

Sam Kim Miller

Curriculum Vitae

Department of Mathematics

University of Georgia

<https://www.samkmiller.com>

✉ sam.miller@uga.edu

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Mathematics Employment and Education

- 2025–Present **Limited-Term Assistant Professor**, *University of Georgia*
Mentors: Nate Harman, Dan Nakano
- 2019–2025 **Ph.D. in Mathematics**, *University of California, Santa Cruz*
Advisor: Robert Boltje
- 2013–2017 **B.S. in Mathematics**, *Harvey Mudd College*
Advisors: Arthur Benjamin, Mohamed Omar

Grants, Honors, and Awards

- 2025, 2026 US Junior Oberwolfach Fellow
- 2025 UCSC Department of Mathematics (Inaugural) Outstanding Research Award
- 2025–Present Sigma Xi Full Membership
- 2025–2027 AMS-Simons Travel Grant
- 2024–2025 UCSC Chancellor's Dissertation Fellowship, Full-Year
- 2014–2016 Putnam Top 500 Finishers
- 2013 ICTM State Math Contest Individual Winner
- 2013 USCF SuperNationals: 1st Place (U1200 Division)

Research

Interests:

Representation theory, tensor-triangular geometry, permutation modules, finite(ish) groups

In preparation and ongoing projects

The tensor triangular geometry of some Delannoy categories, with Nate Harman

The noncommutative tensor triangular geometry of group algebras, with Kent Vashaw

Permutation twisted cohomology, continued, with Juan Omar Gómez

Local Picard groups for permutation modules

Periodicity and the stable permutation category, with Martin Gallauer

Papers and preprints

1. **Challenging knight's tours**, with Arthur T. Benjamin (undergraduate research)
Math Horizons, 25 (3), 18-21 (2018)

2. **A proof of the optimal leapfrogging conjecture**, *with Arthur T. Benjamin (undergraduate research)*
Involve, 18 (1), 105–122 (2025), arXiv:2110.08319
 3. **Endotrivial complexes**
J. Algebra, 650, 173–218 (2024), arXiv:2309.12138
 4. **Brauer pairs for splendid Rickard equivalences**, *with Jady V. Breland*
J. Algebra, 691, 694–729 (2026), arXiv:2312.10258
 5. **Relatively endotrivial complexes**
J. Pure Appl. Algebra, 229 (2), 107867 (2025), arXiv:2402.08042
 6. **The classification of endotrivial complexes**
Adv. Math. 478, 110414 (2025), arXiv:2403.04088
 7. **Galois descent of splendid Rickard equivalences between blocks of p -nilpotent groups**
Proc. Amer. Math. Soc. 153 (5), 1893–1902 (2025), arXiv:2405.16061
 8. **On endosplit p -permutation resolutions and Broué’s conjecture for p -solvable groups**
Represent. Theory 30, 151–174 (2026), arXiv:2408.04094
 9. **On functoriality and the tensor product property in noncommutative tensor-triangular geometry**
Undergoing revisions at Indiana Univ. Math. J., arXiv:2505.01899
 10. **The Euler characteristic of an endotrivial complex**, *with Nadia Mazza*
J. Pure Appl. Algebra, 230 (10, Special Section in honor of Daniel K. Nakano’s 60th birthday), 108345 (2026), arXiv:2508.07404
 11. **Permutation twisted cohomology, remixed**
Undergoing revisions at J. Eur. Math. Soc., arXiv:2509.00954
 12. **Re-framing the classification of ideals in noncommutative tensor-triangular geometry**, *with Timothy De Deyn*
Undergoing revisions at Adv. Math., arXiv:2510.23767
 13. **A semisimple subcategory of Khovanov’s Heisenberg category**
Submitted to Math. Z., arXiv:2512.13968
 14. **The classification of integral endotrivial complexes**, *with Juan Omar Gómez*
Submitted to J. Amer. Math. Soc., arXiv:2605.31128
 15. **The fusion-stable tom Dieck homomorphism**
Submitted to Bull. London Math. Soc., arXiv:2608.12499
 16. **Non-orientable representation spheres**
To appear on arXiv
 17. **The tensor-triangular geometry of some Delannoy categories**, *with Nate Harman*
To appear on arXiv
- [Proceedings](#)
1. **Endotrivial complexes and remixed twisted cohomology**
Oberwolfach Reports 23 (1), 2026

Theses

B.S. **The polynomial combinatorial Hirsch conjecture**

Advisor: Mohamed Omar

Ph.D. **Permutation modules and endotrivial complexes**

Advisor: Robert Boltje

Talks

Expository and Outreach

- Apr 2024 University of San Francisco Math Colloquium
- Oct 2022 Science on Tap hosted by Society of Women Engineers, UC Santa Cruz chapter
- Feb 2021 University of California, Santa Cruz Mathematics Graduate Student Seminar

Research

- Nov 2026 AMS Western Sectional Special Session
- Jun 2026 University of Warwick Algebra Seminar (cancelled due to illness)
- Jun 2026 Aarhus University Algebra Seminar
- May 2026 University of Bielefeld BIREP Oberseminar
- May 2026 UC Irvine Algebra Seminar
- May 2026 UC San Diego Algebra Seminar
- Mar 2026 AMS Southeastern Sectional Special Session
- Feb 2026 Oberwolfach Workshop 2609: Cohomology of Finite Groups
- Dec 2025 Spectrums in Representation Theory of Algebras and Related Topics
- Nov 2025 UCLA Algebra Seminar
- Oct 2025 University of California, Santa Cruz Algebra and Number Theory Seminar
- Sep 2025 UGA Algebra Seminar (x2)
- Aug 2025 AMS Western Sectional Special Session
- Aug 2025 UGA Graduate Student Seminar
- May 2025 New Directions in Group Theory and Triangulated Categories
- Apr 2025 AMS Spring Northeastern Sectional Special Session
- Jan 2025 University of Washington Algebra Seminar
- Dec 2024 University of Copenhagen Topology Seminar
- Nov 2024 University of California, Berkeley Representation Theory and Tensor Categories Seminar
- Nov 2024 University of California, Santa Cruz Algebra and Number Theory Seminar
- Oct 2024 AMS Western Sectional Special Session
- Oct 2024 University of California, Santa Cruz Mathematics Graduate Student Seminar
- Oct 2024 AMS Southeastern Sectional Special Session
- Jul 2024 Group Actions, Groups, and Geometry
- Jun 2024 Groups and Algebras in Bicocca for Young Algebraists 2024
- Jun 2024 RPTU Kaiserslautern-Landau Algebra Seminar

Jun 2024 Groups and their Actions: Algebraic, Geometric, and Combinatorial Aspects
 May 2024 Representation Theory and Related Geometry: Progress and Prospects (Nakano 60)
 May 2024 UCLA Algebra Seminar
 May 2024 University of California, Santa Cruz Algebra and Number Theory Seminar
 May 2024 AMS Western Sectional Special Session
 Jan 2024 University of Arizona Algebra Seminar
 Jan 2024 Joint Mathematics Meetings Contributed Paper Session
 Dec 2023 University of Bilkent Algebra Seminar
 Nov 2023 University of Georgia Algebra Seminar
 Oct 2023 University of California, Santa Cruz Mathematics Graduate Student Seminar
 Sep 2023 Algebra and Number Theory in Conversation at Manchester
 May 2023 AMS Western Sectional Special Session
 Jan 2023 Joint Mathematics Meetings Contributed Paper Session
 Nov 2022 University of California, Santa Cruz Mathematics Graduate Student Seminar
 May 2022 University of California, Santa Cruz Postdoc Symposium
 May 2022 University of California, Santa Cruz Mathematics Graduate Student Seminar
 Apr 2022 University of California, Santa Cruz Graduate Student Symposium
 Aug 2018 MAA MathFest Contributed Session
 May 2017 Harvey Mudd Senior Thesis Day
 Apr 2017 MAA SoCal/NV Sectional Poster Session

Teaching

At UGA

Spring 2027 Topics in Algebra: Modular Representation Theory of Finite Groups
 Fall 2026 Calculus I (x2)
 Spring 2026 Precalculus (x2)
 Fall 2025 Precalculus (x2)

At UC Santa Cruz: Instructor of Record

Spring 2024 Combinatorics
 Winter 2024 Introduction to Number Theory
 Fall 2023 Problem Solving Strategies
 Summer 2023 Cryptography
 Summer 2022 Introduction to Number Theory
 Summer 2021 Introduction to Proof and Problem Solving
 Spring 2021 Introduction to Partial Differential Equations

At UC Santa Cruz: Teaching Assistant

Spring 2023 Linear Algebra
 Winter 2023 Programming for Mathematics
 Fall 2022 Advanced Linear Algebra

Spring 2022 Industrial Mathematics
 Winter 2022 Programming for Mathematics
 Fall 2021 Vector Calculus
 Winter 2021 Linear Algebra
 Fall 2020 Linear Algebra
 Summer 2020 Introduction to Calculus of Several Variables
 Spring 2020 Numerical Analysis
 Winter 2020 Calculus for Science, Engineering, and Mathematics II
 Fall 2019 Calculus for Science, Engineering, and Mathematics I

Organization and Service

Conferences

- 2026 **AMS Fall Southeast Sectional**, Organizer
 Special session on geometric and homological methods in representation theory
- 2026 **AMS Fall Western Sectional**, Organizer
 Special session on finite groups and representation theory

Organization

- 2025–Present **UGA Algebra Seminar**
 Organizer
- 2022–2024 **University of California, Santa Cruz Mathematics Graduate Student Seminar**
 Organizer
- 2022 **University of California, Santa Cruz Graduate Student Committee**
 Electoral Board Member
- 2021 **University of California, Santa Cruz Mathematics Department Social Committee**
 Organizer

Organized Reading Seminars

- 2025 Introduction to Soergel Bimodules
- 2025 Introduction to Tensor Categories
- 2024 Blocks of Cyclic Defect
- 2021 Local Class Field Theory
- 2020 Category Theory

Mentorship

- 2026 University of Georgia Directed Reading Program
- 2021–2025 University of California, Santa Cruz Peer Mentorship Program
- 2021, 2024 University of California, Santa Cruz Directed Reading Program

Refereeing and Reviewing

- Algebras and Representation Theory
- Communications in Algebra

EMS Press

Journal of the London Mathematical Society

Transactions of the American Mathematical Society

MathReviews reviewer

Other Employment

2017–2019 **SupplyFrame**, *Platform Engineer*

Software engineer, worked with big data, natural language processing, and machine learning

2014–2017 **Harvey Mudd College**, *Grutor*

Graded and tutored for various undergraduate courses in mathematics and computer science

2014–2015 **YMCA Camp Widjiwagan**

Led intense week-long canoeing trips for middle- and high-school aged children in the Boundary Waters Canoe Area Wilderness of Minnesota; emphasizing personal growth, self-confidence, and respect for self, nature, others, and equipment