

Ann Bigelow

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Education

Mathematics Ph.D., September 2024 – Present University of Wisconsin–Madison

Applied Mathematics B.S., *Summa Cum Laude*, 2020 – 2024 University of Utah

Research

The Physics of Crumpled Sheets: A Big Data Problem August 2024 – Present

Prof. Chris Rycroft Mathematics, UW-Madison

- Acquired necessary skills in scientific computing such as programming in C++, code collaboration and version control etiquette, and program parallelization.
- Studied publications on Crumple Theory, by the Rycroft Group and collaborators, which predicted crease patterns on crumpled square Mylar sheets.
- Worked to build new computational surrogates of crumpling for augmentation with experimental data as inputs into a machine learning model to predict crease structures.

The Singular Value Decomposition and an Application May – August 2023

Dr. Tim Tribone Mathematics, Utah

- Researched interesting applications of the SVD – in particular, “eigenfaces” – for use in future linear algebra courses taught at the University of Utah.
- Simplified the eigenface procedure by creating a similar example, “eigenones,” which were generated images of the number one.
- Worked in a small-group setting to prove lemmas which culminated in a singular value decomposition (SVD) for complex-valued matrices.

Visualizing Hessian Matrices September 2022 – June 2023

Prof. Alan Dorval Biomedical Engineering, Utah

- Considered the current state of visualization tools of the human brain during Deep-Brain Stimulation treatments in studies of neurological disorders.
- Created a spatial model in MATLAB, scaled according to the eigenvalues and eigenvectors of the voltage function’s Hessian matrix, to better understand effects of electrical contact placement choices upon axon polarizations.
- Utilized ideas in mathematics and physics including multivariable calculus, eigenspaces and manipulation of large matrices, electricity and voltage, and Gaussian surfaces.

Experiences

Teaching Assistant: Calculus and Analytic Geometry I January 2025 – Present

Department of Mathematics UW-Madison

- Individually led recitation sessions and office hours to reinforce introductory concepts for large groups of students in Calculus outside of lectures.

Research Assistant

August – December 2024

The Rycroft Group at the University of Wisconsin – Madison

- Studied the invariant steady-state distribution of facet densities along a folded interval of paper for generalization to higher-dimensional folded sheets as computational surrogates for crumpled materials.

Learning Assistant: Calculus I, Physics I, Precalculus, Physics II, College Algebra

January 2023 – August 2024

Center for Science and Mathematics Education

University of Utah

- Held recitations and office hours to assist students in introductory mathematics and physics courses.
- Individually led review sessions; Attended lectures to aid instructors; Facilitated mathematical discussion.
- Contributed to weekly content preparation meetings with instructors to plan course directions and goals.

Mathematics Tutor

January – August 2023

Math Center

University of Utah

- Tutored students in calculus, linear algebra, differential equations, and introductory mathematics courses.

Peer Mentor

August 2022 – May 2023

Biology Learning Center

University of Utah

- Advised first and second-year undergraduates to promote student involvement and success.
- Contributed to weekly meetings by discussing outreach and mentorship strategies for the implementation of our new mentorship program.

Programming Languages and Models

- C++ and OpenMP
- MATLAB
- Python
- R

Relevant Courses

- Methods of Applied Mathematics, fall 2024 and spring 2025, UW-Madison
- Methods of Computational Mathematics, fall 2024 and spring 2025, UW-Madison
- Survey of Numerical Analysis, spring 2024, Utah
- Mathematical Modeling, spring 2024, Utah
- Foundations of Analysis II, spring 2024, Utah
- Introduction to Optimization, fall 2023, Utah
- Introduction to Partial Differential Equations, fall 2023, Utah

Conferences and Membership

- Gender Minorities in Math at Wisconsin, Active Member, UW-Madison, September 2024 – Present
- Math for All, *Singular Value Decomposition* Poster Presenter, University of Utah, April 2024
- Graduate Research Opportunities for Women, Selected Participant, Duke University, October 2023
- Learning Assistant Symposium, *A Meta-Concept Map* Poster Presenter, University of Utah, April 2023
- University of Utah Student Chapter of the Association for Women in Mathematics, Active Member, August 2022 – August 2024
- Biology Learning Center, Volunteer Tutor, University of Utah, January 2022 – June 2022

