

**IMS-NTU joint workshop on
Applied Geometry for Data Sciences Part II**
(27–28 May, 02–06 Jun 2025)

ORGANIZING COMMITTEE

Han Fei (National University of Singapore)

Wilderich Tuschmann (Karlsruhe Institute of Technology)

Theodore Papamarkou (Zhejiang Normal University)

Yuguang Wang (Shanghai Jiao Tong University)

Kelin Xia (Nanyang Technological University)

Rex Ying (Yale University)



Jointly sponsored by



Venue


IMS Executive Seminar Room

Block S17, Level 3


10 Lower Kent Ridge Rd Singapore 119076

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(27–28 May, 02–06 Jun 2025)

Tuesday, 27 May 2025

Time	Title	Speaker
1600–1700	<u><i>ZOOM Talk</i></u> Bayesian Optimisation of Graph-based Functions	Xiaowen Dong <i>University of Oxford, UK</i>
Scan QR Code for Zoom Link -----> 		


Wednesday, 28 May 2025

Time	Title	Speaker
1600–1700	<u><i>ZOOM Talk</i></u> Algebraic Geometry Learns Machines and Machines Learn Algebraic Geometry	Anthea Monod <i>Imperial College London, UK</i>
Scan QR Code for Zoom Link -----> 		

Monday, 02 Jun 2025

Time	Title	Speaker
0845–0900	Registration	
Session Chair: Frank Nielsen (<i>Sony Computer Science Laboratories</i>)		
0900–0940	Foundations of Differential Calculus for Modules over Small Categories	Ran Levi <i>The University of Aberdeen, UK</i>
0940–1020	Aurora: A Foundation Model for the Earth System	Cristian Bodnar <i>Silurian AI, UK</i>
1020–1100	Coffee Break & Free Discussion	
1100–1140	Categories and Sheaves for Optimization: From Multi-Stage to Distributed	Hans Riess <i>Georgia Institute of Technology, USA</i>
1140–1400	Lunch at IMS	
Session Chair: Ran Levi (<i>The University of Aberdeen</i>)		
1400–1440	Computational Information Geometry on Bregman Manifolds and Submanifolds	Frank Nielsen <i>Sony Computer Science Lab, Japan</i>

Monday, 02 Jun 2025		
Time	Title	Speaker
1440–1520	Frontiers and Opportunities in Topological Deep Learning	Mustafa Hajj <i>University of San Francisco, USA</i>
1520–1600	Coffee Break	
1600–1640	Topological Complexity Measures as Proxies for Generalization in Neural Networks	Tolga Birdal <i>Imperial College London, UK</i>
1800	<u>Conference Dinner (by invitation only)</u> The Scholar Chinese Restaurant 9 Kent Ridge Dr, Singapore 119241	

Tuesday, 03 Jun 2025		
Time	Title	Speaker
0845–0900	Registration	
Session Chair: Stephan Klaus (<i>Mathematisches Forschungsinstitut Oberwolfach</i>)		
0900–0940	A Physicist’s View on Partial 3D Shape Comparison	Patrice Koehl <i>University of California, Davis, USA</i>
0940–1020	Expanders, Waists, and the Kazhdan Property	Roman Sauer <i>Karlsruhe Institute for Technology, Germany</i>
1020–1100	Coffee Break	
1100–1140	Integrating HPC and AI: A New Paradigm for Predicting Protein-ligand Binding	Niu Huang <i>National Institute of Biological Sciences, China</i> <i>Tsinghua Institute of Multidisciplinary Biomedical Research, China</i>
1140–1400	Lunch at IMS	
1400	<u><i>Excursion to Botanic Gardens</i></u> One way transfer from IMS - Botanic Gardens https://www.nparks.gov.sg/sbg Register by scanning the QR code -->	<div>Excursion to Botanic Gardens (03 June 2025, 2 pm)</div> 

Wednesday, 04 Jun 2025		
Time	Title	Speaker
0845–0900	Registration	

Wednesday, 04 Jun 2025		
Time	Title	Speaker
Session Chair: Frédéric Barbaresco (<i>Thales Group</i>)		
0900–0940	Dirty Limit Theorems and Applications	Stephan Huckemann <i>Georg-August-Universität Göttingen, Germany</i>
0940–1020	large Isometry Invariant Topological Transform Shape Descriptor	Ben Yang <i>University of Oxford, UK Max Planck Institute of Molecular Cell Biology and Genetics, Germany</i>
1020–1100	Group Photo & Coffee Break	
1100–1140	Solving PDE Inverse Problems with Generative Models and Their Applications	Zheng Ma <i>Shanghai Jiao Tong University, China</i>
1140–1400	Lunch at IMS	
Session Chair: Stephan Huckemann (<i>Georg-August-Universität Göttingen</i>)		
1400–1440	Symplectic Foliation-informed Neural Network (SFINN) and Lie Groups Machine Learning based on Jean-marie Souriau Lie Groups Thermodynamics & Koszul Information Geometry	Frédéric Barbaresco <i>Thales Group, France</i>
1440–1520	Towards Understanding the Representation Learning of Diffusion Models	Difan Zou <i>University of Hong Kong, Hong Kong SAR</i>
1520–1600	Coffee Break	
1600–1640	Multi-Cover: A Mathematical Framework for Topological Data Analysis and Deep Learning	Yipeng Zhang <i>Nanyang Technological University, Singapore</i>
Thursday, 05 Jun 2025		
Time	Title	Speaker
0845–0900	Registration	
Session Chair: Yuguang Wang (Shanghai Jiao Tong University)		
0900–0940	Geometric Deep Learning for Protein Design	Jian Tang <i>HEC Montréal, Canada</i>
0940–1020	Towards Understanding the Condensation Phenomenon of Deep Neural Networks	Yaoyu Zhang <i>Shanghai Jiao Tong University, China</i>
1020–1100	Coffee Break	

Thursday, 05 Jun 2025		
Time	Title	Speaker
1100–1140	Topological Compound Fingerprinting in Computer-Aided Drug Discovery	Baris Coskunuzer <i>University of Texas Dallas, USA</i>
1140–1400	Lunch at IMS	
Friday, 06 Jun 2025		
Time	Title	Speaker
0845–0900	Registration	
Session Chair: Patrice Koehl (<i>University of California, Davis</i>)		
0900–0940	Nonlinear Regression with Real Algebraic Varieties and their Topology	Stephan Klaus <i>Mathematisches Forschungsinstitut Oberwolfach, Germany</i>
0940–1020	Decoding Deep Graph Neural Networks: An Optimization and Generalization Perspective	Wei Huang <i>RIKEN, Japan</i>
1020–1140	Free Discussion	
1140–1400	Lunch at IMS	