Longmei Shu

Rutgers University - Camden
Department of Mathematical Sciences
311 N. Fifth Street
Camden, NJ 08102
(404) 408-8355
longmei.shu@rutgers.edu

Research Interests

Evolutionary game theory, mathematical biology, isospectral transformations of multidimensional systems and networks

Employment

Rutgers University - Camden, Camden, NJ, USA
Assistant Professor   Sep 2024 - Present
Dartmouth College, Hanover, NH, USA
ACM Instructor   Jul 2021 - Aug 2024
Emory University, Atlanta, GA, USA
Visiting Assistant Professor   Sep 2019 - Aug 2021

Education

Georgia Institute of Technology, Atlanta, GA, USA
Ph.D. in Mathematics   Aug 2019
Advisor: Leonid Bunimovich
Thesis: Topics in Dynamical Systems

Tsinghua University, Beijing, China
M.S. in Applied Mathematics   Jul 2013
Advisor: Meirong Zhang
Thesis: Structure of Eigenvalues of Multi-point Boundary Value Problems of Second-Order Differential Equations

Tsinghua University, Beijing, China
B.S. in Hydraulic Engineering   Jul 2010
Advisor: Fuqiang Tian
Thesis: Rainfall and Fractal Dimension of River Networks

Publications

1. Alexandre Baraviera, Pedro Duarte, Longmei Shu, Maria Joana Torres, "Isospectral Reductions of Non-negative Matrices", under review

2. Longmei Shu, Feng Fu, "Determinants of successful mitigation in coupled social-climate dynamics", *Proceedings of the Royal Society A*, 479(2280)(2023)

3. Longmei Shu, Feng Fu, "Eco-Evolutionary Dynamics of Bimatrix Games", *Proceedings of the Royal Society A*, 478(2267)(2022)

4. Leonid Bunimovich, Longmei Shu, "Local Immunodeficiency: Role of Neutral Viruses", *Bulletin of Mathematical Biology*, 82(140)(2020)

5. Leonid Bunimovich, Longmei Shu, "Local Immunodeficiency: Minimal Networks and Stability", *Mathematical Biosciences*, 310(2019)31-49

6. Leonid Bunimovich, Longmei Shu, "On Attractors of Isospectral Compressions of Networks", Differential Equations and Dynamical Systems, Springer, 2018, pp. 63-73

7. Leonid Bunimovich, Longmei Shu, "Generalized Eigenvectors of Isospectral Transformations, Spectral Equivalence and Reconstruction of Original Networks", *Linear Algebra and its Applications*, 551(15)(2018)104-124

Presentations

Talk

1. "Dynamics of bimatrix games and a social-climate model", January 2024, JMM, San Francisco, CA, USA

2. "Determinants of successful mitigation in coupled social-climate dynamics", September 2023, AMS Sectional, Buffalo, NY, USA

3. "Isospectral Reductions and the Stationary Measure of Stochastic Matrices", August 2022, From elliptic islands to hyperbolic waves, PUC-Rio, Rio de Janeiro, Brazil

4. "Simple Controls for evolutionary game dynamics", April 2022, AMS Contributed Paper Session on Game Theory and its Applications, Recreational Math, JMM, Virtual

5. "SIR Models", April 2020, COVID-19 Outbreak Math Modeling Contest, Emory University, Atlanta, GA, USA

6. "Local Immunodeficiency: Minimal Network and Stability", May 2019, SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA

7. "Attractors and Spectral Equivalence of Isospectral Transformations", April 2019, Workshop on Dynamical Systems and Related Topics, the University of Maryland, College Park, MD, USA

8. "Local Immunodeficiency: Minimal Network and Stability", August 2018, 7th Workshop on Computational Advances in Molecular Epidemiology, Washington, D.C., USA

9. "Generalized Eigenvectors of Isospectral Transformations and Spectral Equivalence", April 2018, Workshop on Dynamical Systems and Related Topics, the University of Maryland, College Park, MD, USA

Poster

1. "Determinants of successful mitigation in coupled social-climate dynamics", July 2023, Dynamical systems in the life sciences, the Ohio State University, Columbus, OH, USA

Mentoring Experience

1. Undergraduate thesis committee, Amar Scherzer, Using Infectious Disease Simulations to Model, Quantify, and Predict the Impact of Self-Quarantine and Vaccination on Mpox Spread across the United States, 2023 Spring, Dartmouth College

2. Directed Reading Program, Learning the Lorenz System with Ergodic Theory, 2023 Winter, Dartmouth College

Teaching Experience

Rutgers University - Camden
- Math Reasoning, 2024 Fall
- Calculus II, 2025 Spring
- Elementary Differential Equations, 2025 Spring

Dartmouth College
- Differential Equations, 2022 Winter & Fall, 2023 Fall, 2024 Spring
- Calculus of Vector-Valued Functions, 2022 Fall, 2023 Spring, 2024 Spring
- Calculus, 2022 Winter
- Accelerated Multivariable Calculus, 2021 Fall

Emory University
- Life Sciences Calculus II, 2020 Fall, 2021 Spring
- Differential Equations, 2020 Spring & Fall, 2021 Spring
- Calculus I, 2019 Fall

Georgia Tech
- Introduction to Multivariable Calculus, 2018 Summer, 2019 Summer
- Teaching Assistant for Multivariable Calculus and Differential Equations, 2014-2018

Honors

1. Sigma-Xi Best Phd Thesis Nominee (Math) 2019 Georgia Tech

2. Certificate of Recognition from SIAM (Society for Industrial and Applied Mathematics) for organizing joint SIAM student conference April 2018 at Georgia Tech (Clemson+UAB+Emory+GaTech)

Service

1. Co-organizer for machine learning seminar, Rutgers Camden, 2024

2. Volunteer for Sonia Kovalevsky Day, Dartmouth College, 2022, 2024

3. Science Day Dartmouth Volunteer, Dartmouth College, 2023

4. Empowering Women of Color (EWOC) leadership team, Dartmouth College, 2022-2024

5. Poster Session Volunteer Reviewer, JMM, Boston, 2023, Seattle, 2025

6. Organizer for ACMS seminar, Dartmouth College, 2021-2022

7. Referee for *Linear Algebra and its Applications*, *PLOS Computational Biology*, *Royal Society Open Science*

8. SIAM Student Chapter President, Georgia Tech, 2018-2019