

Julie Sherman

Curriculum Vitae

Salt Lake City, UT
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Education

- Expected **PhD**, *University of Utah*, Salt Lake City.
May 2025 Mathematics
- May 2022 **M.S.**, *University of Utah*, Salt Lake City.
Statistics
- May 2019 **B.S.**, *University of Minnesota*, Twin Cities, Summa Cum Laude(GPA: 3.86).
Mathematics, Statistics
- Minors**, *University of Minnesota*, Twin Cities.
Computer Science, Astrophysics, and Environmental Science, Policy, and Management

Awards and Honors

- 2019 - 2020 **Center for Quantitative Biology Fellowship Recipient**, For incoming graduate students to pursue mathematical biology via funding throughout year including for summer lab experience and seminar attendance..
- 2015 - 2019 **Clifford I. and Nancy J. Anderson Scholarship Recipient**, Merit-based scholarship for STEM students.
- 2015 - 2019 **University of Minnesota Honors Student**, Invited by University Honors Program. Average honors student in 99th high school rank percentile.
- 2014 - 2019 **Dean's List**, Maintained GPA greater than 3.666 each semester.

Publications

- **J. Sherman**, C. Sampson, E. Fleurantin, Z. Wu, and C.K.R.T. Jones (2024). A data-driven study of the drivers of stratospheric circulation via reduced order modeling and data assimilation. *Meteorology* 3, no. 1: 1-35. <https://doi.org/10.3390/meteorology3010001>.
- **J. Sherman** and J.F. Gutiérrez. (2024). Classifying Arithmetic Problems Used in a United States Government Curriculum Designed to Assimilate Native American Children. *Educational Studies in Mathematics* (under review).
- **J. Sherman**, C. Strong, and K.M. Golden. (2024). Evolution of the fractal geometry of the Arctic marginal ice zone. *Environ. Res. Lett.* (in revisions).
- **J. Sherman**, K. St. Claire, B.R. Gray, and D. Larson. (2024). Predicting a continuous causal variable given ordinal outcomes and structural zeros with application to submersed aquatic vegetation biomass. *J. of Ag. Bio. and Environ. Stat.* (submitted).

- **J. Sherman**, L. Kim, M. Smith, and J.F. Gutiérrez. (2023). Quantitative analysis of mathematical word problems in the Estelle Reel Papers collection. *Proc. Third Annu. Meet. Int. Soc. Learn. Sci.*
- J. David, A. Nolte, and **J. Sherman**. (2018). A Boundary-Value Problem for 3-D Fractional Wave Equation with Singularity. *Bull. Inst. Math., Uzb. Acad. Sci.* (2), 28-52. <http://mib.mathinst.uz/en/archive.html>
- A.K. Shaw, **J. Sherman**, F.K. Barker, M. Zuk. (2018). Metrics matter: the effect of parasite richness, intensity and prevalence on the evolution of host migration. *Proc. R. Soc. B* 285: 20182147. <http://dx.doi.org/10.1098/rspb.2018.2147>

Workshops and Summer Schools

- Sept. 2024 **Greenland Ice Sheet Ocean Science Network Summer School**, *Theme: Beyond the ice edge: linking science and society at Greenland's coastal margins*, Nuuk, Greenland.
- May 2022 **Biogeochemical Exchange Processes at Sea Ice Interfaces Sea Ice Summer School**, Cambridge Bay, Nanuvut, Canada.
- July 2019 **Math Climate Research Network Summer School**, *Theme: Tipping points and data assimilation in climate and weather systems*, Durham, NC, USA.

Conference Presentations

- "Fractals and Multiscale Pattern Formation in Earth's Sea Ice System", SIAM Conference on Dynamical Systems (May 2023)
- "Data Assimilation with a Reduced Order Model of the Polar Vortex"
 - SIAM Conference on Mathematics of Planet Earth (Aug. 2020)
 - SIAM Conference on Computational Science and Engineering Poster Session (Mar. 2021)
- "An Application of Abel's Method to the Inverse Radon Transform", Joint Mathematics Meetings Undergraduate Poster Session (Jan. 2019)
- "Constraints on the Oceanic Carbon Sink Using Atmospheric Oxygen Data"
 - Midwest Dynamical Systems Conference Poster Session (Nov. 2018)
 - Joint Mathematics Meetings Undergraduate Poster Session (Jan. 2018)
 - Nebraska Conference for Undergraduate Women in Mathematics (Jan. 2018)
- "Crabby Consequences of Ocean Acidification", University of Minnesota Student Poster Fair (Apr. 2016)

Ongoing and Unpublished Projects

- Jan 2024–current **Assessing Vegetation Vulnerability to Water Balance Futures Using Satellite Data.**

Quantifying plant response to changes in water balance variables at a 250-m resolution over the continental US. Assess future vulnerability under 12 different climate models and 2 representative concentration pathway scenarios. Collaboration with the U.S. National Parks Service Northern Colorado Plateau Network, funded through AmeriCorps Scientist in Parks program.

- May **Statistics and data analysis in the scope of arctic watershed geochemistry.**
 2023–Sept. 2023 Creating a framework to analyze and relate several geochemical properties measured in Alaskan permafrost. Completed with collaborators at the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) in Fairbanks, AK, and funded through NSF ORISE/ORAU MSGI program.
- May **Nematode modeling in extreme environments.**
 2020–Sept. 2021 Literature review of experiments and models determining effects of physical environment on the invertebrate community of the McMurdo Dry Valleys. In Summer 2021 with collaborators from BYU, ice cores from the Weddell Sea were analyzed for their crystalline structure and biotic communities.
- June **An application of Abel’s method to the inverse Radon transform.**
 2018–Sept. 2018 A method of regularizing the inverse Radon transform was investigated. Convergence theorems were proven and Gibbs phenomena were ruled out. Suggestions were made for applications and an example was presented. Work completed as a part of IRES in Uzbekistan. Published in arXiv
- May **Constraints on the Oceanic Carbon Sink Using Atmospheric Oxygen Data.**
 2017–March 2018 This study develops a simple model of the global carbon-oxygen budget, incorporating data from the Scripps Carbon Dioxide and Oxygen Programs. The results are obtained from derivative free optimization techniques and gives minimum fluxes from the biosphere and the oceans necessary to replicate atmospheric observations. Funded by a UROP grant.
- 2015–2016 **The Model Male: Gender in *Science*.**
 This project examines gender bias in scientific communities. Images in every issue of *Science* from the year 2013 through 2015 were surveyed and appearances of men and women were recorded, as well as the type of image. While overall representation was approximately equal across genders, cartoons and drawings portrayed significantly more males than females. Social implications are discussed.
- Mar. - May 2017 **Effects of Space, Time, and Civilian Involvement on Fatalities in Conflict.**
 A group research project using a large, publicly available dataset with information about violent conflicts in Africa. Nonparametric methods were used to analyze the trend in number of fatalities based on geographic location, time of year, and civilian involvement.
- Nov. 2016 **Effects of Airflow and Temperature on Computer Performance.**
 Treatments which alter the amount of airflow and the ambient temperature were applied to computers and the graphics performance was the measured response. Data was analyzed using R.
- Jan.–Apr. 2016 **Crabby Consequences of Ocean Acidification.**
 The effects of acidic water on *Portunus gibbesii* was measured. Tanks with historic and predicted ocean pH levels, 8.2 and 7.9, respectively, each held four crabs for six weeks. The water chemistry was monitored and kept constant.

Teaching Experience

Lecturer, *University of Utah*.

Teaching classes of up to 80 students. Preparing and lecturing on material from a textbook. Developing and grading homework, quizzes, and tests.

MATH 1070 **Introduction to Statistical Inference**, Spring 2023.

MATH 1090 **Business Algebra**, Fall 2020.

Teaching Assistant, *University of Utah.*

Leading a discussion section and holding office hours for classes of up to 30 students. Developing supplementary worksheets, expanding on topics from the textbook, and leading the class through example problems.

MATH 6710 **Functional Analysis**, Fall 2021, Fall 2022.

MATH 3070 **Introduction to R**, Fall 2021, Spring 2022.

MATH 3080 **Introduction to R II**, Spring 2022.

MATH 1321 **Engineering Calc II**, Fall 2020.

Undergraduate Teaching Assistant, *University of Minnesota - Twin Cities.*

Leading a discussion section and holding office hours for classes of up to 30 students. Developing supplementary worksheets, expanding on topics from the textbook, and leading the class through example problems.

MATH 1272 **Calculus II**, Fall 2017, Spring 2018.

MATH 1151 **Precalculus II**, Fall 2018.

Grader, *University of Minnesota - Twin Cities.*

Providing feedback and grades on homework and quizzes for several math courses.

MATH 5535 **Chaos and Dynamical Systems**, Fall 2017.

MATH 5248 **Cryptology and Number Theory**, Spring 2017.

MATH 4242 **Applied Linear Algebra**, Fall 2016, Fall 2018.

MATH 1142 **Calculus**, Summer 2016.

Extra-Curricular Involvement and Service

Mathematics and Climate Research Network.

May 2023 - **Southwest Regional Co-Coordinator.**

Present Planning and coordinating activities for MCRN members across universities, labs, and organizations in the southwest region.

Association for Women in Mathematics.

Aug. 2022 - **President, *University of Utah Student Chapter.***

May 2024 Coordinating a team of 8-14 committee chairs dedicated to maintaining an active AWM chapter through social events, mentorship programs, outreach, and speaker series.

Aug. 2020 - **Events Committee Chair, *University of Utah Student Chapter.***

May 2022 Very similar role to below. Actively participating and helping plan events for the AWM chapter at my new institution.

Sept. 2016 - **Lead Undergraduate Officer, *UMN Student Chapter.***

Dec. 2018 Organizing, planning, and advertising math-related events. Encouraging women to pursue math in all levels of education. Fostering a welcoming community of women with similar interests.

- Nov. 2017 - **Planner and Counselor**, *Mathematics Project at Minnesota*, Minneapolis, MN.
- Jan. 2019 Developing workshops and team building activities for a four day camp aimed at undergraduate women majoring in mathematics. This project is intended to build an inclusive community for undergraduate women in an academic setting, and increase their understanding of career paths and diversity
- July 2017 **Workshop Leader**, *Girls Solve It! With Mathematical Biology*, Minneapolis, MN.
Leading a group of high school women interested in mathematical biology through a half day workshop concerning the applied problem of sea turtle conservation.

Additional Skills

Programming

