

Lauren Mossman

262.287.8074 | lmossman@ucdavis.edu | Davis, CA

EDUCATION

| | |
|--|---------------------|
| University of California, Davis , Davis, CA | Expected: June 2027 |
| PhD in Applied Mathematics | GPA: 3.88 |
| <i>Advisor:</i> Fernanda Valdovinos | |
| <i>Dissertation:</i> Non-trophic Interactions in Bioenergetic Network Models | |
| University of California, Davis , Davis, CA | June 2024 |
| Master's in Applied Mathematics | GPA: 3.88 |
| St. Olaf College , Northfield, MN | May 2022 |
| Bachelor of Arts | GPA: 3.94 |
| Major: Mathematics Concentrations: Mathematical Biology, Statistics and Data Science | |

RESEARCH EXPERIENCE

Non-trophic Interactions in Bioenergetic Network Models

University of California, Davis (Prof. Fernanda Valdovinos) June 2023 – Present

- Developed novel framework classifying non-trophic interactions by habitat modifications and extended the Allometric Trophic Network model to multiplex networks to evaluate how facilitation, competition for space, and other non-consumptive interactions shape ecosystem stability across six ecological metrics
- Applied multiplex network modeling to Chilean rocky intertidal communities across environmental gradients to identify how network structure and non-trophic interactions influence biodiversity patterns

Validation of Dynamical Systems Models for Vector-borne Virus Transmission in Honeybees

St. Olaf College (Prof. Sara Clifton) September 2021 – May 2022

- Explored impact of environmental conditions on viral transmission among bee hives with a two-part model to capture the deterministic within-hive and stochastic between-hive disease dynamics, resulting in a publication.
- Utilized model validation techniques to estimate parameters in increasingly complex stochastic mathematical models.

Modeling Climate Change's Impact on *Macrocystis pyrifera*

Quantitative Research for the Life and Social Sciences Program (QRLSSP) at Arizona State University (Prof. Steffen Eikenberry and Prof. Claudia Pio Ferreira) June 2021 – July 2021

- Analyzed impact of abiotic factors on the growth and survival of giant kelp forests off the coast of California by creating a non-autonomous ODE age-structured model.
- Communicated results of climate change's impact on giant kelp through weekly presentations and a final technical report.

Modeling Phage-Antibiotic Synergy Inhibited by Temperate and Chronic Virus Competition

St. Olaf College (Prof. Sara Clifton) January 2020 – January 2021

- Modeled the efficacy of antibiotics when target bacteria are infected with a combination of temperate and chronic viruses, resulting in a publication.

Modeling Treatment Strategies for Transplant Patients

Research Experience for Undergraduates at Indiana University-Purdue University Indianapolis

(Prof. Julia Arciero)

June 2020 – August 2020

- Analyzed the role of timing and dosage of alternative treatment strategies to immunosuppressants by modeling cellular dynamics of the immune system, resulting in a publication.

INTERNSHIPS

Pontificia Universidad Católica de Chile Internship

Estacion Costera de Investigaciones Marinas, Chile (Dr. Evie Weiters) August 2025 – September 2025

- Trained in rocky intertidal field methodologies at a coastal marine research station, observing data collection protocols for long-term ecological monitoring studies
- Developed framework with marine biologists for integrating longitudinal field data and expert knowledge of species interactions into multiplex network models.

Cell Therapy Clinical Pharmacology and Modeling Internship

Takeda Pharmaceuticals (Dr. Aman Singh)

June 2024 – August 2024

- Developed mathematical of cellular dynamics during lymphodepletion chemotherapy administered to cancer patients before CAR-T cell treatments.
- Collaborated with European clinical consortium (T2Evolve) to integrate real-world clinical data into models of immune system dynamics, providing clinicians with quantitative tools to optimize chemotherapy dosing while elucidating underlying mechanisms of treatment response

TEACHING EXPERIENCE

Directing Reading Program Mentor, University of California, Davis

September 2025 – Present

- Mentored undergraduate through independent study on differential equations in biomedical devices, meeting weekly to guide reading of advanced texts, facilitate problem-solving discussions, and develop skills in mathematical modeling beyond standard curriculum
- Created structured curriculum and mentored student in preparing end-of-program conference presentation to peer audience

Teaching Assistant, University of California, Davis

September 2022 – Present

- Courses: Population Estimation and Dynamics, Calculus I, Calculus II
- Develop weekly active-learning curriculum and manage a classroom of 25+ students while facilitating group activities
- Host office hours, run drop-in tutoring at the calculus tutoring center, and grade to provide personalized support for students

Undergraduate Teaching Roles, St. Olaf College

August 2019 – May 2022

- Calculus Supplemental Instruction Leader (2019-2022): Led peer collaborative learning sessions using active learning techniques to teach calculus concepts, coordinating with course instructors to align session content with lecture material and student needs
- Mathematical Biology Teaching Assistant (Spring 2022): Facilitated weekly R programming tutorials and graded computation modeling assignments

PUBLICATIONS

L. Boehm Vock, **L.M. Mossman**, Z. Rapti, A.G. Dolezal, S.M. Clifton. “Spatiotemporal, environmental, and behavioral predictors of Varroa mite intensity in managed honey bee apiaries. *PloS one* (2025).

K.J. Landa, **L.M. Mossman**, R.J. Whitaker, Z. Rapti, S.M. Clifton. “Phage-antibiotic synergy inhibited by temperate and chronic virus competition.” *Bulletin of Mathematical Biology* (2022).

M. Lapp, G. Lin, A. Komin, L. Andrews, M. Knudson, **L.M. Mossman**, G. Raimondi, J. Arciero.
“Modeling the potential of Treg-based therapies for transplant rejection: effect of dose, timing, and accumulation site.” *Transplant International* (2022).

WORKSHOPS AND INTERNATIONAL SCHOOLS

- Integrative Food Webs Workshop, Bodega Marine Laboratory, September 2025. Presented: Integrating Non-trophic Interactions into the ATN Model.
- 4th Biostochastic Workshop, Universidad de Valparaíso, September 2025
- Complexity-GAINs International School. Ecological Persistence and Resilience: From Emergence of Life to the Anthroposphere. Santa Fe Institute, France, October 2024. Presented: Network Architecture of Facilitation in Food Webs.
- Interdisciplinary approaches for the sustainable development and conservation of marine ecosystems in Chile, California, and South Africa, Bodega Marine Laboratory, September 2024. Presented: Mathematical Modeling of Non-trophic Interactions.

CONFERENCE PRESENTATIONS

- Lauren Mossman. “The Structure and Dynamics of Habitat-Modifying Interactions in Marine Food Webs,” **Society for Industrial and Applied Mathematics Northern and Central California Sectional (SIAM NCC)**. Conference, Oct. 2025.
- Lauren Mossman and Marco Ruiz. “Validation of dynamical systems models for vector-borne virus transmission in honey bees,” **National Conference on Undergraduate Research**, April 2022 (virtual).
- Lauren Mossman. “Modeling climate change’s impact on *Macrocystis pyrifera*,” **SACNAS National Diversity in STEM (NDiSTEM) Digital Conference**, Oct. 2021 (virtual).
- Lauren Mossman and Josey Sorenson. “Modeling climate change’s impact on *Macrocystis pyrifera*,” **Mathematical Association of America North Central Section Fall Meeting**, Oct. 2021 (virtual).
- Kylie Landa and Lauren Mossman. “Phage-antibiotic synergy inhibited by temperate and chronic virus competition,” **Midstates Consortium for Math and Science Undergraduate Research Symposium in the Physical Sciences, Math, and Computer Science**, Nov. 2020 (virtual).
- Mei Knudson and Lauren Mossman. “Modeling Transplant Immunology,” **National Institute for Mathematical and Biological Synthesis (NIMBioS) Undergraduate Research Conference**, Oct. 2020 (virtual).
- Kylie Landa and Lauren Mossman. “Phage-antibiotic synergy inhibited by temperate and chronic virus competition,” **Northfield Undergraduate Symposium in Mathematics (NUMs)**, Oct. 2020 (virtual).
- Mei Knudson and Lauren Mossman. “Modeling Transplant Immunology,” **Northfield Undergraduate Symposium in Mathematics (NUMs)**, Oct. 2020 (virtual).
- Kylie Landa and Lauren Mossman. “Phage-antibiotic synergy inhibited by temperate and chronic virus competition,” **Society of Mathematical Biology**, Aug. 2020 (virtual).
- Mei Knudson and Lauren Mossman. “Modeling Transplant Immunology,” **Indiana Undergraduate Math Research Conference**, July 2020 (virtual).

CONFERENCES ATTENDED

- Society for Modeling and Theory in Population Biology Conference, National Institute for Theory and Mathematics in Biology, June 2024.
- Symposium for Women and Gender Minorities in Mathematics in Southern California (WiMSoCal), February 2024.
- Dynamics Days UC Davis, Jan. 2024.
- Graduate Group for Applied Math (GGAM) Mini Conference, March 2023.
- Graduate Research Opportunities for Women (GROW), University of Illinois at Urbana-Champaign, October 2019.

LEADERSHIP AND OUTREACH

- University of California, Davis Society for Industrial and Applied Mathematics Leadership Committee September 2025 – Present
- National Conference on Undergraduate Research (NCUR) Abstract Review, 2023 – Present
- University of California, Davis Galois Group's tutoring for finals fundraiser, 2023 – Present
- Gender Minorities in Math Coordinator September 2024 – June 2024
- STEM for Girls Volunteer, May 2024
- Cal-Bridge Graduate Student Panelist, February 2024

AWARDS AND HONORS

Simons Dissertation Fellowship \$30,000 (2025 – 2026)
Jastro & Shields Research Award \$2000 (2023, 2024, 2025)
Jacoby Fellowship \$2000 (2024)
Summer 2023 Graduate Group in Applied Math Fellowship \$1000 (2023)
Chi Alpha Sigma (2021 – 2022)
Blue Key Honor Society (2020 – 2022)
Pi Mu Epsilon (2019 – 2022)
Dean's List (2018 – 2022)
Buntrock Scholarship \$120,000 (2018 – 2022)

SKILLS

Software: Julia, Mathematica, MATLAB, Python, R