Jonathan D. Shaw

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: https://jonathan-d-shaw.github.io

Education

Ph.D. in Applied Mathematics — *Expected May 2028*
University of Colorado Boulder — Boulder, CO

M.S. in Applied Mathematics — *May 2026*
University of Colorado Boulder — Boulder, CO

B.S. in Applied Mathematics — *May 2023*
University of Colorado Boulder — Boulder, CO
Magna cum laude
Concentration in Aerospace Engineering

Research Interests

- Numerical partial differential equations
- Integral equations
- "Fast" algorithm design
- Multiscale modeling/simulation
- Scattering and inverse problems
- Applications of functional, asymptotic, and numerical analysis

Publications

1. Trujillo, M.; Sajadi, A.; **Shaw, J. D.**; Hodge, B.-M., *Computationally Efficient Analytical Models of Frequency and Voltage in Low-Inertia Systems*, IEEE Transactions on Power Delivery 2026 (: arXiv)
2. Trujillo, M.; Sajadi, A.; **Shaw, J. D.**; Hodge, B.-M., *Analytical Models of Frequency and Voltage in Large-Scale All-Inverter Power Systems*, IEEE Transactions on Power Systems 2025 (: arXiv)
3. **Shaw, J. D.**; Restrepo, J. G.; Rodríguez, N., *A dynamical system model of gentrification: Exploring a simple rent control strategy*, Phys. Rev. E, 2024 (: arXiv)

Awards

- Student Travel Award, Dynamics Days US 2025

Talks & Presentations

Talks

- *Improving the density interpolation method*, SIAM Graduate Student Chapter Seminar, University of Colorado Boulder, January 2026 (contributed talk)
- *A dynamical system model of gentrification*, Complex/Dynamical Systems Seminar, University of Colorado Boulder, March 2025 (invited talk)
- *A dynamical system model of gentrification*, Dynamics Days US 2025, Denver, CO, January 2025 (contributed talk)

- *On the dynamics of gentrification*, Mathematical Biology Seminar, University of Colorado Boulder, October 2023 (contributed talk)

Poster Presentations

- *A dynamical system model of gentrification*, Dynamics Days US 2023, Denver, CO, January 2023

Research Experience

Department of Applied Mathematics — University of Colorado Boulder
Research Assistant — *May 2022–Present*

Quasi-direct solvers for boundary integral equations — *May 2026–Present*
Project advisor: Adrianna Gillman

Improving the density interpolation method — *August 2025–May 2026*
Project advisor: Eduardo Corona

Fast solvers for power systems applications — *May 2023–August 2025*
Project advisor: Eduardo Corona
Project collaborators: Fiona Majeau, Bri-Mathias Hodge, Amir Sajadi

Gentrification dynamics — *May 2022–September 2024*
Project advisors: Juan Restrepo and Nancy Rodríguez

Los Alamos National Laboratory — Los Alamos, NM
Intern, Physics XTD-PRI — *May 2018–August 2018*

Algebraic topology for computational fluid dynamics
Project advisor: Roy S. Baty

Software

Contributions

- chunkIE: A MATLAB integral equation toolbox

Leadership & Service

Society for Industrial and Applied Mathematics (SIAM) — University of Colorado Boulder

President, Graduate Student Chapter — *August 2025–Present*

Industry Liaison, Graduate Student Chapter — *August 2024–May 2025*

Buckskin Youth Leadership Training — Richmond, VA
Senior Staff Member — *January 2016–August 2023*