

Shreya Jha

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SUMMARY

Ph.D. student at NYU Courant, advised by Benjamin Peherstorfer. Research focuses on machine learning and numerical methods for stochastic dynamical systems, with an emphasis on learning generative models of time-dependent data directly from trajectories. Broader interests include data-driven surrogate modeling and model reduction for fast simulation and prediction of complex systems. **NSF Graduate Research Fellow**; first-author paper at **NeurIPS 2026**.

EDUCATION

New York University, Courant Institute — Ph.D., Computer Science | 2025–Present (expected June 2030)
Georgia Institute of Technology — B.S., Mathematics; B.S., Computer Science (GPA 3.93/4.00) | 2021–2025

PUBLICATIONS

First-Order Trajectory Matching: Fast Ensemble Predictions of Chaotic, Turbulent, Stochastic Systems NeurIPS 2026
[arXiv](#) | **S. Jha**, T. Schorlepp, N. Geissler, J. Berman, B. Peherstorfer
One-Step Generative Surrogate Models via Block-Triangular Joint Drifting preprint, submitted to SISC
[arXiv](#) | N. Geissler, **S. Jha**, R. Baptista, B. Peherstorfer
Solver to System: LLM Reasoning Across Representations and Execution in Scientific Simulation NeurIPS 2026 Workshop
E. Berman*, R. Subramanian*, **S. Jha**, L. Jagarapu, R. Ranganath (*equal contribution)

EXPERIENCE

Graduate Researcher, NYU Courant Institute | 2025–Present

- Developed First-Order Trajectory Matching (FTM), a method that learns fast surrogate models of stochastic systems directly from trajectory data and generates ensembles with one network evaluation per time step.
- On stochastically forced 2D turbulence, cut energy and enstrophy errors 3–4× relative to an autoregressive diffusion model that needs 100 network evaluations per time step.
- Designed and ran all numerical experiments on GPU clusters, benchmarking against operator-learning, diffusion, and flow-matching baselines on four systems ranging from low-dimensional chaotic dynamics to 2D Navier–Stokes.
- Built Solver2System, a dataset of 32 PDE solvers with aligned code, equations, and trajectories plus controlled physical defects, and helped design experiments testing whether LLMs can identify and diagnose physical errors in simulation code.

Research Intern and Project Manager, IPAM RIPS at UCLA, sponsored by Analog Devices | Summer 2024

- Led a four-student team developing machine-learning tools to model electric motors for precise motor control.
- Learned the input-output dynamics of motors from noisy measurements with physics-structured (rational) neural networks, reducing error 5–8× on noisy simulated data relative to the standard fitting method.

Undergraduate Research Assistant, Georgia Institute of Technology | 2023–2025

- Developed reduced models (moment closures) that evolve a few statistics of a stochastic system and track reference solutions more closely than the standard Gaussian closure on cell-population and nonlinear mechanical-vibration models.
 - Designed stabilizing steps for high-order closures, using semidefinite programming and exponential damping of higher-order cumulants; the damping step stabilized closures up to 12th order.
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AWARDS

NSF Graduate Research Fellowship | 2026
President’s Undergraduate Research Award, Georgia Institute of Technology | 2024

PRESENTATIONS

On the Use of Neural Nets for Transfer Function Approximation for Precise Motor Control — Talk, Nebraska Conference for Undergraduate Women in Mathematics; Poster, Joint Mathematics Meetings, 2025.
Higher Order Cumulant Truncation for Improved Moment Closure — Poster, SIAM Mathematics of Data Science, 2024.

SKILLS

Languages and Tools: Python, JAX, PyTorch, Julia, SLURM, LaTeX, Git