Zhenpeng Li

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EDUCATION

School of Mathematical Science, Peking University — Beijing, China
Bachelor of Science in Mathematics Science — *September 2020 – June 2024*

- **GPA: 3.80/4.0, Major GPA: 3.91/4.0**
- **Selected Courses:**

Fiber Bundles and Characteristic Classes 100.
Algebraic Geometry I 92.
Abstract Algebra (Honor): I 98; II 94.
Mathematical Analysis (Honor): I 98; II 94.
Functional Analysis 96.5.
Differentiable Manifolds 90.
Probability Theory 97.
Chromatic Homotopy Theory 97.
Étale Cohomology Theory 94.
Topics in Algebraic Topology 97.
Computation (A) 92.
Modular Forms and Number Theory 95.
Geometry 95.5.
Advanced Algebra: I 97; II 95.
Functions of Real Variables 99.
Riemann Surfaces 92.
Functions with Complex Variables (Honor) 90.
Homological Algebra 90.
Homology Theory P.
Group Theory P.
Game Theory 98.

ACADEMIC INTERESTS

Algebraic topology: (equivariant) chromatic homotopy theory, algebraic K-theory, prismatic cohomology
Related interests: algebraic number theory, algebraic geometry, (geometric) representation theory

RESEARCH EXPERIENCES

Undergraduate Research Program II — Summer 2024 – Present
Advisor: Prof. Hana Jia Kong — *Online*

- Learned modern motivic homotopy theory from Voevodsky–Morel's papers.
- Studied Bachmann–Kong–Wang–Xu's joint work on the Chow t-structure in $\mathcal{SH}(S)$.
- Studied Bachmann–Hoyois' normed formalism in motivic homotopy theory; delivered my summary notes.
- Learned the recent breakthrough in the equivariant version of chromatic homotopy theory.
- Learned descent and nilpotence property in various settings.

Equivariant Chromatic Homotopy Theory — Autumn 2024 – Present
Advisor: Prof. Markus Hausmann — *Bonn University, German*

- On the basis of Hausmann–Meier's classification of the invariant prime ideals in the equivariant Lazard ring, I will complete my work on the classification of equivariant formal group laws in general settings and the support theory of finite equivariant spectra.

Telescope Conjecture — Autumn 2023 – Summer 2024
Independently — *Peking University, China*

- Learned the purity in chromatic algebra K-theory from Land–Mathew–Meier–Tamme's paper.
- Learned descent and vanishment of algebraic K-theory from Clausen–Mathew–Naumann–Noel's paper.
- Learned chromatic Fourier transform by reading Barthel–Carmeli–Schlank–Yanovski's joint work.
- Recovered the chromatic nullstellensatz and redshift conjecture in my bachelor thesis.
- Completed the process of disproving telescope conjecture.

Undergraduate Research Program I — Summer 2022 – Summer 2024
Advisor: Prof. Enlin Yang — *Peking University, China*

- Studied infinity category and higher algebra by reading *Kerodon*, *Higher Topos Theory*, and *Higher Algebra* written by Lurie.
- Learned étale cohomology by reading *Étale Cohomology* written by Fu, and Scholze's notes about six-functor formlism.

- Learned higher characteristic classes theory, categorical trace method, and bivariant theory by reading Zheng's paper and Abe's paper.
- Learned Weil II, perverse sheaves and Springer theory from Kiehl's book.
- Beilinson's theory on singular support and Saito's theory on characteristic cycle.

Chromatic Homotopy and Deformation of p-divisible Groups June 2023 – August 2023
Advisor: Prof. J. Peter May and Ms. Alicia Lima *The University of Chicago, America*

- Spent time on chromatic homotopy theory and elliptic cohomology by reading Lurie's notes and paper; delivered a final paper.
- Studied ambidexterity in chromatic homotopy at my mentors' suggestion.

HONORS & AWARDS

Winning Prize (top 0.03% worldwide), in 2024 Alibaba Global Mathematics Competition, for algebra and number theory 2024
First Prize (rank 1), Undergraduate Research Competition 2024
First Prize (rank 9), Excellent Bachelor Thesis Competition 2024
Winning Prize (rank 10 in China), 14'th session of S.T. Yau's College Student Mathematical Contests, for algebra and number theory 2023
Merit Student of Peking University 2023
Encouragement Scholarship from Sigma Square Tech 2023
Encouragement Scholarship for pure mathematics from Hope Online 2023
First Prize, 13'th session of National College Student Mathematics Contest 2022
Merit Student of Peking University 2021
Third-class Scholarship of Peking University 2021

RELEVANT SEMINAR TALKS

Balmer spectra of Sp_A, Hausmann-Meier, "Invariant prime ideals in equivariant Lazard rings" Autumn 2024
Pro-étale cohomology of rigid analytic spaces, Sec. 5, BSSW, "On the rationalization of the $K(n)$-sphere" Autumn 2024
LMMT's paper "Purity in chromatically localized algebraic K-theory" Summer 2024
Breuil-Kisin twist and prismatic log, Sec. 2, Bhatt-Lurie, "Absolute prismatic cohomology" Summer 2024
CMNN's paper "Descent and vanishing in chromatic algebraic K-theory via group action" Summer 2024
BCSY's paper "The chromatic Fourier transform" Summer 2024
BHLS's "K-theoretic counterexamples to Ravenel's telescope conjecture" (video available) (notes available) Summer 2024
Perverse sheaves, Ch. 4, Kiehl-Weissauer, "Weil Conjectures, Perverse Sheaves and l-adic Fourier Transform" Summer 2024
Efimov K-theory, Sec. 1, 2, and 4, Efimov, "K-theory and localizing invariants of large categories" Spring 2024
Carmeli-Schlank-Yanovski's paper "Chromatic cyclotomic extensions" Winter 2023
Carmeli-Schlank-Yanovski's paper "Ambidexterity and height" Winter 2023
Yonatan Harpaz's paper "Ambidexterity and the universality of finite spans" Winter 2023
Sec. 4-6 of BSY's paper "The chromatic Nullstellensatz" Winter 2023
Chromatic homotopy theory, Lurie, "Lecture notes on chromatic homotopy theory" Autumn 2023
Deligne-Mumford stacks and the Keel-Mori theorem, Ch. 4, Alper, "Stacks and moduli" Autumn 2023
Algebraic K-theory on schemes, Ch. 2-3, Sriniva, "Algebraic K-theory" Autumn 2023
Sphere Packing Problem, Viazovska, "The Sphere Packing Problem in Dimension 8" (notes available) Summer 2023
Higher algebra, Lurie, "Kerodon", "Higher topos theory", and "Higher algebra" Spring 2023
Abelian Varieties, Ch. 3, Mumford, "Abelian Varieties" Spring 2023
Linnik's conjecture, Kuznecov, "Conjecture for cusp forms of weight zero" (notes available) Winter 2022
Commutative Algebra, Ch. 9-10, Atiyah-Macdonald Spring 2022
Algebraic Topology, Sec. 14, 18, Bott-Tu, "Differential Forms in Algebraic Topology" Spring 2022