

# Sage Shaw

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## Education

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Ph.D. in Applied Mathematics – University of Colorado Boulder	2019 – 2025
M.S. Mathematics – Boise State University	2017 — 2019
B.S. in Mathematics – Southern Oregon University	2008 – 2013

## Publications

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2. **Shaw, Sage B.**, Zachary P. Kilpatrick, and Daniele Avitabile. *Radial Basis Function Techniques for Neural Field Models on Surfaces*. Apr. 2025. doi: [10.48550/arXiv.2504.13379](https://doi.org/10.48550/arXiv.2504.13379). arXiv: [2504.13379](https://arxiv.org/abs/2504.13379)
1. **Shaw, Sage B.** and Zachary P. Kilpatrick. “Representing stimulus motion with waves in adaptive neural fields”. In: *Journal of computational neuroscience* 52.2 (2024), pp. 145–164

## Theses

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2. **Shaw, Sage B.** “Approximating the Effect of Inputs and Cortical Geometry on Wave Propagation in Neural Fields”. PhD thesis. University of Colorado at Boulder, 2025
1. **Shaw, Sage B.** “Radial basis function finite difference approximations of the Laplace-Beltrami operator”. MA thesis. Boise State Univeristy, 2019

## Teaching Experience

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### University of Colorado Boulder

Course Number	Term	Role	Course Name
APPM 2720	S25	Instructor	<i>Matrix Methods and Applications Workgroup</i>
APPM 3310	S25	TA	<i>Matrix Methods and Applications</i>
APPM 5610	S24	TA	<i>Numerical Analysis 2</i>
APPM 4350	F24	TA	<i>Fourier Series and Boundary Value Problems – Intro to PDEs</i>
APPM 5370/4370	F23	Grader	<i>Computational Neuroscience</i>
STAT 5100/4100	S22	TA	<i>Markov Processes, Queues, and Monte Carlo Simulations</i>
APPM 3310	F22	TA	<i>Matrix Methods and Applications</i>
APPM 1360	S21	TA	<i>Calculus 2 for Engineers</i>
APPM 1350	F21	TA	<i>Calculus 1 for Engineers</i>
APPM 4650	F21	TA	<i>Intermediate Numerical Analysis I</i>
APPM 4650	S20	Grader	<i>Intermediate Numerical Analysis II</i>
APPM 2360	F20	TA	<i>Introduction to Differential Equations with Linear Algebra</i>
APPM 1350	F19	TA	<i>Calculus 1 for Engineers</i>

### Boise State University

Course Number	Term	Role	Course Name
MATH 144	S19	TA	<i>Precalculus II: Trigonometry</i>
MATH 149	S19	TA	<i>Precalculus: Function for Business (FM)</i>
MATH 144	F18	TA	<i>Precalculus II: Trigonometry</i>
MATH 144	S18	TA	<i>Precalculus II: Trigonometry</i>
MATH 143	S18	TA	<i>College Algebra (FM)</i>
MATH 143	F17	TA	<i>College Algebra (FM)</i>
MATH 108	F17	TA	<i>Intermediate Algebra</i>

## Presentations

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15. Sage B. Shaw. "Approximating the effect of inputs and cortical geometry on wave propagation in neural fields". Univeristy of Colorado Boulder Applied Math PhD Defense. May 2025
14. Shaw, Sage B., Zachary P. Kilpatrick, and Daniele Avitabile. "RBF Quadrature for Neural Fields". Poster presentation for SIAM Conference on Mathematics of Data Science (MDS24). Oct. 2024
13. Sage B. Shaw. "Radial Basis Function Methods for Neural Field Models". International Conference on Mathematical Neuroscience 2024. June 2024
12. Shaw, Sage B., Zachary P. Kilpatrick, and Daniele Avitabile. "RBF Quadrature for Neural Fields". Poster presentation for University of Colorado Boulder Graduate Student Recruitment. Mar. 2024
11. Sage B. Shaw. "Python in Scientific Computing: Why and How?" University of Colorado Boulder Applied Math Graduate Student Seminar. Oct. 2023
10. Sage B. Shaw. "Wave response theory for neural representations of apparent motion". 20 Years of Collaboration in Computational Neuroscience at University of Chicago. Oct. 2023
9. Sage B. Shaw and Zachary P. Kilpatrick. "Stimuli shift the position of traveling waves in neural fields with synaptic depression". Poster Presentation for SIADS23. May 2023
8. Sage B. Shaw. "Control of Traveling Waves in Adaptive Neural Fields". CU Boulder APPM Comprehensive Exam Presentation. 2023
7. Sage B. Shaw and Zachary P. Kilpatrick. "Stimuli shift the position of traveling waves in neural fields with synaptic depression". Poster Presentation for CU APPM recruitment. Mar. 2023
6. Sage B. Shaw. "Functional Programming in Python". CU Boulder APPM Graduate Student Seminar. Aug. 2021
5. Sage B. Shaw. "Radial Basis Function Finite Difference Approximations of the Laplace-Beltrami Operator". In: *Boise State University Theses and Dissertations* (Aug. 1, 2019). doi: [10.18122/td/1587/boisestate](https://doi.org/10.18122/td/1587/boisestate)
4. Sage B. Shaw, Grady B. Wright, and Varun Shankar. "A Comparison of Rbf-Fd Methods for Solving PDEs on Surfaces". Poster Presentation at SIAM CSE19. 2019
3. Sage B. Shaw. "On the Eigenproblem". Honors Capstone Published through Southern Oregon University. 2013
2. Sage B. Shaw. "The QR Algorithm". Presented at Southern Oregon Arts and Research (SOAR) at Southern Oregon University. 2013
1. Sage B. Shaw. "The Power Method: A Faster Approach to Eigenvectors". Presented at the Northern California Undergraduate Mathematics Conference at Chico State University. 2013

## Service

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2021 - 2022   CU Boulder Applied Math   Graduate Student Representative to the Graduate Committee  
2021 - 2025   CU Boulder Applied Math   Volunteer tutor for the Preliminary Exam Study Group

## Awards and Certifications

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Summer Research Fellowship - Boise State University 2018

Exam P of the Society of Actuaries 2013

Harry S. Kieval Scholarship Outstanding Jr. 2010

Ronald E. McNair Excellence in Scholarship 2010

Charles & Susan Cook Scholarship 2009

### Professional Experience

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#### **Space Situational Awareness Researcher - SpaceNav, LLC**

As an SSA Researcher at SpaceNav I looked for mathematical and algorithmic improvements to their software products. My focus was on the “ $P_c$  calculation”: the probability that two satellites would collide given uncertainties in their states. This involved Monte Carlo simulation techniques, numerical quadrature, numerical differential equations, optimization techniques, and statistical hypothesis testing.