

Likun Xie

xie@mpim-bonn.mpg.de | likunxie.github.io

Research Interests

Number theory: sieve methods and arithmetic over number fields and function fields; commutative algebra: homological methods and local cohomology.

Appointments

Max Planck Institute for Mathematics, Bonn, Germany
Postdoctoral Fellow.

July 2025–present

Education

University of Illinois Urbana–Champaign, USA 2020–2025

Ph.D. in Mathematics. Thesis: Combinatorial Methods in Number Theory: Sieve Theory and Special Functions. Advisors: Alexandru Zaharescu and Bruce C. Berndt.

Commutative algebra study with Sankar P. Dutta

University of Warwick, UK 2018–2019

M.Sc. in Mathematics, Distinction. Dissertation: Descent, Affine Representability and Classifying Space in $\mathbb{A}^1$ -Homotopy Theory. Advisor: Marco Schlichting.

University of Manchester, UK 2016–2018

B.Sc. (Hons) in Mathematics and Physics, First Class. Dissertation: Topos Foundation for Set Theory. Advisor: Michael Prest.

Research Papers and Preprints

- L. Xie, On an instance of the small Cohen–Macaulay conjecture II (2026) arXiv: 2608.10962
- L. Xie, Products of Prime Ideals in Ray Class Groups (2026). arXiv:2606.30567.
- L. Xie, Connectedness in Codimension One and the Non- S_2 Locus (2026). arXiv:2605.06617.
- L. Xie, On a conjecture of Erdős over function fields, *Mathematische Zeitschrift* **313** (2026), 64.
- L. Xie, Almost Prime Orders of Elliptic Curves Modulo Prime Powers (2025). arXiv:2504.18732.
- K. Nath and L. Xie, Almost primes and primes that are sums of two squares plus 1, *Acta Arithmetica* **223** (2026), 51–82.
- L. Xie, On an instance of the small Cohen–Macaulay conjecture, *Journal of Pure and Applied Algebra* **228** (2024), no. 3, 107491.
- B. C. Berndt, L. Xie, and A. Zaharescu, Proofs of McIntosh’s conjecture on Franel integrals and two generalizations, *Advances in Mathematics* **423** (2023), 109041.

Expository Writing

- B. C. Berndt and L. Xie, Identities for the product of two Dirichlet series satisfying Hecke’s functional equation, *Journal of Mathematical Analysis and Applications* **550** (2025), no. 1, 129514.
- L. Xie, Negative real moments of restricted factors in arithmetic progression, *The Ramanujan Journal* **67** (2025), 41. (*Special Collection in honor of George E. Andrews and Bruce C. Berndt*).

Recent Talks

- *Products of Primes in Function Fields and Number Fields*, PLeaSANT Seminar, Max Planck Institute for Mathematics, Bonn, August 2026.
- *On a Conjecture of Erdős over Function Fields*, Number Theory Seminar, University of Cologne, December 2025.

- *Almost Prime Orders of Elliptic Curves Modulo Prime Powers*, ÖMG–DMV Annual Meeting, Number Theory Section, Johannes Kepler University Linz, September 2025.
- *Almost Prime Orders of Elliptic Curves Modulo Prime Powers*, Graduate Number Theory Seminar, University of Illinois Urbana–Champaign, April 2025.

Awards and Fellowships

- Dr. Lois M. Lackner Mathematics Fellowship, University of Illinois Urbana–Champaign, 2023–2025.

Teaching and Mentoring

- Mentored high school and undergraduate research interns in projects involving elementary sieve methods at MPIM, 2025.
- Teaching Assistant, University of Illinois Urbana–Champaign: Calculus, Differential Equations, and Algebra, 2020–2023.
- Grader, University of Illinois Urbana–Champaign: Abstract Algebra, Honors Abstract Algebra, Commutative Algebra, Real Analysis, Complex Variables, and Differentiable Manifolds, 2020–2024.

Languages

Cantonese and Mandarin Chinese (native); English (fluent); Spanish (basic).