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*

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students on original research in computational geometry and graph theory (led to *Catching Polygons*, see "Unpublished Research" below)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

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

PUBLICATIONS

- **Reconstructing Embedded Graphs from Persistence Diagrams**
  Computational Geometry, Theory and Applications. October 2020.
  Available at https://www.sciencedirect.com/science/article/pii/S0925772120300523
- **Book review – Statistical Analysis of Contingency Tables**
  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
- **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

UNPUBLISHED RESEARCH

- **Efficient Graph Reconstruction and Representation Using Augmented Persistence Diagrams**
  Conference proceedings available at https://www.torontomu.ca/content/dam/canadian-conference-computational-geometry-2022/papers/CCCG2022_paper_49.pdf
- **Zig-Zag Modules: Cosheaves and K-Theory**
  Under review. Available at https://arxiv.org/abs/2110.04591
- **Catching Polygons**
  Available at https://arxiv.org/abs/2201.01286
- **Natural Stratifications of Reeb Spaces and Higher Morse Functions**
  Under review. Available at https://arxiv.org/abs/2011.08404
- **A Faithful Discretization of the Augmented Persistent Homology Transform**
  To be submitted. Available at https://arxiv.org/abs/1912.12759
- **Challenges in Reconstructing Shapes from Euler Characteristic Curves**
  Available at https://arxiv.org/abs/1811.11337
- **Learning Simplicial Complexes from Persistence Diagrams**
  Available at https://arxiv.org/abs/1805.10716
- **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, attended talks
- **CMS Summer Meeting – Relative Homology and Persistence Theory** *June 2022*
  50-minute on K-theory of zig-zag persistence modules research, attended talks
- **Algebraic Topology Methods, Computation, & Science** *June 2022*
  20-minute talk on ordering descriptors research, attended talks

- **AMS Southeastern Sectional – Workshop on Algebraic Combinatorics and Category Theory in Topological Data Analysis** *March 2022*
  20-minute on ordering topological descriptors, attended talks
- **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, attended talks on a variety of subjects
- **Computational Geometry Week** *June 2017*
  Gave a talk at a satellite event (YRF) and attended talks
- **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

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

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