

New Directions for Stochastic Differential Equations and Machine Learning

Monday 3 – Friday 7 June 2024

The programme is subject to change. All times are British Summer Time (BST).

Monday 3 June 2024	
09.20 - 09.50	Registration and Refreshments
09.50 - 10.00	Welcome and Housekeeping
10.00 - 12.00	Mini-course 1 - Desmond Higham , University of Edinburgh <i>Introduction to the Numerical Simulation of SDEs</i>
12.00 - 14.00	Lunch
14.00 - 15.00	Mini-course 2 - Fabio De Sousa Ribeiro , Imperial College London <i>Demystifying Diffusion Models</i>
15.00 - 15.30	Break and Discussion
15.30 - 16.30	Mini-course 3 - Andraž Jelinčič , University of Bath <i>Using DiffraX for efficient GPU-accelerated SDE simulation</i>

Tuesday 4 June 2024	
09.30 - 10.00	Konstantinos Zygalakis , University of Edinburgh <i>Talk Title TBC</i>
10.00 - 10.30	Break and Discussion
10.30 - 11.00	Tiffany Vlaar , University of Glasgow <i>Constrained and Partitioned Training of Neural Networks</i>
11.00 - 11.30	Break and Discussion
11.30 - 12.00	Robert Gruhlke , FU Berlin <i>Generative modelling with Tensor Train approximations of Hamilton–Jacobi–Bellman equations</i>
12.00 – 13.30	Lunch
13.30 - 14.00	Alexander Lobbe , Imperial College London <i>Generative Modelling of Stochastic Parametrisations for Geophysical Fluid Dynamics</i>
14.00 - 14.30	Break and Discussion
14.30 - 15.00	Yating Liu , Université Paris-Dauphine <i>Application of the optimal quantization and K-means clustering to the simulation of the McKean-Vlasov equation</i>
15.00 - 15.30	Break and Discussion
15.30 - 16.00	Teo Deveney , University of Bath <i>Closing the ODE-SDE gap in score-based diffusion models through the Fokker-Planck equation</i>
16.00 - 16.30	Break and Discussion
16.30 - 17.00	Terry Lyons , University of Oxford <i>Talk Title TBC</i>
17.00 - 17.30	Break and Discussion
17.30 – 18.30	Welcome Reception & Poster Session, hosted at ICMS
18.30 - 19.30	Public Lecture, hosted in G.03 (ground floor) Terry Lyons , University of Oxford <i>Signatures of Streams</i>

Wednesday 5 June 2024	
09.30 – 10.00	Desmond Higham , University of Edinburgh <i>Stability Issues for Diffusion Models in Generative AI</i>
10.00 - 10.30	Break and Discussion
10.30 – 11.00	Georgios Batzolis , University of Cambridge <i>Variational Diffusion Auto-encoder: Latent Space Extraction from Pre-trained Diffusion Models</i>
11.00 – 11.30	Break and Discussion
11.30 – 12.00	Thomas Gaskin , University of Cambridge <i>Neural parameter calibration for large-scale systems</i>
12.00 – 13.00	Lunch
13.00 - 15.00	Mini-course 4 - Grigoris Pavliotis , Imperial College London <i>Langevin-based sampling schemes</i>
15.00 - onwards	Free afternoon <i>(Guided walk around the city)</i>

Thursday 6 June 2024	
09.30 – 10.00	Neil Chada , Heriot-Watt University <i>Unbiased Kinetic Langevin Monte Carlo</i>
10.00 - 10.30	Break and Discussion
10.30 – 11.00	Benedict Leimkuhler , University of Edinburgh <i>Langevin and Adaptive Langevin Algorithms for Sampling and Optimisation in Machine Learning</i>
11.00 – 11.30	Break and Discussion
11.30 – 12.00	Lionel Riou-Durand , National Institute of Applied Sciences of Rouen <i>Metropolis Adjusted Langevin Trajectories: a robust alternative to Hamiltonian Monte Carlo</i>
12.00 – 14.00	Lunch
14.00 – 14.30	Josh Williams , STFC Hartree Centre <i>Modelling particle-laden turbulent flows with neural stochastic differential equations</i>
14.30 – 15.00	Break and Discussion
15.00 – 15.30	Irene Tubikanec , Johannes Kepler University Linz <i>Network inference in a stochastic multi-population neural mass model via approximate Bayesian computation</i>
15.30 – 16.00	Break and Discussion
16.00 – 16.30	Hao Ni , University College London <i>High Rank Path Development: an approach of learning the filtration of stochastic processes</i>
16.30 – 18.40	Break and Discussion
19.00 - onwards	Workshop Dinner, hosted at Blonde Restaurant <i>75 St. Leonard's Street, Edinburgh EH8 7QR</i>

Friday 7 June 2024	
09.30 – 10.00	Teresa Klatzer , University of Edinburgh <i>Bayesian Computation with Plug and Play Priors for Poisson Inverse Problems</i>
10.00 - 10.30	Break and Discussion
10.30 – 11.00	Mateusz Majka , Heriot-Watt University <i>Sampling, optimization, SDEs and gradient flows</i>

11.00 - 11.30	Break and Discussion
11.30 – 12.00	Grigoris Pavliotis , Imperial College London <i>Learning mean field models from data</i>
12.00 – 14.00	Lunch and End of Workshop