

MARTHA TORSTENSON

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Environmental Studies
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PROFESSIONAL EXPERIENCE

Dartmouth College, Hanover, NH Postdoctoral Research Associate, Department of Environmental Studies Advisor: Theresa Ong	2025-Present
• Mechanistic modelling of transitions to agroforestry in New England	
Carleton College, Northfield, MN Visiting Instructor	2025
Macalester College, St. Paul, MN Visiting Instructor	2024-2025

EDUCATION

University of Minnesota, Twin Cities, MN Ph.D., Ecology, Evolution, and Behavior Areas of specialization: Mathematical modeling, migration, disease, climate Dissertation committee: Alison Shaw (advisor), Jessica Hellman, Sarah Hobbie, Kate Meyer Minnesota Center for Philosophy of Science Graduate Student Fellow Member of the Mathematics of Climate Research Network	2020-2025
Carleton College, Northfield, MN B.A., Mathematics, <i>magna cum laude</i> Dean's List 2014-2015, 2016-2017 Phi Beta Kappa	2014-2018

RESEARCH

Publications

1. Verzuh T, **Torstenson M**, Tao Y, Fryxell J, Rutz C, Beltran R (2026) "Aligning tools and terminology to integrate movement ecology with conservation science" *Conservation Biology*. e70209. <https://doi.org/10.1111/cobi.70209>.

2. **Torstenson M**, Shaw AK (2025). "Population response to extreme climate events depends on population spatial distribution" *Ecosphere*, 16(8).
<https://doi.org/10.1002/ecs2.70369>.
3. Shaw AK, Fouda L, Mezzini S, Kim D, Chatterjee N, Wolfson D, Abrahms B, Attias N, Beardsworth CE, Beltran R, Binning SA, Chan Y, Fronhofer EA, Hegemann A, Hurme ER, Iannarilli F, Kellner JB, McCoy KD, Rafiq K, Saastamoinen M, Sequeira AMM, Serota MW, Sumasgutner P, Tao Y, **Torstenson M**, Yanco S, Beck KB, Bertram MG, Beumer LT, Bradarić M, Clermont J, Ellis-Soto D, Faltusová M, Fieberg J, Hall RJ, Kölzsch A, Lai S, Lee-Cruz L, Lorreto MC, Loveridge A, Michelangeli M, Mueller T, Riotte-Lambert L, Sapir N, Scacco M, Teitelbaum CS, Cagnacci F (2025) "Perceived and Observed Biases within Scientific Communities: A Case Study in Movement Ecology." *Proceedings of the Royal Society B: Biological Sciences* 292:2051.
<https://doi.org/10.1098/rspb.2025.0679>.
4. Shao C, **Torstenson M**, Shaw AK (2025) "Effect of Resistant Compartment on Pathogen Strategy in Partially Migratory Populations" *PLOS One*, 20(2) e0316640.
<https://doi.org/10.1371/journal.pone.0316640>.
5. **Torstenson M**, Shaw AK (2025) "Strength of seasonality and type of migratory cue determine how the benefits of migration are affected by changing phenology" *Oikos*, 2025(1): e10862. <https://doi.org/10.1111/oik.10862>
6. **Torstenson MS**, Wolfson DW, Safran SM, Walton DJ, Hallberg AB, Kim D, Tan YF, Kramer GR, Andersen DE (2024) "Conservation of North American migratory birds: insights from emerging technologies" *Avian Conservation and Ecology*.
<https://doi.org/10.5751/ACE-02749-190213>
7. Shaw AK, Bisesi AT, Wojan C, Kim D, **Torstenson M**, Naven Narayanan, Lutz P, Ales R, Shao C (2024) "Six personas to adopt when framing theoretical research questions in biology" *Proceedings of the Royal Society B*. 291:20240803
<https://doi.org/10.1098/rspb.2024.0803>.
 - Discussed in a Dynamic Ecology blog post "[New feature: interviews with authors of really interesting papers! This week: Shaw et al. \(2024\) on the different "personas" you can adopt as a theoretician.](#)"
8. **Torstenson M**, Shaw AK (2024) "Pathogen evolution following spillover from a resident to a migrant host population depends on interactions between host pace of life and tolerance to infection." *Journal of Animal Ecology*, 93, 475-487.
<https://doi.org/10.1111/1365-2656.14075>

9. Shaw AK, **Torstenson M**, Craft ME, Binning SA (2023) "Gaps in modelling animal migration with evolutionary game theory: infection can favour the loss of migration." *Philosophical Transactions of the Royal Society B* 378:20210506. <https://doi.org/10.1098/rstb.2021.0506>

Code

1. **Torstenson, M. S.**, & Shaw, A. K. (2024). Model code associated with: Population response to extreme climate events depends on population spatial distribution. Zenodo. <https://doi.org/10.5281/zenodo.14510659>
2. **Torstenson, M. S.**, & Shaw, A. K. (2024). Model code associated with: Strength of seasonality and type of migratory cue determine the fitness consequences of changing phenology for migratory animals. In *Oikos*. Zenodo. <https://doi.org/10.5281/zenodo.13695479>
3. **Torstenson, M.**, & Shaw, A. K. (2024). Model code associated with: Pathogen evolution following spillover from a resident to a migrant host population depends on interactions between host life history speed and cost of infection. In *Journal of Animal Ecology*. Zenodo. <https://doi.org/10.5281/zenodo.10723759>

Experience

Fulbright Student Fellow 2019-2020
 Norwegian University of Science and Technology, Trondheim, Norway

- Built a mathematical model studying the impacts of environmental stochasticity and extreme climate events on community dynamics on Svalbard

Undergraduate Thesis

Carleton College, Northfield, MN 2017-2018

- Investigated the structure of shadows cast by multidimensional Cantor Sets

Research Assistant

Carleton College, Northfield, MN 2017-2018

- Assisted with data collection, statistical analysis, and writing on a variety of prairie ecosystem ecology experiments

PRESENTATIONS

Invited Talks

1. Shaw AK, **Torstenson M**, Lutz P, Wojan C. *Theory ‘personas’ as a tool to frame research questions*. Society for Modeling and Theory in Population Biology. March 2025.
2. **Torstenson M**. *Applying a flow-kick framework to understand how the spatial spread of populations affects population response to extreme climate events*. University of Minnesota - Mathematics of Climate Seminar. Minneapolis, MN. February 2024.

3. **Torstenson M.** *How does migration affect response to climate change?* University of Bergen - Theoretical Ecology Group. Bergen, Norway. May 2023.

Contributed Talks

1. **Torstenson M.** *Population response to extreme climate events depends on population spatial distribution.* Society for Mathematical Biology Online Conference on Population Dynamics, Ecology, and Evolution. February 2026.
2. **Torstenson M,** Kumawat D, Noory J, Kula L, Sárközi Z, Tilsen M, Copp K, Kaspar R. *Ecosystem and Planetary Health Cohort.* University of Minnesota Sustainability Symposium. St. Paul, MN. April 2024.

Posters (* denotes presenting author)

1. **Torstenson M*** & Shaw AK. *Population response to extreme climate events depends on population spatial distribution.* Gordon Research Seminar and Conference on Movement Ecology of Animals. Ventura, CA. July 2025.
2. Shaw AK*, Bisesi AT, Wojan C, Kim D, **Torstenson M,** Naven Narayanan, Lutz P, Ales R, Shao C. *What is your theorist 'persona'? Six ways to frame theoretical questions in ecology.* Ecological Society of America Conference. Long Beach, CA. August 2024.
3. **Torstenson M*** & Shaw AK. *Pathogen evolution following spillover from a resident to a migrant host population depends on interactions between host pace of life and tolerance to infection.* Ecology and Evolution of Infectious Disease Conference. Palo Alto, CA. June 2024.
4. **Torstenson M*** & Kumawat D*. *Ecosystem and Planetary Health Cohort: Model and Process.* University of Minnesota Sustainability Symposium. St. Paul, MN. April 2024. (Won an award for best poster)
5. **Torstenson M*** & Shaw AK. *Historical patterns of seasonality and type of migratory cue determine how the benefits of migration are affected by climate change.* Gordon Research Conference on Movement Ecology of Animals. Lucca, Italy. May-June 2023.
6. **Torstenson M*** & Shaw AK. *How pathogens evolve following spillover from a non-migratory to a migratory host population depends on cost of infection and life history speed.* Gordon Research Seminar on Movement Ecology of Animals. Lucca, Italy. May 2023.

TEACHING

Instructor of Record

Visiting Instructor, BIOL/ENVI 359 **Big Data in Ecology**
Macalester College, Saint Paul, MN

Fall 2024,
Spring 2025

Visiting Instructor, BIOL 210 **Global Change Biology**
Carleton College, Northfield, MN

Winter 2025

Teaching Assistantships

Teaching Assistant, EEB 5053 **Ecology: Theory and Concepts**
University of Minnesota, Twin Cities, MN

Fall 2023

- Wrote and graded problem sets
- Led weekly TA sessions
- Graded exams
- Taught 2 class sessions

Teaching Assistant, BIOL 1961 **Foundations of Biology Lab 1**
University of Minnesota, Twin Cities, MN

Fall 2021

- Taught a 20-student lab section for biology majors with a focus on computational biology
- Assisted students with lab work and the development of research proposals
- Graded post-lab assignments, tests, and research proposals.

Course Grader, MATH 120 **Calculus 2** and MATH 321 **Real Analysis**
Carleton College, Northfield, MN

Winter, Spring 2017

- Evaluated solutions to problem sets and communicated with professors about patterns in student understanding

Teaching Fellowships

Teaching Fellow, **Algebra 2 and Pre-Calculus**
Conserve School, Land O' Lakes, WI

2018-2019

- Provided one-on-one learning support to students and developed curriculum to encourage students to use mathematics to think about the natural world

Guest teaching

ENVS 22/EEES 181: **Coupled Human Natural Systems**, Dr. Theresa Ong
Dartmouth College, Hanover, NH

January 2026

- Taught a week of class on path dependency, hysteresis, and bifurcations

BIOL 362: **Arctic Ecology**, Dr. Mary Heskell
Macalester College, St. Paul, MN

March 2024

- Developed and executed a 3-class session series on animal migration in the Arctic

BIO 261: **Ecology**, Dr. Jake Grossman
St. Olaf College, Northfield, MN

May 2024

- Taught a class session on movement ecology

Other teaching experience

Nature of Life Instructor, **Simulating Animal Migration**
University of Minnesota, Twin Cities, MN

July 2024

- Developed and executed a 4-hour module for incoming freshman biology students

- Led and participated in other instructional activities, including mini-modules and a symposium

Educational Resources

1. **Torstenson, M. S.**, Balstad, L., Shaw, A. K. (2024). Simulating selection on migration. QUBES Educational Resources. doi:10.25334/G89V-6533

FELLOWSHIPS AND ACADEMIC HONORS

Fellowships

Torske Klubben Fellowship (\$32,000)	2022-2024
Fulbright Student Fellowship (\$13,300)	2019-2020

Prizes

Steven P. Galovich Prize in Mathematics (\$250)	2018
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Scholarships

Patricia V. Damon Scholarship (\$10,000)	2017
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SERVICE

To University

<i>Fulbright Interviewer</i>	2024
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Macalester College, Saint Paul, MN

- Interviewed 4 Fulbright applicants

<i>Nature of Life Panelist</i>	2024
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University of Minnesota, Twin Cities, MN

- Participated in a panel of graduate students discussing research and graduate school with freshman biology majors

<i>Biology Saves the World Focus Scientist</i>	2024
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University of Minnesota, Twin Cities, MN

- Discussed my research and life as a scientist with freshman biology majors across two one-hour sessions

<i>UROP Application Reviewer</i>	2023
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University of Minnesota, Twin Cities, MN

- Evaluated and provided feedback on proposals for undergraduate research

To Department

<i>EEB Welcome Week Coordinator</i>	2024, 2025
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University of Minnesota, Twin Cities, MN

- Coordinated faculty meetings for prospective graduate students.

- Organized other logistics for welcome week, including meals, current student panel, and activities in the Twin Cities.

Winter Gear Drive Coordinator 2023

University of Minnesota, Twin Cities, MN

- Led a panel on winter preparedness and organized a collection of winter gear for graduate students.

Ethics Committee Member 2020-2023

University of Minnesota, Twin Cities, MN

- Developed and facilitated four Ethics Seminars per year for the University of Minnesota's EEB Ph.D. program across four areas (Relationships in the academic and research community, authorship and scientific misconduct, peer review and research conduct)

To the Field

Reviewer for Journal of Ecology, Movement Ecology, Animal Taxonomy and Ecology, npj Urban Sustainability

MENTORSHIP

Research Mentor 2023-2024

University of Minnesota, Twin Cities, MN

- Mentored an undergraduate student (Jessica Valiarovski) researching the evolution of virulence

REU Mentor 2022-2023

University of Minnesota, Twin Cities, MN

- Mentored an undergraduate student (Cynthia Shao) researching the evolution of virulence, resulting in the publication of a manuscript

Directed reading mentor 2022

University of Minnesota, Twin Cities, MN

- Chose papers and guided discussion for an undergraduate student's (Ruby Ales) directed reading on ecological theory and migration

Field Guides Mentor 2020-2024

University of Minnesota, Twin Cities, MN

- Provided mentorship to 4 undergraduate students interested in biology

Mentor Chain Participant 2021-2022

Ecological Society of America Theory Section

Trail Guide 2016-2021

YMCA Camp Widjiwagan, Ely, MN

- Led canoeing and backpacking trips for teens ranging in length from 5 to 35 days in various remote wilderness locations.

- Mentored participants on leadership, teamwork, and outdoor skills.

Society for Women in Mathematics and Statistics Mentor 2017-2018
Carleton College, Northfield, MN

- Provided mentorship to first-year math students

Tutor

TORCH, Northfield, MN 2014-2015

- Assisted high school students with math concepts and study skills

OUTREACH

K-12 Education 2023-2024

Summer Youth Camps

Bell Museum, Saint Paul, MN

- Developed and implemented an activity designed to teach 5th and 6th-graders about animal migration and mathematical modeling

Cedar Creek EcoExtravaganza May 2022, 2024

University of Minnesota, Twin Cities, MN

- Assisted middle and high school students with a day of ecological research projects

Young Chefs 2015-2016

Carleton College, Northfield, MN

- Taught weekly lessons about science and cooking to middle school students

Green Thumbs 2014-2015

Carleton College, Northfield, MN

- Developed and executed a curriculum to teach 3rd-grade students about science and gardening

Public Talks

Earth Day Talk April 2025

Minikhada Club, Minneapolis, MN

- Delivered a talk about animal migration and global change to a local country club

Study Club Talk October 2024

Study Club, Wayzata, MN

- Gave a talk on migration in an era of global change to a women's club

Cedar Creek Lunch with a Scientist December 2022

University of Minnesota, Twin Cities, MN

- Gave a public lecture to over 100 participants on my research about animal migration and climate change (Available at https://mediaspace.umn.edu/media/t/1_ioxjyvox)

Other Public Outreach

Market Science 2021-2022
University of Minnesota, Twin Cities, MN

- Led interactive activities about patterns in nature at a local farmer's market

PROFESSIONAL DEVELOPMENT

New Faculty Orientation September 2024
Macalester College, Saint Paul, MN

- Participated in a week of training for new faculty

Entering Mentoring Spring 2024
University of Minnesota, Twin Cities, MN

- Participated in a semester-long workshop series following a curriculum developed by The Center for the Improvement of Mentored Experiences in Research (CIMER)

Institute on the Environment Graduate Leader 2023-2024
University of Minnesota, Twin Cities, MN

- Led an interdisciplinary graduate cohort focused on ecosystem and planetary health and participated in a series of leadership trainings

Preparing Future Faculty Fall 2021 and Spring 2024
University of Minnesota, Twin Cities, MN

- Took coursework focused on preparing faculty and participated in a practicum under the mentorship of Dr. Mary Heskell