

Songyu Ye

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Education

2025–2030 **University of California, Berkeley:** Ph.D. student in Mathematics
2021–2024 **Cornell University:** B.A. Summa Cum Laude Mathematics, Computer Science
 Senior Thesis: Moment Maps and Equivariant Cohomology w/ Professor Tara Holm

Interests

Representation theory, algebraic geometry, and mathematical physics, with particular interests in loop groups, affine Lie algebras, and the moduli of G -bundles on algebraic curves.

Research Experience / Reading Courses

- **Berkeley Mathematics PhD Research (Fall 2025–):** Working with Professor Constantin Teleman on the geometry and representation theory of loop groups and affine Lie algebras.
- **Cornell Undergraduate Research (Summer 2023, Spring 2024):** Gap research semester working with Professor Tara Holm and Professor Allen Knutson on problems in toric geometry, representation theory, and equivariant cohomology.
- **Intersection Theory Reading Course** (Cornell, SP 2024) w/ Professor Mike Stillman
- **Lie Algebra Cohomology** (Cornell, FA 2023) w/ Professor Birgit Speh
- **Moduli Spaces and Algebraic Groups** (Cornell, SP 2023) w/ Professor Dan Halpern-Leistner
- **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). <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

- Toric Varieties Seminar (Cornell, SP 2024): *Line bundles on toric varieties and their cohomology*
- 4 Manifolds Seminar (Cornell, FA 2023): *Handle slides and cancellation*

Travel

- SwissMAP Research Station (SUM 2025) - Topological Symmetries and Defects in Quantum Field Theory
- IMPAN Będlewo, Poland (SUM 2025) - Torus Actions and Characteristic Classes
- 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
- University of Notre Dame (SUM 2022) - Geometry and Topology Workshop: Algebraic Curves

Teaching Experience

- Graduate Student Instructor (FA 25) Math 51 Calculus 1
- Teaching Assistant (FA 23) CS 4820 Analysis of Algorithms
- Head Teaching Assistant (SP 23) CS 2802 Honors Discrete Structures
- Teaching Assistant (FA 22) CS 2800 Discrete Structures