ANNA SCHENFISCH

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ACADEMIC APPOINTMENTS

Eindhoven University of Technology *September 2023 – present*

- Postdoctoral researcher

EDUCATION

Montana State University (MSU) *2017 – 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 *2013 – 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 Heysse, 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 Schenfisch. ***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 Schenfisch, 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 Schenfisch 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 Schenfisch. ***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 Schenfisch, 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 Schenfisch, 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 Schenfisch, 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 Schenfisch. ***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 Geoemtry (SoCG) *June 2024*
30-minute talk on concise vs. verbose descriptors, in workshop on directional transforms

Applied Algebraic Topology Research Network (AATRN) *July 2023*
50-minute invited talk on ordering topological descriptors (availible at this link)

SIAM Conference on Applied Algebraic Geometry *July 2023*
25-minute talk on minimal faithful sets of topological descriptors

Canadian Conference on Computational Geometry (CCCG) *August 2022*
20-minute talk on discretizing the persistence homology transform

CMS Summer Meeting – Relative Homology and Persistence Theory *June 2022*
50-minute invited talk on K-theory of zig-zag persistence modules research

Algebraic Topology Methods, Computation, & Science *June 2022*
20-minute talk on ordering descriptors research

AMS Southeastern Sectional – Workshop on Algebraic Combinatorics and Category Theory in Topological Data Analysis *March 2022*
20-minute on ordering topological descriptors

Finite Dimensional Seminar *March 2022*
50-minute invited talk on K-theory in "seminar on representation theory of finite-dimensional algebras"

University of Florida Topological Data Analysis Conference *January 2022*
20-minute talk on verbose persistence diagrams and zig-zag modules as cosheaves

Applied Mathematics Seminar *October 2021*
50-minute talk at MSU on research related to the persistent homology transform

Applied Algebraic Topology Research Network (AATRN) *January 2021*
20-minute invited talk on research related to the persistent homology transform (availible at this link)

Applied Mathematics Seminar *March 2018*
50-minute joint talk at MSU on research on geometric data analysis and its applications to prostate cancer classification

Pure Mathematics Seminar *March 2018*
50-minute talk at MSU on Turán numbers publication

Computational Geometry Week – Young Researchers Forum *June 2018*
20-minute talk presenting research on prostate cancer classification

Computer Science Department Seminar *December 2017*
50-minute joint talk at MSU on topological data analysis and its applications to prostate cancer classification

Nebraska Conference for Undergraduate Women in Mathematics *February 2017*
20-minute talk on Turán numbers research

OTHER MATHEMATICAL CONFERENCES AND REU PARTICIPATION

EuroCG *March 2024*
Presented work on ordering topological descriptors

Math Research Community *May/June 2023*
Week-long collaboration on "Ricci Curvatures of Graphs and Applications to Data Science." Led to paper on positively-curved graphs.

Talbot Workshop *June 2022*
Week-long immersive summer school on K-theory and scissors congruence

Computational Geometry Week *June 2019*
Attended talks and helped with conference practicalities (set-up, registration, etc.)

Fall Workshop on Computational Geometry *October 2018*
Attended talks, and research on Euler Characteristic curves presented by collaborator

Women in Topology Workshop – MSRI *November 2017*
Participated in research on directed topology

Computational Geometry Week *June 2017*
Gave a talk at a satellite event (YRF)

HerbFest *June 2017*
Attended a series of talks in celebration of Herbert Edelsbrunner's 60th birthday

Summer Undergraduate Applied Mathematics Institute – CMU *Summer 2016*
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 – present*
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 - fall 2023*
Worked with undergraduate students to prepare seminar presentations and understand material several times during the semester

Directed Reading Program Mentor *six semesters spring 2018 – spring 2023*
Mentored undergraduate students reading textbooks in mathematics/computer science

Research with Undergraduate Students *2020 – present*
Worked with undergraduate student on research projects in computational geometry (led to *Catching Polygons* paper) and TDA in biology

Letters to a Prescientist pen-pal *2020*
Scientist role model to middle school students 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 *April 2022 and April 2018*
Led activity on knot theory to group of around 20 elementary students

Hardin High School Visit *April 2022*
Led activity on understanding 4-spheres via level-sets to group of around 20 high school students

University of Wyoming Honors College Mentor *fall 2015 – spring 2016*
Organized and conducted supportive group sessions for honors freshman

ADDITIONAL PROFESSIONAL DEVELOPMENT

Implementing Peer Feedback *anticipated October 2024*
Teacher training from TU/e on implementing peer feedback in assesments to foster a "culture of collaboration...and promote deeper learning"

Indian Education for All *September 2022*
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 *September 2022*
Received training through MSU for on-campus resources

Women in Science and Engineering at MSU *2019 – present*
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 *fall 2013 – spring 2017*
Attended weekly meetings and received certification related to LGBTQ+ topics