

Madeleine E. Goertz

Curriculum Vitae

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EDUCATION

University of California, Berkeley, CA Ph.D. in Mathematics Advised by Bernd Sturmfels and Serkan Hoşten.	Aug. 2025 – Present
California Polytechnic State University, San Luis Obispo, CA M.S. in Mathematics. Advised by Patrick Orson. Thesis: <i>On Diffeomorphism Groups of Surfaces</i>	Sept. 2021 – June 2025 GPA: 4.0/4.0
B.S. in Mathematics Joint BS/MS Program. Member of University Honors Program Advised by Eric Brussel. Senior Project: <i>On Moduli Spaces of Triangles</i>	GPA: 4.0/4.0

PREPRINTS & PUBLICATIONS

Journal Articles

1. *The Torus of Triangles*. (with Eric Brussel). To appear in: *Involve*. arXiv:2303.11446.

Conference Proceedings

2. *The Quaternary Gray Code and Ziggu Puzzles*. (with Aaron Williams). Proceedings of the 13th International Conference on Fun with Algorithms, 2026. DOI:10.4230/LIPIcs.FUN.2026.22.
1. *Exhaustive Generation of Pattern-Avoiding s -Words*. (with Samuel Buick, Amos Lastmann, Kunal Pal, Helen Qian, Sam Tacheny, Aaron Williams, Leah Williams, and Yulin Zhai). Proceedings of the 23rd International Conference on Permutation Patterns, 2025. Available here.

Preprints

1. *The Stack of Triangles Up to Similarity*. (with Eric Brussel, Elijah Guptill, and Kelly Lyle). arXiv:2408.07792. (under review).

SELECTED AWARDS & FELLOWSHIPS

At UC Berkeley

Berkeley Connect Fellowship	Aug. 2026
Chancellor's Fellowship	Jan. 2026

At Cal Poly

Outstanding Master's Thesis Award, Math Department	May 2026
Academic Excellence Award, Bailey College	May 2025
Academic Excellence Award, Math Department	May 2025
Frost Research Scholarship	Sept. 2022 – June 2025
Charles J. Hanks Excellence in Mathematics Scholarship	May 2024
First place, Cal Poly 3-Minute Thesis Competition	Feb. 2024
First place, Physical Sciences & Math, CSU Student Research Competition	Apr. 2023

RESEARCH PROGRAMS & VISITS

- Visiting Ph.D. Student, Max Planck Institute for Mathematics in the Sciences, Leipzig Summer 2026
Advised by Bernd Sturmfels and Serkan Hoşten on *Metric Algebraic Geometry*.
- NSF SMALL REU, Williams College, Williamstown, MA Summer 2024
Advised by Aaron Williams on *Combinatorial Algorithms & Hamilton Paths*.
- Frost Summer Undergraduate Research Program, Cal Poly, San Luis Obispo, CA Summer 2023
Advised by Eric Brussel on *Moduli Space of Triangles*.
- Frost Summer Undergraduate Research Program, Cal Poly, San Luis Obispo, CA Summer 2022
Advised by Eric Brussel on *Poncellet's Theorem*.

TALKS & POSTERS

key: ★ = invited; ◇ = contributed; † = adapted for a general audience.

Talks

The Linear Programming Degree

- ★ Nonlinear Algebra Seminar, Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany July 2026

The Quaternary Gray Code and Ziggu Puzzles

- ◇ FUN26: 13th International Conference on Fun with Algorithms, Porquerolles, France May 2026
- ◇ CanaDAM: CM16 - Greedy Constructions of Gray Codes, Ottawa, Canada (virtual talk) May 2025
- † Cal Poly Bailey College Student Research Conference, San Luis Obispo, CA May 2025

Moduli Spaces of Triangles and Euclid's Similarity Theorems

- † Invited guest lecture in Cal Poly Math 112: Nature of Modern Math, San Luis Obispo, CA May 2025
- † 4th annual CSU Grad Slam, Virtual May 2024
- † Western Association of Graduate Schools 8th Annual Regional 3-Minute Thesis Competition, Virtual Mar. 2024
- † Cal Poly 3-Minute Thesis Competition, San Luis Obispo, CA Feb. 2024
- ◇ Joint Mathematics Meetings: AMS Contributed Paper Session on Geometry, San Francisco, CA Jan. 2024
- ◇ 2nd CSU Mathematical Sciences Conference, Bakersfield, CA Nov. 2023

Poncellet Families and the Torus of Triangles

- † Cal Poly Bailey College Student Research Conference, San Luis Obispo, CA May 2023
- † 37th Annual CSU Student Research Competition, San Diego, CA Apr. 2023
- † Cal Poly CSU Student Research Competition, San Luis Obispo, CA Feb. 2023
- ◇ 1st CSU Mathematical Sciences Conference, Northridge, CA Nov. 2022

Posters

Three Moduli Spaces of Triangles

- ◇ Cal Poly Bailey College Student Research Conference, San Luis Obispo, CA May 2024
- ◇ Cal Poly Summer Undergraduate Research Symposium, San Luis Obispo, CA Oct. 2023
- ◇ Cal Poly Math Department Summer Research Poster Symposium, San Luis Obispo, CA Oct. 2023

Poncellet Families and the Torus of Triangles

- ◇ Cal Poly Math Department Summer Research Poster Symposium, San Luis Obispo, CA Oct. 2022

TEACHING EXPERIENCE

Teaching experience as a graduate student instructor facilitating discussion sections at UC Berkeley.

Math 51: Calculus I (2 sections) Fall Semester 2025

Teaching experience as a graduate teaching associate and instructor of record at Cal Poly.

Math 221: Calculus for Business and Economics Spring Quarter 2025

Math 118: Precalculus Algebra Fall Quarter 2024, Winter Quarter 2025

MENTORSHIP & SERVICE

Berkeley Connect FellowAug. – December 2026
Graduate Student Peer Mentor, UC Berkeley MPS Scholars NetworkOct. 2025 – May 2026
Member, Cal Poly Nat'l & Internat'l Fellowships & Scholarships Advisory Board Feb. 2025 – June 2026