Melissa L. Zhang   Curriculum Vitae

CONTACT INFORMATION	Department of Mathematics UC Davis One Shields Ave. Davis, CA 95616-8633 U.S.A.	1-732-688-5826 (cell) mlzhang@ucdavis.edu https://www.melissa-zhang.com Citizenship: USA

RESEARCH INTERESTS

low-dimensional topology
Khovanov and Floer homologies
equivariant cohomology and localization
Khovanov stable homotopy type
smooth, Legendrian, and transverse knot invariants
categorification and quantum invariants

EMPLOYMENT

UNIVERSITY OF CALIFORNIA, DAVIS

Krener Assistant Professor, 2023 – present

SIMONS LAUFER MATHEMATICAL SCIENCES INSTITUTE (FORMERLY MSRI)

Viterbi Endowed Postdoctoral Fellow
Floer Homotopy Theory semester program, Fall 2022

UNIVERSITY OF GEORGIA

Limited-Term Assistant Professor, Fall 2019–Spring 2022

EDUCATION

BOSTON COLLEGE

Ph.D., Mathematics, May 2019
Advisors: J. Elisenda Grigsby, David Treumann

COLUMBIA UNIVERSITY

Visiting Ph.D. Scholar, 2018–19 academic year

CALIFORNIA INSTITUTE OF TECHNOLOGY

B.S. in Mathematics with honors, June 2014

AWARDS, RESEARCH AND COLLABORATION GRANTS

Craig A. Tracy Research Prize, annual award for postdocs or Krener Assistant Professors in the UC Davis math department, June 2023.

Collaborate@ICERM, Summer 2022.

AIM Structured Quartet Research Ensembles (SQuaREs), 2021–2023. (Moved to 2022–2024 due to pandemic.)

MSRI Summer Research for Women in Mathematics (SWiM), Summer 2020. (Moved to Summer 2021 due to pandemic.)

Donald J. White Teaching Excellence Award for Graduate Teaching, Boston College, May 2018.

PUBLICATIONS / PREPRINTS	"Kirby belts, categorified projectors, and the skein lasagna module of $S^2 \times S^2$," with Ian Sullivan, arXiv:2402.01081.

PUBLICATIONS / PREPRINTS

"Kirby belts, categorified projectors, and the skein lasagna module of $S^2 \times S^2$," with Ian Sullivan, arXiv:2402.01081.

"Khovanov homology and the Involutive Heegaard Floer homology of branched double covers," with Akram Alishahi and Linh Truong, *In Revision*, arXiv:2305.07172.

"On Equivariant Khovanov homology," with Rostislav Akhmechet, *Submitted*, arXiv:2210.1073.

"On Khovanov homology and related invariants," with Carmen Caprau, Nicolle González, Christine Ruey Shan Lee, Adam M. Lowrance, and Radmila Sazdanović, *Research directions in symplectic and contact geometry and topology*, 273–292, Assoc. Women Math. Ser., 27, Springer, Cham, [2021], ©2021.

"Annular link invariants from the Sarkar-Seed-Szabó spectral sequence," with Linh Truong, *Michigan Math. J.* Advance Publication 1-39 (2021). DOI: 10.1307/mmj/20205862.

"Localization in Khovanov homology," with Matthew Stoffegen, *Geometry & Topology (to appear)*, arXiv:1810.04769.

"A rank inequality for the annular Khovanov homology of 2-periodic links," *Algebraic & Geometric Topology* 18-2 (2018), 1147–1194. DOI 10.2140/agt.2018.18.1147.

WORKSHOP LECTURE SERIES

Lecture series on annular Khovanov homology, Workshop on "Perspectives on link homology theories"; Regensburg, Germany, August 2021.

INVITED TALKS

(*Upcoming*) 2024 Trisectors Workshop: Connections with Knotted Surfaces; University of Nebraska-Lincoln; June 2024.

(*Upcoming*) Geometry/Topology/Dynamics Seminar; Boston College, April 2024.

Geometry & Topology Seminar; Caltech, January 2024.

Joint Mathematics Meetings, Algebraic Structures in Knot Theory; San Franscisco, CA, January 2024.

Joint Mathematics Meetings, AMS-AWM Special Session on Women and Gender Minorities in Symplectic and Contact Geometry and Topology, IV; San Franscisco, CA, January 2024.

Geometry/Topology Seminar; UC Davis, May 2023.

AMS Special Session on Algebraic Structures in Knot Theory; AMS Spring Western Sectional Meeting, Fresno, CA, May 2023.

68th Cascade Topology Seminar; UBC Vancouver, Canada, April 2023.

AMS Special Session on Combinatorial and Geometric Knot Theory; AMS Spring Central Sectional Meeting, Cincinnati, OH, April 2023.

Topology Seminar; University of California, Berkeley, April 2023.

Department of Mathematics Colloquium Series: Celebrating Women's History Month; California State University, Fresno, CA, March 2023.

South Central Topology Conference II; Texas State University; San Marcos, TX, February 2023.

Oberwolfach workshop: Morphisms in Low Dimensions; Mathematisches Forschungsinstitut Oberwolfach; Oberwolfach, Germany, January 2023.

Floer Homotopical Methods in Low Dimensional and Symplectic Topology; MSRI/SLMath, Berkeley, CA, November 2022.

CMO Workshop: Using Quantum Invariants to do Interesting Topology; Banff International Research Station for Mathematical Innovation and Discovery (BIRS) / Casa Matemática Oaxaca (CMO), October 2022.

AMS Special Session: Heegaard Floer homology in topology, algebra, and physics; AMS Fall 2022 Western Sectional Meeting, University of Utah, October 2022.

Connections Workshop: Floer Homotopy Theory; MSRI/SLMath, Berkeley, CA, September 2022.

Chico Math Colloquium; California State University, Chico, September 2022.

Georgia Topology Conference 2022; University of Georgia, May 2022.

Joint Mathematics Meetings, AWM Special Session on Women and Gender Minorities in Symplectic and Contact Geometry and Topology, III; Seattle, WA (virtual), April 2022.

AMS Special Session: Low-dimensional topology; AMS 2022 Spring Central Sectional Meeting, Purdue University (virtual), March 2022.

UGA Topology Seminar; University of Georgia, January 2022.

AMS Special Session: Recent Advances in Low-dimensional Topology; Low Dimensional Symplectic and Contact Topology, Their Invariants and Interactions; AMS 2021 Fall Southeastern Sectional Meeting, November 2021.

CKVK* Online Seminar; The Ohio State University, November 2021.

Geometry and Topology Seminar; Syracuse University, November 2021.

ICERM Workshop: Foam Evaluation; Institute for Computational and Experimental Research in Mathematics, November 2021.

NCSU Topology Seminar; North Carolina State University, September 2021.

MCA Special Session: Categorification, Higher Representation Theory, and Homological Knot Invariants; Mathematical Congress of the Americas 2021, July 2021.

Recent techniques in Floer and Khovanov homology; The Nearly Carbon Neutral

Geometric Topology Conference (NCNGT) 2021, June 2021.

BIRS Workshop: Perspectives on Knot Homology; Banff International Research Station, May 2021.

Algebra and Discrete Math Seminar; UC Davis, February 2021.

AMS Special Session: Low Dimensional Topology; Joint Math Meetings 2021, January 2021.

Virtual Symplectic Seminar; Online, May 2021.

ICERM Workshop: Soergel Bimodules and Categorification of the Braid Group; Institute for Computational and Experimental Research in Mathematics, February 2020.

Georgia Tech Geometry & Topology Seminar, Georgia Institute of Technology, January 2020.

UIowa Topology Seminar, University of Iowa, October 2019.

AMS Sectional Meeting, Special Session on Floer Homology in Dimensions 3 and 4, University of Wisconsin, Madison, September 2019.

Floer Homotopy 2019, University of Oregon, August 2019.

ICERM Workshop: Women in Contact and Symplectic Geometry and Low-Dimensional Topology Workshop, Institute for Computational and Experimental Research in Mathematics; July 2019.

Park City Mathematics Institute (IAS) Research Program short talk, July 2019.

AMS Sectional Meeting, Special Session on Invariants of knots, links, and low-dimensional manifolds, University of Connecticut Hartford, April 2019.

AWM Symposium 2019, Special Session on the topology of 3- and 4-manifolds; Rice University; April 2019.

MSU Topology Seminar, Michigan State University, February 2019.

Columbia Symplectic Geometry, Gauge Theory, and Categorification Seminar; Columbia University; September 2018.

Topology et. al. Seminar, Wesleyan University, April 2018.

AMS Graduate Student Conference in Geometry and Topology, Brown University, April 2018.

Triangle Topology Seminar, Duke University (joint with NCSU, UNC), April 2018.

MIT Geometry and Topology Seminar, MIT, March 2018.

Joint Mathematics Meetings, AMS special session on Quantum link invariants, Khovanov homology, and low-dimensional manifolds; San Diego, CA; January 2018.

Knots in Washington XLV, Distinguished Graduate Student Talk, GWU, December 2017.

Dartmouth Topology Seminar, Dartmouth College, October 2017.

Boston Graduate Topology Seminar, Harvard University, September 2017.

Boston College Geometry and Topology Seminar, Boston College, September 2017.

Teaching Experience	At University of California, Davis:	
Winter 2024	*(Graduate) Algebra* (MAT250B) *Modern Algebra* (MAT150A)	
Fall 2023	*Modern Algebra* (MAT150A) (2 sections)	
Spring 2023	*Applied Linear Algebra* (MAT167) *Special Topics: Knot Theory* (MAT180)	
Winter 2023	*Introduction to Abstract Mathematics* (MAT108)	
	At University of Georgia:	
Fall 2021	*Point-Set Topology*	
Spring 2021	*Elementary Differential Equations*	
Fall 2020	*Precalculus* (3 sections)	
Spring 2020, Spring 2022	*Calculus II for Science and Engineering Majors* (1 section, 2 sections, respectively)	
Fall 2019	*Calculus I for Science and Engineering Majors* (2 sections)	
	At Boston College:	
Spring 2017, Spring 2018	*Calculus II* Teaching Fellow (Instructor of record)	
Summer 2015, Fall 2017	*Finite probability and applications* Teaching Fellow (Instructor of record)	
Spring 2016	*Analysis II* Teaching Assistant	
Fall 2015, Fall 2016	*Calculus II* Teaching Assistant and discussion section leader	
Fall 2014, Spring 2015	*Calculus I* Teaching Assistant and discussion section leader	

PROFESSIONAL SERVICE	*Referee* for *Advances in Mathematics*, *Algebraic & Geometric Topology*, *Geometry & Topology*, *Proceedings of Gökova Geometry-Topology Conference*, *Quantum Topology*.

Faculty Sponsor for the UC Davis Association for Women in Mathematics (AWM) chapter, Fall 2023 – present.

Summer research mentor for **Naomi Ladenburg**, UC Davis mathematics undergraduate (graduated Spring 2023), on a project related to ribbon knots and symmetric unions, Summer 2023.

Summer research mentor for UC Davis undergraduates **Eli Lenett, Mani Ebrahimi Mojaveri, and Runze Lu**, on a project related to Heegaard diagrams and freely periodic links, Summer 2023.

Coffee with a Prof, invited professor for 1-hour discussion, UC Davis, Spring 2023.

UC Davis Math Club + AWM Chapter Lecture Series, speaker for two-talk series, UC Davis, Spring 2023.

Homotopy types in low-dimensional topology learning seminar at SLMath, organizer, Fall 2022.

5-minute introductions organizer for SLMath's Fall 2022 Floer Homotopy Theory and Analytic and Geometric Aspects of Gauge Theory semester programs. Fall 2022.

Panelist on the UGA CAMS and AWM's *Navigating Graduate School Workshop*. March 2022.

"Knots and Algebra" REU (research experience for undergraduates) co-mentor, with Akram Alishahi. Students: **Mary Breen, Daniel Bustamante, Alex Eldridge, and Ulfa Aulyah Idrus**. Summer 2021.

2021 Georgia Topology Conference at UGA, co-organizer, June 2021.

AMS Special Session on *Algebraic and geometric perspectives on low-dimensional topology*, JMM 2021 in Washington, DC. Co-organizer with Christine Ruey-Shan Lee.

Academic champion for local middle-school student, through the East Athens Development Corporation. Weekly meetings from Summer 2020 – Summer 2021.

Directed reading course for UGA graduate student Terrin Warren, Fall 2019 and Spring 2020.

Learning Seminar on Categorification, online seminar, Summer 2020 – Summer 2021. Co-organizer with Ben Elias, Nicolle González, and Mikhail Khovanov.

AMS-AWM Special Session on *Women in Symplectic and Contact Geometry*, JMM 2020 in Denver, CO. Co-organizer with Catherine Cannizzo and Morgan Weiler.

UGA / Georgia Tech Joint Topology Seminar. Fall 2019–Spring 2020. Co-organizer with Caitlin Leverson, JungHwan Park, and Kyle Larson.

UGA Topology Seminar co-organizer. Fall 2019–present.

Localization in Floer Theories Seminar, Columbia University, Fall 2018. Organizer.

Kashiwara-Schapira Seminar, Massachusetts Institute of Technology, Summer 2017. Co-organizer with Kevin Sackel.

Camp Euclid research mentor, Euclid Lab, Summer 2017.

Women in Math and Statistics Conference, Harvard University, April 2017. Panelist on Careers in Math Panel.

Summer research mentor, for John Baldwin's summer research students **Champ Davis and Chris Ratigan**, on a project related to transverse knots and grid diagrams, Boston College, Summer 2016.

Simple Persons Assembly on Complex Examples (example-driven learning seminar), Boston College, Spring 2016. Organizer.

Updated February 2024.