

ANNA SCHENFISCH

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EDUCATION

Montana State University (MSU)

Fall 2017 – present

- PhD Student, Mathematics
- Anticipated graduation - Spring 2023
- Advised by Brittany Terese Fasy (brittany.fasy@montana.edu)

University of Wyoming

Fall 2013 – Spring 2017

- 3.97/4.0 GPA
- Bachelor of Science - Mathematics
- Bachelor of Music - Music Performance, violin
- Honors Program - minor

HONORS AND AWARDS

NSF Graduate Research Fellowship Program recipient

Spring 2019 – present

Outstanding Mathematical Sciences Graduate Student award

Spring 2020

University of Wyoming Trustee's Scholarship recipient (all costs covered)

Fall 2013 – Spring 2017

International Baccalaureate Diploma – Natrona County High School

June 2013

National Merit Scholar Finalist

April 2013

PUBLICATIONS (with hyperlinks)

Journal Publications

1. Ryan Grady and Anna Schenfisch. ***Zig-Zag Modules: Cosheaves and K-Theory***. To appear in Homology, Homotopy and Applications. 26 pages. Available at <https://arxiv.org/abs/2110.04591>
2. 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>
3. 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>
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

5. 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

CONFERENCE CONTRIBUTIONS OR ONGOING WORK (with hyperlinks)

1. Bradley McCoy, Anna Schenfish, Eli Quist. *Catching Polygons*. Presented at the Fall Workshop on Computational Geometry, 2021. 6 pages. Available at <https://arxiv.org/abs/2201.01286>
2. Ryan Grady and Anna Schenfish. *Natural Stratifications of Reeb Spaces and Higher Morse Functions*. Under review. 28 pages. Available at <https://arxiv.org/abs/2011.08404>
3. Brittany T. Fasy, Samuel Micka, David L. Millman, Anna Schenfish, and Lucia Williams. *A Faithful Discretization of the Augmented Persistent Homology Transform*. To be submitted. 21 pages. Available at <https://arxiv.org/abs/1912.12759>
4. 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>
5. Robin Belton, Brittany T. Fasy, Rostik Mertz, Samuel Micka, David L. Millman, Daniel Salinas, Anna Schenfish, Jordan Schupach, and Lucia Williams. *Learning Simplicial Complexes from Persistence Diagrams*. 12 pages. Available at <https://arxiv.org/abs/1805.10716>
6. Brittany T. Fasy, David L. Millman, and Anna Schenfish. *A Total Order on and Lower Bounds on Representability of Topological Descriptors*. In progress.

TALKS AND PRESENTATIONS

Canadian Conference on Computational Geometry 20-minute talk on discretizing the persistence homology transform	<i>August 2022</i>
CMS Summer Meeting – Relative Homology and Persistence Theory 50-minute 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 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 augmented 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 20-minute talk on research related to the persistent homology transform	<i>January 2021</i>
Applied Mathematics Seminar Gave part of a 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 in Budapest, Hungary presenting research on prostate cancer classification	<i>June 2018</i>

Computer Science Department Seminar*December 2017*

Gave a portion of a 50-minute 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

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*

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

Calculus for Technology II Instructor*Fall 2021 – Spring 2022*

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

Discrete Mathematics*Summer 2021*

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

Calculus I Instructor*Fall 2017 – Spring 2018*

Main lecturer for classes of around 36 students at MSU

Grader for University of Wyoming Differential Equations classes*2015 – 2017*

Provided detailed feedback and scored homework and tests

MENTORING

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 – Spring 2022*

Mentored undergraduate students in reading textbooks on mathematics/computer science

Research with Undergraduate Students*2020 – present*

Worked with two undergraduate students on original research in computational geometry and graph theory (led to *Catching Polygons*, see “Works in Progress” below)

Letters to a Prescientist pen-pal Scientist role model to middle school student through snail-mail	<i>Fall and Spring 2020</i>
Montana State University Math Learning Center Provided math tutoring to MSU undergraduate students	<i>2017 – 2018</i>
Math and Physics Tutor – Office of Academic Support Tutored student-athletes at the University of Wyoming	<i>Fall 2015</i>
Casper College Math Learning Center Assistant Provided math tutoring to Casper College students	<i>Summers 2014 – 2015</i>
Private Tutor Provided private tutoring to college-level students	<i>Summers 2014 – 2015</i>
LEADERSHIP SKILLS AND SERVICE LEARNING	
Graduate Student Seminar Organizer Solicits speakers and organizes logistics for weekly graduate student seminar	<i>Fall 2018 – present</i>
Montana Science Olympiad Led activity on knot theory to group of around 20 elementary students	<i>April 2022</i>
Hardin High School Visit Led activity on understanding 4-spheres through level-sets to group of around 20 middle-school students	<i>April 2022</i>
Befrienders Volunteer Companion for local senior citizen	<i>Fall 2018 – present</i>
Dance Instructor Volunteers to to teach community dance classes (forró, lindy hop, salsa, and bachata)	<i>2019 – present</i>
Montana Science Olympiad Led activity on knot theory to a small group of elementary students	<i>April 2018</i>
University of Wyoming Honors College Mentor Organized and conducted supportive group sessions for honors freshman	<i>Fall 2015 – Spring 2016</i>
ADDITIONAL PROFESSIONAL DEVELOPMENT	
Indian Education for All Received training through MSU “to learn about the distinct and unique heritage of American Indians in a culturally responsive manner”	<i>September 2022</i>
Recognizing & Referring Students with Mental Health Needs Received training through MSU for on-campus resources	<i>September 2022</i>
Women in Science and Engineering at MSU Participated in community-building activities, as well as a book club focused on social justice and diversity in the sciences	<i>2019 – present</i>
Safe Zone and Related Events Attended weekly meetings and received certification related to LGBTQ+ topics	<i>Fall 2013 – Spring 2017</i>