Dr. Lily Silverstein — Curriculum Vitae

Education

University of California, Davis

Ph.D., Mathematics — June 2019
Advisor: Jesús A. De Loera
Dissertation: *Probability and Machine Learning in Combinatorial Commutative Algebra*

Claremont Graduate University

M.S., Mathematics — May 2015

University of Massachusetts, Boston

B.S., Mathematics — Aug. 2011

Academic Employment

California State Polytechnic University, Pomona

Assistant Professor of Mathematics and Statistics. — August 2019–current

- Undergraduate course assignments: Abstract Algebra I and II, Number Theory, Calculus
- Graduate course assignments: Grad. Abstract Algebra I and II, Directed Research Supervision, Master's Thesis Supervision, Comprehensive Exam Supervision

Enhancing Diversity in Graduate Education (EDGE) Summer Program

Measure Theory Instructor and Mentor.

- EDGE at the University of Minnesota/IMA, Minneapolis, MN — Summer 2021
- EDGE (virtual) hosted by Brown University, Providence, RI — Summer 2020
- EDGE at Pomona College, Pomona, CA — Summer 2019

University of California, Davis

Associate Instructor, Dept. of Mathematics. — Winter 2019

- Integral Calculus

Teaching Assistant, Dept. of Mathematics. — Fall 2016–Spring 2019

- Undergraduate courses: Math. for Data Analysis, Discrete Math, Intro. to Abstract Math, Linear Algebra, Calculus
- Graduate courses: Algebra

Scripps College

Teaching Assistant, Complex Analysis — Spring 2015

Pomona College

Quantitative Skills Center Fellow — 2014–2015

University of Massachusetts, Boston

Teaching Assistant, Quantitative Reasoning — 2008–2010
Tutoring Center Fellow — 2009–2011

Research & Publications

Research interests

Computational commutative algebra, computational algebraic geometry, combinatorial algorithms, discrete optimization, machine learning and data science, data visualization, algorithms and complexity in computer algebra.

Publications

1. Christopher O'Neill and Lily Silverstein. (2022) Discovery learning in an interdisciplinary course on finite fields and applications, *PRIMUS*, DOI: 10.1080/10511970.2022.2073412
2. Jesús A. De Loera, Serkan Hoşten, Robert Krone and Lily Silverstein. (2019) Average behavior of minimal free resolutions of monomial ideals. *Proceedings of the American Mathematical Society* 147 (8), 3239-3257.
3. Jesús A. De Loera, Sonja Petrović, Lily Silverstein, Despina Stasi and Dane Wilburne. (2019) Random monomial ideals. *Journal of Algebra* 519, 440-473.
4. Probability and Machine Learning in Combinatorial Commutative Algebra. (2019) PhD thesis, University of California, Davis.

Accepted for publication

1. Lily Silverstein, Dane Wilburne and Jay Yang. Asymptotic Degree of Random Monomial Ideals. To appear in *Journal of Commutative Algebra*.

Software

1. Lily Silverstein and Jay White. "Monomial Integer Programs" package for Macaulay2 computer algebra system. https://github.com/Macaulay2/M2/blob/development/M2/Macaulay2/packages/MonomialIntegerPrograms.m2.
2. David Eisenbud, Frank Moore, Frank-Olaf Schreyer, Greg Smith and Lily Silverstein. "Chain Complex Extras" package for Macaulay2 computer algebra system. https://github.com/Macaulay2/M2/blob/development/M2/Macaulay2/packages/ChainComplexExtras.m2.
3. Yiting Ji, Di Kang, Robert Knickerbocker, Hareshram Natarajan and Lily Silverstein. *Topological Optimization of Reliability Volatility in Power Distribution Networks.* C++ software and accompanying technical report in collaboration with Southern California Edison. May 2015.

Grants

Awarded

1. Lily Silverstein (PI) and Stacy Brown (co-PI). Amount awarded: $5,495. "Sophie's Circle Mentoring Program." 2021–2022 *Tensor Women & Mathematics Grants* from the Tensor Foundation and the Mathematical Association of America.

Mentoring Activities

Research Mentoring

- Master's thesis supervision. Nikita Campos, *Polynomial Ideals, Gröbner Bases, And Dynamic Computations Via Tentative Hilbert Functions* 2021–2022
- Undergraduate research mentor. Students: Rasha Issa and Heba Ayeda. 2020–2021
- Project leader. Macaulay2 development workshop, Cleveland State University (remote). May 2020
- Project leader. Introductory Macaulay2 workshop, University of Wisconsin, Madison. April 2018
- Project manager. Engineering & Industrial Applied Math Clinic, Claremont Graduate University. 2014–2015
- Mathematics REU mentor, UC Davis Summers 2017, 2018
- Capstone senior projects mentor Spring 2017

Diversity, Equity & Inclusion

- Cal-Bridge Mentor. Student: Diana Morales 2022–2023
- MAA Project NExT Fellow 2019–2020
- Advisor, Sophie's Circle (official AWM Student Chapter at Cal Poly Pomona) 2021–current
- Equity-Minded Teaching Institute, USC Race and Equity Center (virtual) Spring 2021
- Safe Zone Ally Training Feb. 2020

- Bronco Dreamers Ally Training — Nov. 2019
- "To Be a Woman in STEM" Panelist — Sept. 2019
- Equity-Minded Teaching Institute, USC Race and Equity Center (virtual) — Spring 2021
- UC Davis AWM Student Chapter Founder/President/Treasurer — 2016–2019
- UC Davis Women's Resources & Research Center Volunteer — 2016–2019
- STEM for Girls Annual workshop volunteer — 2016–2019

Selected Invited Talks

1. Department Colloquium
   Cal Poly Pomona, Pomona, CA — Nov. 2019
2. Algebra/Number Theory/Combinatorics Seminar
   Pomona College, Claremont, CA — Sep. 2019
3. Geometric and Topological Combinatorics special session
   Joint Mathematics Meetings, Baltimore, MD — Jan. 2019
4. Applied Algebra Days
   MIT, Cambridge, MA — Nov. 2018
5. Core Computational Methods
   ICERM at Brown University, Providence, RI — Sept. 2018
6. Seminar on Nonlinear Algebra
   Max Planck Institute, Leipzig, Germany — Aug. 2018
7. Macaulay2 Workshop
   University of Wisconsin, Madison, WI — April 2018
8. Commutative Algebra and Algebraic Geometry Seminar
   UC Berkeley, Berkeley, CA — April 2018
9. Math Colloquium
   Seattle University, Seattle, WA — Nov. 2017
10. Combinatorics Research Seminar
    San Jose State Univ., San Jose, CA — Sept. 2017
11. SIAM Conference on Applied Algebraic Geometry
    Georgia Tech., Atlanta, GA — July 2017

Summer and Semester Academic Programs

1. ICERM Semester on Nonlinear Algebra
   Brown University, Providence RI — Fall 2018
2. Numerical Computing in Algebraic Geometry Summer School & Visiting Student
   Max Planck Institute, Leipzig, Germany — Aug. 2018
3. Mixed-Integer Nonlinear Programming
   MSRI Summer School, Seville, Spain — June 2016