

# JASPER WEINBURD

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## RESEARCH INTERESTS

Collective Behavior, Self-Organization, Mathematical Biology and Ecology,  
Data Science, Dynamical Systems, Differential Equations

## EDUCATION

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PhD Mathematics, *University of Minnesota – Twin Cities, MN* May 2019  
Advisor: Arnd Scheel  
Thesis: Patterns Selected by Spatial Inhomogeneity

MSc Mathematics, *University of Minnesota – Twin Cities, MN* December 2016

BA Mathematics, *Bard College, NY* May 2013

## EMPLOYMENT

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University of St. Thomas, Saint Paul, MN 2024-present  
*Assistant Professor of Data Science*

Hamline University, Saint Paul, MN 2022-2024  
*Assistant Professor of Mathematics & Computational Data Science*

Minnesota Alliance on Problem Gambling, Roseville, MN Spring 2023  
*Consultant – Data Analyst*

Harvey Mudd College, Claremont, CA 2019-2022  
*Visiting Assistant Professor of Mathematics*  
*NSF Postdoctoral Fellow, DMS-1902818*

St. Olaf College, Northfield, MN Fall 2018  
*Instructor of Mathematics*

University of Minnesota, Minneapolis, MN 2013-2019  
*Course Supervisor, Lecturer, Teaching Assistant, Research Assistant*

## PUBLICATIONS

•denotes undergraduate coauthor

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- S King, K Adamyk, J Weinburd, R Stinchfield. *Frequent and problem gambling in public school students*. JAMA Pediatrics (2025).  
DOI: [10.1001/jamapediatrics.2025.0925](https://doi.org/10.1001/jamapediatrics.2025.0925)
  - J Weinburd, J Landsberg<sup>•</sup>, A Kravtsova<sup>•</sup>, S Lam<sup>•</sup>, T Sharma<sup>•</sup>, S Simpson, G Sword, J Buhl. *Anisotropic interaction and motion state of locusts in a hopper band*. Proc Roy Soc B (2024).  
DOI: [10.1098/rspb.2023.2121](https://doi.org/10.1098/rspb.2023.2121)

- AJ Bernoff, M Culshaw-Maurer, RA Everett, ME Hohn, WC Strickland, J Weinburd. *Agent-based and continuous models of hopper bands for the Australian plague locust: How resource consumption mediates pulse formation and geometry*. PLOS Comp Biol (2020). DOI: [10.1371/journal.pcbi.1007820](https://doi.org/10.1371/journal.pcbi.1007820)
- R Samuelson<sup>\*</sup>, Z Singer<sup>\*</sup>, J Weinburd, A Scheel. *Advection and autocatalysis as organizing principles for banded vegetation patterns*. J Nonl Sci 29:255-285 (2019). DOI: [10.1007/s00332-018-9486-6](https://doi.org/10.1007/s00332-018-9486-6)
- A Scheel, J Weinburd. *Wavenumber selection via spatial parameter jump*. Phil Trans Roy Soc A 376:20170191 (2018). DOI: [10.1098/rsta.2017.0191](https://doi.org/10.1098/rsta.2017.0191)

## ARTICLES IN PREPARATION

- AJ Bernoff, RA Everett, ME Hohn, J Maclean, WC Strickland, J Weinburd. *Selection of alignment models via Bayesian particle filtering of locust trajectory data*.
- AJ Bernoff, JEF Green, J Weinburd. *Continuous models for alignment and motion in locust swarms*.

## TECHNICAL REPORTS

- S King, K Adamyk, J Weinburd, R Stinchfield. *Gambling Among Minnesota Public School Students in 2022*. Prepared for the Minnesota Alliance on Problem Gambling (2023).

## NON-TECHNICAL ARTICLES

- J Weinburd, K Adamyk, M Ikanovic (Ed.). *Alumni Newsletter*. Mathematics Department, Hamline University (2023). <https://www.jasperweinburd.com/newsletter>
- J Weinburd. *My Relationship with My To Do List*. Math Values MAA Blog (2022). <https://www.mathvalues.org/masterblog/my-relationship-with-my-to-do-list>
- J Weinburd. *Student Feature*. The Dynamical Systems Web Magazine (2019). <https://dsweb.siam.org/The-Magazine/Article/student-feature-jasper-weinburd>

## AWARDS AND PRIZES

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Structured Quartet Research Ensembles (SQuaREs) <i>American Institute of Mathematics, Pasadena, CA</i>	May 2023-present
Full funding to bring our research group together at AIM for three weeks over three years.	
Mathematical Sciences Postdoctoral Research Fellowship, DMS-1902818 <i>National Science Foundation</i>	2019-2022
Three-year award totaling \$150,000	
Short-term Visiting Collaborators Grant <i>National Institute for Mathematical and Biological Synthesis</i> <i>University of Tennessee – Knoxville</i>	December 2020
Summer Collaborators Grant <i>Institute for Advanced Study, Princeton, NJ</i>	June 2019
Full funding to bring our research group together for two weeks at IAS.	
Society for Industrial and Applied Mathematics (SIAM) Student Travel Award <i>SIAM Conf. on Applications of Dynamical Systems</i>	May 2019
<i>SIAM Conf. on Nonlinear Waves and Coherent Structures</i>	June 2018
<i>SIAM Conf. on Applications of Dynamical Systems</i>	May 2017

Graduate Student Poster Prize August 2018  
*SIAM Conf. on Life Sciences*  
 Awarded to three poster presenters, selected by anonymous judges.

## INTERNAL GRANTS

Research in the Classroom Grant Summer 2023  
*Collaborative Undergraduate Research Program, Hamline University*  
 Stipend and support for in-class research projects totaling \$2000

HMC Math Department Collaborator Support May 2022  
*Harvey Mudd College, Claremont, CA*  
 Funding to support visiting collaborators on campus for a week of research.

HMC Internal Student Summer Support Summers 2020-2022  
*Harvey Mudd College, Claremont, CA*  
 Salary and support for four students totaling \$32,000

Graduate Student Teaching Award May 2014  
*Council of Graduate Students, University of Minnesota*  
 One of twelve awarded across the university on the basis of student nominations.

## RESEARCH MENTORSHIP

\*denotes co-mentorship

### Research Programs

*Summer Collaborative Undergrad Research Program, Hamline University* Summer 2023  
 B. Rosenberg: “Locust of Control: Modeling Locust Motion as a Markov Process”  
 • Awarded one of six University-wide Ridgeway Forum Fund Partnership Awards.

*Undergraduate Research Opportunities, Harvey Mudd College* Summer 2021  
 T. Sharma: “Classifying motion of locusts from trajectory data”

*Data Science REU, NSF DMS–1757952, Harvey Mudd College* Summer 2020  
 A. Kravtsova, S. Lam, J. Landsberg:  
 “Swarming locusts: Deducing insect interactions from field video data”

\**Summer Research and Scholarship Program, Harvey Mudd College* Summer 2020  
 Y. Maltsman: “Modeling aggregation as evolutionary trait in locust swarms”

\**Complex Systems REU, NSF DMS–1311740, University of Minnesota* Summer 2017  
 R. Samuelson & Z. Singer: “Advection and Autocatalysis in Banded Vegetation Patterns”  
 P. Flynn & Q. Neville: “Self-Organized Bacterial Clusters in Run and Tumble Processes”

### Undergraduate Theses

*Senior Thesis, Haverford College* 2020-2021  
 J. Landsberg: “Motion tracking individual interactions in locust hopper bands”

\**Senior Thesis & Independent Study, Harvey Mudd College* 2019-2021  
 M. Velez: “Energetic stability of swarm equilibria”

\**Senior Thesis, Harvey Mudd College* 2019-2020  
 H. Larson: “Agent-based models for foraging locusts”

### Internships and Independent Studies

*External Internship, Hamline University* Spring 2023  
 S. Silver with Traffic Engineering Team, Hennepin County, MN

*Industry Clinic Program, Harvey Mudd College* 2021-2022  
 S. Devin, R. Edmonds, R. Gallardo, C. Morken, B. Mountain  
 with Tempus Ex Machina, San Francisco, CA:  
 “A low-latency data pipeline for real-time sports analytics and inference”

## TEACHING

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University of St. Thomas, Saint Paul, MN 2024-present  
*Assistant Professor*  
 Teaching in the Data Science program.  
 Focus on inclusive pedagogy and reaching students traditionally not included in technical fields.
 

- Introduction to Data Science (Fall 2024)
- Introductory Computational Statistics (Fall 2024)

Hamline University, Saint Paul, MN 2022-2024  
*Assistant Professor*  
 Teaching in the Mathematics and Computational Data Science programs.  
 Emphasis in active learning and pedagogies that deconstruct barriers to learning.
 

- Data Visualization with R (Fall 2023)
- Introductory Statistics (Fall 2022, Fall 2023)
- Differential Equations (Spring 2023)
- Elements of Statistical Learning (Spring 2023)

Harvey Mudd College, Claremont, CA 2020-2022  
*Visiting Assistant Professor*  
 Taught across the mathematics curriculum from calculus to advanced and special courses.  
 Particular focus on implementing flipped-classroom pedagogy.
 

- Fourier Series and Boundary Value Problems (Spring 2022)
- Single and Multivariable Calculus (Fall 2021)
- Intermediate Differential Equations (Spring 2021)
- Fourier Series and Boundary Value Problems, co-instructed with A. Bernoff (Spring 2021)
- Math Forum, public speaking for math majors (Fall 2020)
- Partial Differential Equations, co-instructed with A. Bernoff (Fall 2020)

St. Olaf College, Northfield, MN Fall 2018  
*Instructor of Mathematics*  
 Independently taught one class of 19 students, with advice from colleagues as needed.
 

- Calculus II

University of Minnesota – Twin Cities, MN  
*Course Supervisor* Fall 2017  
 Designed, managed, and taught a class of 31 students with the help of a graduate TA.
 

- Intensive Precalculus

*Lecturer* Summer 2015  
 Taught a summer session of 15 students with graduate colleagues as co-supervisors.
 

- Calculus 2

*Graduate Teaching Assistant* 2013-2019  
 Lead discussion sections of ~ 30 students with almost complete autonomy from lecturer.
 

- Introduction to Proofs through Analysis (Fall 2015, Spring 2014)

- Linear Algebra and Differential Equations (Spring 2019, Fall 2016, Spring 2015)
- Multivariable Calculus (Fall 2018, Spring 2017, Spring 2016, Fall 2014)
- Calculus I (Fall 2013)

## PROFESSIONAL DEVELOPMENT IN TEACHING

Inclusive Classroom Institute	Fall 2024
<i>New Faculty Orientation, University of St. Thomas</i>	
Project NExT (New Experiences in Teaching) - Brown '20 cohort	2020-2021
<i>Mathematical Association of America</i>	
Student Seminar in Undergraduate Mathematics Education	2013-2019
<i>School of Mathematics, University of Minnesota</i>	
Seminar on Scholarship of Teaching and Learning in Mathematics	2018
<i>Mathematics Center of Educational Programs, U of Minnesota</i>	
To Include is to Excel	August 2018
<i>Teaching Summit Breakout Session, St. Olaf College, Northfield, MN</i>	
Difficult Dialogues Workshop: How to be a Better Ally	July 2018
<i>SIAM Annual Meeting, Portland, OR</i>	
Geometry of Redistricting: Educator Workshop	October 2017
<i>Metric Geometry and Gerrymandering Group, U. of Wisconsin, Madison, WI</i>	
Teaching in Higher Education, Preparing Future Faculty Program	Fall 2017
<i>Graduate Course (Elective), University of Minnesota</i>	
Undergraduate Coursework	2011-2013
<i>Bard College, Annandale-on-Hudson, NY</i>	
Composition Theory and Pedagogy	
Philosophy of Education	

## CONFERENCES AND PRESENTATIONS

\*denotes virtual presentation

### INVITED TALKS AND MINISYMPOSIA

Data Assimilation and Model Selection for Collective Motion in Locust Swarms	May 2025
<i>SIAM Conf. on Applications of Dynamical Systems, Denver, CO</i>	
Invasion fronts mediated by alignment and consumption	May 2023
<i>SIAM Conf. on Applications of Dynamical Systems, Portland, OR</i>	
Invasion fronts and columns in locust swarms	Apr 2023
<i>Research Seminar, Pattern Formation Group, U of Minnesota – Twin Cities</i>	
Collective behavior in locust swarms: From differential equations to data	Feb 2023
<i>Mathematics and Physics Joint Seminar, Hamline University, MN</i>	
<i>Colloquium, Center for Applied Mathematics, University of St. Thomas, MN</i>	
<i>*Colloquium, Little School Dynamics Research Community</i>	
<i>*Mathematics Colloquium, University of Montana, Missoula, MT</i>	
Emergent patterns in locust swarms: From individual data to collective behavior	Nov 2021
<i>*Colloquium, Claremont Center for the Mathematical Sciences, Claremont, CA</i>	
Measuring individual interactions in locust swarms	May 2021
<i>*SIAM Conf. on Applications of Dynamical Systems, Portland, OR</i>	
Emergent patterns in locust hopper bands using agent-based and continuous models	

* <i>BioMath Seminar, Virginia Commonwealth University, Richmond, VA</i>	Apr 2021
* <i>Colloquium at the Center for Applied Mathematics, Cornell University, NY</i>	Oct 2020
• You can watch the full talk online: <a href="#">Cornell CAM Colloquium</a>	
Resource consumption mediates locust swarm formation and geometry	
* <i>AMS Special Session, Joint Mathematics Meetings, Washington, DC</i>	Jan 2021
* <i>Mathematical Biology Seminar, UC Davis, CA</i>	Nov 2020
* <i>SIAM/CAIMS Annual Meeting, Toronto, CA</i>	July 2020
Agent-based and PDE Models for Foraging Locust Swarms	April 2020
* <i>PDE &amp; Applied Math Seminar, UC Riverside, CA</i>	
Fronts of foraging locusts	December 2019
<i>SIAM Conf. on Analysis of PDEs, La Quinta, CA</i>	
Patterns deformed by spatial inhomogeneity	November 2019
<i>Applied Math Seminar, Claremont Center for Mathematical Sciences, Claremont, CA</i>	
Imperfect hexagons deformed by spatial inhomogeneity	May 2019
<i>SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT</i>	
Collective waves from individual behavior in foraging locusts	January 2019
<i>AMS Special Session, Joint Mathematics Meetings, Baltimore, MD</i>	
Traveling vegetation bands from advection and autocatalysis	July 2018
<i>SIAM Annual Meeting, Portland, OR</i>	
Advection and autocatalysis in banded vegetation patterns	June 2018
<i>SIAM Conf. on Nonlinear Waves and Coherent Structures, Anaheim, CA</i>	
Wavenumber selection via spatial parameter step	May 2017
<i>SIAM Conf. on Applications of Dynamical Systems, Snowbird, UT</i>	

## TALKS FOR UNDERGRADUATES

Assessing locust interactions within a swarm	July 2022
* <i>Modeling Accelerator, Southeast Center for Math and Biology, Atlanta, GA</i>	
Fronts of foraging locusts	June 2021
* <i>Modeling Accelerator, Southeast Center for Math and Biology, Atlanta, GA</i>	
A tale of two models for foraging locusts	
<i>Research Seminar, St. Olaf College, Northfield, MN</i>	November 2018
<i>Undergraduate Math Club, University of Minnesota</i>	November 2018
Gerrymandering and measuring compactness	February 2018
<i>Undergraduate Math Club, University of Minnesota</i>	
The edge of patterns: spatial transitions	September 2016
<i>Special Seminar, Bard College, Annandale-on-Hudson, NY</i>	

## POSTERS

Advection and conservation in banded vegetation patterns	
<i>Midwest Dynamical Systems Conference, Minneapolis, MN</i>	November 2018
<i>SIAM Conference on Life Sciences, Minneapolis, MN</i>	August 2018
• Graduate Student Poster Prize winner	
Wavenumber selection via spatial parameter step	
<i>Dynamics Days, Silver Spring, MD</i>	January 2017

*Workshop in Nonlinear Optics, Inst. for Math. and Applications, MN* October 2016

## WORKSHOP PARTICIPATION

Grant Writing Training Program Spring 2025

*University of St. Thomas*

Anti-Racist Reading Group for Faculty and Staff Summer 2020

*Harvey Mudd College*

Introduction to Data Analysis with R & Reproducible Data Science August 2018

*Institute for Research in Statistics and its Applications, U of Minnesota*

Agent-Based Modeling in Biological and Social Systems June 2018

*Mathematical Research Communities Program, American Mathematical Society, RI*

Funded to attend introductory workshop with small group work on research-level problems.

Maintain ongoing collaboration that has produced papers and current research questions.

Dynamical Systems Summer School May 2015

*University of Houston, Houston, TX*

## SERVICE

### SERVICE TO THE COMMUNITY

Guest Speaker December 2019

*Gateway to Exploring Mathematical Sciences, Claremont, CA*

Engaged middle and high school students in college-level mathematical ideas through a presentation with active participation in this monthly outreach program.

Science Fair Judge June 2019

*KIPP North Star Academy, Minneapolis, MN*

Evaluated poster presentations at this middle school science fair at this college-prep charter school serving low-income middle school students.

### SERVICE AT UNIVERSITY OF ST. THOMAS

Service to the University

*Sustainability Communities Partnership, Office of Sustainability Initiatives (OSI)* Fall 2024

- Enriched student learning through experiential, real-world course projects in intro data science.
- Students developed data visualizations enabling OSI to share UST's sustainability performance in relation to other institutions.

*Attended Faculty Senate Meeting* November 2024

*Attended Faculty Forum, Reimagining Faculty-Student Engagement* Fall 2024

Service to the College of Arts and Sciences

*Statistics and Data Science Program Advisory Board* Fall 2024-present

Departmental Service

*Hiring Committee, Limited-Term Data Science Faculty* 2024-2025

### SERVICE AT HAMLINE UNIVERSITY

Service to the University

- Junior Faculty Group Leadership* Spring 2023-2024
- Contributions to Recruitment and Retention* 2022-2024
- Organized student career panel and luncheon.
  - Restructured MATH 1200 with additional support, applicable content, and tutors.
  - Engaged with prospective students through admissions and athletics.
- Selection Committee, Summer Collaborative Undergraduate Research* Spring 2023
- Departmental Service 2022-2024
- Curricular Work*
- Skills-Based Minor Creation: Interdisciplinary collaboration to create the Data Visualization skills-based minor.
  - Revised Curricular Pathways: Created more entry points to and aligned CDS and AP programs.
- Student Engagement*
- Embedded Tutor Initiative: Brought peer tutors into the classroom every week in introductory Statistics (largest service course offered by the department), in partnership with Center for Academic Success and Achievement.
  - Academic Advising: Ten students (informally) in AY 2022-23 and sixteen (formally) in AY 2023-24.
- Administrative Work*
- Hiring (tenure-track): Wrote and submitted two tenure-track hiring proposals for colleagues to fill vacancies in our department.
  - Hiring (visiting): Wrote job ad, reviewed applications, and drafted interview questions.
  - Hiring, Orientation, Check-ins (adjuncts): Reviewed candidates, connected new employees to course materials and on-campus resources, provided regular check-ins, received feedback on course design and student engagement.
  - Program Reapproval: Wrote Computational Data Science (CDS) Program Reapproval Form.
  - Program Reapproval: Contributed to Applied Mathematics (AP) Reapproval Form.
  - Alumni Newsletter: Coordinated writing, editing, and communication of first departmental newsletter in decades, in partnership with the office of Institutional Advancement.
    - Available online here: <https://www.jasperweinburd.com/newsletter>

## SERVICE TO THE PROFESSION

### Student Poster Judge

*SIAM Conf. on Applications of Dynamical Systems* May 2025

### Journal Referee

*SIAM Undergraduate Research Online* Spring 2023

*SIAM Applied Math* Spring 2021

*The Undergraduate Mathematics and Its Applications Journal* Fall 2020

*Nature Communications* Summer 2020

### Conference Session Organizer

*Joint Mathematics Meetings, Washington, DC* Jan 2021

“AMS Special Session on Agent-Based Dynamics and Self-Organization in Biology”

*SIAM Conf. on Analysis of PDEs, La Quinta, CA* December 2019

“Traveling Waves: Selection Principles and Stability”

*SIAM Nonlinear Waves and Coherent Structures, Anaheim, CA* June 2018

“Vegetation Patterns: Modeling, Analysis, and Data”

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SIAM Student Chapter Representative <i>SIAM Annual Meeting, Portland, OR</i>	July 2018
Local Site Host Coordinator <i>Student Challenge Using Differential Equation Modeling, Minneapolis, MN</i>	April 2018
Seminar Organizer <i>Pattern Formation and Dynamical Systems Research Group, U of Minnesota</i>	2016-2018
President; Secretary <i>Student Chapter of the American Mathematical Society, U of Minnesota</i> Oversaw weekly Junior Colloquium, Intro to Research seminar, and social teas. Secured internal grant funding for major math community events (75+ participants).	2014-2016
Graduate Student Peer Mentor <i>School of Mathematics, U of Minnesota</i>	2014-2016

## PROFESSIONAL AFFILIATIONS

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Society for Industrial and Applied Mathematics (SIAM)  
 American Mathematical Society (AMS)  
 Mathematical Association of America (MAA)

## COMPUTER PROGRAMS & LANGUAGES

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R, Python, MATLAB, SQL, Mathematica,  $\LaTeX$