YUNHAN (ALEX) SHENG

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EDUCATION

University of Chicago   **September 2020 - June 2024 (expected)**

B.S. in Mathematics with honors ⋄ Minor in Germanic Studies ⋄ GPA: 3.74/4.00

RESEARCH EXPERIENCE

The PCMI 2023 Undergraduate Summer School   **July 2023-August 2023**

The University of Chicago Mathematics REU 2023   **June 2023-August 2023**

The University of Chicago Mathematics REU 2022   **June 2022-August 2022**
○ Mentor: Wei Yao & Pallav Goyal
○ Expository Paper: *Complex Multiplication of Elliptic Curves and Abelian Varieties. PDF*
○ Participant talk: *On the complex multiplication of elliptic curves. PDF*

The University of Chicago Mathematics REU 2021   **June 2021-August 2021**
○ Mentors: J. Peter May & Xiaolin Danny Shi
○ Expository Paper: *On Realizing Rational and Polynomial Cohomology Rings. PDF*

RELEVANT COURSEWORK

○ MATH 38005 Decomposition Theorem for Perverse Sheaves and Hodge Theory*, Grade: P
○ MATH 36206 Algebraic Number Theory*, Spring 2023, Grade: A
○ MATH 29700 Proseminar in Mathematics (chromatic homotopy theory), Spring 2023, Grade: A
○ MATH 37392 Arithmetic Geometry*, Winter 2023, Grade: A
○ MATH 29700 Proseminar in Mathematics (scheme theory), Winter 2023, in progress
○ MATH 31800 Topology and Geometry II (differential topology)*, Winter 2023, Grade: A
○ MATH 29700 Proseminar in Mathematics (characteristics classes and K-theory), Grade: A
○ Preliminary Arizona Winter School 2022: Heights in Diophantine geometry
○ Midwest Algebraic Geometry Graduate Conference 2022
○ Directed Reading Program: étale cohomology and the Weil conjectures

Sophomore year
○ MATH 27400 Introduction to Differentiable Manifolds and Integration on Manifolds, Grade: A-
○ MATH 25700 Honors Basic Algebra I, Grade: A
○ MATH 25800 Honors Basic Algebra II, Grade: A
○ MATH 32600 Algebra II (commutative algebra)*, Grade: B+
○ MATH 32700 Algebra III (algebraic number theory)*, Grade: A
○ MATH 38511 Brownian Motion and Stochastic Calculus*, Grade: A-
○ MATH 31700 Topology and Geometry I (algebraic topology)*, Grade: A-
○ Direct Reading Program: classical invariant theory of finite groups

Freshmen year
○ MATH 20250 Abstract Linear Algebra, Grade: A
○ MATH 20310 Analysis in Rn I (accelerated), Grade: A-
○ MATH 20410 Analysis in Rn II (accelerated), Grade: A-
○ MATH 20510 Analysis in Rn III (accelerated), Grade: A
○ STAT 38300 Measure-Theoretic Probability II*, Grade A
○ Direct Reading Program: fundamental groups and homology

                                                                    ∗ indicates graduate courses

EXPOSITORY WRITINGS

Elements of Complex K-theory. [PDF]   December 2022
Final project for the course *Proseminar in Mathematics* with Prof. Akhil Mathew.

Kähler manifolds and Hodge theory. [PDF]   March 2023
Final project for the course *Topology and Geometry II** with Prof. Eduard Looijenga.

Commutative ring theory. [PDF]   March 2022
Class notes for *Algebra II (commuative algebra)** with Prof. Ngo Bao Chau.

Brownian motion and stochastic calculus. [PDF]   December 2021
Class notes for *Brownian Motion and Stochastic Calculus** with Prof. Gregory Lawler.

Algebraic Topology. [PDF]   December 2021
Class notes *Topology and Geometry I (algebraic topology)** with Prof. Shmuel Weinberger.

TEACHING EXPERIENCE

MATH 24400 Introduction to Algebraic Geometry ⋄ Reader	Winter 2022
MATH 25400 Basic Algebra II ⋄ Super reader	Autumn & Winter 2022
MATH 25500 Basic Algebra III ⋄ Reader	Spring 2022
MATH 15300 Calculus III ⋄ Grader (VCA)	Spring 2022
MATH 15200 Calculus II ⋄ Grader (VCA)	Autumn & Winter 2021

Note: readers and super readers are teaching assistant positions.

MISCELLANEOUS

Music: I am passionate about classical music. I am a classically trained pianist and organist. I also play the carillon. To access my recordings and writings, please go to my [homepage].

Languages: native fluency in Mandarin and English, can read basic German (still learning), Python.

Citizenship: Hefei, China

Date of Birth: December 22, 2001.