

# Information Theory and Data Science Workshop (16–27 January 2023)



## ORGANIZING COMMITTEE

### Co-Chairs

Po-Ling Loh  
University of Cambridge, UK

Jonathan Scarlett  
National University of Singapore

Vincent Y. F. Tan  
National University of Singapore

### Venue

16–20 Jan 2023  
IMS Auditorium  
Institute for Mathematical Sciences  
3 Prince George's Park  
Singapore 118402

25–27 Jan 2023  
ZOOM Online  
Zoom link will be sent to registered participants .

For more information: [Click here](#)

# Workshop on Information Theory and Data Science (16–27 January 2023)


## Monday, 16 January 2023

Time	Title	Speaker
0900–0920	Registration	
0920–0930	Opening Remarks	Organizers
0930	Session Chair: Eric Han Liang Wee (National University of Singapore)	
0930–1030	Lower Bounds for Sparse Oblivious Subspace Embeddings	Yi Li Nanyang Technological University, Singapore
1030–1045	<i>Coffee Break</i>	
1045–1145	Optimal Rates of Teaching and Learning Under Uncertainty	Yan Hao Ling National University of Singapore, Singapore
1145–1400	<i>Lunch Break</i>	
1400	Session Chair: Fengzhuo Zhang (National University of Singapore)	
1400–1500	Free Inference for Bandits with Rich Actions	Aditya Gopalan Indian Institute of Science, India
1500–1515	<i>Coffee Break</i>	
1515–1615	Causal Bandits	Ali Tajer Rensselaer Polytechnic Institute, USA
1615–1715	Almost Cost-Free Communication in Federated Best Arm Identification	P. N. Karthik National University of Singapore, Singapore

## Tuesday, 17 January 2023

Time	Title	Speaker
0915–0930	Registration	
0930	Session Chair: P. N. Karthik (National University of Singapore)	
0930–1030	Invertible Neural Networks for Graph Prediction	Yao Xie Georgia Institute of Technology, USA
1030–1045	<i>Coffee Break</i>	
1045–1145	The role of data and models for deep-learning based image reconstruction	Reinhard Heckel Technical University of Munich, Germany

Tuesday, 17 January 2023		
Time	Title	Speaker
1145–1400	<i>Lunch Break</i>	
1400	Session Chair: Yan Hao Ling (National University of Singapore)	
1400–1500	Near-optimal learning of tree-structured distributions	Arnab Bhattacharyya National University of Singapore, Singapore
1500–1515	<i>Coffee Break</i>	
1515–1615	Lower bounds for estimation under information constraints: general recipe, and new dishes	Clement Canonne University of Sydney, Australia
1615–1715	Lower Bounds for Discrete Distribution Testing Under Information Constraints	Himanshu Tyagi Indian Institute of Science, India

Wednesday, 18 January 2023		
Time	Title	Speaker
0915–0930	Registration	
0930	Session Chair: Wei En Ng (National University of Singapore)	
0930–1030	Studying Generalization in Deep Neural Networks	Mehul Motani National University of Singapore, Singapore
1030–1045	Group Photo and Coffee Break	
1045–1145	Generalization Behaviour of Learning Algorithms: Recent Information-Theoretic Advances	Miguel Rodrigues University College London, UK
1145–1330	Lunch reception at IMS	
1330	<u>Excursion</u> Venue: <a href="https://www.gardensbythebay.com.sg">Gardens By the Bay</a> Voluntary (Prices vary based on the attraction choice. <a href="https://www.gardensbythebay.com.sg">https://www.gardensbythebay.com.sg</a> )	

Thursday, 19 January 2023		
Time	Title	Speaker
0915–0930	Registration	
0930	Session Chair: Recep Can Yavas (CNRS@CREATE / National University of Singapore)	
0930–1030	Inference from heterogeneous pairwise data	Galen Reeves Duke University, USA
1030–1045	<i>Coffee Break</i>	
1045–1145	A Wasserstein Distance Approach for Concentration of Empirical Risk Estimates	Prashanth L.A. Indian Institute of Technology Madras, India

Thursday, 19 January 2023		
Time	Title	Speaker
1145–1400	<i>Lunch Break</i>	
1400	Session Chair: Qiaoqiao Zhou (National University of Singapore)	
1400–1500	On the Robustness to Misspecification of $\alpha$ -Posteriors and Their Variational Approximations	Cynthia Rush Columbia University, USA
1500–1515	<i>Coffee Break</i>	
1515–1615	Score-based Generative Modeling Secretly Minimizes the Wasserstein Distance	Kangwook Lee University of Wisconsin-Madison, USA
1615–1715	Inference in High Dimensions for (Mixed) Generalized Linear Models: the Linear, the Spectral and the Approximate	Marco Mondelli Institute of Science and Technology Austria, Austria
1800	<u>Conference dinner</u> Venue: Jumbo Seafood @ Riverside Point <i>Voluntary</i>	

Friday, 20 January 2023		
Time	Title	Speaker
0915–0930	Registration	
0930	Session Chair: Prathamesh Pramod Mayekar (National University of Singapore)	
0930–1030	Achieving joint privacy and communication efficiency in federated learning and analytics	Wei-Ning Chen Stanford University, USA
1030–1045	<i>Coffee Break</i>	
1045–1145	The Role of Random Orthogonality in Federated Learning	Cong Shen The University of Virginia, USA
1145–1400	<i>Lunch Break</i>	
1400	Session Chair: Yunlong Hou (National University of Singapore)	
1400–1500	Multiplicative Updates for Symmetric-cone Factorizations	Antonios Varvitsiotis Singapore University of Technology and Design, Singapore
1500–1515	<i>Coffee Break</i>	
1515–1615	Entropy-based Centrality and Clustering	Frederique Oggier Nanyang Technological University, Singapore
1615–1715	Understanding and overcoming the statistical limitations of decision trees	Yan Shuo Tan National University of Singapore, Singapore

Wednesday, 25 January 2023 (ZOOM ONLINE)		
Time (GMT+8)	Title	Speaker
0920–0930	<i>ZOOM Waiting Room Opens</i>	
0930	Session Chair: Jonathan Scarlett (National University of Singapore)	
0930–1030	Information Constrained Optimal Transport: From Relay to Generative Adversarial Networks	Ayfer Ozgur Stanford University, USA
1030–1130	The power of adaptivity in representation learning: From meta-learning to federated learning	Sewoong Oh University of Washington, USA
1130–1230	Looped Transformers are Universal Computers and Prompts are their Programs	Dimitris Papailiopoulos University of Wisconsin-Madison, USA

Thursday, 26 January 2023 (ZOOM ONLINE)		
Time (GMT+8)	Title	Speaker
0920–0930	<i>ZOOM Waiting Room Opens</i>	
0930	Session Chair: Vincent Y. F. Tan (National University of Singapore)	
0930–1030	From sensitivity-constrained information bottleneck to fair selective prediction	Yuheng Bu University of Florida USA
1030–1130	On the rate-distortion theory and the generalization error of learning algorithms	Amin Gohari The Chinese University of Hong Kong, China
1130–1550	<i>Session Break</i>	
1550–1600	<i>ZOOM Waiting Room Opens</i>	
1600	Session Chair: Po-Ling Loh (University of Cambridge)	
1600–1700	The leap complexity in neural network learning	Emmanuel Abbé EPFL, Switzerland
1700–1800	Semantic and Pragmatic Compression: New Problems and Information Theoretic Bounds	Deniz Gunduz Imperial College London, UK

Friday, 27 January 2023 (ZOOM ONLINE)		
Time (GMT+8)	Title	Speaker
0920–0930	<i>ZOOM Waiting Room Opens</i>	
0930	Session Chair: Jonathan Scarlett (National University of Singapore)	
0930–1030	Deep Generative models and Inverse problems	Alex Dimakis University of Texas at Austin, USA

Friday, 27 January 2023 (ZOOM ONLINE)		
Time (GMT+8)	Title	Speaker
1030–1130	Advancing information theory and coding via deep learning	Hyeji Kim University of Texas at Austin, USA
1130–1550	Session Break	
1550–1600	<i>ZOOM Waiting Room Opens</i>	
1600	Session Chair: Po-Ling Loh (University of Cambridge)	
1600–1700	Statistical-to-Computational Gaps: The Low-Degree method and Free-Energy Barriers	Afonso Bandeira ETH Zurich, Switzerland
1700–1800	Information-theoretic limit theorems old and new	Oliver Johnson University of Bristol, UK

**This schedule is accurate as of 16 Jan 2023.**