KENZ KALLAL

Email: kallal@princeton.edu   Website: https://web.math.princeton.edu/~kk2703/kallal.html

EDUCATION

Princeton University Department of Mathematics   **Princeton, NJ**
Mathematics Ph.D. student   **September 2022 —**
· Supported by NSF Graduate Research Fellowship
· General examination passed in April 2023 (committee chaired by Prof. Akshay Venkatesh)

Institut de Mathématiques d'Orsay (Université Paris–Sud/Paris–Saclay)   **Orsay, France**
M2 "Arithmétique, Analyse, Géométrie" with Highest Honors ("mention très bien")   **June 2022**
· M2 master's thesis ("mémoire"): *p-adic analytic continuation of symmetric power functoriality*
          (advised by 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   **Cambridge, MA**
A.B. in Mathematics with Highest Honors   **May 2021**
· Undergraduate thesis: *The Arthur–Selberg trace formula and some applications to arithmetic statistics*
          (advised by Prof. Mark Kisin, awarded Hoopes prize)
· Extracurricular activities:
          Gender Inclusivity in Mathematics board member (2017-2019),
          Harvard-MIT Math Tournament staff (2017-2019)

Harvard University   **Cambridge, MA**
S.M. in Computer Science   **May 2021**
· Concurrent master's degree in computer science

PUBLICATIONS

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 WORKING PAPERS

· 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.
· My 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.
· My work on measuring gerrymandering with persistent homology, 2019.
· Equal compositions of rational functions. MIT-PRIMES, 2015. With Matthew Lipman and Felix Wang.

PRESENTATIONS

· Princeton University, graduate automorphic forms learning seminar:
          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 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.
· 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, TEACHING, AND WORK EXPERIENCE

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

Harvard College Research Program   **Cambridge, MA**
Summer 2019 and 2020 (supported by Harvard HCRP grants)   May–August 2019–2020
- 2020: Undergraduate thesis research on p-adic variation of automorphic forms and the Arthur–Selberg trace formula (advisor: Prof. Mark Kisin)
- 2019: Reading project in class field theory (advisor: Prof. Mark Kisin)

Harvard University Department of Mathematics   **Cambridge, MA**
Course assistant (grading and teaching section)   2019–2021
- 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]

University of Chicago Mathematics Research Experience for Undergraduates   **Chicago, IL**
Participant in the full program   June–August 2018
- Ramification in algebraic number theory and dynamics, mentored by Drew Moore

PROMYS, Boston University   **Boston, MA**
Intensive 6-week program in mathematics   July–August 2014–2017, 2019, 2021
- Research mentored by Prof. Henry Cohn (MIT), Laurent Berger (ENS Lyon), and Matthew Baker (GA Tech)
- Junior counselor in 2017; counselor in 2019 and 2021

uThere, L.L.C.   **Acton, MA**
Software development intern   April–June 2017
- Contributed to uThere's Ruby™ autopilot (in C) and ground control (in C#) for use with the Swift 020 UAV
- Optimized autopilot's quaternion computations and implemented new features for ground control

MIT-PRIMES Math Research Track, Massachusetts Institute of Technology   **Cambridge, MA**
1 year-long research program in mathematics   January–December 2015

Research mentored by Prof. Michael Zieve (University of Michigan)

DISTINCTIONS AND 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)
2021	Harvard certificate of distinction in teaching (awarded for high evaluation in undergraduate course, Math 137)
2020	Harvard College Phi Beta Kappa
2020	John Harvard Scholar
2019	Harvard certificate of distinction in teaching (awarded for high evaluation in undergraduate course, Math 129)
2017	Joint Mathematics Meetings outstanding poster award
2016	Siemens competition semifinalist
2015	Siemens competition regional finalist

OTHER SKILLS

Programming Skills	Experience in C++, C, C#, Java, Python, SQL, PARI/GP, SAGE, and LaTeX
Languages	English (native), French (native), Mandarin Chinese (proficient)