts Institute of Technology (MIT)**

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 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	2024	Charles and Holly Housman Award for Excellence in Undergraduate Teaching, MIT
	2020	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 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 math colloquium](#)
Integer points, Diophantine geometry, and moduli spaces
 - 2019 [Arithmetic geometry internal seminar at Princeton](#)
Diophantine problems and p -adic period mappings

Undergraduate Work	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	
Teaching	Co-mentored two undergraduate student projects in number theory, with Steven J. Miller and Ezra Waxman.	
	<i>One-level density for a family of L-functions associated to super-even characters over function fields.</i>	
	Dang Dang, Hari Iyer, Sanford Lu, Steven J. Miller, Ezra Waxman. In preparation.	
	<i>A Hardy–Littlewood Conjecture for Artin Primes.</i>	
	Mengzhen Liu and Ezra Waxman. In preparation.	
Other Service and Organization	Mentor, Grad-Undergrad Math Mentoring Initiative (GUMMI) at MIT	
	2020 – present	
	Massachusetts Institute of Technology (MIT)	
	2024 Spring	Recitation instructor for 18.06 (Linear algebra)
	2024 Spring	Co-organizer for internal number theory student seminar at MIT
Conferences, Programs, and Workshops Attended	2023 Fall	Co-organizer for internal number theory student seminar at MIT
	2023 Spring	Social co-chair for program associates at SLMath/MSRI
	2024	AIM workshop: Arithmetic intersection theory on Shimura varieties
	2023	Conference on Global Langlands, Shimura varieties, and shtukas
	2023	Conference on Global Langlands, Shimura varieties, and shtukas
	2023	Coates Memorial Conference (Iwasawa 2023)
	2023	SLMath/MSRI semester 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)