

# 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  
Senior thesis advisor: Shou-Wu Zhang

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](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).

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\*Listed in reverse order of first arXiv appearance (with arXiv year also indicated).  
arXiv author ID link: [https://arxiv.org/a/chen\\_r\\_2](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	<a href="#">Charles and Holly Housman Award for Excellence in Undergraduate Teaching, MIT</a>
	2020	<a href="#">MIT Presidential Fellowship</a>
	2019	<a href="#">NSF Graduate Research Fellowship</a>
	2019	<a href="#">Churchill Scholarship</a>
	2018	<a href="#">Barry M. Goldwater Scholarship</a>
	2017	<a href="#">Shapiro Prize for Academic Excellence, Princeton University</a>
	2016	<a href="#">Manfred Pyka Memorial Prize in Physics, Princeton University</a>
Research talks	2024	<a href="#">MIT number theory seminar</a> <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2024	<a href="#">Arithmetic intersection theory on Shimura varieties (AIM workshop)</a> <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2019	<a href="#">MAA Undergraduate Poster Session at JMM</a> <i>p-adic Properties of Hauptmoduln with Applications to Moonshine</i>
	2017	<a href="#">Ohio State Young Mathematicians Conference</a> <i>Spectral statistics of non-Hermitian random matrix ensembles</i>
	2017	<a href="#">Ohio State Young Mathematicians Conference</a> <i>Bounds for vanishing of L-functions at the central point</i>
	2017	<a href="#">MAA Undergraduate Poster Session at JMM</a> <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	<b>Princeton undergraduate work</b>	
	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
	<b>2018 Emory REU in mathematics</b>	
	Advisors: Ken Ono and John F. R. Duncan	
Mentoring	<b>2017 SMALL REU in mathematics at Williams College</b>	
	Advisors: Steven J. Miller and Ezra Waxman	
	<b>2016 Summer Program for Undergraduate Research in mathematics at Cornell University</b>	
	Advisor: Florian Frick	
	<b>2021 Polymath Jr. Mentor</b>	
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 <math>L</math>-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	<b>Mentor, Grad-Undergrad Math Mentoring Initiative (GUMMI) at MIT</b>	
	2020 – present	
	<b>Massachusetts Institute of Technology (MIT)</b>	
	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	<a href="#">The Mordell conjecture 100 years later</a>
	2024	<a href="#">AIM workshop: Arithmetic intersection theory on Shimura varieties</a>
	2023	<a href="#">Conference on Global Langlands, Shimura varieties, and shtukas</a>
	2023	<a href="#">Conference on Global Langlands, Shimura varieties, and shtukas</a>
	2023	<a href="#">Coates Memorial Conference (Iwasawa 2023)</a>
	2023	<a href="#">SLMath/MSRI semester program: Algebraic Cycles, <math>L</math>-values, and Euler Systems</a>
	2022	<a href="#">Arizona Winter School: Automorphic forms beyond <math>GL_2</math></a>
	2021	<a href="#">Theta Series: Representation Theory, Geometry, and Arithmetic (Kudla 70th)</a>