

ANNA SCHENFISCH

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ACADEMIC APPOINTMENTS

Eindhoven University of Technology

Fall 2023 – Present

- Postdoctoral researcher

EDUCATION

Montana State University (MSU)

Fall 2017 – Spring 2023

- PhD, Mathematics
- Dissertation title – Faithful Sets of Topological Descriptors and The Algebraic K -Theory of Multi-Parameter Zig-Zag Grid Persistence Modules

University of Wyoming

Fall 2013 – Spring 2017

- Bachelor of Science, Mathematics
- Bachelor of Music, Music Performance, violin
- Honors Program minor

HONORS AND AWARDS

Outstanding Mathematical Sciences Graduate Student award

Spring 2020

NSF Graduate Research Fellowship Program recipient

Spring 2019

PUBLICATIONS (with hyperlinks)

Journal Publications

8. Ryan Grady and Anna Schenfisch. ***K-Theory of multiparameter persistence modules: Additivity.*** Proceedings of the American Mathematical Society, Series B. Volume 11. March 2024. Pages 63-74. Available at <https://doi.org/10.1090/bproc/208>
7. Ryan Grady and Anna Schenfisch. ***Zig-Zag Modules: Cosheaves and K-Theory.*** Homology, Homotopy and Applications. Volume 25, Number 2. November 2023. Pages 243-274. Available at www.intlpress.com/site/pub/pages/journals/items/hha/content/vols/0025/0002/a011/index.php
6. Ryan Grady and Anna Schenfisch. ***Regularity via Links and Stein Factorization.*** Beiträge zur Algebra und Geometrie / Contributions to Algebra and Geometry. August 2023. 20 pages. Available at <https://link.springer.com/article/10.1007/s13366-023-00713-y>
5. Robin Belton, Brittany T. Fasy, Rostik Mertz, Samuel Micka, David L. Millman, Daniel Salinas, Anna Schenfisch, Jordan Schupach, and Lucia Williams. ***Reconstructing Embedded Graphs from Persistence Diagrams.*** Computational Geometry, Theory and Applications. October 2020. 17 pages. Available at <https://www.sciencedirect.com/science/article/pii/S0925772120300523>
4. Jessica De Silva, Kristin Heyse, Adam Kapilow, Anna Schenfisch, and Michael Young. ***Turán Numbers of Vertex Disjoint Cliques in r -Partite Graphs.*** Journal of Discrete Mathematics, Volume 341, Issue 2. February 2018. Pages 492-496. Available at <https://www.sciencedirect.com/science/article/pii/S0012365X17303266>

Conference Publications

3. Brittany T. Fasy, David L. Millman, Anna Schenfish. *How Small Can Faithful Sets be? Ordering Topological Descriptors*. 13 pages. Canadian Conference on Computational Geometry. Conference proceedings available at https://cosc.brocku.ca/~rnishat/CCCG_2024_proceedings.pdf
2. Brittany T. Fasy, Samuel Micka, David L. Millman, Anna Schenfish, and Lucia Williams. *Efficient Graph Reconstruction and Representation Using Augmented Persistence Diagrams*. Canadian Conference on Computational Geometry. 9 pages. Conference proceedings available at https://www.torontomu.ca/content/dam/canadian-conference-computational-geometry-2022/papers/CCCG2022_paper_49.pdf

Book Review

1. Anna Schenfish and Brittany T. Fasy. *Statistical Analysis of Contingency Tables (Book Review)*. The American Statistician, Volume 73, Issue 2. April 3, 2019. Page 634. Available at <https://www.tandfonline.com/doi/full/10.1080/00031305.2019.1571848>

CONFERENCE CONTRIBUTIONS OR ONGOING WORK (with hyperlinks)

5. Brittany Fasy, David Millman, and Anna Schenfish. *Lower Bounding Faithful Sets of Verbose Persistence Diagrams*. Presented at EuroCG. 7 pages. Available at https://eurocg2024.math.uoi.gr/data/uploads/paper_28.pdf
4. George Brooks, Fadekemi Osaye, Anna Schenfish, Zhiyu Wang, and Jing Yu. *Outerplanar Graphs with Positive Lin-Lu-Yau Curvature*. Under review. 8 pages. Available at <https://arxiv.org/pdf/2403.04110.pdf>
3. Bradley McCoy, Anna Schenfish, and Eli Quist. *Catching Polygons*. Presented at the Fall Workshop on Computational Geometry, 2021. 6 pages. Available at <https://arxiv.org/abs/2201.01286>
2. Brittany T. Fasy, Samuel Micka, David L. Millman, Anna Schenfish, and Lucia Williams. *A Faithful Discretization of Verbose Directional Transforms*. Under review. 30 pages. Available at <https://arxiv.org/abs/1912.12759>
1. Brittany T. Fasy, Samuel Micka, David L. Millman, and Anna Schenfish. *Challenges in Reconstructing Shapes from Euler Characteristic Curves*. Presented at the Fall Workshop on Computational Geometry, 2018. 6 pages. Available at <https://arxiv.org/abs/1811.11337>

TALKS AND PRESENTATIONS

Symposium on Computational Geometry (SoCG) 30-minute talk on concise vs. verbose descriptors, in workshop on directional transforms	<i>June 2024</i>
Applied Algebraic Topology Research Network (AATRN) 50-minute invited talk on ordering topological descriptors (available at this link)	<i>July 2023</i>
SIAM Conference on Applied Algebraic Geometry 25-minute talk on minimal faithful sets of topological descriptors	<i>July 2023</i>
Canadian Conference on Computational Geometry (CCCG) 20-minute talk on discretizing the persistence homology transform	<i>August 2022</i>
CMS Summer Meeting – Relative Homology and Persistence Theory 50-minute invited talk on K -theory of zig-zag persistence modules research	<i>June 2022</i>
Algebraic Topology Methods, Computation, & Science 20-minute talk on ordering descriptors research	<i>June 2022</i>

AMS Southeastern Sectional – Workshop on Algebraic Combinatorics and Category Theory in Topological Data Analysis 20-minute on ordering topological descriptors	<i>March 2022</i>
Finite Dimensional Seminar 50-minute invited talk on K -theory in “seminar on representation theory of finite-dimensional algebras”	<i>March 2022</i>
University of Florida Topological Data Analysis Conference 20-minute talk on verbose persistence diagrams and zig-zag modules as cosheaves	<i>January 2022</i>
Applied Mathematics Seminar 50-minute talk at MSU on research related to the persistent homology transform	<i>October 2021</i>
Applied Algebraic Topology Research Network (AATRN) 20-minute invited talk on research related to the persistent homology transform (available at this link)	<i>January 2021</i>
Applied Mathematics Seminar 50-minute joint talk at MSU on research on geometric data analysis and its applications to prostate cancer classification	<i>March 2018</i>
Pure Mathematics Seminar 50-minute talk at MSU on Turán numbers publication	<i>March 2018</i>
Computational Geometry Week – Young Researchers Forum 20-minute talk presenting research on prostate cancer classification	<i>June 2018</i>
Computer Science Department Seminar 50-minute joint talk at MSU on topological data analysis and its applications to prostate cancer classification	<i>December 2017</i>
Nebraska Conference for Undergraduate Women in Mathematics 20-minute talk on Turán numbers research	<i>February 2017</i>
OTHER MATHEMATICAL CONFERENCES AND REU PARTICIPATION	
EuroCG Presented work on ordering topological descriptors	<i>March 2024</i>
Math Research Community Week-long collaboration on “Ricci Curvatures of Graphs and Applications to Data Science.” Led to paper on positively-curved graphs.	<i>May/June 2023</i>
Talbot Workshop Week-long immersive summer school on K -theory and scissors congruence	<i>June 2022</i>
Computational Geometry Week Attended talks and helped with conference practicalities (set-up, registration, etc.)	<i>June 2019</i>
Fall Workshop on Computational Geometry Attended talks, and research on Euler Characteristic curves presented by collaborator	<i>October 2018</i>
Women in Topology Workshop – MSRI Participated in research on directed topology	<i>November 2017</i>
Computational Geometry Week Gave a talk at a satellite event (YRF)	<i>June 2017</i>
HerbFest Attended a series of talks in celebration of Herbert Edelsbrunner’s 60th birthday	<i>June 2017</i>

Research Intern in Extremal Graph Theory REU. Led to Turán numbers publication

TEACHING

Discrete Structures

Anticipated November 2024 – January 2025

Main lecturer for section at TU/e (computer science)

Projects in Topological Data Analysis

September 2023 – (Anticipated) January 2025

Co-led two iterations of a reading course and project in TDA for small groups of master's students (cross-university collaboration)

Calculus for Technology II Instructor

Fall 2021 – Spring 2022

Main lecturer and course designer for classes of around 47 students at MSU (mathematics)

Discrete Mathematics

Summer 2021

Main lecturer and course designer for an accelerated course of around 10 students, held virtually through MSU (computer science)

Calculus I Instructor

Fall 2017 – Spring 2018

Main lecturer for classes of around 36 students at MSU (mathematics)

Grader for University of Wyoming Differential Equations classes

2015 – 2017

Provided detailed feedback and scored homework and tests

MENTORING AND ADVISING

Master's Student Thesis/Project Co-Advisor

January 2024 - August 2024

Co-advised two master's students in a thesis and project

Computational Topology and Geometry Club

Fall 2017 - present

Worked with undergraduate students to prepare seminar presentations and understand material several times during the semester

Directed Reading Program Mentor

Spring 2018 – present

Mentored undergraduate students in reading textbooks on mathematics/computer science

Research with Undergraduate Students

2020 – present

Worked with undergraduate student on research project in computational geometry (led to *Catching Polygons* paper)

Letters to a Prescientist pen-pal

Fall and Spring 2020

Scientist role model to middle school student through snail-mail

Montana State University Math Learning Center

2017 – 2018

Provided math tutoring to MSU undergraduate students

Math and Physics Tutor – Office of Academic Support

Fall 2015

Tutored student-athletes at the University of Wyoming

LEADERSHIP SKILLS AND SERVICE LEARNING

Women in Science and Engineering Board Member

Spring 2024 – present

Board member for TU/e group supporting gender minorities in STEM

Graduate Student Seminar Organizer

Fall 2018 – Fall 2023

Solicited speakers and organized logistics for weekly graduate student seminar

Montana Science Olympiad	<i>April 2022 and April 2018</i>
Led activity on knot theory to group of around 20 elementary students	
Hardin High School Visit	<i>April 2022</i>
Led activity on understanding 4-spheres via level-sets to group of around 20 high school students	
University of Wyoming Honors College Mentor	<i>Fall 2015 – Spring 2016</i>
Organized and conducted supportive group sessions for honors freshman	
ADDITIONAL PROFESSIONAL DEVELOPMENT	
Implementing Peer Feedback	<i>Anticipated October 2024</i>
Teacher training from TU/e on implementing peer feedback in assessments to foster a “culture of collaboration...and promote deeper learning”	
Indian Education for All	<i>September 2022</i>
Received training through MSU “to learn about the distinct and unique heritage of American Indians in a culturally responsive manner”	
Recognizing & Referring Students with Mental Health Needs	<i>September 2022</i>
Received training through MSU for on-campus resources	
Women in Science and Engineering at MSU	<i>2019 – present</i>
Participated in community-building activities, as well as a book club focused on social justice and diversity in the sciences	
Safe Zone and Related Events	<i>Fall 2013 – Spring 2017</i>
Attended weekly meetings and received certification related to LGBTQ+ topics	