

Ryan C. Chen

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October 2024

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
Senior thesis advisor: Shou-Wu Zhang

Interests Number theory, arithmetic geometry

Papers*

Faltings heights and the subleading terms of adjoint L -functions
with Weixiao Lu and Wei Zhang.
In preparation. [Abstract](#) (from Faltings birthday conference).

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).

In addition to blue hyperlinks, this document also contains many hyperlinks in non-highlighted text, such as collaborator names.

*Listed in reverse order of first arXiv appearance (with arXiv year also indicated).

arXiv author ID link: https://arxiv.org/a/chen_r_2.

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 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	The Ohio State University number theory seminar, Columbus USA Fourier coefficients and arithmetic 1-cycles
	2024	Columbia automorphic forms and arithmetic seminar, New York USA Fourier coefficients, orbital integrals, and arithmetic 1-cycles
	2024	MIT number theory seminar, Cambridge USA <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2024	Arithmetic intersection theory on Shimura varieties (AIM workshop), Pasadena USA <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2019	MAA Undergraduate Poster Session at JMM, Baltimore USA <i>p-adic Properties of Hauptmoduln with Applications to Moonshine</i>
	2017	Ohio State Young Mathematicians Conference, Columbus USA <i>Spectral statistics of non-Hermitian random matrix ensembles</i>
	2017	Ohio State Young Mathematicians Conference, Columbus USA <i>Bounds for vanishing of L-functions at the central point</i>
	2017	MAA Undergraduate Poster Session at JMM, Atlanta USA <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

Mentoring	2021 Polymath Jr. Mentor	
	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, and Ezra Waxman. In preparation.	
Teaching	<i>A Hardy–Littlewood Conjecture for Artin Primes.</i>	
	Mengzhen Liu and Ezra Waxman. In preparation.	
	Mentor, Grad-Undergrad Math Mentoring Initiative (GUMMI) at MIT	
	2020 – present	
Other Service and Organization	Massachusetts Institute of Technology (MIT)	
	2024 Fall	Teaching Assistant for 18.112 (Complex analysis)
	2024 Spring	Recitation instructor for 18.06 (Linear algebra)
	Princeton University	
Undergraduate Work	2016 Fall	Undergraduate Course Assistant/Grader for MAT 350 (Differential Manifolds)
	2024 Spring	Co-organizer for internal number theory student seminar at MIT
	2023 Fall	Co-organizer for internal number theory student seminar at MIT
	2023 Spring	Social co-chair for program associates at SLMath/MSRI
Conferences, Programs, and Workshops Attended	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	
	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	
	2024	The Mordell conjecture 100 years later, Cambridge USA
	2024	AIM workshop: Arithmetic intersection theory on Shimura varieties, Pasadena USA
	2023	Conference on Global Langlands, Shimura varieties, and shtukas, Bonn DEU
	2023	Coates Memorial Conference (Iwasawa 2023), Cambridge UK
	2023	SLMath/MSRI semester program: Algebraic Cycles, L-values, and Euler Systems, Berkeley USA
	2022	Arizona Winter School: Automorphic forms beyond GL_2, Tucson USA
	2021	Theta Series: Representation Theory, Geometry, and Arithmetic (Kudla 70th), Toronto CAN (virtual)