

Cary L. Malkiewich

Assistant Professor

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Citizenship: USA

Department of Mathematics

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Employment

Assistant Professor, Binghamton University (SUNY).

2017 – present

J. L. Doob Research Assistant Professor, UIUC.

2014 – 2017

Visiting Positions

Postdoctoral Fellow, Max Planck Institute for Mathematics, Bonn.

Jan 2018 – Dec 2018

Trimester Program *K-Theory and Related Fields*, Hausdorff Institute, Bonn.

Jul 2017

Junior Trimester Program *Topology*, Hausdorff Institute, Bonn.

Sept 2016

Visitor, University of Copenhagen.

Summer 2015

Education

Ph.D. in Mathematics, Stanford University. Advisor: Ralph L. Cohen.

2014

B.A. in Mathematics, Princeton University.

2009

Research Interests

Algebraic topology. Key words: homotopy theory, spectra, scissors congruence, algebraic K -theory, topological Hochschild homology (THH), Nielsen theory (fixed-point theory), h -cobordisms, high-dimensional manifolds, free loop spaces, duality and transfers.

Awards and Grants

NSF Award (DMS - 2052923): FRG: Collaborative Research: Trace Methods and Applications for Cut-and-Paste K -Theory

2021-2024

NSF Award (DMS - 2005524): Algebraic K -Theory in Fixed-Point Theory and Smooth Manifolds

2020-2023

NSF Award (DMS - 1612162): Young Topologists Meeting 2016

July 2016

AMS Simons Travel Grant

July 2015 – June 2017

Stanford University Centennial Teaching Assistant Award

June 2013

Papers and Preprints

On the functoriality of the space of equivariant smooth h -cobordisms.

(with Thomas Goodwillie, Kiyoshi Igusa, and Mona Merling.) [arxiv.org:2303.14892](https://arxiv.org/abs/2303.14892).

A Farrell-Jones Isomorphism for K -theory of Polyhedra.

(with Anna Marie Bohmann, Teena Gerhardt, Mona Merling, and Inna Zakharevich.) [arxiv.org:2303.08172](https://arxiv.org/abs/2303.08172).

- On the multiplicativity of the Euler characteristic.*
(with John Klein and Maxime Ramzi.) arxiv.org:2211.04992.
accepted, Proceedings of the American Mathematical Society.
- Scissors congruence K -theory is a Thom spectrum.* arxiv.org:2210.08082.
submitted.
- Coherence for bicategories, lax functors, and shadows.* (with Kate Ponto.) arxiv.org:2109.01249.
Theory and Applications of Categories 38 (2022), Paper No. 12, 328–373.
- K -theoretic torsion and the zeta function.* (with John Klein.) arxiv.org:2009.10120.
Annals of K-Theory 7 (2022), no. 1, 77–118.
- K -theory of endomorphisms, the TR -trace, and zeta functions.*
(with Jonathan Campbell, John Lind, Kate Ponto, and Inna Zakharevich.) arxiv.org:2005.04334.
submitted.
- The equivariant parametrized h -cobordism theorem, the non-manifold part.*
(with Mona Merling.) arxiv.org:2001.05563.
Advances in Mathematics 399 (2022): 108242.
- Coassembly is a homotopy limit map.* (with Mona Merling.) arxiv.org:1904.05858.
Annals of K-Theory 5.3 (2020): 373–394.
- Periodic points and topological restriction homology.* (with Kate Ponto.) arxiv.org:1811.12871.
International Mathematics Research Notices (2020).
- Comparing cyclotomic structures on different models for topological Hochschild homology.*
(with Emanuele Dotto, Irakli Patchkoria, Steffen Sagave, and Calvin Woo.) arxiv.org:1707.07862.
Journal of Topology 12.4 (2019): 1146–1173.
- The Morita equivalence between parametrized spectra and module spectra.* (with John Lind.) arxiv.org:1702.07794.
Contemporary Mathematics 707, New Directions in Homotopy Theory (2018): 45–66.
- Equivariant A -theory.* (with Mona Merling.) arxiv.org:1609.03429.
Documenta Mathematica 24 (2019): 815–855.
- The transfer map of free loop spaces.* (with John Lind.) arxiv.org:1604.03067.
Transactions of the American Mathematical Society 371 (2019): 2503–2552.
- Cyclotomic structure in the topological Hochschild homology of DX .* arxiv.org:1505.06778.
Algebraic & Geometric Topology 17.4 (2017): 2307–2356.
- The topological cyclic homology of the dual circle.* arxiv.org:1610.06898.
Journal of Pure and Applied Algebra 221.6 (2017): 1407–1422.
- Coassembly and the K -theory of finite groups.* arxiv.org:1503.06504.
Advances in Mathematics 307C (2017): 100–146.
- A tower connecting gauge groups to string topology.* arxiv.org:1209.1778.
Journal of Topology 8.2 (2015): 529–570.

Other Publications and Preprints

- Parametrized spectra, a low-tech approach.* arxiv.org:1906.04773.
This has been rewritten into a shorter paper (96 pages) to be re-submitted for publication.

Spectral Waldhausen categories, the S_\bullet -construction, and the Dennis trace. (with Jonathan Campbell, John Lind, Kate Ponto, and Inna Zakharevich.) arxiv.org:2006.04006.

This is an expository paper on technical underpinnings of the Dennis trace map.

The user's guide project: giving experiential context to research papers. (with Mona Merling, David White, Luke Wolcott, and Carolyn Yarnall.)

Journal of Humanistic Mathematics (2015) 5 (2): 186-188.

The stable homotopy category.

Homotopy colimits via the bar construction.

Expository notes on homotopy theory that are occasionally cited in published works.

Duality and linear approximations in Hochschild homology, K -theory, and string topology.

Ph.D. thesis.

Recent talks

Higher scissors congruence June 2022 - present
Union College, Hausdorff Institute (Bonn), Upstate NY Topology Seminar, Purdue University, Cornell University, BUGCAT (Binghamton University)

Introduction to stable homotopy and ring spectra, for symplectic geometers. Jul 2022
PIMS (Vancouver)

Colloquium: Fixed-point theory, both old and new Nov 2021 - Mar 2022
Colgate, SUNY Buffalo

The higher characteristic polynomial. June 2020 - Mar 2022
Universität Regensburg, George Mason University, Johns Hopkins University, AMS Sectional at Purdue, Brandeis University, Columbia University

K -theory of endomorphisms, topological restriction homology, and periodic points. Autumn 2019
University of Madison

Homotopical Nielsen theory and periodic points. June 2019
KU Leuven (Kortrijk, Belgium)

Periodic orbits and topological restriction homology. Spring 2017 - Spring 2019
AMS Sectional at IU Bloomington, Hausdorff Institute, SUNY Albany, Midwest Topology Seminar (Wayne State), Stanford University, Higher Geometric Structures along the Lower Rhine, Universität Wuppertal, Ruhr-Universität Bochum, Universität Regensburg, EPFL, University of Copenhagen, Workshop "Manifolds" at the Isaac Newton Institute (Cambridge), University of Rochester, Cornell University

The transfer map of free loop spaces. Autumn 2017 - Autumn 2018
AMS Buffalo, Princeton University, NRW Topology Meeting, Universität Regensburg, Universiteit Utrecht

Recent Teaching

Binghamton University

Math 601A: Topics in Topology (Stable Homotopy and Algebraic K -theory) Spring 2023

Math 330: Number Systems Spring 2023

Math 518: Algebraic Topology II Autumn 2022

Math 479: Real Analysis II Spring 2022

Math 330: Number Systems Autumn 2021

Math 518: Algebraic Topology II	Autumn 2021
Math 479: Real Analysis II	Spring 2021
Math 517: Algebraic Topology I	Spring 2021
Math 330: Number Systems	Autumn 2020
Math 601A: Topics in Topology (Fiber Bundles and Differential Topology)	Spring 2020
Math 330: Number Systems	Autumn 2019
Math 518: Algebraic Topology II	Autumn 2019
Math 517: Algebraic Topology I	Spring 2019

Conferences and Workshops Organized

<i>Collaborative workshop on Scissors Congruence, Algebraic K-Theory, and Trace Methods</i> , Cornell University.	June 2024
<i>Summer school on Scissors Congruence, Algebraic K-Theory, and Trace Methods</i> , UC Boulder.	June 2023
<i>Summer school on Homotopical Methods in Fixed Point Theory</i> , UC Boulder.	July 2022
<i>AMS Sectional (special session co-organizer)</i> , Binghamton University.	October 2019

Conferences and Workshops Attended

<i>Binghamton University Graduate Combinatorics, Algebra, and Topology Conference (BUGCAT)</i> , Binghamton University.	November 2022
<i>Upstate New York Topology Seminar (UNYTS)</i> , Syracuse University.	October 2022
<i>Followup Junior Trimester Program Workshop</i> , HIM, Bonn.	September 2022
<i>Floer Homotopy Theory Summer School</i> , PIMS, UBC Vancouver.	July 2022
<i>Union College Mathematics Conference</i> , Union College.	June 2022
<i>Cornell Topology Festival</i> , Cornell University.	May 2022
<i>AMS Sectional (virtual)</i> , Purdue University.	March 2022
<i>Various virtual seminars and workshops during CoVID-19.</i>	2020-2021
<i>Midwest Topology Seminar (MayDay)</i> , University of Chicago.	October 2019
<i>AMS Sectional</i> , Madison.	September 2019
<i>Nielsen Theory and Related Topics</i> , Kortrijk, Belgium.	June 2019
<i>55th Cornell Topology Festival</i> , Cornell University.	May 2019
<i>Manifolds</i> , Isaac Newton Institute, Cambridge, UK.	December 2018
<i>30th NRW Topology Meeting</i> , Universität Münster.	November 2018
<i>New trends in K-theory and homotopy theory</i> , Institut Henri Poincaré, Paris.	November 2018
<i>Utrecht Topology Feast</i> , Universiteit Utrecht.	August 2018
<i>Homotopy Theory Summer Berlin</i> , Freie Universität Berlin.	June 2018
<i>Homotopy Theory Workshop</i> , Universität Regensburg.	May 2018
<i>29th NRW Topology Meeting</i> , Universität Bonn.	April 2018
<i>Higher Geometric Structures along the Lower Rhine XI</i> , MPIM Bonn.	March 2018
<i>Women in Topology</i> , MSRI.	November 2017
<i>Midwest Topology Seminar</i> , Wayne State.	November 2017
<i>AMS Sectional</i> , Buffalo.	September 2017
<i>Workshop: K-theory and related fields</i> , HIM, Bonn.	July 2017
<i>Trimester Program</i> , HIM, Bonn.	July 2017

<i>Midwest Topology Seminar</i> , University of Chicago.	May 2017
<i>AMS Sectional</i> , IU Bloomington.	April 2017
<i>Shanks Workshop in Homotopy Theory</i> , Vanderbilt.	March 2017
<i>Midwest Topology Seminar</i> , University of Notre Dame.	Feb 2017
<i>Joint Mathematics Meetings</i> , Atlanta.	January 2017
<i>New Directions in A-theory, Junior Trimester Program (Topology)</i> , HIM.	September 2016
<i>Indiana Topology Seminar</i> , IUPUI.	April 2016
<i>Mid-Atlantic Topology Seminar</i> , Johns Hopkins University.	March 2016
<i>Midwest Topology Seminar</i> , Northwestern University.	February 2016
<i>Midwest Topology Seminar</i> , Wayne State University.	November 2015
<i>K-theory, Cyclic Homology and Motives</i> , Rutgers.	August 2015
<i>Summer School on Algebraic K-theory and Trace Methods</i> , Regensburg.	August 2015
<i>Young Topologists Meeting</i> , EPFL.	July 2015
<i>European Talbot Workshop: Invariants of Structured Ring Spectra</i> , Klosters.	July 2015
<i>Equivariant and motivic homotopy theory</i> , Reed.	May 2015
<i>Midwest Topology Seminar</i> , U Chicago.	May 2015
<i>Indiana Topology Seminar</i> , IUPUI.	April 2015
<i>Midwest Topology Seminar</i> , UI Chicago.	February 2015
<i>Indiana Topology Seminar</i> , IUPUI.	November 2014
<i>Midwest Topology Seminar</i> , Northwestern.	October 2014
<i>Young Topologists Meeting</i> , Copenhagen.	July 2014
<i>Topology in Dubrovnik</i> , Dubrovnik.	June 2014
<i>Reimagining the Foundations of Algebraic Topology</i> , MSRI.	April 2014
<i>Introductory Workshop: Algebraic Topology</i> , MSRI.	January 2014
<i>Semester in Algebraic Topology</i> , MSRI.	January-May 2014
<i>Joint Mathematics Meetings</i> , Baltimore.	January 2014
<i>Workshop in Algebraic Topology</i> , MSRI.	June 2013
<i>Midwest Topology Seminar</i> , U Kentucky.	May 2013
<i>Algebraic Topology: Applications and New Directions</i> , Stanford.	July 2012
<i>West Coast Algebraic Topology Summer School</i> , Stanford.	July 2012
<i>Young Topologists Meeting</i> , Copenhagen.	July 2012
<i>Homotopy Algebra and Applications</i> , CIRM, France.	June 2012
<i>Algebra, Topology, and Fjords Summer School</i> , Nordfjordeid, Norway.	June 2011
<i>9th Graduate Student Topology and Geometry Conference</i> , Michigan State.	April 2011
<i>Hot Topics: Kervaire Invariant</i> , MSRI.	October 2010
<i>Morse Theory Workshop</i> , UC Berkeley.	June 2010
<i>8th Graduate Student Topology and Geometry Conference</i> , U Michigan.	April 2010