

Serena An

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Education

- 2022 – 2026 **Massachusetts Institute of Technology** Cambridge, MA
Bachelor of Science in Mathematics. Concentration in Theater Arts. *GPA: 4.9.*
Graduate coursework: Algebraic Topology I & II, Algebraic Geometry I & II, Commutative Algebra, Number Theory, Manifold Geometry, Theory of Probability, Stochastic Calculus.
- 2021 – 2022 **National Security Language Initiative for Youth (NSLI-Y)** Seoul, South Korea
Took a gap year to study abroad with the selective [NSLI-Y Korean Academic Year Program](#).

Selected Awards

- 2025 **MIT Humanities Scholar** [Burchard Scholars Program](#) Cambridge, MA
- 2023 **Honorable Mention (Top 100)** [Putnam Mathematical Competition](#) Cambridge, MA
- 2021 **Gold Medal** [European Girls' Mathematical Olympiad](#) Kutaisi, Georgia (Online)
- 2019, 2020 **MOP Participant** [Math Olympiad Summer Program](#) Pittsburgh, PA
- 2018 **TEDx Speaker** [TEDxPioneerParkKids](#) Brookings, SD

Research Experience

- 2026 [MIT MISTI Japan Research Exchange](#) Kyoto, Japan
Studied chromatic quasisymmetric functions under Tatsuyuki Hikita.
- 2025 [Imperial Summer Research Exchange](#) London, England
Studied group cohomology under Benjamin Briggs.
- 2024 [UMN Combinatorics and Algebra REU](#) Minneapolis, MN
Studied Postnikov-Stanley polynomials under Shiyun Wang and quiver representations under Kayla Wright.
- 2023 [MIT Summer Program for Undergraduate Research](#) Cambridge, MA
Studied flip graphs under Elisabeth Bullock.
- 2020 [MIT PRIMES-USA](#) Online
Studied Grothendieck polynomials under Adela Zhang.

Work Experience

- 2024 – Present **USA Deputy Leader** [European Girls' Mathematical Olympiad](#) Europe (Varies)
Coordinated olympiad papers and accompanied the USA EGMO team.
- 2023 – 2026 **Instructor** [MIT Global Teaching Labs](#) South Africa; Ghana; Bhutan; Mexico
Helped direct national math olympiad training camps.
- 2022 – 2025 **Teaching Assistant** [Math Olympiad Summer Program](#) Pittsburgh, PA
Graded olympiads and bridged the gap between instructor and student as an approachable role model.

Research Reports

- 2025 Rank varieties for modules over quantum complete intersections
[pdf] under Benjamin Briggs
- 2024 Postnikov–Stanley polynomials are Lorentzian
[arXiv] with Katherine Tung and Yuchong Zhang
Algebraic Combinatorics, to appear.
- 2024 Newton polytopes of dual Schubert polynomials
[arXiv] with Katherine Tung and Yuchong Zhang
- 2024 Equality and saturated Newton polytopes of Postnikov–Stanley polynomials
[pdf] with Katherine Tung and Yuchong Zhang under Shiyun Wang and Meagan Kenney
- 2024 Mixed dimer model for exceptional type quiver representations and cluster algebras
[pdf] with Casey Appleton and Sogol Cyrusian under Kayla Wright and Elise Catania
- 2023 Flip graphs on self-complementary ideals of chain products
[arXiv] with Holden Mui under Elisabeth Bullock
- 2021 The Stembridge equality for skew stable Grothendieck polynomials and skew dual stable Grothendieck polynomials
[journal] with Fiona Abney-McPeck and Jakin Ng under Adela Zhang
Algebraic Combinatorics, Volume 5 (2022) no. 2, pp. 187-208.

Expository Writing

- 2025 Homotopy groups of spheres
[pdf] for MATH 231BR *Algebraic Topology II*.
- 2025 Faithful specializations of the Burau representation
[pdf] for 18.904 *Seminar in Topology*.
- 2024 Dyson Brownian motion as noncolliding Brownian motion
[pdf] for 18.676 *Stochastic Calculus*.
- 2024 Projective modules
[pdf] for 18.704 *Seminar in Algebra*.

Service and Mentorship

- Spring 2026 Undergraduate Assistant 18.900 *Geometry and Topology in the Plane*
- Fall 2025 Undergraduate Assistant 18.100A *Real Analysis*
- 2023 – 2025 Exec Member *Undergraduate Society of Women in Math*
- 2023 – 2026 Mentor *Undergraduate Society of Women in Math*
- 2023 – 2026 Mentor *Undergraduate Math Association*
- 2023 Tutor for 18.100A and 18.100Q *Undergraduate Math Association*
- 2022 – 2024 Problems Staff *Harvard-MIT Math Tournament*

Languages

English, Mandarin, Korean, Japanese