



SCML2025

International Conference on Scientific Computing and Machine Learning

All times are in JST.

March 3rd

13:50-14:00 Opening Remarks

14:00-15:00 Keynote Talk 1

Approximation Analysis for Neural Operators and Transformers in Applications to PDEs

Takashi Furuya (Shimane University)

15:00-15:50 Invited Talk 1

Deep Neural Network Design Guided by Dynamical Systems Theory

Chu Haoyu (China University of Mining and Technology)

16:10-17:00 Oral Session 1

- Generalized Lie Symmetries in Physics-Informed Neural Operators
Xiang Wang (NYU), Zakhar Shumaylov (University of Cambridge), Peter Zaika (University of Cambridge), Ferdia Sherry (University of Cambridge), Carola-Bibiane Schonlieb (University of Cambridge)
- Adjoint-Based Online Learning of Baroclinic Turbulence
Fei Er Yan (Hong Kong University of Science and Technology), Hugo Frezat (Institut de Physique du Globe de Paris), Julien Le Sommer (Université Grenoble-Alpes), Julian Mak (Hong Kong University of Science and Technology, National Oceanography Centre), and Karl Otness (New York University)

March 4th

10:00-11:00 Tutorial

Theoretical Foundations of Feature Learning in Deep Learning

Taiji Suzuki (University of Tokyo / RIKEN)

11:00-12:00 Lightning Talk/Video

14:00-15:00 Keynote Talk 2

Operator Learning: From Theory to Practice

Nikola Kovachki (NVIDIA)

15:10-17:00 Poster Session 1

1. Heterogeneous Transfer Learning for Efficient Transitions Between Batch and Continuous Pharmaceutical Manufacturing
Junya Ihira (Kyoto University Graduate School of Informatics), Keita Yaginuma (Formulation Technology Research Laboratories, Daiichi Sankyo Co., Ltd.), Kanta Sato (Formulation Technology Research Laboratories, Daiichi Sankyo Co., Ltd.), Shota Kato (Kyoto University Graduate School of Informatics), Manabu Kano (Kyoto University Graduate School of Informatics)
2. Towards a Diffusion-Based Virtual Subject Generator
Imran Nasim (IBM), Adam Nasim (Merck)
3. Efficient constrained optimisation on the equilibration of unstable baroclinic flows: initial result
Ho Ching Lee (Hong Kong University of Science and Technology), Julian Mak (Hong Kong University of Science and Technology)
4. An Application of the Holonomic Gradient Method to the Neural Tangent Kernel
Akihiro Sakoda (Kobe University), Nobuki Takayama (Kobe University)
5. Energy-consistent Neural Operator Learning
Yusuke Tanaka (NTT), Takaharu Yaguchi (Kobe University), Tomoharu Iwata (NTT), Naonori Ueda (RIKEN)
6. An Infinite Dimensional LSSL with Infinite Dimensional HiPPO
Atsushi Takabatake (Kobe University), Takaharu Yaguchi (Kobe University)
7. PM 2.5 Advection-Diffusion with Multiple Sources and LSTM Neural Network Surrogate Model Optimization
Kevin Yotonyos (Chiang Mai University), Somchai Sriyab (Chiang Mai University)

10:00-11:00 Keynote Talk 3

Neural Operators, their Motivation, Use, and Deep Theory

Michael Puthawala (South Dakota State University)

11:20-12:10 Oral Session 2

- Regression-Based Physics-informed Neural Network (Reg-PINN) for Magnetopause Tracking
Po-Han Hou (Imperial College London), Sung-Chi Hsieh (University of Leicester)
- Estimation and Updating of Digital Twin Models via Scientific Machine Learning
Arijit Seth (The University of Texas at Austin), Tan Bui (The University of Texas at Austin)

12:00- Free Afternoon

Evening: Banquet at Kyoto Tower Hotel

March 6th

10:00-11:00 Keynote Talk 4

Neural networks in infinite dimensions: from shallow networks to transformers

Yury Korolev (Bath University)

11:20-12:10 Oral Session 3

- Reinforcement Learning for Optimal Trade Execution
Lufan Wang (University of Waterloo), Justin Wan (University of Waterloo)
- Evidential Physics-Informed Neural Networks
Hai Siong Tan (Gryphon Center for AI and Theoretical Sciences), Kuancheng Wang (Georgia Institute of Technology), Rafe McBeth (University of Pennsylvania)

14:00-14:50 Invited Talk 2

Accelerating Multi-Scale Fluid Dynamics and Galaxy Simulations with Machine Learning Surrogate Modeling

Keiya Hirashima (The University of Tokyo)

15:10-17:00 Poster Session 2

8. Fine-Tuning MLP-Mixer Architectures For Extreme Weather Event Prediction
Imran Nasim (IBM), João Lucas de Sousa Almeida (IBM)
9. Advancing Structural Vibration Analysis: Implementation of PINNs for Aerospace Applications
Jainish Solanki (Indian Institute of Technology Kharagpur), Sakshi Patil (Indian Institute of Technology Kharagpur), Mohammed Rabiun Sunny (Indian Institute of Technology Kharagpur)
10. Learning Hamiltonian Density Using DeepONet for Modeling Wave Equations
Baige Xu (Kobe University), Yusuke Tanaka (NTT Corporation), Takashi Matsubara (Hokkaido University), Takaharu Yaguchi (Kobe University)
11. Learning Hamiltonian Partial Differential Equations Using DeepONet with a Symplectic Branch Network
Yeang Makara (Kobe University), Yusuke Tanaka (NTT Communication Science Laboratories), Takashi Matsubara (Hokkaido University), Takaharu Yaguchi (Kobe University)
12. A Moderate Survey of Sketching Techniques Comparison for Randomized Numerical Linear Algebra under Machine Learning Setting
Yuqi Liu (University of California, Berkeley), Leon Mikulinsky (University of California, Berkeley), Konstantin Zörner (University of California, Berkeley), James Demmel (University of California, Berkeley)
13. Refinement of the average vector field method for Hamiltonian systems using neural networks
Chong Shen (Kobe University), Baige Xu (Kobe University), Elena Celledoni (Norwegian University of Science and Technology), Brynjulf Owren (Norwegian University of Science and Technology), Takaharu Yaguchi (Kobe University)

March 7th

9:30-10:20 Invited Talk 3

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Alvaro Fernandez Corral (DESY, Universität Hamburg)

10:40-11:30 Oral Session 4

- Modeling Coupled Systems by Neural Networks through Poisson-Dirac Formulation
Razmik Khosrovian (Osaka University), Takaharu Yaguchi (Kobe University), Hiroaki Yoshimura (Waseda University), Takashi Matsubara (Hokkaido University)

- A Hybrid Finite Element and Machine Learning Approach to Willmore Flow
Martin Rumpf (University of Bonn), Josua Sassen (ENS Paris-Saclay), Christoph Smoch (University of Bonn)

11:40-12:30 Oral Session 5

- Improving Regional Weather Forecasts with Neural Interpolation
James Jackaman (NTNU), Oliver Sutton (King's College London)
- Estimating Distributions of Parameters in Nonlinear State Space Models with Stein Variational Markov Chain Monte Carlo Method
Koshin Hagimoto (Kobe University), Toshiaki Omori (Kobe University)