

Songyu Ye

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Education

2021-2025 **B.A. Mathematics and Computer Science**

Cornell University

Coursework (Graduate): Algebraic Geometry, Algebraic Topology, Differentiable Manifolds, Lie Groups and Lie Algebras, Representation Theory, Algebraic Number Theory, Commutative Algebra, Noncommutative Algebra, Real Analysis

GPA: 3.95 / 4

Awards: Putnam Top 350 (2023), Cornell Mathematics Prize Exam Top 3 (2022), Dean's List

Interests

Representation theory and algebraic geometry, perverse sheaves, intersection cohomology, \mathcal{D} -modules, Schubert varieties, structure constants and positivity.

Mathematics Experience

- **Cornell Undergraduate Research Assistant (Spring 2024):** Gap research semester working with Professor Tara Holm and Professor Allen Knutson on problems in toric geometry, moment maps, and representation theory. This work was supported by DMS-1711317.
- **Cornell Summer Research (Summer 2023):** Undergraduate research on Schubert Calculus, Quiver Varieties, and Kazhdan-Lusztig Coefficients with Professor Allen Knutson. This work was supported by DMS-1953948.
- **University of Maryland Combinatorics, Algorithms, Artificial Intelligence REU (Summer 2022):** Researched and developed dynamic visualization software for Voronoi Diagrams in hyperbolic space with Professor Dave Mount.

Publications

- Ye, S. (2024). Representations of complex tori and $GL(2, \mathbb{C})$. *Columbia Journal of Undergraduate Mathematics*, 1(1). Retrieved from <https://journals.library.columbia.edu/index.php/cjum/article/view/12908>
- Bumpus M., Dai C., Gezalyan A., Munoz S., Santhoshkumar S., Ye S., Mount D. (2023). Software and Analysis for Dynamic Voronoi Diagrams in the Hilbert Metric. *Canadian Conference on Computational Geometry 2023*.

Talks / Independent Study

- **Intersection Theory Reading Course (Cornell, SP 2024)** with Professor Mike Stillman
- **Toric Varieties Seminar (Cornell, SP 2024):** *Line bundles on toric varieties and their cohomology*
- **4 Manifolds Seminar (Cornell, FA 2023):** *Handle slides and cancellation*
- **Lie Algebra cohomology (Cornell, FA 2023)** w/ Professor Birgit Speh
- **Moduli Spaces and Algebraic Groups (Cornell, SP 2023)** w/ Professor Dan Halpern-Leistner

Travel (participant)

- **Fields Institute (FA 2024)** - Workshop on Toric Topology
- **Park City Mathematics Institute (SUM 2024)** - Summer School in Motivic Homotopy Theory
- **Isaac Newton Institute for Mathematical Sciences (SUM 2024)** - Moduli Stacks and Enumerative Geometry
- **University of Michigan (SP 2024)** - Singularities in Ann Arbor
- **Binghamton University (FA 2022, FA 2023)** - Graduate Conference in Algebra and Topology
- **University of Notre Dame (SUM 2022)** - Geometry and Topology Workshop: Algebraic Curves

Teaching Experience

- **Teaching Assistant (FA 24)** INFO 4940 Topics in Information Science: Cybersecurity
- **Teaching Assistant (FA 23)** CS 4820 Introduction to Algorithms
- **Head Teaching Assistant (SP 23)** CS 2802 Honors Discrete Structures
- **Teaching Assistant (FA 22)** CS 2800 Discrete Structures
- **Math Tutor (FA 22, SP 23)** Cornell Math Support Center