

# KENZ KALLAL

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## EDUCATION

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### Princeton University

*Mathematics Ph.D. student*

Princeton, NJ  
September 2022 —

- Supported by NSF Graduate Research Fellowship (ending spring 2026)
- General examination passed, April 2023
- Advisor: Prof. Akshay Venkatesh (Institute for Advanced Study)

### Institut de Mathématiques d'Orsay (Université Paris–Sud/Paris–Saclay)

*M2 “Arithmétique, Analyse, Géométrie” with highest honors (“mention très bien”)*

Orsay, France  
June 2022

- M2 master’s thesis (“mémoire”): *p*-adic analytic continuation of symmetric power functoriality
- Advisor: Prof. Gaëtan Chenevier (C.N.R.S. / École Normale Supérieure de Paris, rue d’Ulm)
- Supported by Sophie Germain master’s scholarship of the Fondation Mathématique Jacques Hadamard, and the Fulbright U.S. Student Program

### Harvard College

*A.B. in Mathematics with highest honors*

Cambridge, MA  
May 2021

- Undergraduate thesis: *The Arthur–Selberg trace formula and some applications to arithmetic statistics*
- Advisor: Prof. Mark Kisin; awarded Hoopes prize

### Harvard University

*S.M. in Computer Science*

Cambridge, MA  
May 2021

- Concurrent master’s degree in computer science
- Coursework: probabilistic analysis and algorithms; information theory; error-correcting codes; distributed systems

## PUBLICATIONS (INCLUDING PAPERS IN PREPARATION)

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4. Kenz Kallal. *Fourier expansions of theta cocycles in higher coherent cohomology* (in preparation).
3. Kenz Kallal and Akshay Venkatesh. *Algebraic theory of indefinite theta functions* (in preparation).
2. Kenz Kallal and Hudson Kirkpatrick. [Ramification of wild automorphisms of Laurent series fields](#). *Proceedings of the American Mathematical Society*, 149:991–1009, 2021. [arXiv:1611.01077](#).
1. Kenz Kallal, Tomoka Kan, and Eric Wang. [Improved lower bounds for kissing numbers in dimensions 25 through 31](#). *SIAM Journal on Discrete Mathematics*, 31(3):1895–1908, 2017. [arXiv:1608.07270](#).

## EXPOSITORY AND OTHER PAPERS NOT PRESENTLY INTENDED FOR PUBLICATION

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- Translation of Weber’s *Theorie der Abel’schen Zahlkörper* part II, 2025.
- [A new viewpoint on Weber’s proof of the parity of class numbers of 2-power cyclotomic fields](#), 2025.
- [Expository notes on the metaplectic group and theta functions](#), 2023.
- My M2 master’s thesis: [p](#)-adic analytic continuation of symmetric power functoriality, 2022.
- My undergraduate thesis: [The Arthur–Selberg trace formula and some applications to arithmetic statistics](#), 2021.
- [A new proof of the Gauss–Siegel asymptotic averaging formula for class numbers of real quadratic fields](#), 2020.
- [Expository notes on automorphic forms and the Selberg trace formula](#), 2020.
- [Expository notes on finite flat group schemes](#), 2020. With Matthew Hase-Liu.
- [Expository notes on class field theory](#), 2019.
- [An application of persistent homology to geospatial election data](#), 2019.
- [Equal compositions of rational functions](#). MIT-PRIMES, 2015. With Matthew Lipman and Felix Wang.

## INVITED LECTURES

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- [Oberwolfach Arbeitsgemeinschaft](#): *Hypergeometric differential equations and modular forms*, 30 March 2026.
- Princeton University / Institute for Advanced Study, Number Theory Seminar: [invited talk](#), 26 March 2026.
- University of Michigan, Group, Lie, and Number Theory Seminar: [invited talk](#), 22 March 2026.
- McGill University, Henri Darmon Graduate Seminar: [invited talk](#), 19 March 2026.
- Louisiana State University, Algebra / NT Seminar: *Algebraic theory of indefinite theta functions*, 2025.
- Boston University, PROMYS guest lecture: *Weber’s theorem on oddness of the class number of  $\mathbf{Q}(\zeta_{2^n})$* , 2025.

- MIT, STAGE seminar: [Second-order differential equations and projective connections](#), 2024.
- Sorbonne University — Jussieu, [Séminaire Mathjeunes: Stark’s conjecture and Kronecker limit formulas](#), 2024.
- Boston University, PROMYS guest lecture: [Theta functions and the metaplectic group](#), 2023.
- Harvard Open Neighborhood Seminar (talk given to the Friends of the Harvard Mathematics Department): [The Arthur–Selberg trace formula and some applications to arithmetic statistics](#), 2021.

## OTHER LECTURES

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- Princeton University, Graduate Student Seminar: *Arithmetic technique of algebrization*, 2025.
- Clemson University, Palmetto Area Number Theory Series: [Algebraic theory of indefinite theta functions](#), 2025.
- Temple University, GTA Philadelphia: [Algebraic theory of indefinite theta functions](#), 2025.
- Princeton University / Institute for Advanced Study, Skinner–Venkatesh learning seminar: [Iwasawa and Weber on divisibility of class numbers of cyclotomic fields](#), 2025.
- Princeton University / Institute for Advanced Study, Skinner–Venkatesh learning seminar: *Weber’s proof of the Kronecker–Weber Theorem*, 2024.
- Princeton University / Institute for Advanced Study, Skinner–Venkatesh learning seminar: *Hilbert’s proof of the Kronecker–Weber Theorem*, 2024.
- Princeton University, Skinner–Urban learning seminar: *Urban’s eigenvariety*, 2023.
- Princeton University, graduate automorphic forms learning seminar: *Admissibility of the Jacquet module*, 2023.
- Princeton University, graduate automorphic forms learning seminar: *Induction and the Jacquet functor*, 2023.
- Princeton University, graduate automorphic forms learning seminar: *Overview of representation theory of  $p$ -adic reductive groups*, 2023.
- Boston University, PROMYS guest lecture: [Theta functions and the metaplectic group](#), 2023.
- Princeton / Institute for Advanced Study, Skinner–Venkatesh learning seminar: *Stark units and SIC-POVMs*, 2023.
- Princeton University, Graduate Student Seminar: *The Gouvêa–Mazur infinite fern*, 2023.
- Princeton / Institute for Advanced Study, Skinner–Venkatesh learning seminar: [Two talks on Artin  \$L\$ -functions](#), 2022.
- Princeton University, graduate automorphic forms learning seminar: *Discreteness of cuspidal spectrum*, 2022.
- Princeton University, first-year seminar: *The Cantor–Zassenhaus algorithm*, 2022.
- Harvard undergraduate mathematics colloquium (Math Table): [Class numbers, prime geodesics, and automorphic forms \(after Sarnak\)](#), 2021.
- University of Chicago graduate automorphic forms learning seminar:  $(\mathfrak{g}, K)$ -modules for  $GL(2, \mathbf{R})$ , 2020.
- JMM Undergraduate Poster Session: *Ramification of wild automorphisms of Laurent series fields*, 2017.
- JMM Undergraduate Poster Session: *Improved lower bounds on kissing numbers*, 2016.

## RESEARCH VISITS

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**Institut des Hautes Études Scientifiques (Université Paris–Saclay)** **Bures-sur-Yvette, France**  
*Visitor* October 2021 — August 2022

Invited by Prof. Ahmed Abbes (C.N.R.S./I.H.É.S.); visit supported by Fulbright U.S. Student Program

**University of Chicago Mathematics Research Experience for Undergraduates** **Chicago, IL**  
*Participant in the full program* June — August 2018, 2020

- 2020: Graduate learning seminar on automorphic forms and representations, organized by Hao Lee
- 2018: [Ramification in algebraic number theory and dynamics](#), mentored by Drew Moore

## TEACHING EXPERIENCE

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**Princeton University Department of Mathematics** **Princeton, NJ**  
*Preceptor* September — December 2025

Taught weekly hour-long lectures for two sections of Prof. János Kollár’s Math 201 (*Multivariable Calculus*)

**Harvard University Department of Mathematics** **Cambridge, MA**  
*Course assistant* 2019 — 2021

- Taught weekly hour-long lectures and graded assignments for:
  - Prof. Fabian Gundlach’s Math 137 (*Algebraic Geometry*; spring 2021) [evaluation: 5.0/5.0]
  - Prof. Fabian Gundlach’s Math 223b (*Algebraic Number Theory*; spring 2021) [evaluation: 5.0/5.0]
  - Prof. Fabian Gundlach’s Math 223a (*Algebraic Number Theory*; fall 2019 and 2020) [evaluation: 5.0/5.0]
  - Prof. Mark Kisin’s Math 129 (*Number Fields*; spring 2019) [evaluation: 4.6/5.0]

Mentored dozens of high school students in number theory and various research projects.

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## OTHER WORK EXPERIENCE

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### **uThere, L.L.C.**

*Software Engineering Intern*

**Acton, MA**

April — July 2017

- Optimized Ruby™ autopilot quaternion computations, increasing speed and reliability of embedded code (in C)
- Implemented new camera view-related features for ground control (in C#, worked with large codebase)

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## AWARDS

2021	NSF Graduate Research Fellowship
2021	National Defense Science and Engineering Graduate Fellowship (NDSEG) winner
2021	Fulbright U.S. Student Grant (Université Paris–Saclay, France)
2021	Sophie Germain M2 master's scholarship of the Fondation Mathématique Jacques Hadamard
2021	Harvard Thomas T. Hoopes Prize (for excellent undergraduate thesis)
2021	Friends of Harvard Mathematics Award (departmental undergraduate thesis prize)
2020	Harvard College Phi Beta Kappa
2020	John Harvard Scholar
2019	Harvard certificate of distinction in teaching (awarded for Math 129; also in 2021 for Math 137)
2017	Joint Mathematics Meetings outstanding undergraduate poster award
2015	Siemens competition regional finalist (semifinalist in 2016)

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## OTHER SKILLS

<b>Programming Skills</b>	Experience in C++, C, C#, Java, Python, SQL, PARI/GP, SAGE, and L <sup>A</sup> T <sub>E</sub> X
<b>Languages</b>	English (native), French (native), Mandarin Chinese (proficient)