

YUNHAN (ALEX) SHENG

University of Chicago, IL 60637 \diamond yhsheng@uchicago.edu

Personal webpage: <https://yunhansheng.github.io/>

EDUCATION

University of Chicago

September 2020 - June 2024 (expected)

B.S. in Mathematics with honors \diamond GPA: 3.74/4.00

RESEARCH EXPERIENCE

IWoAT Summer School 2023: Operads, spectra, and multiplicative structures

August 2023

The University of Chicago Mathematics REU 2023

June 2023-August 2023

- \circ Mentor: J. Peter May

- \circ Expository Paper: *Cofreeness of Lubin-Tate theory*. [PDF](#)

The PCMI 2023 Undergraduate Summer School

July 2023-August 2023

The University of Chicago Mathematics REU 2022

June 2022-August 2022

- \circ Mentors: Wei Yao & Pallav Goyal

- \circ Expository Paper: *Complex multiplication of elliptic curves and abelian varieties*. [PDF](#)

- \circ Participant talk: *On the complex multiplication of elliptic curves*. [PDF](#)

The University of Chicago Mathematics REU 2021

June 2021-August 2021

- \circ Mentors: J. Peter May & Xiaolin Danny Shi

- \circ Expository Paper: *On realizing rational and polynomial cohomology rings*. [PDF](#)

RELEVANT COURSEWORK

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

Sophomore year

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

Freshmen year

- \circ MATH 20250 Abstract Linear Algebra, Grade: A
- \circ MATH 20310 Analysis in \mathbb{R}^n I (accelerated), Grade: A-
- \circ MATH 20410 Analysis in \mathbb{R}^n II (accelerated), Grade: A-
- \circ MATH 20510 Analysis in \mathbb{R}^n III (accelerated), Grade: A
- \circ STAT 38300 Measure-Theoretic Probability II*, Grade: A
- \circ Direct Reading Program: fundamental groups and homology

* indicates graduate courses

EXPOSITORY WRITINGS

<i>Power operations and HKR character theory.</i> PDF	June 2023
Final project for the course <i>Proseminar in Mathematics</i> with Prof. Peter May.	
<i>Elements of Complex K-theory.</i> PDF	December 2022
Final project for the course <i>Proseminar in Mathematics</i> with Prof. Akhil Mathew.	
<i>Kähler manifolds and Hodge theory.</i> PDF	March 2023
Final project for the course <i>Topology and Geometry II*</i> with Prof. Eduard Looijenga.	
<i>Commutative ring theory.</i> PDF	March 2022
Class notes for <i>Algebra II (commutative algebra)*</i> with Prof. Ngo Bao Chau.	
<i>Brownian motion and stochastic calculus.</i> PDF	December 2021
Class notes for <i>Brownian Motion and Stochastic Calculus*</i> with Prof. Gregory Lawler.	
<i>Algebraic Topology.</i> PDF	December 2021
Class notes <i>Topology and Geometry I (algebraic topology)*</i> with Prof. Shmuel Weinberger.	

TEACHING EXPERIENCE

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