Hang Chen

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Education

Peking University | *School of Mathematical Sciences* — Sep. 2020 – Jun. 2024
Major: Mathematics and Applied Mathematics — Beijing, China

GPA
Overall: **3.84/4**, Major: **3.89/4**, Rank **10/130**

Research Interests
Number Theory, especially Arithmetic Geometry

Research Projects

Undergraduate Research Program — Apr. 2022 – Present
Advised by Prof. Liang Xiao — Peking University

- Read 10+ books and notes on number theory and algebraic geometry
- Gave presentations every other week
- Studied some algebraic geometry, including intersection theory referring to Fulton's *Intersection Theory*
- Learned theories of elliptic curves and abelian varieties referring to Silverman's *The Arithmetic of Elliptic Curves* and *Advanced Topics in the Arithmetic of Elliptic Curves* and Mumford's *Abelian Varieties*
- Learned the proofs of the Mordell-Weil theorem and Mazur's theorem and further results, mainly referring to Serre's *Lectures on the Mordell-Weil Theorem* and Andrew Snowden's notes on Mazur's theorem

The University of Chicago Mathematics REU — Jun. 2023 – Aug. 2023
Organized by Prof. Peter May, and mentored by Micah Gay — The University of Chicago

- Wrote an expository paper *Introduction to Shimura Varieties*
- Read on Shimura variety, mainly referring to Milne's *Introduction to Shimura Varieties* and Genestier and Ngo's *Lectures on Shimura Varieties*
- Attended courses for 8 weeks focusing on various fields of pure math

Expository Papers

Introduction to Shimura Varieties — September 2023

- Draft for Uchicago's REU paper, [pdf]
- Explains the definition of Shimura varieties, moduli interpretation of Siegel and PEL-type Shimura varieties, along with some discussion on canonical models

Notes on Chern-Weil Theory — June 2023

- [pdf], summarized and translated Appendix C of Milnor and Stasheff's *Characteristic Classes*
- Outlines the Chern-Weil description of characteristic classes

A Concise Explanation of the Sphere Packing Problem in Dimension 8 — June 2023

- [pdf], explains the main methods in Viazovska's solution of the sphere packing problem in eight dimensions on [Viazovska, 17]

Introduction to Dessins d'Enfants — Feb. 2022 – Jun. 2022

- [pdf], covers Belyi's theorem, Grothendieck's correspondence, Galois actions on dessins, with some applications
- Gave a 3-hour presentation with partner

Introduction to Linear Representation of Finite Groups — Sep. 2021 – Dec. 2021

- [pdf], presents the basic theory of linear representation of finite groups, including character theory and induced representation, with some examples provided

Seminars and Talks

Weil Conjecture Seminar Autumn 2023
Organized by Prof. Enlin Yang Peking University
- Main material: Kiehl and Weissauer's *Weil Conjectures, Perverse Sheaves and l-adic Fourier Transform*
- Gave several talks on Chapter 2 "The Formalism of Derived Categories"

Stacks Seminar Autumn 2023
Organized by Prof. Qizheng Yin Peking University
- Main material: Alper's *Stacks and Moduli*
- Gave one talk on the geometry of Deligne-Mumford stacks

Algebraic K-Theory Seminar Autumn 2023
Held by students Peking University
- Main material: Sriniva's *Algebraic K-Theory*
- Gave several talks on the first few chapters

Math Courses

Upper-lever Courses	Grade	Graduate Courses	Grade
Algebra I, II (H)	96, 94	Algebraic Geometry I	88
Topology	94	Algebraic Geometry II	93.5
Introduction to Differential Manifolds	97	Fiber Bundles and Characteristic Classes	96
Complex Analysis (H), Real Analysis	95,96	Modular Form and Number Theory	95
Functional Analysis	99	Lie Groups and Lie Algebras	90
Ordinary Differential Equations	97	Homology Theory	P

(H) = Honor, P = Pass (due to COVID-19)
For a full math course list, see here.

Other Experiences

China Undergraduate Mathematical Contest in Modeling September 2021
- Won first prize of Beijing area
- Cooperated with team members to propose a model and write a paper on it

Teaching Assistant in High School Mathematics Olympiad Jul. 2020–Sep. 2020
- Gave lectures and helped grade exam papers

Honors and Awards

three-time student scholarships Oct. 2023/2022/2021
Awarded for outstanding performance of top 10%

three-time Merit Student Oct. 2023/2022/2021
Ranked 3/30 in my class for three years

The President's Fund for Research April 2023
In Peking University Undergraduate Research Program

Winning prizes in S-T Yau College Student Mathematics Contest Jun. 2023/Aug. 2022
In Analysis and Partial Differential Equations Track and Algebra and Number Theory Track

Gold medal in Chinese Mathematics Olympiad November 2019
Entered the national training team ranking 19

Test Scores

TOEFL iBT: Total 105
GRE Subject Test in Mathematics: 970 with percentile 97%