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. Work supported by DMS-1711317.
- **Cornell Summer Research (Summer 2023)**: Undergraduate research on Schubert Calculus, Quiver Varieties, and Kazhdan-Lusztig Coefficients with Professor Allen Knutson. Work 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, 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

- **Senior Thesis: Moment Maps and Equivariant Cohomology (Cornell, SP 2024)** with Professor Tara Holm
- **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 Algberaic 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 & 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