

# Ryan C. Chen

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March 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*

Preliminary version (2024), pp. 1–223.  
[https://rycchen.github.io/papers/corank1\\_ASW](https://rycchen.github.io/papers/corank1_ASW) (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 Sweetzer,  
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).

*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).

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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).

Honors and Awards	2019	<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><math>p</math>-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 <math>L</math>-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 internal seminar at MIT <i>Co-rank 1 Arithmetic Siegel–Weil</i>
	2023	Fall learning seminar at MIT <i>Integral canonical models of orthogonal Shimura varieties</i>
	2023	Fall learning seminar at MIT <i>Integral models of orthogonal Shimura varieties and K3 surfaces</i>
	2022	Program associate seminar at SLMath/MSRI <i>Rapoport–Zink uniformization and Kudla–Rapoport cycles</i>
	2022	Fall learning seminar at MIT <i>Introduction to Kudla’s program</i>
	2022	Summer learning seminar on Gross–Zagier at MIT <i>Archimedean local heights</i>
	2022	MIT graduate student seminar (PUMAGRASS) <i>Polytopes and toric varieties</i>
	2021	Seminar on Topics in Arithmetic, Geometry, etc. (STAGE) at MIT <i>Moduli spaces of curves and abelian varieties</i>
	2021	Fall learning seminar on $p$ -adic shtukas at MIT <i>Perfectoid spaces</i>

- 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\$](#)