Zhehao LI

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Research Interests

I am interested in arithmetic geometry and Hodge theory, especially the geometry of Shimura varieties and function field versions of conjectures in number theory and algebraic geometry.

Education

Now – Aug 2019 | **University of Illinois Chicago**, Chicago, United States
Doctoral Candidate in Pure Mathematics
Thesis: *Curves on Shimura surfaces* | Advisor: Ben Bakker

Jul 2018 – Jul 2016 | **The University of Melbourne**, Melbourne, Australia
Master of Science in Pure Mathematics
Thesis: *The vanishing of traces of Hecke operators* | Advisor: Alex Ghitza

Jun 2016 – Sep 2012 | **Renmin University of China**, Beijing, China
Bachelor of Management | Major: Management Science

Dec 2014 – Sep 2014 | **University College Dublin**, Dublin, Ireland
Exchange Semester

Papers

Curves on Hilbert Modular Surfaces
in preparation.

Curves on Compact Arithmetic Quotients of Hyperbolic 2-ball
25 pages, preprint arXiv:2502.11582

The vanishing of traces of Hecke operators
Master Thesis, 2018.

Work Experience

Now – Aug 2019 | Teaching Assistant, **University of Illinois Chicago**, Chicago, United States
Discussion Sessions:
- MATH 110 College Algebra (Fall 2019, Summer 2022)
- MATH 180 Calculus I (Fall 2020, Fall 2021, Fall 2022)
- MATH 181 Calculus II (Spring 2020, Summer 2021)
- MATH 210 Calculus III (Summer 2020, Spring 2021, Fall 2023, Fall 2024)
- MATH 220 Introduction to Differential Equations (Spring 2023, Spring 2024)
- MCS 260 Introduction to Computer Science (Spring 2022)

Grading:
- MATH 435 Foundations of Number Theory (Fall 2023)
- MATH 514 Algebraic Number Theory (Fall 2023)

Jun 2019 – Jan 2019 | Researcher, **Portland House Group**, Melbourne, Australia
Financial data analysis | Python | Extreme value theory and copula theory

Expository Talks

Hodge Theory Reading Seminar, **University of Illinois Chicago**, Chicago, United States

2025	nearby and vanishing cycles.
2024	group theory for algebraic groups, Tannaka duality and motives, semisimplicity of polarized VHS, Mumford-Tate and Shimura data, lattice theory, nilpotent orbit theorem, regular holonomic D-modules.

Graduate Number Theory Seminar, **University of Illinois Chicago**, Chicago, United States

2024	abelian varieties, motives.
2023	the Pila-Zannier method, heights of abelian varieties, linear algebraic groups, root data.
2022	modular curves of prime power level, finite flat group schemes, p-adic Hodge theory, Shimura variety, Galois cohomology.
2021	heights on elliptic curves, Langlands program and its geometrization, étale cohomology, Jacobian varieties.
2020	p-divisible groups, arithmetic statistics, modular curves, Sato-Tate conjecture, modular forms.

Graduate Algebraic Geometry Seminar, **University of Illinois Chicago**, Chicago, United States

2022	toric varieties and fans.
2020	surfaces of general type.

Graduate Algebraic Topology Seminar, **University of Illinois Chicago**, Chicago, United States

2022	Introduction to Spectra.
2020	5 talks in a learning seminar on Lurie's *Spectral Algebraic Geometry*.

Service and Other Talks

Aug 2022 - Dec 2023	(Co)organizer of UIC Graduate Number Theory Seminar
Oct 2023	*Introduction of Continued fractions* at UIC Math Club
Mar 2023	*Functional transcendence and unlikely intersections* at UIC Graduate Student Colloquium

Conferences Attended

Jul 2024	The Mordell conjecture 100 years later, MIT, Cambridge
Apr 2023	Degeneracy of Algebraic Points, SLMath, Berkeley
Mar 2023	Arizona Winter School: Unlikely Intersections, University of Arizona, Tucson
Oct 2022	Midwest Arithmetic Geometry and Number Theory Series, UIC, Chicago
Aug 2022	Derived categories, moduli spaces, and hyperkähler varieties, University of Michigan, Ann Arbor

Skills

Computer	Python (NumPy, Pandas), SageMath, Magma, mySQL, Linux, C, LaTeX
Languages	Native: Chinese (Mandarin, Cantonese) | Fluent: English

Last updated: Feb 19, 2025