Dr. Lily Silverstein — Curriculum Vitae

Education

University of California, Davis

Ph.D., Mathematics — June 2019
Advisor: Jesús A. De Loera
Thesis: *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

- MAT 6970 Comprehensive Exam (Supervision) — Spring 2021 (x3), Spring 2022 (x3)
- MAT 6910 Directed Research (Supervision) — Fall 2021
- MAT 5180 Abstract Algebra II — Fall 2020
- MAT 5170 Abstract Algebra I — Spring 2021
- MAT 4180 Introduction to Abstract Algebra II — Spring 2022
- MAT 4170 Introduction to Abstract Algebra I — Fall 2021 (x2), Spring 2020, Fall 2019
- MAT 3250 Introduction to Number Theory — Spring 2021, Spring 2019
- MAT 1150 Calculus II — Fall 2021

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.

- MAT 21B Integral Calculus — Winter 2019

Teaching Assistant, Dept. of Mathematics.

- MAT 250B Graduate Algebra — Winter 2017
- MAT 189 Capstone course — Spring 2017
- MAT 160 Math. for Data Analysis & Decision Making — Spring 2016
- MAT 148 Discrete Math — Winter 2017, Winter 2018
- MAT 108 Intro to Abstract Math — Spring 2018
- MAT 22AL Linear Algebra Computer Lab — Fall 2015, Winter 2016
- MAT 22A Linear Algebra — Fall 2017
- MAT 21B Integral Calculus — Fall 2016

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

Publications & Preprints

Research interests

Computational commutative algebra and algebraic geometry, probabilistic combinatorics, machine learning and data science, discrete optimization, algorithms and complexity in computer algebra.

Publications

1. Jesús A. De Loera, Serkan Hoşten, Robert Krone and Lily Silverstein. Average behavior of minimal free resolutions of monomial ideals. Proceedings of the American Mathematical Society 147 (8), 3239-3257. 2019.
2. Jesús A. De Loera, Sonja Petrović, Lily Silverstein, Despina Stasi and Dane Wilburne. Random monomial ideals. Journal of Algebra 519, 440-473. 2019.
3. Probability and Machine Learning in Combinatorial Commutative Algebra. PhD thesis, University of California, Davis. 2019.

Accepted for publication

1. Lily Silverstein, Dane Wilburne and Jay Yang. Asymptotic Degree of Random Monomial Ideals. Preprint available at https://arxiv.org/abs/2009.05174.

Under review

1. Christopher O'Neill and Lily Silverstein. Discovery learning in an interdisciplinary course on finite fields and applications. Preprint available at https://arxiv.org/abs/1810.10568.

Software

1. Lily Silverstein and Jay White. "Monomial Integer Programs" software package for Macaulay2 computer algebra system. Code available at https://github.com/Macaulay2/M2/blob/development/M2/Macaulay2/packages/MonomialInte m2.
2. David Eisenbud, Frank Moore, Frank-Olaf Schreyer, Greg Smith and Lily Silverstein. "Chain Complex Extras" package for Macaulay2 computer algebra system. Code available at 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.

Research Mentoring

Cal Poly Pomona

- Master's thesis supervisor, Nikita Campos. — 2021–2022
- Undergraduate research mentor, Rasha Issa and Heba Ayeda. — 2020–2021

Macaulay2 Workshops

- Project Leader at Macaulay2 development workshop, Cleveland State University (remote), May 2020.
- Project leader/mentor at introductory Macaulay2 workshop. University of Wisconsin, Madison. April 2018.

University of California, Davis

- Undergraduate summer research mentor — Summers 2017, 2018
- Capstone senior projects mentor — Spring 2017

Claremont Graduate University

- Project manager, Engineering & Industrial Applied Math Clinic, CGU — 2014–2015

Professional Training & Mentoring Activites

MAA Project NExT Fellow, 2019–2020

- MAA Project NExT Workshop (virtual). — July 2020
- MAA Project NExT Sessions. Denver, CO. — Jan. 2020
- MAA Project NExT Workshop, Cincinnati, OH. — July 2019

The UTMOST Project Faculty Participant

- NSF-funded study of open-source texts in undergraduate math courses. — Fall 2021

Cal Poly Pomona

- Advisor for Sophie's Circle (official AWM Student Chapter) — 2021–current
- Mentor/consultant/fundraiser, 2020 Sonia Kovalevsky Day at Cal Poly Pomona.
- Safe Zone Ally Training at Cal Poly Pomona. — Feb. 2020
- Bronco Dreamers Ally Training at Cal Poly Pomona. — Nov. 2019
- "To Be a Woman in STEM" Panelist. Cal Poly Pomona. — Sept. 2019
- Introduction to Teaching with Canvas, CAFE training course (virtual). — Summer 2021
- 2019 New Tenure Track Faculty Institute. — Summer 2019

USC Race and Equity Center

- Equity-Minded Teaching Institute (virtual). — Spring 2021

University of California, Davis

- UC Davis AWM Student Chapter Founder/President/Treasurer — 2016–2019
- UC Davis Women's Resources & Research Center, volunteer — 2016–2019
- STEM for Girls at UC Davis, 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. UC Davis Student-run Math/Applied Math Seminar
   UC Davis, Davis CA — Nov. 2017
10. Math Colloquium
    Seattle University, Seattle, WA — Nov. 2017
11. Combinatorics Research Seminar
    San Jose State Univ., San Jose, CA — Sept. 2017
12. SIAM Conference on Applied Algebraic Geometry
    Georgia Tech., Atlanta, GA — July 2017
13. Davis Math Conference
    UC Davis, Davis, CA — Jan 2017
14. Algebra/Number Theory/Combinatorics Seminar
    Pomona College, Claremont, CA — May 2015

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

Research Workshops and Conferences

1. Macaulay2 "Internals" meeting
   Virtual. — June 2020.
2. Macaulay2 Workshop
   Virtual (hosted by Cleveland State University). — May 2020.
3. Macaulay2 "Internals" meeting
   Virtual. — May 2020.
4. 13th Symposium for Women in Math. in So. Cal. (WiMSoCal)
   Irvine, CA. — March 2020.
5. MESCal (Math Equity in SoCal) Unconference
   Cal Poly Pomona, CA. — Feb. 2020
6. AMS-MAA 2020 Joint Mathematics Meetings
   Denver, CO. — Jan. 2020
7. Fall Midwestern Sectional Meeting of the AMS
   Madison, WI. — Sept. 2019
8. MAA MathFest
   Cincinnati, OH. — July–Aug. 2019.
9. Nonlinear Algebra in Applications
   ICERM, Providence, RI — Nov. 2018
10. Real Algebraic Geometry and Optimization
    ICERM, Providence, RI — Oct. 2018
11. AGNES (Algebraic Geometry Northeastern Series)
    Brown University, Providence, RI — Sept. 2018

12. Core Computation Methods
ICERM, Providence, RI — Sept. 2018
13. Nonlinear Algebra Bootcamp
ICERM, Providence, RI — Aug. 2018
14. Macaulay2 Workshop
Madison, WI — April 2018
15. Geom. and Topol. Comb.: Modern techniques and methods
MSRI, Berkeley, CA — Oct. 2017
16. Geom. and Topol. Comb.: Introductory workshop
MSRI, Berkeley, CA — Sept. 2017
17. CA+
Minneapolis, MN — Sept. 2017
18. Geom. and Topol. Comb.: Connections for women
MSRI, Berkeley, CA — Aug. 2017
19. Applied Macaulay2 Tutorials
Atlanta, GA — July 2017
20. Stochastic Topology and Thermodynamic Limits
ICERM, Providence, RI — Oct. 2016
21. HMC Scientific Computing: Parallel Processing with OpenMP
Harvey Mudd College, Claremont, CA — Oct. 2014
22. HMC Scientific Computing: Advanced MATLAB
Harvey Mudd College, Claremont, CA — Oct. 2014
23. HMC Scientific Computing: Essential MATLAB for Beginners
Harvey Mudd College, Claremont, CA — Oct. 2014