

Research interests algebraic & geometric topology, manifolds, operads, homotopy calculus

Education **University of Notre Dame** South Bend, IN
MS, PhD candidate in Mathematics August 2019 – May 2024
Adviser: Mark Behrens
Thesis: Some results on operads and configuration spaces

University of Alabama Tuscaloosa, AL
BA, MA in Mathematics 2015 – 2019
Adviser: Lawrence Roberts

Employment **Max Planck Institute for Mathematics** Bonn, Germany
Postdoctoral Researcher July 2024 - Present
Mentor: Peter Teichner

Publications

Koszul self duality of manifolds. 2023. to appear in *Journal of Topology*. [arxiv](#)

The stable embedding tower and operadic structures on configuration spaces.

2023. to appear in *Homology, Homotopy and Applications*. [arxiv](#)

An elementary proof of the homotopy invariance of stabilized configuration spaces.

Proc. Amer. Math. Soc. 151 (2023), 3635-3644. [arxiv](#)

Preprints

One point compactifications of configuration spaces and the self duality of the little disks operad. 2023. [arxiv](#)

Invited Talks

TBA. May 2024. University of Victoria Topology Seminar

Generalizing a result of Cohen on the homology of configuration spaces. April 2024. University of Massachusetts Amherst Geometry and Topology Seminar

Koszul Duality and Orthogonal Calculus. January 2024. Copenhagen Algebra/Topology Seminar

Koszul Duality and Functor Calculus. January 2024. Stockholm Topology Seminar

Configuration spaces with labels in a spectral Lie algebra. January 2024. JMM Special Session: *Homotopy theory*. San Francisco

Homotopy invariance results for configuration spaces. January 2024. JMM Special Session: *Modern developments in the theory of configuration spaces*. San Francisco

On the intersection of embedding calculus, Goodwillie calculus, and chromatic homotopy theory. November 2023. Spaces of Manifolds: Algebraic and Geometric Approaches. Banff International Research Station

A tautological construction of the self duality of the little disks operad. November 2023.

University of Illinois Urbana-Champaign Topology Seminar

A scanning construction of the self duality of the little disks operad. November 2023. Ohio

State University Homotopy Theory Seminar

Koszul duality with applications to axiomatic functor calculus. November 2023. New Mexico

State University Geometry and Topology Seminar

Applications of Koszul duality to Goodwillie calculus and factorization homology. October

2023. University of Chicago Algebraic Topology Seminar

Koszul duality and manifold calculus. June 2023. *Advances in Homotopy theory IV.*

Embedding calculus of singular manifolds. March 2023. University of Lafayette Topology Seminar

The homotopy theory of configuration spaces. February 2023. University of Alabama Algebra and

Topology Seminar

Koszul duality and the Lie bracket on the homology of configuration spaces. September 2022.

European Autumn School in Topology

Duality in topology. August 2022. Notre Dame Math Orientation

Seminars Organized

Factorization Homology Seminar. Notre Dame Graduate Student Topology Seminar. Spring 2023.

Embedding Calculus Seminar. Notre Dame Graduate Student Topology Seminar. Spring 2021.

Teaching experience

Instructor, Notre Dame Department of Mathematics:

Spring 2024 Calculus II

Teaching assistant, Notre Dame Department of Mathematics:

2020-2023 Calculus A, Calculus B, Calculus II, Calculus III

Grader, Notre Dame Department of Mathematics: Topology I, Topology II

Fellowships

Bayer Fellowship (Notre Dame) 2022

Schmitt Fellowship (Notre Dame) 2019

Thomas W. Palmer Scholarship (University of Alabama) 2019

University of Alabama Presidential Scholarship 2015

National Merit Scholarship 2015

Contributed Talks

TBA. February 2024. Notre Dame Graduate Student Topology Seminar

Transforms in calculus and category theory. February 2024. Notre Dame Graduate Student Seminar

K-theory methods in manifold topology. October 2023. BIRS Workshop Online Seminar

Koszul duality from a homotopical perspective. September 2023. Notre Dame Graduate Student Seminar

Koszul self duality of manifolds. July 2023. Young Topologists Meeting

Differentiating automorphisms of the E_n operad. July 2023. Stability in Topology, Arithmetic, and Representation Theory Workshop

An operadic proof of Poincaré-Koszul duality. March 2023. Notre Dame Graduate Topology Seminar

An introduction to factorization homology. February 2023. Notre Dame Graduate Topology Seminar

Nonabelian Poincaré Duality. February 2023. Notre Dame Graduate Topology Seminar

Resolutions of moduli spaces by moduli spaces. October 2022. Notre Dame Graduate Topology Seminar

Spectral Lie algebra models for unstable v_n -periodic homotopy theory. April 2022. Notre Dame Graduate Topology Seminar

Diff isomorphic implies diffeomorphic. September 2021. Notre Dame Graduate Topology Seminar

Demystifying buzzwords: real homotopy theory is derived algebra. September 2021. Notre Dame Graduate Seminar

Operads and manifold Calculus. March 2021. Notre Dame Graduate Topology Seminar

Homotopy sheaves and manifold calculus. March 2021. Notre Dame Graduate Topology Seminar

Funky manifolds. September 2020. Notre Dame Graduate Topology Seminar

Applications of the Poincaré conjecture. September 2020. Notre Dame Graduate Topology Seminar

Manifold up to homotopy = Poincaré duality + what?. August 2020. Notre Dame Graduate Seminar

Spaces of manifolds, cobordism categories, and the Madsen-Weiss theorem. July 2020. Notre Dame Oral Exam

The geometric model structure on categories. January 2020. Notre Dame Reading Seminar

The Hopf invariant 1 problem via Adams operations. November 2019. Notre Dame Graduate Topology Seminar

Homotopy and its application to the Brouwer fixed point theorem. April 2019. Troy MathFest

Games on groups. August 2018. University of Alabama Algebra & Topology seminar

On subsums of series with positive terms. April 2018. University of Tennessee Undergraduate Math Conference