

Madeleine Weinstein

CONTACT INFORMATION	Department of Mathematics University of California Berkeley Berkeley, CA 94720	maddie@math.berkeley.edu https://math.berkeley.edu/~maddie/
RESEARCH INTERESTS	Applied algebraic geometry, real algebraic geometry, intersection theory, topological data analysis, distance optimization, geometry of data.	
EDUCATION	University of California Berkeley Ph.D. Candidate, Mathematics (expected May 2021) <ul style="list-style-type: none">• Thesis: <i>Metric Algebraic Geometry</i>. Advisor: Bernd Sturmfels Harvey Mudd College B.S. in Mathematics, May 2016 <ul style="list-style-type: none">• High Distinction and Honors in Mathematics• Thesis: <i>Adinkras and Arithmetical Graphs</i>. Advisor: Dagan Karp Budapest Semesters in Mathematics Fall 2014	
FELLOWSHIPS	AAAS IF/THEN Ambassador National Science Foundation Graduate Research Fellow UC Berkeley Chancellor's Fellow	2019 2016 2016
PAPERS	<i>Real Symmetric Matrices with Partitioned Eigenvalues</i> . Submitted. <i>Voronoi Cells in Metric Algebraic Geometry of Plane Curves</i> (with M. Brandt). Submitted. <i>96120: The Degree of the Linear Orbit of a Cubic Surface</i> (with L. Brustenga i Moncusí and S. Timme). <i>Le Matematiche</i> 75 (2020), 425-437. <i>The Bottleneck Degree of Algebraic Varieties</i> (with S. Di Rocco and D. Eklund). <i>SIAM J. Appl. Algebra Geometry</i> 4 (2020), 227-253. <i>Voronoi Cells of Varieties</i> (with D. Cifuentes, K. Ranestad, and B. Sturmfels). Published online in <i>Journal of Symbolic Computation</i> (2020). <i>Offset Hypersurfaces and Persistent Homology of Algebraic Varieties</i> (with E. Horobet). <i>Comput. Aided Geom. Design</i> 74 (2019), 101767. <i>Learning Algebraic Varieties from Samples</i> (with P. Breiding, S. Kališnik, and B. Sturmfels). <i>Revista Mathematica Complutense</i> 31 (2018), 545-593. <i>Invariance of the Sprague-Grundy Function for Variants of Wythoff's Game</i> . <i>Integers</i> 16 (2016). <i>Gaussian Distribution of the Number of Summands in Generalized Zeckendorf Decompositions in Small Intervals</i> (with A. Best, P. Dynes, X. Edelsbrunner, S.J. Miller, B. McDonald, and C. Turnage-Butterbaugh). <i>Integers</i> 16 (2016).	

Gaussian Behavior of the Number of Summands in Zeckendorf Decompositions in Small Intervals (with A. Best, P. Dynes, X. Edelsbrunner, S.J. Miller, B. McDonald, and C. Turnage-Butterbaugh), *Fibonacci Quarterly* **52** (2014), 35-46.

Benford Behavior of Zeckendorf Decompositions (with A. Best, P. Dynes, X. Edelsbrunner, S.J. Miller, B. McDonald, and C. Turnage-Butterbaugh), *Fibonacci Quarterly* **52** (2014), 47-53.

Geometric-Progression-Free Sets over Quadratic Number Fields (with A. Best, K. Huan, N. McNew, S.J. Miller, J. Powell, and K. Tor), *Proceedings of the Royal Society of Edinburgh, Section A: Mathematics* **147** (2017), 242-262.

Benford Behavior of Generalized Zeckendorf Decompositions (with A. Best, P. Dynes, X. Edelsbrunner, S.J. Miller, B. McDonald, and C. Turnage-Butterbaugh), *Combinatorial and Additive Number Theory II: CANT*, New York, NY, 2015 and 2016, Springer, New York, 2017.

Ramsey Theory Problems over the Integers: Avoiding Generalized Progressions (with A. Best, K. Huan, N. McNew, S.J. Miller, J. Powell, and K. Tor), *Combinatorial and Additive Number Theory II: CANT*, New York, NY, 2015 and 2016, Springer, New York, 2017.

HONORS AND AWARDS

<i>UC Berkeley Outstanding Student Leadership Award, Nominee</i>	2019
• Nominated for award recognizing leadership that impacts community	
<i>NSF We Are Mathematics Video Contest, Honorable Mention</i>	2019
• Received Honorable Mention for MatheMaddies' Ice Cream Map in competition for videos to showcase math research in a way that is exciting and accessible to a broad audience	
<i>NSF Graduate Research Fellowship</i>	2016
• Awarded \$102,000 to support three years of graduate study	
<i>UC Berkeley Chancellor's Fellowship</i>	2016
• Awarded \$60,000 to support two years of graduate study	
<i>Greever Mathematical Research Prize</i>	2015
• Awarded by Harvey Mudd College for an original contribution to mathematics for paper <i>Invariance of the Sprague-Grundy Function for Variants of Wythoff's Game</i>	
<i>Alice T. Schafer Prize, Honorable Mention</i>	2015
• Awarded by the Association for Women in Mathematics to an outstanding undergraduate female mathematician	
<i>Giovanni Borrelli Mathematics Prize</i>	2015
• Awarded by Harvey Mudd College to two seniors	
<i>Goldwater Scholarship, Honorable Mention</i>	2015
<i>Outstanding Presentation Award, Joint Mathematics Meeting</i>	2014
<i>Robert James Prize</i>	2013
• Awarded by Harvey Mudd College to three sophomores	
<i>National Merit Scholarship</i>	2012-2016
<i>Harvey S. Mudd Merit Award</i>	2012-2016

PRESENTATIONS	<i>Stanford Algebraic Geometry Seminar</i> , Stanford, CA	2019
	• Invited Talk: Metric Algebraic Geometry	
	<i>Commutative Algebra and Algebraic Geometry Seminar</i> , Berkeley, CA	2019
	• Talk: Metric Algebraic Geometry	
	<i>Western Algebraic Geometry Symposium</i> , Salt Lake City, UT	2019
	• Poster: Voronoi Cells in Metric Algebraic Geometry of Plane Curves	
	<i>Varieties, Polyhedra, Computation</i> , Berlin, Germany	2019
	• Poster: Voronoi Cells in Metric Algebraic Geometry of Plane Curves	
	<i>AMS Sectional</i> , Madison, WI	2019
	• Invited Talk: Voronoi Cells in Metric Algebraic Geometry of Plane Curves	
	<i>Intersection Theory Seminar</i> , Leipzig, Germany	2019
	• Talk: Fano Schemes	
	<i>SIAM Conference on Applied Algebraic Geometry</i> , Bern, Switzerland	2019
	• Invited Talk: Voronoi Cells of Varieties	
	<i>Trieste Algebraic Geometry Summer School</i> , Trieste, Italy	2019
	• Talk: Voronoi Cells of Varieties	
	• Course Assistant: Algebraic Geometry of Data Clouds	
	<i>Invitation to Nonlinear Algebra Course</i> , Leipzig, Germany	2019
	• Talk: Representation Theory	
	<i>MEGA: Effective Methods in Algebraic Geometry</i> , Madrid, Spain	2019
	• Talk: Voronoi Cells of Varieties	
	<i>ASGARD Math</i> , Oslo, Norway	2019
	• Talk: Voronoi Cells of Varieties	
	<i>Applied Invariant Theory Seminar</i> , Berkeley, CA	2019
	• Talk: The Reach of an Algebraic Variety	
	<i>Nonlinear Algebra Seminar</i> , Berkeley, CA	2019
	• Talk: Voronoi Cells of Varieties	
	<i>Connections for Women: Derived Algebraic Geometry, Birational Geometry and Moduli Spaces</i> , Berkeley, CA	2019
	• Poster: Voronoi Cells of Varieties	
	<i>Real Algebraic Geometry and Optimization at ICERM</i> , Providence, RI	2018
	• Poster: Offset Hypersurfaces and Persistent Homology of Algebraic Varieties	
	<i>Applied Algebra and Topology Seminar</i> , Oxford, England	2018
	• Talk: Offset Hypersurfaces and Persistent Homology of Algebraic Varieties	
	<i>IAS Women and Mathematics</i> , Princeton, NJ	2018
	• Talk: Gender Equity in Mathematical Studies	
	<i>Linking Topology to Algebraic Geometry and Statistics</i> , Leipzig, Germany	2018
	• Poster: Algebraicity of Persistent Homology	
	<i>Nonlinear Algebra Seminar</i> , Leipzig, Germany	2018
	• Talk: Offset Hypersurfaces and Persistent Homology of Algebraic Varieties	
	<i>Commutative Algebra and Algebraic Geometry Seminar</i> , Berkeley, CA	2017
	• Talk: Symbolic Powers and the Zariski-Nagata Theorem	

TEACHING	<i>Graduate Student Instructor for Precalculus, UC Berkeley</i>	2020
	<i>Course Consultant for Nonlinear Algebra, UC Berkeley</i>	2020
	<ul style="list-style-type: none"> • Advised students on their term papers 	
	<i>Volunteer Teacher, Willard Middle School</i>	2016-2019
	<ul style="list-style-type: none"> • Developed curriculum in alignment with Common Core standards to meet needs of students who struggled in previous math courses • Taught after-school credit recovery course to 8th grade students • Established program to bring other mathematics students from UC Berkeley to volunteer at Willard Middle School 	
	<i>Teaching Assistant, Bridge to Enter Advanced Mathematics</i>	2016
<ul style="list-style-type: none"> • Assisted teacher in Mathematical Logic course at summer camp for talented middle school students from underserved communities • Led homework sessions and encouraged development of students' skills at solving difficult math problems 		
	<i>Grader and Tutor, Harvey Mudd College</i>	2013-2014
MENTORING	<i>Fab Fems</i>	2020-Present
	<ul style="list-style-type: none"> • Meeting virtually with students who request mentoring 	
	<i>AAAS IF/THEN Ambassador</i>	2019-Present
	<ul style="list-style-type: none"> • Serving as a high-profile STEM role model for middle school girls • Partnering with GoldieBlox to produce video about my work for the 600,000+ subscribers of their YouTube channel • Reached approximately 1000 K-12 students as a virtual guest speaker through Nepris platform • Created and delivered fun math activities to kids at AAAS Family Science Days 	
	<i>National Museum of Mathematics</i>	2020
	<ul style="list-style-type: none"> • Served as invited panelist for virtual program <i>The Limit Does Not Exist</i> 	
	<i>Julia Robinson Math Festival</i>	2019
	<ul style="list-style-type: none"> • Ran activity at math conference for K-12 students 	
	<i>Expanding Your Horizons</i>	2019
	<ul style="list-style-type: none"> • Volunteered to support STEM conference for girls 	
	<i>Co-Founder and Co-Leader of Gender Equity in Mathematical Studies</i>	2017-2019
	<ul style="list-style-type: none"> • Organized reading groups to discuss equity and diversity in STEM • Planned social events to bring together communities of graduate and undergraduate students in math • Facilitated events to help undergraduates prepare for graduate school • Created volunteer opportunities for other students 	
<i>IAS Women and Mathematics Ambassador</i>	2017-2018	
<ul style="list-style-type: none"> • Awarded \$1500 to found and run Gender Equity in Mathematical Studies organization for UC Berkeley graduate and undergraduate students with Madeline Brandt • Organized multi-semester reading group discussing equity and diversity in STEM • Organized group of students to volunteer weekly throughout the year in math classrooms at Willard Middle School • Organized events to help undergraduates prepare for the GRE Math Subject Test • Organized social events to bring together communities of graduate and undergraduate students in math 		

UC Berkeley Women in Math Graduate School Panel 2016

- Served as volunteer panelist to discuss graduate application process with undergraduate women

Littlebrook Science Expo 2016

- Taught lesson on Möbius Valentine to encourage elementary school students' interest in math

REFEREEING

Algebraic Statistics

Experimental Mathematics