Ann Bigelow

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Education

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

NSF Graduate Research Fellow, September 2025 – Present

Applied Mathematics B.S., *summa cum laude*, 2020 – 2024   University of Utah

Research

Simulating Thin Sheet Deformations: Finite Element Edition   November 2025 – Present

Chris Rycroft   Mathematics, UW - Madison

- Built a finite element method for simulating large deformations of thin sheets, with the intention of improving accuracy from the mass-spring model.
- Topics: deformation of solids, Föppl--von Kármán equations, strain energy density functions, and finite element methods.

Crumpled Thin Sheets for Stomatal Density Measurements   June 2025 – Present

Chris Rycroft and the Lang Lab at UC Berkeley   UW - Madison, UC Berkeley

Topics: plant adaptation to climate change, mass-spring models of elastoplastic thin sheets, mechanical simulation in C++ of crumpling and wrinkling, and surface roughness metrics.

Computational Surrogates for Crumpled Sheets   August 2024 – June 2025

Chris Rycroft   Mathematics, UW - Madison

Topics: scientific computing in C++, multithreading, universality of creasing behavior of crumpled sheets, data augmentation for scientific studies using machine learning, crease network prediction, randomness of crease patterns and Bertrand's Paradox.

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

Directed Reading Program Graduate Mentor   Fall 2025

Department of Mathematics   UW - Madison

   Project Title: *The Mathematics of Modeling Thin Sheets*

Grader: Math/CS 714 (Methods of Computational Mathematics I**)**   Fall 2025

Department of Mathematics   UW - Madison

Affiliate Research Assistant   June 2025

The Rycroft Group, Lawrence Berkeley National Laboratory

Teaching Assistant: Calculus and Analytic Geometry I   Spring 2025

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   Fall 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.

Awards

- National Science Foundation Graduate Research Fellow, 2025 – Present

Presentations

- UW-Madison Graduate Applied Mathematics Seminar (GAMS*), Simulating the Large Deformations of Thin Sheets: A Survey*, November 2025

- Association for Women in Mathematics Research Symposium, *Computational Surrogates for Crumpled Sheets* Poster, UW-Madison, May 2025
- Math for All, *Singular Value Decomposition* Poster, University of Utah, April 2024
- Learning Assistant Symposium, *A Meta-Concept Map* Poster, University of Utah, April 2023

Programming Languages and Models

C++ and OpenMP, MATLAB, Python, and R.

Relevant Courses

- Stochastic Computational Methods, fall 2025, UW—Madison
- 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

- Association for Women in Mathematics Research Symposium Volunteer, UW-Madison, May 2025
- Graduate Teaching Assistants' Peer Observation Program Participant, UW-Madison, Spring 2025
- Gender Minorities in Math at Wisconsin, Active Member, UW-Madison, September 2024 – Present
- Graduate Research Opportunities for Women, Selected Participant, Duke University, October 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