

ANNA SCHENFISCH

annaschenfisch.github.io/
+1(307) 333 3836
annaschenfisch@montana.edu

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. 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

4. 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

5. 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)

1. Bradley McCoy, Anna Schenfisch, 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 Schenfisch. *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 Schenfisch, 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 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>
5. Robin Belton, Brittany T. Fasy, Rostik Mertz, Samuel Micka, David L. Millman, Daniel Salinas, Anna Schenfisch, 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 Schenfisch. *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>
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Computer Science Department Seminar Gave a portion of a 50-minute talk at MSU on topological data analysis and its applications to prostate cancer classification	<i>December 2017</i>
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Nebraska Conference for Undergraduate Women in Mathematics 20-minute talk on Turán numbers research	<i>February 2017</i>
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OTHER MATHEMATICAL CONFERENCES AND REU PARTICIPATION

Talbot Workshop Week-long immersive summer school on K -theory and scissors congruence	<i>June 2022</i>
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Computational Geometry Week Attended talks and helped with conference practicalities (set-up, registration, etc.)	<i>June 2019</i>
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Fall Workshop on Computational Geometry Research on Euler Characteristic curves presented by collaborator	<i>October 2018</i>
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Women in Topology Workshop – MSRI Participated in research on directed topology	<i>November 2017</i>
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Computational Geometry Week Gave a talk at a satellite event (YRF)	<i>June 2017</i>
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HerbFest Attended a series of talks in celebration of Herbert Edelsbrunner’s 60th birthday	<i>June 2017</i>
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Summer Undergraduate Applied Mathematics Institute – CMU Research Intern in Extremal Graph Theory REU. Led to Turán numbers publication	<i>Summer 2016</i>
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TEACHING

Calculus for Technology II Instructor Main lecturer and course designer for classes of around 47 students at MSU	<i>Fall 2021 – Spring 2022</i>
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Discrete Mathematics Main lecturer and course designer for an accelerated computer science course of around 10 students, held virtually through MSU	<i>Summer 2021</i>
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Calculus I Instructor Main lecturer for classes of around 36 students at MSU	<i>Fall 2017 – Spring 2018</i>
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Grader for University of Wyoming Differential Equations classes Provided detailed feedback and scored homework and tests	<i>2015 – 2017</i>
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MENTORING

Computational Topology and Geometry Club Worked with undergraduate students to prepare seminar presentations and understand material several times during the semester	<i>Fall 2017 - present</i>
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Directed Reading Program Mentor Mentored undergraduate students in reading textbooks on mathematics/computer science	<i>Spring 2018 – Spring 2022</i>
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Research with Undergraduate Students	<i>2020 – present</i>
Worked with two undergraduate students on original research in computational geometry and graph theory (led to <i>Catching Polygons</i> , see “Works in Progress” below)	
Letters to a Prescientist pen-pal	<i>Fall and Spring 2020</i>
Scientist role model to middle school student through snail-mail	
Montana State University Math Learning Center	<i>2017 – 2018</i>
Provided math tutoring to MSU undergraduate students	
Math and Physics Tutor – Office of Academic Support	<i>Fall 2015</i>
Tutored student-athletes at the University of Wyoming	
Casper College Math Learning Center Assistant	<i>Summers 2014 – 2015</i>
Provided math tutoring to Casper College students	
Private Tutor	<i>Summers 2014 – 2015</i>
Provided private tutoring to college-level students	
LEADERSHIP SKILLS AND SERVICE LEARNING	
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Graduate Student Seminar Organizer	<i>Fall 2018 – present</i>
Solicits speakers and organizes logistics for weekly graduate student seminar	
Montana Science Olympiad	<i>April 2022</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 through level-sets to group of around 20 middle-school students	
Befrienders Volunteer	<i>Fall 2018 – present</i>
Companion for local senior citizen	
Dance Instructor	<i>2019 – present</i>
Volunteers to to teach community dance classes (forró, lindy hop, salsa, and bachata)	
Montana Science Olympiad	<i>April 2018</i>
Led activity on knot theory to a small group of elementary 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	
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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