

Yuanhao Jiang

PhD Student in Applied and Computational Mathematics

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Research Interests

Stochastic numerical methods for molecular dynamics and sampling, non-equilibrium statistical mechanics, diffusion-based generative models.

Education

- 2025–Present **PhD Student in Applied and Computational Mathematics**, *The University of Edinburgh*
Supervisors: Prof. Benedict Leimkuhler and Dr. Nikolay Malkin.
Research focus: Non-equilibrium thermodynamics, thermostats, and diffusion-based generative models.
- 2024–2025 **MSc in Statistical Science**, *The University of Oxford*
Qualification: Distinction.
Dissertation: *Score-Based Diffusion Models for Protein Backbone Generation* (Supervisor: Prof. George Deligiannidis, GitHub: github.com/Yuanhao-JIANG/protein-backbone-diffusion).
- 2020–2024 **BSc (Hons) in Mathematics and Statistics**, *The University of Edinburgh*
Qualification: First Class Honours, average grade 86 (ranked 1st of 71 students).
Dissertation: *Score-Based Diffusion Techniques and Diffusion Map Method for Generative Modeling* (Supervisor: Prof. Benedict Leimkuhler).

Publications

- 2025 Rajit Rajpal, Benedict Leimkuhler, Yuanhao Jiang.
Adaptive Stepsizing for Stochastic Gradient Langevin Dynamics in Bayesian Neural Networks.
Math4AI Workshop @ AAAI 2026. (Oral presentation. Top 10%).

Research Experience

- Summer 2024 **Summer Research Student**, *The University of Edinburgh*
Applied constrained SDEs in score-based diffusion models to restrict the data points on Riemannian manifolds, potentially allowing more structural and controllable data perturbation and data generation.

- Summer 2023 **Summer Research Student, The University of Edinburgh**
Applied innovative approaches, especially the Leimkuhler-Matthews discretization method, for solving SDEs in diffusion generative models, to both the perturbation and denoising process. Compared sample quality and training efficiency with traditional numerical SDE solvers including the Euler-Maruyama method, the Milstein method, the stochastic Runge-Kutta method and so on. Embedded the diffusion coefficient function in perturbation SDE with spatial information to allow potentially higher perturbation flexibility.
- Summer 2022 **Summer Research Student, The University of Edinburgh**
Constructed interactive environment to model specific quantitative finance scenario. Implemented various model-free algorithms, including Actor-Critic, REINFORCE, and PPO, to train our pricing policy. Compared different algorithms for training efficiency and effectiveness. GitHub: github.com/Yuanhao-JIANG/RL-in-QF.

Teaching Experience

- 2025–Present **Tutor, Honours Complex Variables, The University of Edinburgh**
Delivered problem-solving tutorials for the Honours-level course Complex Variables. Guided students through contour integration, residue theory, conformal mappings, and analytic continuation. Provided formative feedback on coursework and examinations.

Employment

- 2021–2022 **Part-Time Assistant, Careers Service, The University of Edinburgh**
Managed the University's Careers Service WeChat account, reaching over 1,500 students annually. Coordinated onboarding for new students and maintained alumni engagement groups. Shared job opportunities and career events. Liaised with employers and developed employer networks to improve the quality and timeliness of career information.

Technical Expertise

- Computing Scientific computing in Python (NumPy, SciPy, PyTorch); stochastic differential equations; Monte Carlo methods; Bayesian inference; numerical integration schemes for Langevin dynamics.
- Languages English (professional), Chinese (native), Swedish (elementary).

Awards and Scholarships

- 2025–2029 School of Mathematics Studentship, the University of Edinburgh.
- 2024 Lawley Memorial Prize, the University of Edinburgh. Awarded to the candidate with the most distinguished performance in the final degree examinations of the joint honours degree in Mathematics and Statistics.
- 2023 School of Mathematics College Vacation Scholarship, the University of Edinburgh.
- 2023 Arthur Erdelyi Prize for distinguished performance in the Degree Examinations for Mathematics, the University of Edinburgh.
- 2023 James Ward Prize for distinguished performance in the Degree Examinations in Mathematics & Statistics, the University of Edinburgh.
- 2022 School of Mathematics College Vacation Scholarship, the University of Edinburgh.