Morgan P. Opie

mopie@math.ucla.edu

math.ucla.edu/∼opie

POSITIONS

2022 - 2025 National Science Foundation Mathematical Sciences Postdoctoral Research Fellow

University of California, Los Angeles, 06/2021 - present
Hedrick Assistant Adjunct Professor, mentored by Michael A. Hill.

> Research interests: topological and algebraic vector bundles; applications of homotopy theory to geometry, topology, and algebra; chromatic homotopy theory; motivic homotopy theory.

EDUCATION

Harvard University, 09/2015 - 05/2021
Ph.D. in Mathematics, supervised by Michael J. Hopkins.

University of Cambridge, 10/2014 - 06/2015
M.A.St., Part III of the Mathematical Tripos, Pure Mathematics.

University of Massachusetts Amherst, 09/2011 - 05/2014
B.S. in Mathematics, honors thesis supervised by Jenia Tevelev.

RESEARCH &
PUBLICATIONS

"Enumerating rank n vector bundles on $\mathbb{C}P^{n+1}$." arXiv:2410.23520. Submitted.

"Applications of higher real K-theory to enumeration of stably trivial vector bundles", with R. H. Chatham and Y. Hu. arXiv:2403.04733. Submitted.

"Rank-preserving additions for topological vector bundles, after a construction of Horrocks." arXiv:2302.06963. To appear in Alg. and Geometric Topology.

"A classification of complex rank 3 bundles on complex projective 5-space." arXiv:2301.04313. Advances in Mathematics, Vol. 455 (2024).

"Cofibration category of digraphs for path homology," with D. Carranza, B. Doherty, C. Kapulkin, M. Sarazola, and L. Z. Wong. arXiv:2212.12568. Algebraic Combinatorics, Vol. 7, No. 2 (2024).

"Compactly supported $\mathbb{A}^1$-Euler characteristic and the Hochschild complex," with N. Arcila-Maya, C. Bethea, K. Wickelgren and I. Zakharevich. arXiv:2003.09347. Topology and its Applications, Vol. 316 (2022).

"The trace of the $\mathbb{A}^1$-local degree," with T. Brazelton, R. Burklund, S. McKean, and M. Motoro. arXiv:1912.04788. Homology, Homotopy, and Applications, Vol. 23, No. 1 (2021).

"Localization in homotopy type theory," with J.D. Christensen, E. Rijke, and L. Scoccola. arXiv:1807.04155. Higher Structures, Vol. 4, No. 1 (2020).

"Extremal divisors on moduli spaces of rational curves with marked points." arXiv:1309.7229. Michigan Math. J., Vol. 65 (2016).

SELECTED HONORS	2021 - 2022 Liggett Instructor Award for teaching, UCLA
	2021 - 2023 AMS–Simons Travel Grant recipient
	2014 - 2019 National Science Foundation Graduate Research Fellow
	2014 - 2015 Churchill Scholar
	2014 Association for Women in Mathematics Alice T. Schafer Prize runner-up
	2013 University of Massachusetts Rising Researcher Award
	2013 Chang Transfer Award, UMass Amherst Dept. of Physics
	2012 Hasbrouck Award, UMass Amherst Dept. of Physics
OUTREACH & SERVICE	Ongoing: organizer for Conference for Early-Career Researchers in Homotopy Theory at the ICMS in Edinburgh (proposal approved for October 2025)
	Ongoing: organizer for JMM 2025 Special Session on Homotopy Theory
	2020 - present: moderator, Algebraic Topology Discord Server
	Fall 2023: scientific organizer for eCHT seminar on algebraic vector bundles
	Summer 2022, 2023, 2024: UCLA Summer Bridge program mini-course leader and mentor for students from California State University campuses
	Summer - fall 2023: mentor for online Workshop on (oo,2)-Categories
	Summer 2021: TA for Park City Mathematics Institute Undergraduate Program on quadratic forms
	Summer 2020 - 2022: moderator, the Algebraic Geometry Syndicate (discord)
	Fall 2017 - fall 2021: MIT Talbot Workshop organizer
	2020 - 2021: Harvard University Derek Bok Center Pedagogy Fellow
	September 2017 - January 2022: MIT Talbot Workshop organizer
	Spring 2020, spring 2021: Directed Reading Program mentor
	Fall 2015 - spring 2019: Harvard Womxn in Math Lunch organizer
TEACHING	Fall 2021 - present: Instructor at UCLA

- Math 115A, proof-based linear algebra (Fall 2021, Winter 2022, Fall 2023, Fall 2024)
- Math 115AH, proof-based honors linear algebra (Spring 2024)

Summer 2024: taught one-week course on the Borsuk–Ulam theorem for students from California State University Campuses

Summer 2023: taught one-week course on category theory for students from California State University Campuses

Summer 2022: taught one-week course on Riemann surfaces and basic algebraic geometry for students from California State University Campuses

2018 - 2019: Teaching Fellow, Harvard University

- Tutorial on categorical knot theory (summer 2019)

- Tutorial on category theory (summer 2018)

- Linear algebra (spring 2018)

- Course assistant, calculus and linear algebra (fall 2018)

Fall 2012 - spring 2014: Math teaching assistant, UMass Amherst

Fall 2009 - spring 2011: Peer tutor, Cape Cod Community College

SELECTED TALKS

November 2024 Joint Los Angeles Topology Seminar. "Classification of vector bundles on projective spaces."

October 2023 South Central Topology Conference. "Applications of higher real K-theory to enumeration of stably trivial vector bundles."

August 2023 K-theory, Algebraic Cycles, and Mathematical Physics conference at OSU. "Topological vector bundles on complex projective spaces."

June 2022 ALPE Seminar, Toulouse. "Rank 3 vector bundles on complex projective 5-space."

June 2022 Chromatic Homotopy and Friends conference, Mittag-Leffler Institute, Stockholm. "Chromatic invariants of vector bundles."

May 2020 K-theory and Related Topics conference. "A compactly supported $\mathbb{A}^1$-Euler characteristic via the Hochschild complex."

July 2019 European Talbot Workshop on Algebraic K-theory. "Continuity for K-theory and TC". Expository.

March 2019 Women in homotopy theory and algebraic geometry II, Freie University Bonn. "Localization in Homotopy Type Theory."

February 2014 Midwest Algebraic Geometry Graduate Conference, UIC. "Extremal divisors on moduli spaces of rational curves with marked points."