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 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

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 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 *August 2022*
20-minute talk on discretizing the persistence homology transform

CMS Summer Meeting – Relative Homology and Persistence Theory *June 2022*
50-minute 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 talk on K-theory in "seminar on representation theory of finite-dimensional algebras"

Applied Mathematics Seminar *October 2022*
50-minute talk at MSU on research related to the persistent homology transform

Applied Algebraic Topology Research Network *January 2021*
20-minute talk on research related to the persistent homology transform

Applied Mathematics Seminar *March 2018*
Gave part of a 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 in Budapest, Hungary presenting research on prostate cancer classification

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 *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

Casper College Math Learning Center Assistant *Summers 2014 – 2015*
Provided math tutoring to Casper College students

Private Tutor *Summers 2014 – 2015*
Provided private tutoring to college-level students

LEADERSHIP SKILLS AND SERVICE LEARNING

Graduate Student Seminar Organizer *Fall 2018 – present*
Solicits speakers and organizes logistics for weekly graduate student seminar

Montana Science Olympiad *April 2022*
Led activity on knot theory to group of around 20 elementary students

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

Befrienders Volunteer *Fall 2018 – present*
Companion for local senior citizen

Dance Instructor *2019 – present*
Volunteers to to teach community dance classes (forró, lindy hop, salsa, and bachata)

Montana Science Olympiad *April 2018*
Led activity on knot theory to a small group of elementary students

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

ADDITIONAL PROFESSIONAL DEVELOPMENT

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