

Nikolas Schonsheck — Curriculum Vitæ

Department of Mathematical Sciences
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Education & Employment

University of Delaware

Postdoctoral Fellow July 2021-present
PI: Chad Giusti

The Ohio State University

Ph.D. in Mathematics May 2021
M.S. in Mathematics December 2018
Supervisor: John E. Harper

Vassar College

B.A. in Mathematics, general and subject honors May 2015
Minor in social and political philosophy

Teaching Experience

University of Delaware

Instructor

Math 367: Applied Topology Spring 2023
Math 349: Elementary Linear Algebra Fall 2022
Math 401: Introduction to Analysis Spring 2022

The Ohio State University

Instructor

Math 1149: Trigonometry Summer 2018

Co-instructor

Math 1125: Mathematics for Elementary Teachers I Fall 2019
Math 1149: Trigonometry Summer 2017

Graduate Teaching Associate

Regular duties included planning material for and conducting two recitation meetings per week, writing and grading quizzes, grading homework.

Math 1150: Precalculus Fall 2020
Math 1161: Accelerated Calculus I Fall 2018, Fall 2017
Math 1151: Calculus I Spring 2018, Fall 2016
Spring 2016, Fall 2015
Math 1152: Calculus II Spring 2017

Vassar College

Undergraduate Assistant

Held six office hours per week for upper-level mathematics classes. Fall 2014-Spring 2015

Papers

Spherical coordinates from persistent cohomology (with S. Schonsheck). Submitted. Available at <https://arxiv.org/pdf/2209.02791.pdf>.

Toroidal coordinates: decorrelating circular coordinates with lattice reduction (with J. Bush, H. Gakhar, J. Perea, T. Rask, L. Scoccola, L. Zhou). Accepted to 39th *International Symposium on Computational Geometry*. Available at <https://arxiv.org/abs/2212.07201>.

On the chromatic localization of the homotopy completion tower for O -algebras (with C. Ogle). *New York Journal of Mathematics* **28** 1042-1056 (2022).

TQ-completion and the Taylor tower of the identity functor. *Journal of Homotopy and Related Structures*, **17**, 201-216 (2022).

Fibration theorems for TQ-completion of structured ring spectra. *Tbilisi Math. Journal: Special Issue on Homotopy Theory, Spectra, and Structured Ring Spectra* (2020).

On the cop number of generalized Petersen graphs (with T. Ball, R. Bell, J. Guzman, and M. Hanson-Colvin.) *Discrete Mathematics*, 340 (2017), no.6, 1381-1388.

In preparation

Equivariant dimensionality reduction on Stiefel manifolds (with A. Lee, H. Lee, J. Perea, M. Weinstein).

Research Mentoring and Service

Summer Scholars Program Summer 2023
Undergraduate summer research program at University of Delaware. Will be supervising two undergraduate students.

GEMS Summer Program Summer 2022
Summer research program at University of Delaware; supervisor to one undergraduate and one graduate student studying propagation of cyclical data features through feedforward neural networks.

Directed Reading Program (University of Delaware) Spring 2022-present
Cofounded and continue to organize Directed Reading Program at University of Delaware; supervised reading projects on simplicial homology and elementary number theory.

Knots and Graphs undergraduate research working group Summer 2020
Summer research program similar to an REU but only open to Ohio State students; volunteered to mentor two groups of four undergraduate students working on problems in graph coloring.

Directed Reading Program (Ohio State) Spring 2019
Oversaw a reading course on introductory algebraic topology while a graduate student at Ohio State.

Honors, Awards, & Fellowships

Teaching

Phil Huneke Distinguished Graduate Teaching Associate Award Spring 2021
Departmental. This award recognizes “mathematics graduate students who have demonstrated excellence in the classroom and a high level of commitment to undergraduate mathematics education.” Awarded for the 2019-2020 academic year, but awards delayed to 2021 due to the COVID-19 pandemic.

Graduate Associate Teaching Award

Spring 2020

University-wide. “Ohio State’s highest recognition of teaching done by graduate students.” Ten recipients chosen each year out of over 3,000 graduate TA’s.

First-year Graduate Teaching Associate Award

Spring 2016

Departmental. “This award recognizes outstanding first year Graduate Teaching Associates within the OSU Department of Mathematics.”

*Research & Scholarship***Research Training Groups (RTG) Fellowship**

Summer 2020, Spring 2020

Department of Mathematics, The Ohio State University

Spring 2019

Mary Evelyn Wells and Gertrude Smith Prize

Spring 2011

Department of Mathematics, Vassar College

Other Service and Activities**JMM Special Session**

January 2023

Applied Topology: Theory and Implementation

Co-organized special session on applied topology with a particular view towards bridging the gap between the theory and implementation of recent research in applied topology and topological data analysis. To run in January of 2023.

AMS Mathematics Research Communities

Summer 2022

Participant in MRC: Data Science at the Crossroads of Analysis, Geometry, and Topology. Worked with two groups of other early career researchers on projects in topological data analysis. Projects are ongoing and in preparation to submit for publication.

Addressing Barriers to Participation in STEM

Fall 2021-present

Member, committee of University of Delaware Anti-Racism Initiative. Activities have included developing materials for holistic admission processes, lobbying for required diversity and inclusion questions in faculty hiring, and successfully advocating the raise of minimum graduate student stipend.

Invited Panelist, AWM Chapter at Marian University

Spring 2021

Served as a panelist for a discussion on transitioning from an undergraduate liberal arts school to graduate school/industry in STEM fields.

Buckeye Aha! Math Moments

Summer 2020

Volunteered to mentor and review student work for this outreach initiative of the Department of Mathematics at OSU.

Mentor for TA training

Summer 2020, 2019, 2018, 2017

Assisted in summer training of incoming TA’s at Ohio State.

TA Peer mentor

Fall 2019, 2018, 2017, 2016

Served in the peer-mentoring program for new TA’s at Ohio state; oversaw a total of 14 new teaching associates.

Conferences & Research Talks*Invited and contributed talks***Annual Meeting, Organization for Computational Neuroscience**

July 2023

“Relative neural population size modulates learnability of cyclic features of neural codes”

Geometry-Topology Seminar, Oregon State University

October 2022

“Spherical coordinates from persistent cohomology”

Topology Seminar, University of Iowa “Fibration theorems, functor calculus, and chromatic connections in O -algebras”	April 2021
Graduate Student Topology and Geometry Conference, Indiana University “Functor calculus and chromatic connections in O -algebras”	April 2021
Topology Seminar, University of Regina “Fibration theorems, functor calculus, and chromatic connections in O -algebras”	January 2021
Graduate Conference in Algebra and Topology, Binghamton University “TQ-completion: fibration theorems and connections to functor calculus”	November 2020
Algebraic Topology Seminar, UCLA “Fibration theorems and functor calculus for structured ring spectra”	October 2020
Topology Seminar, Pennsylvania State University-Altoona “TQ-completion: fibration theorems and connections to functor calculus”	September 2020
Topology Seminar, University of Virginia “TQ-completion: fibration theorems and connections to functor calculus”	September 2020
AMS Sectional Special Session on Homotopy Theory, University of Virginia “TQ-completion of certain fibration sequences” (This conference was canceled due to the COVID-19 pandemic; notes available at http://people.virginia.edu/~jeb2md/Schonsheck2020.pdf)	March 2020
Young Topologists Meeting, EPFL, Switzerland “Topological Quillen homology of structured ring spectra”	July 2019
Mathematics Colloquium, Vassar College “Homotopy theory—from the fundamental group to structured ring spectra”	February 2019
Young Topologists Meeting, University of Copenhagen “An introduction to symmetric spectra”	July 2018

Informal talks

GOATS 2 Online Mini-Conference “Fibration Theorems for TQ-completion of structured ring spectra” (Available at https://youtu.be/NZ71N1-CUZQ)	June 2020
GROOT Summer Seminar, online “Fibration Theorems for TQ-completion of structured ring spectra” (Available at https://youtu.be/DkjCgY1kjF8 and https://youtu.be/EUAh8fwjF9M)	May 2020
Student Homotopy Seminar, Ohio State Mathematics Department “Pro-nilpotent homology types” “Fibration theorems for TQ-completion of structured ring spectra” “Long homology localization towers” “Localization and completion with respect to topological Quillen homology” “Cosimplicial resolution model structures” “The role of principal fibrations” “Completion of spaces and ring spectra with respect to homology” “Operads and the recognition principle” “Comparing $H\mathbb{Z}$ -algebras in Sp^Σ to unbounded chain complexes” “Why symmetric spectra?”	2018-2020
Graduate Student Seminar, Ohio State Mathematics Department “Homotopy theory—from the fundamental group to structured ring spectra”	January 2019

Seminar- ∞ , Ohio State Mathematics Department Fall 2017
 “The Dold-Kan Correspondence”
 “Eilenberg-Zilber and geometric realization”

Various Presentations 2014-2015
 “The game of Cops and Robbers on graphs”

Conference participation

Algebraic Topology and Topological Data Analysis: August 2022
A Conference in Honor of Gunnar Carlsson
Institute for Mathematics and its Applications, University of Minnesota

Mathematics Research Communities: June 2022
Data Science at the Crossroads of Analysis, Geometry, and Topology
American Mathematical Society, Beaver Hollow, NY

Hot Topics Workshop: May 2022
Topological and Dynamical Analysis of Brain Connectomes
ICERM, Brown University

COSYNE: Computational Systems Neuroscience March 2022
Lisbon, Portugal

Graduate Student Topology and Geometry Conference, Indiana University April 2021

Graduate Conference in Algebra and Topology, Binghamton University November 2020

Midwest Topology Seminar, Virtual, Wayne State University October 2020

GOATS 2 Online Mini-Conference June 2020

AMS Sectional Meeting, University of Wisconsin-Madison September 2019

Young Topologists Meeting, EPFL, Switzerland July 2019

Midwest Topology Seminar, Michigan State University May 2019

Graduate Student Topology and Geometry Conference, UIUC March 2019

Functor Calculus Workshop, Ohio State University March 2019

Midwest Topology Seminar, University of Kentucky September 2018

Young Topologists Meeting, University of Copenhagen July 2018

Midwest Topology Seminar, Indiana University April 2018

AMS Sectional Meeting, Ohio State University March 2018

Midwest Topology Seminar, Northwestern University March 2018

Midwest Topology Seminar, Wayne State University November 2017

Homotopy theory: tools and applications, UIUC July 2017