



Institute of
mathematics
& its applications

**4th IMA Conference on The
Mathematical Challenges of
Big Data**

20-21 September 2022

PROGRAMME

Day 1 – 20 September

Main room is L1

8.30	Registration open		
8.50	Opening Speech		
9.00	Keynote: Disentangling homophily, community structure and triadic closure in networks, <i>Tiago de Paula Peixoto</i> (Chair – <i>Ginestra Bianconi</i>)		
	ROOM – L1 (Online talks in blue)		ROOM – L5
10.00	10.00	(Chair – <i>Jared Tanner</i>) A dimensionality reduction technique for global optimization via random subspace embeddings, <i>Adilet Otemissov</i>	(Chair – <i>Ginestra Bianconi</i>) Resolving the data ambiguity in the largest database of crystals, <i>Vitaliy Kurlin</i>
	10.20	Sequential Motifs in Observed Walks Through Networks, <i>Timothy LaRock</i>	A subspace cubically regularised method for large-scale non-convex optimisations, <i>Zhen Shao</i>
	10.40	Optimization algorithms, <i>Laurent Condat</i>	Smale's 18th problem and the barriers of deep learning, <i>Matthew Colbrook</i>
11.00	Break/Poster		
11.20	11.20	(Chair – <i>Jared Tanner</i>) Modularity maximisation for graphons, <i>Florian Klimm</i>	(Chair – <i>Daniel Lawson</i>) Asymptotic Randomised Control and Exploration Value of Learning, <i>Tanut Treetanthiploet</i>
	11.40	Sampling strategies for the approximation of large-scale kernel matrices, <i>Bertrand Gauthier</i>	Social contagion and asset prices: Reddit's self-organised bull runs, <i>Valentina Semanova</i>

12.00	Poster Lighting talks (Chair – Jared Tanner) Lower dimensional representations of the filtering distribution via geometric projections, <i>Eliana Fausti</i> Shifted compression framework: generalizations and improvements, <i>Egor Shulgin</i> CLASSIX: Fast and explainable clustering based on sorting, <i>Xinye Chen</i> High-dimensional Asymptotics of Feature Learning: How One Gradient Step Improves the Representation, <i>Denny Wu</i> Error rates for kernel methods under source and capacity conditions, <i>Hugo Cui</i> Stiffness analysis for the diffusion of fake information, <i>Giuseppe Giordano</i>		
12.30	Lunch/ Posters		
13.30	13.30	(Chair – Jared Tanner) Constrained Optimization on Manifolds, <i>Melanie Webber</i>	(Chair – Daniel Lawson) Hypergraph Generative Models and Associated Spectral Embedding Algorithms, <i>Xue Gong</i> A Message-Passing Approach to Epidemic Tracing and Mitigation with Apps, <i>Hanlin Sun</i> Sequential data assimilation for uncovering an influence network from Hawkes processes driven by count data, <i>Naratip Santitissadeek</i>
	13.50	Regularisation of Inverse Problems: Deep Equilibrium Models versus Bi-level Optimisation, <i>Salvatore Riccio</i>	
	14.10	GNNs for Node Clustering in Signed and Directed Networks, <i>Yixuan He</i>	
14.30	Break/Posters		
14.45	14.45	(Chair – Jared Tanner) Normalizing Flows for Mutual Information Estimation, <i>Haoran Ni</i>	(Chair – Ginestra Bianconi) Macroprudential Policy in a Heterogeneous Environment - An Application of Agent-Based Macro Model, <i>Jagoda Kaszowska-Mojša</i>
	15.05	Streaming multi-resolution adaptive kernel methods, <i>Andreas Oslandbotn</i>	Phase Collapse in Neural Networks, <i>Florentin Guth</i>
	15.25	Coordinate descent on the orthogonal group for recurrent neural network training, <i>Estelle Massart</i>	Statistical and agent-based modelling of the transmissibility of different SARS-CoV-2 variants in England and impact of different interventions, <i>Jasmina Panovska-Griffiths</i>

15.45	Break/Poster
16.00	Keynote: The transformer leap, Nando de Freitas (<i>Chair – Jared Tanner</i>)
17.00	Conference Day Ends
17.30- 19.00	Drinks Reception & Buffet Green Templeton College (Stables Bar) 43 Woodstock Road Oxford OX2 6HD

Day 2 – 21 September

08.45	Registration open		
9.00	Keynote: Over-parametrization: Insights from solvable models, <i>Lenka Zdeborova (Chair – Jared Tanner)</i>		
		ROOM – L1	ROOM – L5
10.00	10.00	(Chair – Jared Tanner) Computing second-order points under equality constraints using Fletcher’s augmented Lagrangian, <i>Florentin Goyens</i>	(Chair – Daniel Lawson)
	10.20	High order tensor methods for non-convex unconstrained optimization, <i>Wenqi Zhu</i>	Exploring the compositional structure of images with convolutional kernel methods, <i>Francesco Cagnetta</i>
	10.40	Higher-order signal processing with the Dirac operator, <i>Lucille Calmon</i>	Accelerating Deep Unrolling Networks via Dimensionality Reduction, <i>Junqi Tang</i>
11.00	Break		
11.20	11.20	(Chair – Jared Tanner) Approximation properties of two-layer neural networks with values in a Banach space, <i>Yury Korolev</i>	(Chair – Daniel Lawson) Nearest-Neighbour Resampling for Off-Policy Policy Evaluation with Applications in Market Making, <i>Michael Giegrich</i>
	11.40	Identifiability in inverse reinforcement learning, <i>Samuel Cohen</i>	Generalized Diffusion for Graph Learning, <i>Darrick Lee</i>
	12.00	An unsupervised manifold learning approach to untangle big data of collective human behaviors, <i>Fanqi Zeng</i>	Lifted Bregman Networks, <i>Xiaoyu Wang</i>

12.20	Lunch / Posters		
13.20	13.20	(Chair – Jared Tanner) Continuous-time stochastic gradient descent for optimizing over the stationary distribution of stochastic differential equations, <i>Ziheng Wang</i>	(Chair – Daniel Lawson) Unifying information propagation models and their influence maximisation, <i>Yu Tian</i>
	13.40	Motion correction for cardiac MRI images using generative neural networks with disentangled latent space variables, <i>Malena Sabate Landman</i>	Using Web Data and Network Science to Detect Spatial Relationships, <i>Emerald Dilworth</i>
	14.00	Mirror Q-learning can exploit the structure of the environment, <i>Carlo Alfano</i>	Neural Q-Learning for solving elliptic PDEs, <i>Deqing Jiang</i>
	14.20	Tangent Space and Dimension Estimation with the Wasserstein Distance, <i>Uzu Lim</i>	Robust Dynamic Network Embedding, <i>Ed Davis</i>
14.40	Break / Posters		
15.00	Keynote: Inducement of sparsity, <i>Heather Battey</i> (Chair – Daniel Lawson)		
16.00	Conference Ends		