Madeleine E. Goertz

Curriculum Vitae

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EDUCATION

University of California, Berkeley, CA — Matriculating Aug. 2025
Ph.D. in Mathematics

California Polytechnic State University, San Luis Obispo, CA — Sept. 2021 – June 2025
M.S. in Mathematics — *GPA: 4.0/4.0*
  Advised by Patrick Orson, wrote master's thesis *On Diffeomorphism Groups of Surfaces*
B.S. in Mathematics — *GPA: 4.0/4.0*
  Advised by Eric Brussel, wrote senior project *On Moduli Spaces of Triangles*

PREPRINTS & PUBLICATIONS

Journal Articles

1. The Torus of Triangles. (with E. Brussel). (to appear in *Involve, A Journal of Mathematics*). arXiv:2303.11446.

Conference Proceedings

1. Exhaustive Generation of Pattern-Avoiding s-Words. (with S. Buick, A. Lastmann, K. Pal, H. Qian, S. Tacheny, A. Williams, L. Williams, and Y. Zhai). (to appear in *Proceedings of the 23rd International Conference on Permutation Patters, 2025*). Link to Research Gate Preprint.

Preprints

2. The Quaternary Gray Code and How It Can Be Used to Solve Ziggurat and Other Ziggu Puzzles. (with A. Williams). arXiv:2411.19291. (preprint).
1. The Stack of Triangles Up to Similarity. (with E. Brussel, E. Guptill, & K. Lyle). arXiv:2408.07792. (preprint).

SELECTED AWARDS & SCHOLARSHIPS

Chancellor's Fellowship, UC Berkeley . . . . Spring 2026
Academic Excellence Award, Cal Poly Bailey College of Science and Mathematics . . . . May 2025
Academic Excellence Award, Cal Poly Math Department . . . . May 2025
Charles J. Hanks Excellence in Mathematics Scholarship . . . . May 2024
Frost Research Scholarship . . . . Sept. 2022 – June 2025
First place, Physical & Mathematical Sciences, 37th Annual CSU Student Research Competition . . . . Apr. 2023
Frost Summer Undergraduate Research Scholarship . . . . June 2022 & June 2023

RESEARCH PROGRAM PARTICIPATION

NSF SMALL REU, *Williams College* . . . . Summer 2024
  Advised by Aaron Williams, on *Combinatorial Algorithms & Hamilton Paths*
Frost Summer Undergraduate Research Program, *Cal Poly* . . . . Summer 2023
  Advised by Eric Brussel, on *Moduli Space of Triangles*
Frost Summer Undergraduate Research Program, *Cal Poly* . . . . Summer 2022
  Advised by Eric Brussel, on *Poncelet's Theorem*

SELECTED RESEARCH COMMUNICATION

Talks for Mathematical Audiences

4. "Solving Ziggu Puzzles Using the Quaternary Gray Code." (with A. Williams). CM16 - Greedy Constructions of Gray Codes, *CanaDAM 2025: Canadian Discrete and Algorithmic Mathematics Conference*, Ottawa, CA, May 2025. (virtual talk).
3. "Moduli Space of Triangles & Euclid's Similarity Theorems." (with E. Brussel, E. Guptill, & K. Lyle). AMS Contributed Paper Session on Geometry, *Joint Mathematics Meetings*, San Francisco, CA. Jan. 2024.

2. "Geometry of the moduli spaces of similarity classes of triangles defined by three classical theorems." (with E. Brussel, E. Guptill, & K. Lyle). *2nd CSU Mathematical Sciences Conference*, Bakersfield, CA. Nov. 2023.

1. "Poncelet Families & The Torus of Triangles." (with E. Brussel). *1st CSU Mathematical Sciences Conference*, Northridge, CA. Nov. 2022.

Talks for General Audiences

3. "Solving Ziggu Puzzles Using the Quaternary Gray Code." (with A. Williams). *Cal Poly Bailey College of Science and Mathematics Student Research Conference*, San Luis Obispo, CA. May 2025.

2. "A Moduli Space of Triangles." (with E. Brussel). *4th Annual CSU Grad Slam*, Virtual Meeting. May 2024.

1. "The Torus of Triangles." (with E. Brussel). *37th Annual CSU Student Research Competition*, San Diego, CA. Apr. 2023.

Poster Presentations

2. "Three Moduli Spaces of Triangles." (with E. Brussel, E. Guptill, & K. Lyle). *Bailey College of Science and Mathematics 2024 Student Research Conference*, San Luis Obispo, CA. May 2024.

1. "Poncelet Families & The Torus of Triangles." (with E. Brussel). *Mathematics Department Summer Research Poster Symposium*, San Luis Obispo, CA. Oct. 2022.

Teaching Experience

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

Math 221: Calculus for Business and Economics, *Cal Poly* . . . . Spring Quarter 2025
Math 118: Precalculus Algebra, *Cal Poly* . . . . Fall Quarter 2024, Winter Quarter 2025

Other Work Experience

Mathematics Tutor, *Cal Poly Learning Support Center* . . . . Oct. 2023 – June 2024
Grader, *Cal Poly Department of Mathematics* . . . . Jan. 2023 – June 2023
Learning Assistant, *Cal Poly Department of Physics* . . . . Apr. 2022 – June 2022
Coding Camp Instructor, *Coding with Kids LLC* . . . . June 2019 – Sept. 2021