

Mathematical Foundations & Methodologies for Artificial Intelligence and Data-Driven Scientific Computing (11 Aug 2026–30 Sep 2026)

List of Speakers and Talks' Title

Name and Affiliation	Talk Title
Tutorial	
Yi Ma The University of Hong Kong, Hong Kong SAR	Principles and Practice of Deep Representation Learning Part 1
Tan Minh Nguyen National University of Singapore, Singapore	Workshop 3 Tutorial Part 1
Thanh Bình Nguyễn University of Science - VNUHCM, Vietnam	Workshop 3 Tutorial Part 2
Vo Ngoc Thieu University of Bath, UK	Workshop 3 Tutorial Part 3
Peng Wang University of Macau, Macau SAR	Principles and Practice of Deep Representation Learning Part 2
Research	
Laziz Abdullaev National University of Singapore, Singapore	Feature-Space Dimensionality as a Control Knob for LLM Activation Steering The Effects of Feature-Space Dimensionality on Activation Steering
Bo An Nanyang Technological University, Singapore	Agentic Reinforcement Learning
Richard Baraniuk Rice University, USA	Challenges and Opportunities of Self-Consuming Loops in AI
Tan Bui-Thanh The University of Texas at Austin, USA	Real-time Digital Twins: Challenges and Opportunities for Scientific Machine Learning
Larry Carin A*STAR, Singapore	Narrative Models for Interpretable Use of LLMs
Volkan Cevher École Polytechnique Fédérale de Lausanne, Switzerland	Training Neural Networks at Any Scale

Name and Affiliation	Talk Title
Won Chang Seoul National University, S. Korea	Emulating and Calibrating Antarctic Ice-Sheet Dynamics with Diffusion Models and Deep Feature Matching
Zhi Chen Peking University, China	Benchmarking Neural Surrogates on Realistic Spatiotemporal Multiphysics Flows
Lenaïc Chizat National University of Singapore, Singapore	Training Dynamics in the Large-Scale Limit
Grigoris Chrysos University of Wisconsin, USA	Anatomy of a Hallucination: How Diffusion Solvers Shape Generation Errors
Alexandre d'Aspermont Ecole Normale Supérieure, France	Learning Rates, Restart and Adaptive Acceleration
Maarten de Hoop Rice University, USA	Foundation Models for Physics: From Transformers to Kinetic and Self-Warping Architectures
Daniel Dehtyriov University of Oxford, UK	Deep Learning for Reynolds-Averaged Navier-Stokes Simulations of Turbulent Flows
Carlos Esteve-Yagüe University of Alicante, Spain	Approximating PDEs with Neural Networks via Residual Minimization of Monotone Discretizations
Kenji Fukumizu The Institute of Statistical Mathematics, Japan	Dynamics of Flow Matching under Manifold Hypothesis: Proximal Viewpoint
Bahman Ghahsifard Queen's University, Canada	On Preventing Model Collapse in Generative Models
Marc Aurèle T. Gilles Princeton University, USA	Finding Latent Structure at Very Low SNR: Heterogeneity Analysis in Cryo-EM
Ling Guo Shanghai Normal University, China	Flow-based Bayesian Filtering for High-dimensional Nonlinear Stochastic Dynamical Systems
Alfred Hero University of Michigan, USA	Learning Structured Relevance Networks
Youngjoon Hong Seoul National University, S. Korea	How Mathematics Shapes AI for Science
Myungjoo Kang Seoul National University, S. Korea	Deep Learning based Surface Reconstruction from PointClouds

Name and Affiliation	Talk Title
George Em Karniadakis Brown University, USA	Curvature-Aware Optimization for High-Accuracy Physics-Informed Neural Networks
Gitta Kutyniok Ludwig Maximilian University of Munich, Germany	Beyond Learning: Toward a Mathematical Theory of Computation for Artificial Intelligence
Tam Le The Institute of Statistical Mathematics, Japan	Sobolev IPM with Graph Metric: Regularization, Scalability, and Applications
Wee Sun Lee National University of Singapore, Singapore	Non-Hackable Confidence Reward Functions
Benedict Leimkuhler University of Edinburgh, UK	Accelerated Langevin Sampling of Complex Distribution using Variable Timestep and Friction
Qianxiao Li National University of Singapore, Singapore	Learning Mesoscopic Dynamics Learning, Approximation and Control
Hsuan-Tien Lin National Taiwan University, Taipei	Nipping the Butterfly Effect in the Bud: Self-Output Fine-Tuning for Autoregressive Weather Prediction
Lu Lu Yale University, USA	Foundation Neural Operators and Diffusion Models over Function Spaces
Yulong Lu University of Minnesota, USA	In-Context Learning in Scientific Computing
Yueming Lyu A*STAR, Singapore	Efficient Sampling, Optimization, and Targeted Diffusion Generation for Physical AI
Yi Ma The University of Hong Kong, Hong Kong SAR	Pursuing the Nature of Intelligence
Mauro Maggioni Johns Hopkins University, USA	Instances where Compositional Structure Helps Avoid the Curse of Dimensionality
Roland Memisevic University of Toronto, Canada	Human-like Common Sense as Core Inductive Bias for General Intelligence
Xuhui Meng Huazhong University of Science and Technology, China	Flow-based Generative Models for Amortized Bayesian Inference in Regression and Inverse PDE Problems
Govind Menon Brown University, USA	The Geometry of Training Dynamics

Name and Affiliation	Talk Title
Maxime Meyer National University of Singapore, Singapore	How Many Different Outputs Can a Transformer Generate?
Guido Montufar University of California, Los Angeles, USA	Discriminants for Neural Network Verification
Hoang Long Ngo Hanoi National University of Education, Vietnam	Numerical Approximation for McKean-Vlasov SDE with Super-linear Growth Coefficients
Tan Minh Nguyen National University of Singapore, Singapore	Missing Data Imputation using Neural Cellular Automata
Tien Trinh Nguyen Shanghai Jiao Tong University, China	Mixture of Experts Inside the Euler Equation
Atsushi Nitanda A*STAR Nanyang Technological University, Singapore	Slowly Annealed Langevin Dynamics: Theory and Applications to Training-Free Guided Generation
Qing Qu University of Michigan, USA	Training Task Diversity Shapes In-Context Learning via Low- Dimensional Subspaces
Kannan Ramchandran University of California, Berkeley, USA	AI meets Fourier: Towards Interpretability in Large Language Models
Tran Hoang Son National University of Singapore, Singapore	Beyond Independence: Strongly Correlated Particle Systems in Sampling for ML
Hao Sun Renmin University, China	Intelligent Scientific Computing: from Data-driven Modeling to Discovery
Quang Khoat Than Hanoi University of Science and Technology, Vietnam	No-Free-Fairness: Fundamental Limits and Trade-offs in Learning Systems
Xin Tong National University of Singapore, Singapore	Diffusion Models for High Dimensional Distributions
Viet Hoang Tran National University of Singapore, Singapore	Symmetry in Neural Networks
Rene Vidal University of Pennsylvania, USA	Convergence, Implicit Bias, and Edge of Stability of Gradient Descent for Neural Networks

Name and Affiliation	Talk Title
Robin Walters Northeastern University, USA	Symmetry in Deep Learning
Bao Wang University of Utah, USA	Test-Time Guidance for Flow-Based Generative Models via Enhanced Sampling
Li-Lian Wang Nanyang Technological University, Singapore	Kolmogorov Superpositions: Construction, Approximation and Networks
Yangshuai Wang National University of Singapore, Singapore	Autonomous Knowledge Distillation: Building an AI-Ready Infrastructure for Scientific Discovery
Zhongjian Wang Nanyang Technological University, Singapore	Preconditioned One-step Generative Modelling for Bayesian Inverse Problems
Melanie Weber Harvard University, USA	Impact of Data and Model Geometry on Learning Complexity in Deep Learning
Lei Wu Peking University, China	Functional Scaling Laws for LLM Pretraining
Yang Xiang Hong Kong University of Science and Technology, Hong Kong SAR	Neural Network Methods for Solving PDEs and Materials Design
Jinchao Xu King Abdullah University of Science and Technology, Saudi Arabia	From Parameter Complexity to Bit Complexity in Approximation Theory
Juntao Yang NVIDIA, Singapore	A Hybrid Two-level MCMC Framework to Accelerate Posterior Mean Estimation with Deep Learning Surrogates for Bayesian Inverse Problems
Liu Yang National University of Singapore, Singapore	ICON and EvE: Scientific Foundation Models and Self-Evolving Agents
Xinyu Yang National University of Singapore, Singapore	When Does Scientific AI Actually Use Physics? From Causal Mechanism Audits to Executable Solver Semantics
Kun Yuan Peking University, China	Accelerating LLM Pre-Training through Flat-Direction Dynamics Enhancement
Chulhee Yun Korea Advanced Institute of Science & Technology, S. Korea	How Does Learning Progress in Neural Network Training? River-Valley Landscapes and Optimizer Dynamics

Name and Affiliation	Talk Title
Pin Zhang National University of Singapore, Singapore	Knowledge-Informed Machine Learning for Modelling and Simulation in Geomechanics
Shijun Zhang Hong Kong Polytechnic University, Hong Kong SAR	Multigrade Neural Network Approximation: Residual Refinement and Layer-wise Rates
Hongkai Zhao Duke University, USA	Mathematical and Computational Understanding of Neural Networks: From Representation to Learning, From Shallow to Deep, and Beyond
Zhihui Zhu Ohio State University, USA	Inference-Time Learning Through Context