

Sam K Miller | Curriculum Vitae

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Research Interests

- Modular representation theory of finite groups.
- Invertible objects such as endotrivial modules and complexes.
- Intersections of modular representation theory and tensor-triangulated geometry.
- Biset functors and applications.
- Galois descent of representations.

Education

University of California Santa Cruz <i>Doctorate of Philosophy in Mathematics</i> Advisor: Robert Boltje	Santa Cruz, CA 2019–2025
Harvey Mudd College <i>Bachelor Degree in Mathematics</i> Concentration in Political Science	Claremont, CA 2013–2017

Research

In Preparation

Twistier cohomology for permutation modules	tbd
The Euler characteristic of an endotrivial complex <i>w/ N. Mazza</i>	tbd

Publications and Preprints

On endosplit p-permutation resolutions and Broué's conjecture for p-solvable groups	2024
<i>Submitted</i> arXiv:2408.04094	
Galois descent of splendid Rickard equivalences between blocks of p-nilpotent groups	2024
<i>To appear, Proc. Amer. Math. Soc.</i> arXiv:2405.16061	
The classification of endotrivial complexes	2024
<i>Submitted</i> arXiv:2403.04088	
Relative endotrivial complexes	2024
<i>J. Pure Appl. Algebra, 229(2), (2025).</i> arXiv:2402.08042	
Brauer pairs for splendid Rickard equivalences	2023
<i>Submitted, w/ J. Breland</i> arXiv:2312.10258	
Endotrivial complexes	2024
<i>J. Algebra, 650, 173-218 (2024).</i> arXiv:2309.12138	
A proof of the optimal leapfrogging conjecture	2023
<i>Involve, 18(1), 105–122 (2025), w/ A. T. Benjamin</i> arXiv:2110.08319	
Challenging knight's tours	2018
<i>Math Horizons, 25(3), 18-21 (2018), w/ A. T. Benjamin</i>	

Theses

Permutation Modules, Invertible Complexes, and Local-to-Global Representation Theory 2025

Ph.D. Dissertation

Advisor: Robert Boltje

The combinatorial polynomial Hirsch conjecture 2017

Undergraduate Senior Thesis

Advisor: Mohamed Omar

Fellowships and Awards

UCSC Dissertation Year Fellowship September 2024-June 2025

(Around 10 full-length fellowships are awarded each year, 2 per division)

Harvey Mudd College Dean's List 2014-2017

Putnam: Top 500 Scorers 2014,2015

ICTM State Math Contest: 1st Place Individual (Senior Division) 2013

USCF SuperNationals: 1st Place (U1200 Division) 2013

Talks

AMS Eastern Sectional Special Session April 2025

University of Washington Algebra Seminar January 2025

University of Copenhagen Algebra and Topology Seminar December 2024

UC Berkeley Representation Theory and Tensor Categories Seminar November 2024

AMS Western Sectional Special Session October 2024

UCSC Algebra and Number Theory Seminar October 2024

UCSC Mathematics Graduate Student Colloquium October 2024

AMS Southeast Sectional Special Session October 2024

Group Actions, Groups, and Geometry July 2024

Groups and Algebras in Biccoca for Young Algebraists June 2024

RPTU Kaiserslautern-Landau Algebra Seminar June 2024

Representation Theory and Related Geometry May 2024

UCLA Algebra Seminar May 2024

UCSC Algebra and Number Theory Seminar May 2024

AMS Western Sectional Special Session May 2024

University of San Francisco Math Colloquium April 2024

University of Arizona Algebra Seminar January 2024

JMM 2024 Contributed Paper Session January 2024

University of Bilkent Algebra Seminar November 2023

University of Georgia Algebra Seminar November 2023

UCSC Mathematics Graduate Student Colloquium October 2023

DKO Workshop: Algebra and Number Theory in Conversation September 2023

Topics in Representation Theory: Biset Functors June 2023

AMS Western Sectional, Special Session May 2023

JMM 2023 Contributed Paper Session January 2023

UCSC Mathematics Graduate Student Colloquium November 2022

Society of Women Engineers, UCSC Chapter: Science on Tap October 2022

UCSC Postdoc Symposium Poster Session May 2022

UCSC Mathematics Graduate Student Colloquium	May 2022
UCSC Graduate Symposium	April 2022
UCSC Mathematics Graduate Student Colloquium	February 2021
MAA MathFest Contributed Paper Session	August 2018
Harvey Mudd Senior Thesis Day	May 2017
MAA SoCal/NV Sectional, Poster Session	April 2017

Teaching

Instructor of Record

Math 116: Combinatorics	Spring 2024
Math 110: Introduction to Number Theory	Winter 2024
Math 101: Problem Solving Strategies	Fall 2023
Math 134: Cryptography	Summer 2023
Math 110: Introduction to Number Theory	Summer 2022
Math 100: Introduction to Proof and Problem Solving	Summer 2021
Math 107: Introduction to Partial Differential Equations	Spring 2021

Teaching Assistant

Math 21: Linear Algebra	Spring 2023
Math 152: Programming for Mathematics	Winter 2023
Math 117: Advanced Linear Algebra	Fall 2022
Math 140: Industrial Mathematics	Spring 2022
Math 152: Programming for Mathematics	Winter 2022
Math 23A: Vector Calculus	Fall 2021
Math 21: Linear Algebra	Winter 2021
Math 21: Linear Algebra	Fall 2020
Math 22: Introduction to Calculus of Several Variables	Summer 2020
Math 148: Numerical Analysis	Spring 2020
Math 19B: Calculus for Science, Engineering, and Mathematics II	Winter 2020
Math 19A: Calculus for Science, Engineering, and Mathematics I	Fall 2019

Work Experience

University of California Santa Cruz <i>Graduate Student Instructor</i> Instructor of record for undergraduate courses.	Santa Cruz, CA 2021-Present
University of California Santa Cruz <i>Teaching Assistant</i> Teaching assistant for undergraduate courses.	Santa Cruz, CA 2019-Present
SupplyFrame <i>Platform Engineer</i> Software engineer, worked primarily with big data and neural networks.	Pasadena, CA 2017-2019
Harvey Mudd College <i>Grutor</i> Graded and tutored undergraduate courses in mathematics and computer science.	Claremont, CA 2014-2017
Camp Widjiwagan <i>Trail Staff</i> Led week-long outdoor canoeing trips for middle- and high-school aged kids.	Ely, MN 2014-2015

Organization and Activities

Organization

UCSC Mathematics Graduate Student Colloquium: Organizer	<i>September 2022-September 2024</i>
UCSC Graduate Student Committee: Electoral Board	<i>March 2022-December 2022</i>
UCSC Mathematics Department Social Committee: Organizer	<i>September 2021-May 2022</i>

Reading Groups

Organizer: Blocks of Cyclic Defect (BloCD)	<i>January 2024</i>
Organizer: Etingof, Gelaki, Nikshych, Ostrik, Tensor Categories	<i>January 2025 - Present</i>
Aschbacher, Kessar, & Oliver, Fusion Systems in Algebra & Topology	<i>September 2021-March 2022</i>
Bouc, Biset Functors for Finite Groups	<i>September 2021-May 2022</i>
Linckelmann, The Block Theory of Finite Group Algebras	<i>June 2021-December 2021</i>
Organizer: Guillot, A Gentle Course in Local Class Field Theory	<i>January 2021-August 2021</i>
Organizer: Riehl, Category Theory in Context	<i>June 2020-September 2020</i>

Mentorship

UCSC Directed Reading Program: Mentor	<i>September 2024-Present</i>
UCSC Peer Mentorship Program: Mentor	<i>September 2023-Present</i>
UCSC Peer Mentorship Program: Mentor	<i>September 2021-May 2022</i>
UCSC Directed Reading Program: Mentor	<i>September 2021-December 2021</i>