Ann Bigelow

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Education

Mathematics PhD, 2029 — University of Wisconsin–Madison

- ***NSF Graduate Research Fellow***

Applied Mathematics BS, ***summa cum laude***, 2024 — University of Utah

Graduate Research Projects

*****All projects were advised by Chris Rycroft at the University of Wisconsin–Madison.

Simulating Crumpling via Finite Element Methods Nov. 2025–Present

- Used finite-element methods to simulate large deformations of thin sheets, with the intention of improving accuracy with respect to a mass-spring model. Derived equations of motion using variational calculations.
- Highlights: solid mechanics, Kirchhoff–Love plate theory, Willmore energies, nonlinear strain energy density functions, finite element methods, computing in C++

Crumpled Thin Sheets for Stomatal Density Measurements June 2025–Present

In collaboration with the Lang Lab at the University of California–Berkeley

- Highlights: mechanical mass-spring models of elastoplastic thin sheets, parallelized computing in C++, surface roughness metrics, Gaussian convolutions, spatial derivative discretizations on an arbitrary triangular mesh, plant adaptations to climate change

Computational Surrogates for Crumpled Sheets Aug. 2024–Present

- Highlights: scientific computing in C++, multithreading, universality of creasing behavior of crumpled sheets, data augmentation in data-sparse machine learning studies, crease network prediction, stochasticity of fold patterns and Bertrand's Paradox in probability

Presentations

- Howard University, Graduate Mathematics Seminar, *Paper Crumpling: A Mass-Spring Model,* April 2026
- UW–Madison Physical Applied Mathematics Seminar (PhAMS), *Paradoxes in Paper Folding,* Feb. 2026
- UW–Madison Graduate Applied Mathematics Seminar (GAMS), *Paradoxes in Paper Folding,* Feb. 2026
- UW–Madison, GAMS*, Simulating the Large Deformations of Thin Sheets: A Survey*, Nov. 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

Awards

- National Science Foundation Graduate Research Fellow, 2025 – Present

Experiences

We Inspire STEM Empowerment (WISE) Graduate Mentor Committee	2026–2027
	UW–Madison
WISE Graduate Mentor	Spring 2026
	UW–Madison
Directed Reading Program (DRP) Graduate Mentor	Fall 2025
Project Title: The Mathematics of Modeling Thin Sheets	UW–Madison
Grader	Fall 2025
Math/CS 714 (Methods of Computational Mathematics I)	UW–Madison
Affiliate Research Assistant	June 2025
The Rycroft Group	Lawrence Berkeley National Laboratory
Teaching Assistant	Spring 2025
Calculus and Analytic Geometry I	UW–Madison
Research Assistant	Fall 2024
Chris Rycroft	
Learning Assistant:	Jan. 2023–Aug. 2024
Center for Science and Mathematics Education	University of Utah
Calculus I, Physics I, Precalculus, Physics II, College Algebra	
Mathematics Tutor	Jan.–Aug. 2023
Math Center	University of Utah

Conferences and Membership

- Nebraska Conference for Undergraduate Wisdom in Mathematics (NCUWM) **Graduate Student Panelist**, UN–Lincoln, Jan. 2025
- 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, Sept. 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, Aug. 2022–Aug. 2024
- Biology Learning Center, Volunteer Tutor, University of Utah, Jan. 2022–June 2022

Undergraduate Research Projects

The Singular Value Decomposition and an Application May–Aug. 2023

Tim Tribone, PhD 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.

Hessian Matrix Visualization Sept. 2022–June 2023

Alan Dorval, PhD 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 a voltage function's Hessian matrix, to better understand effects of electrical contact placement choices upon axon polarizations.

Programming Languages and Models

Primarily: C++ (OpenMP, Intel Math Kernel Library (MKL), MKL PARDISO), MATLAB.

Occasionally: Python and R

Relevant Courses

- Parallel and Throughput Computing, S (Spring) 26, UW–Madison
- Stochastic Computational Methods, F (Fall) 25, UW–Madison
- Methods of Applied Mathematics, F 24–S 25, UW–Madison
- Methods of Computational Mathematics, F 24–S 25, UW–Madison
- Survey of Numerical Analysis, S 24, Utah
- Mathematical Modeling, S 24, Utah
- Foundations of Analysis II, S 24, Utah
- Introduction to Optimization, F 23, Utah
- Introduction to Partial Differential Equations, F 23, Utah