Stephanie Dodson | PhD

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Academic Appointments

Colby College — **Waterville, ME**
Assistant Professor of Mathematics — *2022 – Present*

University of California, Davis — **Davis, CA**
Krener Assistant Professor, Department of Mathematics — *2019 – 2022*

Education

Brown University — **Providence, RI**
PhD, Applied Mathematics — *May 2019*
Thesis Advisor: Dr. Björn Sandstede, Division of Applied Mathematics
Thesis: Wave propagation in spatially extended systems

Master of Science, Applied Mathematics — *May 2015*

University of Massachusetts, Amherst — **Amherst, MA**
Bachelor of Science, Mathematics — *May 2014*

Bachelor of Science, Physics — *May 2014*
Commonwealth Honors College Scholar with Greatest Distinction, Summa cum laude

Publications

Articles in press

2022 **S. Dodson** and T.J. Lewis, *Wave Reflections in Excitable Media Linked to Existence and Stability of One-Dimensional Spiral Waves*, SIAM Journal on Applied Dynamical Systems, **21** 2 (2022) 1631-1659.

2022 **S. Dodson** and B. Sandstede, *Behavior of Spiral Wave Spectra with a Rank-Deficient Diffusion Matrix*, SIAM Journal on Mathematical Analysis, **54** 3 (2022) 3789-3816.

2020 **S. Dodson**, B. Abrahms, S. J. Bograd, J. Fiechter, and E. L. Hazen. *Disentangling the biotic and abiotic drivers of emergent migratory behavior using individual-based models*, Ecological Modelling, **432** (2020): 109225.

2019 **S. Dodson**, B. Sandstede. *Determining the Source of Period-Doubling Instabilities in Spiral Waves*, SIAM Journal on Applied Dynamical Systems **18**, 4 (2019) 2202-2226.

2018 H.M. McNamara, **S. Dodson**, Y-L Huang, E.W. Miller, B. Sandstede, and A.E. Cohen. *Geometry-Dependent Arrhythmias in Electrically Excitable Tissues*, Cell Systems, October 2018, doi.org/10.1016/j.cels.2018.08.013.

2015 A. Conard, **S. Dodson**, J. Kepner, and D.O. Ricke, *Using a Big Data Database to Identify Pathogens in Protein Data Space,* New England Database Day (NEDB), 2015, Cambridge, MA.

2015 **S. Dodson**, D.O. Ricke, J. Kepner, N. Chiu, and A. Shcherbina, *Rapid Sequence Identification of Potential Pathogens Using Techniques from Sparse Linear Algebra,* IEEE Symposium on Technologies for Homeland Security (HST), 2015.

2014 **S. Dodson**, D.O. Ricke, and J. Kepner, *Genetic Sequence Matching Using D4M Big Data Approaches,* IEEE High Performance Extreme Computing (HPEC) conference, 2014.

Press

2020 Featured in SIAM News article: *Agent-based Models Shed Light on Blue Whale Migration*

Selected Awards

2019 **Stella Dafermos Award**, Division of Applied Mathematics, Brown University
2018 **Association for Women in Mathematics Poster Prize**, SIAM Annual Meeting
2017 **Red Sock Award for Poster Presentation**, SIAM Conference on Applications of Dynamical Systems
2014 **Best Paper Award**, IEEE High Performance Extreme Computing Conference
2013 **William F. Field Alumni Scholar**, University of Massachusetts, Amherst

Fellowships and Grants

2020 **AMS-Simons Travel Grant**
Travel & research funding to use over two years, $5,000

2018 **National Science Foundation Graduate Research Internship Program (NSF GRIP)**
Travel & research funding to work with collaborators at NOAA, $5,000

2015 **National Science Foundation Graduate Research Fellowship (NSF GRFP)**
Three year award totaling $138,000

Student and Conference Travel Awards:
2020 SIAM Early Career Travel Award, $650
2018 SIAM Student Travel Award, $650
2018 Association for Women in Mathematics & NSF Workshop Grant, $700
2018 Graduate School Conference Travel Fund, Brown University, $650
2017 SIAM Student Travel Award, $650
2017 Graduate School Conference Travel Fund, Brown University, $650
2017 Graduate School Council Travel Funding, $200

Upcoming Activities

Presentations & Conferences

2022 **SIAM Conference on Nonlinear Waves and Coherent Structures**
Invited talk in minisymposium: *Planar and higher dimensional patterns: analysis & numerics*

2023 **Joint Mathematics Meetings**
Invited talk in AMS Special Sessions

Presentations

Invited Talks

2022 **Association for Women in Mathematics Research Symposium**, Minneapolis, MN, June 2022
When curvature promotes or obstructs the ability of a pacemaking region to drive activity in excitable tissue.

2022 **School of Mathematical Sciences Colloquium**, Rochester Institute of Technology (virtual)
Traveling waves, reflections, and the onset of cardiac arrhythmia, April 2022.

2022 **Sonoma State University M*A*T*H Colloquium**, Rohnert Park, CA
Modelling Population Migrations from Individual Decisions, April 2022.

2022 **IMACS: International Conference on Nonlinear Evolution Equations & Wave Phenomena**, Athens, GA
Behavior of Spiral Wave Spectra with a Rank-Deficient Diffusion Matrix, March 2022.

2022 **Department Colloquium**, Southern Methodist University (virtual)
Exploring Migratory Patterns of Blue Whales with an Agent-Based Model, January 2022.

2022 **Dynamics Days Conference** (virtual)
Reflections in Excitable Media Linked to Existence and Stability of One-Dimensional Spiral Waves, January 2022.

2021 **SIAM Conference on Application of Dynamical Systems** (virtual)
Exploring Migratory Patterns of Blue Whales with an Agent-Based Model, May 2021.

2021 **Applied PDE Seminar**, University of Washington (virtual)
One-dimensional spiral waves, source defects, and initiation of cardiac-arrhythmias, May 2021.
Recording available here on YouTube.

2021 **Joint Mathematics Meeting** (virtual)
Using Agent-Based Models to Understand Drivers of Migration in Northern Pacific Blue Whales, January 2021.

2020 **Partial Differential Equation Seminar**, University of Houston (virtual)
Behavior of Spiral Wave Spectrum with a Rank-Deficient Diffusion Matrix, November 2020.

2020 **SIAM Conference on Mathematics of Planet Earth** (virtual)
Using Agent-Based Models to Understand Drivers of Migration in Northern Pacific Blue Whales, August 2020.

2020 **SIAM Conference on Nonlinear Waves and Coherent Structures**
One-dimensional spiral waves, source defects, and initiation of cardiac arrhythmia, Bremen, Germany, July 2020 - Cancelled due to COVID-19

2020 **Mathematical Biology Seminar**, University of California, Davis
One-dimensional spiral waves, source defects, and initiation of cardiac arrhythmia, Davis, CA, February 2020.

2019 **SIAM Conference on Analysis of Partial Differential Equations**, La Quinta, CA
Stability of Spiral Wave Patterns in Models of Excitable and Oscillatory Media, December 2019.

2019 **Mathematical Biology Seminar**, University of California, Davis
Wave Propagation in Spatially Extended Systems, Davis, CA, May 2019.

2019 **Brown-BU-UMass Dynamics and PDEs Seminar**, Boston University
Mechanisms driving period-doubling instabilities in spiral waves, Boston, MA, May 2019.

2019 **Center for Biofilm Engineering Seminar Series**, Montana State University
Geometry Dependent Instabilities of Waves in Excitable Media, Bozeman, MT, March 2019.

2018 **SIAM Annual Meeting**, Portland, OR
Line Defects and Alternans: Period-Doubling Instabilities in Spiral Waves, July 2018.

2018 **SIAM Conference on Nonlinear Waves and Coherent Structures**, Anaheim-Orange County, CA
Stability of Spiral Waves in Models of Cardiac Tissue, June 2018.

2017 **Boston University Dynamical Systems Seminar**, Boston, MA
Stability of Spiral Waves in Cardiac Dynamics, October 2017.

Contributed Talks

2021 **Dynamics of Waves and Patterns Workshop**, Oberwolfach Research Institute for Mathematics (virtual)
Reflections in excitable media linked to existence and stability of one-dimensional spiral waves, August 2021.

2021 **Society for Mathematical Biology Conference** (virtual)
One-dimensional spiral waves and reflection-induced cardiac arrhythmia, June 2021.

2019 **SIAM Conference on Applications of Dynamical Systems**, Snowbird, UT
Role of Specta in Period-Doubling Instabilities of Spiral Waves, May 2019.

2019 **Dynamics Days Conference**, Northwestern, Evanston, IL
Mechanisms Driving Period-Doubling Instabilities in Spiral Waves, January 2019.

2018 **Brown University SIAM/AWM Math Slam**, Providence, RI
Stability of Spiral Waves in Models of Cardiac Tissue, April 2018.

2018 **Advancing Women's Impact in Mathematics Symposium (AWIMS)**, Worcester Polytechnic Institute
Spectral Stability of Spiral Waves in Models of Cardiac Tissue, April 2018.

2018 **Dynamics Days Conference**, Denver, CO
Stability of Spiral Waves in Cardiac Dynamics (Ignite Talk), January 2018.

2017 **Applied Math Graduate Student Seminar**, Brown University, Providence, RI
Stability of Spiral Waves in Cardiac Dynamics, November 2017.

2017 **Applied Math Days**, Rensselaer Polytechnic Institute, Troy, New York
Spiral Waves in Cardiac Dynamics, April 2017.

2017 **Applied Math Graduate Student Seminar**, Brown University, Providence, RI
Spiral Waves in Cardiac Dynamics, February 2017.

Posters

2020 **Dynamics Days Digital 2020** (virtual)
One-dimensional spiral waves, source defects, and initiation of cardiac arrhythmia, August 2020.

2018 **SIAM Annual Meeting**, AWM Poster Session
Spectral Properties of Spiral Waves in the Karma Model, Portland, OR, July 2018.

2018 **Dynamics Days Conference**, Denver, CO
Spectral Stability of Spiral Waves in Models of Cardiac Tissue, January 2018.

2017 **SIAM Conference on Applications of Dynamical Systems**, Snowbird, UT
Spectral Properties of Spiral Waves in the Karma Model, May 2017.

2017 **Dynamics Days Conference**, Silver Springs, Maryland
Spectral Properties of Spiral Waves in the Barkley Model, January 2017.

Workshops Attended

2021 Dynamics of Waves and Patterns Workshop, Oberwolfach Research Institute for Mathematics, August 2021

2019 Applied Mathematical Modeling with Topological Techniques Workshop, ICERM, Providence, RI, August, 2019.

2018 NOAA Ocean Satellite Data Course, University of Washington, Seattle, WA, August, 2018.

2017 MBI-NIMBioS-CAMBAM Summer Graduate Program: Connecting Biological Data with Mathematical Models, NIMBioS, Knoxville, TN, June, 2017.

2016 Gene Golub SIAM Summer School, Drexel University, Philadelphia, PA, July 25 – August 5, 2016.

2016 Séminaire de Mathématiques Supérieures: Dynamics of Biological Systems, University of Alberta, Edmonton, Alberta, Canada, June, 2016.

2015 Brown-ICERM-Kobe Summer Simulation School, Brown University, Providence, RI and Kobe University, Kobe, Japan, August, 2015.

Teaching

Experience

Spring 2022	**Instructor**, Reading Course on traveling waves and cardiac dynamics, UC Davis
Winter 2022	**Instructor**, Calculus for Biosciences, UC Davis
Fall 2021	**Instructor**, Partial Differential Equations, UC Davis
Fall 2020	**Instructor**, Introduction to Abstract Mathematics (Remote), 2 sections, UC Davis
Spring 2020	**Instructor**, Mathematical Biology (Remote), UC Davis
Fall 2019	**Instructor**, Introduction to Abstract Mathematics, UC Davis
Summer 2017	**Instructor**, Applied Ordinary Differential Equations, Brown University
Spring 2016	**Teaching Assistant**, Method of Applied Mathematics I, Brown University
Fall 2015	**Teaching Assistant**, Applied Ordinary Differential Equations, Brown University

Undergraduate Thesis Students

2021	Sameerah Helal, *Recovering Individual Based Model Outcomes on Spatiotemporally Coarsened Data*, UC Davis
2022	Saud Molaib, *Understanding the Effect of Prescribed Fires with Agent-Based Models*, UC Davis

Pedagogical Training

2020 - 2021	**Pedagogy Hangout**, Mathematics Department, UC Davis Participant in weekly discussion among math faculty on best practices for remote learning
2019 - 2021	**Center for Educational Excellence Workshops**, UC Davis Continually attending numerous single day workshops on teaching pedagogy hosted through the Center for Educational Excellence.
2020	**Summer Institute on Technology and Teaching**, UC Davis Attended the three day online workshop *Remotely Possible: Moving Beyond the Emergency* about integrating effective pedagogies into online teaching.
2018	**Sheridan Center Course Design Seminar**, Brown University Seminar focused on composing realistic course goals and using principles of backward design to create effective forms of assessment
2017 - 2018	**Sheridan Center Teaching Consultant Program**, Brown University Learned how to observe and provide constructive feedback on the teaching practices of diverse classrooms and subject areas.
2016	**Sheridan Center Certificate I: Reflective Teaching**, Brown University Introductory seminar which highlighted inclusive teaching practices, student engagement, and principles of learning design.

Service

Mentoring

2021 **Undergraduate Mentor**, Association for Women in Mathematics
Mentoring two students through the national AWM Mentor Network.

2020 - 2021 **Undergraduate Research Advisor**, University of California, Davis
Supervised two talented undergraduate students on independent and novel research

2019 - 2021 **AWM and Undergraduate Diversity in Physics Club Mentoring Program**
Mentoring undergraduate and graduate students, University of California, Davis

2018 - 2019 **Directed Reading Program**, Division of Applied Mathematics, Brown University
Mentored 2 undergraduate students pursuing an independent reading project on the use of differential equations in climate and epidemic models.

2015 - 2019 **Applied Math Undergraduate Graduate Mentoring Program**
Mentor and co-founder, Division of Applied Mathematics, Brown University

Conferences and Seminars Organized

2022 **Association for Women in Mathematics Research Symposium**, Minneapolis, MN
Co-organizer of minisymposium titled *Recent Advances in Mathematical Biology*, June 2022.

2021 **Society for Mathematical Biology** (virtual)
Co-organizer of MS08-CBBS: *Waves and traveling phenomena in living systems*, June 2021.

2020 - 2022 **UC Davis Mathematical Biology Seminar**
Co-organizer of weekly mathematical biology seminar for 2020-2021 & 2021-2022 academic years.
Department of Mathematics, University of California Davis

2019 **Minisymposium Organizer**, SIAM Conference on Applications of Dynamical Systems
Co-organizer of two-part minisymposium series titled *Theoretical Aspects of Spiral Waves and Traveling Waves in a Cardiac or Neuroscience Context*, Snowbird, UT, May 2019.

2018 - 2019 **Lefschetz Center for Dynamical Systems Seminar**
Co-organizer of weekly dynamical systems seminar for the 2018-2019 academic year.
Division of Applied Mathematics, Brown University

2016 - 2018 **Math SLAM**, Division of Applied Mathematics, Brown University
Co-organizer of a series of short and accessible mathematical talks to highlight the diversity of math research within the division.

2017 **Women's Intellectual Network Research Symposium, New England**
Lead organizer of regional conference to support and connect underrepresented researchers, Providence, RI.

Service and Outreach

2021-2022 **Program-level Assessment Capacity Enrichment for Equity (PACE4Equity)**, UC Davis
Member of a team revising the program learning outcomes for the applied mathematics major and focusing on developing equity-centered learning outcomes.

2021 **Judge**, Society for Mathematical Biology Annual Meeting
Judge for SMB contributed talk award

2021 **Poster Judge**, SIAM Conference on Applications of Dynamical Systems
Judge for *Red Sock* poster award

2021 **Guest speaker**, Swallow Union Elementary School, Dunstable, MA
Guest/alumna speaker about mathematical modeling for fourth grade classes.

2021 **COSMOS, UC Davis**, Calfornia State Summer School for Mathematics and Science
Co-instructor of Mathematical Modeling of Biological Systems cluster for advanced high schoolers.

2019 **Johns Hopkins Center for Talented Youth**, Outreach presentation in the Science Series in Applied Math (middle and high school students), Providence, RI.

2017 & 2019 **Judge**, AWM National Essay Contest: Biographies of Contemporary Women in Math.

2017-2018 **Reviewer** of undergraduate submissions to the SIAM Math Modeling Contest
Division of Applied Mathematics, Brown University

2015 - 2017 **President**, Brown University Association for Women in Mathematics Student Chapter.
*Chapter received the **Scientific Excellence Award** from the national AWM Executive Committee in 2016.*

2014 - 2019 **Event organizer**, Rose Whelan Society for Women in Math, Brown University
Organized events to build a network among graduate students, postdocs, and faculty.

2016 - 2017 **Applied Math Graduate Student Retreat**
Co-organized the annual fall retreat which serves to foster a collaborative research and learning environment for graduate students in the department. Led small group of peers in study of pattern formation in PDEs.

2015 - 2017 **Faculty-Graduate Liaison**, Division of Applied Mathematics, Brown University
Organized graduate student group budgets and facilitated communication between faculty and graduate students

2014 - 2015 **Secretary**, Brown University Association for Women in Mathematics Student Chapter

Professional Organizations: Association for Women in Mathematics (AWM), Mathematical Association of America (MAA), Society for Industrial and Applied Mathematics (SIAM)

Journals Refereed: *Ecological Modelling, IMA Journal of Applied Mathematics, Physica D, PLOS One, SIADS*