

The Mathematics of Data
Workshop on Optimal Transport and PDEs
(15 to 26 Jan)



Venue

IMS Auditorium
Institute for Mathematical Sciences
3 Prince George's Park
Singapore 118402

ORGANIZING COMMITTEE

Co-Chairs

Afonso S. Bandeira
ETH Zurich

Subhroshekhar Ghosh
National University of Singapore

Philippe Rigollet
Massachusetts Institute of Technology

Members

Hong T.M. Chu
National University of Singapore

		Time	Title Speaker
		Monday 15 Jan 2024	
1000–1055	Diffusion Schrödinger Bridge with Applications to Score-Based Generative Modeling <i>Jeremy Heng</i> <i>ESSEC Business School, Singapore</i>		
1055–1100	Short Break		
1100–1155	Semidiscrete optimal transport maps: stability, limit theorems, and asymptotic efficiency <i>Kengo Kato</i> <i>Cornell University, USA</i>		
1155–1430	Lunch Break		
1430–1525	Bregman-Wasserstein divergence and a modified JKO scheme <i>Ting-Kam Leonard Wong</i> <i>University of Toronto, Canada</i>		
1525–1530	Short Break		
1530–1625	The perfect diffusion model does not generate <i>Qin Li</i> <i>University of Wisconsin-Madison, USA</i>		
		Time	Title Speaker
		Tuesday 16 Jan 2024	
1000–1055	Local Structures for Large-Scale Optimal Transport <i>Tam Le</i> <i>The Institute of Statistical Mathematics, Japan</i>		
1055–1100	Short Break		
1100–1155	Deep Learning based algorithm for nonlinear PDEs in finance and gradient descent type algorithm for non-convex stochastic optimization problems with ReLU neural networks <i>Ariel Neufeld</i> <i>Nanyang Technological University, Singapore</i>		
1155–1430	Lunch Break		
1155–1430	Lunch Break		
1430–1525	A mathematical perspective on Transformers <i>Borjan Geshkovski</i> <i>Massachusetts Institute of Technology, USA</i>		

Tuesday 16 Jan 2024	Time	Title Speaker
	1525–1530	Short Break
	1530–1625	Neural Networks for PDEs: Representational Power and Inductive Biases <i>Andrej Risteski</i> <i>Carnegie Mellon University, USA</i>
	1830–1930	<u><i>Ng Kong Beng Public Lecture Series</i></u> Beating the odds: Learning or hallucinating? What is the science of data doing today? <i>Gerard Ben Arous</i> <i>New York University, USA</i>

Wednesday 17 Jan 2024	Time	Title Speaker
	0945–1000	Registration
	1000–1055	A New Perspective On Denoising Based On Optimal Transport <i>Bodhisattva Sen</i> <i>Columbia University, USA</i>
	1055–1105	Group Photo & Short Break
	1105–1200	Transformers Meet Image Denoising: Mitigating Over-smoothing in Transformers via Regularized Nonlocal Functionals <i>Tan Minh Nguyen</i> <i>National University of Singapore, Singapore</i>
	1200–1400	<i>Lunch Reception at IMS</i>
	1400–1455	Mirror gradient flows in the Wasserstein space <i>Soumik Pal</i> <i>University of Washington, USA</i>
	1455–1500	Short Break
	1500–1555	On Preemption and Learning in Stochastic Scheduling <i>Vianney Perchet</i> <i>ENSAE/CREST, France</i>
	1555–1630	Coffee Break
1630–1725	Statistical Analysis on Generalization Ability of In-Context Learning <i>Masaaki Imaizumi</i> <i>The University of Tokyo, Japan</i>	

Thursday 18 Jan 2024	Time	Title Speaker
	0945–1000	Registration
	1000–1055	(Skew) Gaussian surrogates for high-dimensional posteriors: from tighter bounds to tighter approximations <i>Anya Katsevich</i> <i>Massachusetts Institute of Technology, USA</i>
	1055–1100	Short Break
	1100–1155	Stochastic Interpolants: A Unifying Framework for Flows and Diffusions <i>Eric Vanden-Eijnden</i> <i>Courant Institute, New York University, USA</i>
	1155–1430	Lunch Break
	1430–1525	Feature Learning in Two-layer Neural Networks under Structured Data <i>Denny Wu</i> <i>University of Toronto, Canada</i>
	1525–1530	Short Break
	1530–1625	Gradient flow for fairness in real and virtual worlds <i>Xin Tong</i> <i>National University of Singapore, Singapore</i>
1800	<i>Conference Dinner @ Peach Garden Metropolis</i> <i>1-way transfer provided</i>	

Monday 22 Jan 2024	Time	Title Speaker
	0930–1030	Registration
	1030–1125	Optimal transport map estimation in general function spaces <i>Jonathan Niles-Weed</i> <i>New York University, USA</i>
	1125–1130	Short Break
	1130–1225	Approximation and Kernelization of Gradient Flow Geometry: Fisher-Rao and Wasserstein <i>Jia-Jie Zhu</i> <i>Weierstrass Institute for Applied Analysis and Stochastics, Germany</i>
	1225–1500	Lunch Break
	1500–1555	Wide neural networks for learning dynamical systems: a mean-field theory approach <i>Andrea Agazzi</i> <i>Università di Pisa, Italy</i>
	1555–1600	Short Break
1600–1655	New statistical phenomena for entropic optimal transport <i>Austin Stromme</i> <i>Massachusetts Institute of Technology, USA</i>	

Tuesday 23 Jan 2024	Time	Title Speaker
	0945–1000	Registration
	1000–1055	Gradient flows for empirical Bayes in high-dimensional linear models <i>Zhou Fan</i> <i>Yale University, USA</i>
	1055–1100	Short Break
	1100–1155	Steering Deep Feature Learning with Backward Aligned Feature Updates <i>Praneeth Netrapalli</i> <i>Google Research, India</i>
	1155–1400	Lunch Break
	1400–1455	<u>Mini Course</u> The geometry of the deep linear network <i>Govind Menon</i> <i>Brown University, USA</i>
	1455–1500	Short Break
	1500–1555	Approximation Theory of Deep Learning for Sequence Modelling <i>Qianxiao Li</i> <i>National University of Singapore, Singapore</i>
	1700–1800	<u>Dept of Math Colloquium Lecture @S17</u> The Emergence of Clusters in Self-attention dynamics <i>Philippe Rigollet</i> <i>Massachusetts Institute of Technology, USA</i>

Wednesday 24 Jan 2024	Time	Title Speaker
	0945–1000	Registration
	1000–1055	A geometric approach to a priori estimates for optimal transport maps <i>Robert McCann</i> <i>University of Toronto, Canada</i>
	1055–1100	Short Break
	1100–1155	Inference for nonlinear inverse problems <i>Vladimir Spokoiny</i> <i>Weierstrass Institute for Applied Analysis and Stochastics, Germany</i>
	1155–1430	Lunch Break
	1430–1525	<u>Mini Course</u> The geometry of the deep linear network <i>Govind Menon</i> <i>Brown University, USA</i>
	1525–1530	Short Break
	1530–1625	Learning under latent group sparsity via heat flow dynamics on networks <i>Soumendu Sundar Mukherjee,</i> <i>Indian Statistical Institute, Kolkata, India</i>