

MATTHEW HUDES

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EDUCATION

Johns Hopkins University

Ph.D. candidate in Applied Mathematics & Statistics (expected May 2028)

M.S.E. in Applied Mathematics & Statistics (May 2025)

Research Advisor: Gregory Eyink

Tufts University

B.S. in Applied Mathematics, *Summa Cum Laude* (May 2023)

Senior thesis: *Incremental dictionary learning via geometric sparse encoding*, High Honors.

Senior Thesis Advisor: Abiy Tasissa

RESEARCH INTERESTS

Spontaneous stochasticity, turbulence, partial differential equations, functional renormalization group (FRG), numerical renormalization group

PUBLICATIONS AND PREPRINTS

2. **Solving Functional PDEs with Gaussian Processes and Applications to Functional Renormalization Group Equations.** Xianjin Yang, Matthieu Darcy, **Matthew Hudes**, Francis J. Alexander, Gregory Eyink, Houman Owhadi. [arXiv preprint](#). 2025.
1. **An economically realistic asset exchange model.** Bruce M. Boghosian, **Matthew Hudes**, Gor A. Khachatryan, Jeremy Marcq. [Philosophical Transactions of the Royal Society A](#). 2022.

EXPERIENCE

DOE SCGSR Fellowship, Lawrence Berkeley National Lab (Summer 2026)

Working with Ishan Srivastava at the Center for Computational Sciences and Engineering

Investigating the effect of thermal fluctuations on spontaneous stochasticity in the Kelvin-Helmholtz instability

Wealth Inequality Research, Bruce Boghosian, Tufts University (2020 – 2023)

Development of agent-based Monte-Carlo models of the economy in C++ to understand oligarch creation

Research for a multi-country COVID-19 model (Summer 2020)

Research Experience for Undergraduates, Mason Porter, UCLA (Summer 2021)

Identifying anomalies in sparsely sampled traffic data with different machine learning techniques

TALKS AND PRESENTATIONS

April 2026 *Direct Approximation of FRG Flow Equations via Kernel Methods: Application to Lattice ϕ^4 and a 1D Model of Spontaneous Stochasticity (poster)*. WE Heraeus Physics School on The Non-Perturbative FRG and its Applications, Les Houches.

July 2025 *A FRG Approach to Spontaneous Stochasticity (poster)*. Statphys Conference, Florence.

April 2025 *A FRG Approach to Spontaneous Stochasticity (poster)*. SIAM Conference, Johns Hopkins University.

April 2025 *A FRG Approach to Spontaneous Stochasticity (oral)*. PhD Student Seminar, Johns Hopkins University.

April 2022 *Economic Models with Prospect Theory (poster)*. Joint Math Meetings.

August 2021 *Anomaly Detection in Sparsely Sampled Traffic Data (presentation)*. UCLA REU.

¹Updated May 23, 2026

TEACHING EXPERIENCE

Johns Hopkins University

- Spring 2026 **Teaching Assistant**, EN.553.681 Numerical Analysis for Jingmin Sun
Undergraduate/graduate-level course on numerical analysis
- Fall 2025 **Teaching Assistant**, EN.553.680 Numerical Linear Algebra for Gregory Eyink
Undergraduate/graduate-level course on numerical linear algebra
- Spring 2025 **Teaching Assistant**, EN.553.681 Numerical Analysis for Gregory Eyink
Undergraduate/graduate-level course on numerical analysis
- Fall 2024 **Teaching Assistant**, EN.553.680 Numerical Linear Algebra for Mario Micheli
Undergraduate/graduate-level course on numerical linear algebra
- Fall 2024 **Teaching Assistant**, EN.553.691 Dynamical Systems for Yashil Sukurdeep
Undergraduate/graduate-level course on nonlinear dynamical systems
- Spring 2024 **Teaching Assistant**, EN.553.681 Numerical Analysis for Gregory Eyink
Undergraduate/graduate-level course on numerical analysis
- Fall 2023 **Teaching Assistant**, EN.553.691 Dynamical Systems for Yashil Sukurdeep
Undergraduate/graduate-level course on nonlinear dynamical systems

Tufts University

- Fall 2021 **Teaching Assistant**, Math 164 Math of Poverty & Inequality for Bruce Boghosian
Undergraduate course on mathematical models of wealth inequality

ORGANIZATION

Seminar Co-organizer

Applied Mathematics & Statistics PhD Student Seminar, Johns Hopkins University (2024–2025). [Website](#).

Directed Reading Program Mentor

- Spring 2026** William Xiao: [Dreaming up scale invariance via inverse renormalization group](#) (Rançon et al)
- Spring 2025** Jack Drouin: Scaling and Renormalization in Statistical Physics (Cardy)
- Fall 2024** Andrew Gilbert: Path Integrals for Stochastic Processes (Wio)

AWARDS AND FUNDING

- DOE SCGSR Award, Lawrence Berkeley National Lab (Summer 2026)
- Rubenstein Fellowship, Johns Hopkins University (2023–2025)
- Norbert Wiener Award in Mathematics, Tufts University (2023)
- Benjamin G. Brown Scholarship, Tufts University (2023)

COMPUTING

Familiar with Python, R, C++, Git, Linux, Slurm, L^AT_EX, JAX, Dedalus

HOBBIES

Rock climbing, saxophone, origami, juggling