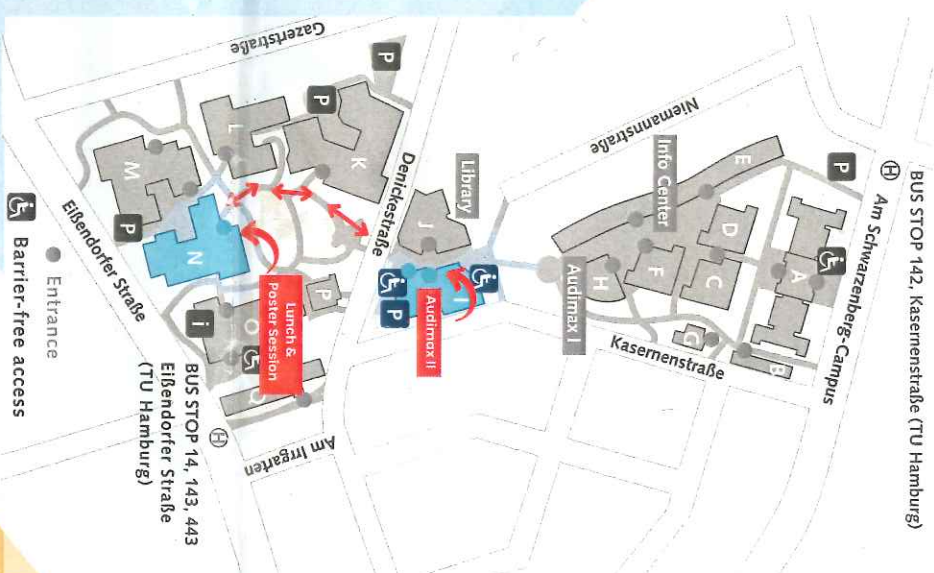


Thursday

SEP 25, 2025

- 09:00 - 09:50 Markos Katsoulakis  
UMass Amherst, USA  
**Hamilton-Jacobi Equations, Mean-Field Games, and Uncertainty Quantification for Robust Machine Learning**
- 09:50 - 10:15 Pavel Gurikov  
Hamburg University of Technology, Germany  
**Physics-Informed Machine Learning for Sustainable Process Design: Predicting Solubility in Green Solvents**
- 10:15 - 10:40 Sebastian Götschel  
Hamburg University of Technology, Germany  
**Hard-constraining Boundary Conditions for Physics-Informed Neural Operators**
- 10:40 - 11:10 Coffee Break
- 11:10 - 11:35 Jan Gerken  
Chalmers University of Technology, Sweden  
**Emergent Equivariance in Deep Ensembles**
- 11:35 - 12:00 Timm Faulwasser  
Hamburg University of Technology, Germany  
**The Optimal Control Perspective on Deep Neural Networks – Early Exits, Insights, and Open Problems**
- 12:00 - 13:00 Lunch (Building N)
- 13:00 - 13:50 Matus Telgarsky  
New York University, USA  
**Mathematical and sociological questions in deep learning and large language models**
- 13:50 - 14:15 Nihat Ay  
Hamburg University of Technology, Germany  
**On the Natural Gradient of the Evidence Lower Bound**
- 14:15 - 14:40 Jethro Warrnett  
University of Oxford, United Kingdom  
**Stein Variational Gradient Descent**
- 14:40 - 15:10 Coffee Break
- 15:10 - 16:00 Kenji Fukumizu  
Institute of Statistical Mathematics, Japan  
**Pairwise Optimal Transports and All-to-All Flow-Based Condition Transfer**
- 16:00 - 16:25 Vitalii Konarovskyi  
University of Hamburg, Germany  
**Stochastic Modified Flows, Mean-Field Limits and Dynamics of Stochastic Gradient Descent**
- 16:25 - 16:50 Tim Jahn  
TU Berlin, Germany  
**Learning Jump-Diffusion Dynamics from Irregularly-Sampled Data via Trajectory Generator Matching**
- 16:50 - 17:20 Coffee Break
- 17:20 - 17:45 Gianluca Finocchio  
University of Vienna, Austria  
**Model-Free Identification in Ill-Posed Regression**
- 17:45 - 18:10 Rishi Sonthalia  
Boston College, USA  
**Generalization with Non-Standard Spectra**

## Campus Map



## More Details



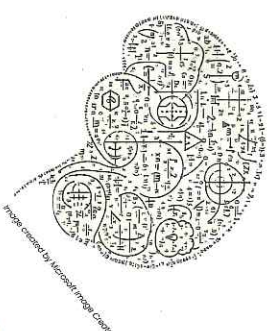
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22-25

SEP 2025

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Technology



CONFERENCE ON

# Mathematics of Machine Learning

## Organisers

Nihat Ay  
Hamburg University of Technology, Germany  
Santa Fe Institute, USA

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University of Hamburg, Germany

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TECHNISCHE  
UNIVERSITÄT  
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UCLA

Mathematik  
an der  
NATURWISSENSCHAFTEN

FoDL DFG  
Deutsche  
Forschungsgemeinschaft

SECAI  
Socio-Economic  
Computational  
Analysis

European Union  
erc  
European Research Council



## Monday

SEP 22, 2025

- 09:30 - 09:50 Welcome address
- 09:50 - 10:40 Gabriele Steidl  
TU Berlin, Germany  
**Telegrapher's Generative Model via Kac Flows**
- 10:40 - 11:10 Coffee Break
- 11:10 - 11:35 Christoph Lampert  
ISTA, Austria  
**Generalization Guarantees for Multi-task and Meta-learning**
- 11:35 - 12:00 Simon Weissmann  
University of Mannheim, Germany  
**Almost sure convergence rates for stochastic gradient methods**
- 12:00 - 13:00 Lunch **(Building N)**
- 13:00 - 13:50 Lénárd Chizat  
EPFL, Switzerland  
**The Hidden Width of Deep ResNets**
- 13:50 - 14:15 Viktor Stein  
TU Berlin, Germany  
**Wasserstein Gradient Flows for Moreau Envelopes of  $f$ -Divergences in Reproducing Kernel Hilbert Spaces**
- 14:15 - 14:40 Michael Murray  
University of Bath, United Kingdom  
**Implicit Bias and Invariance: How Hopfield Networks Efficiently Learn Graph Orbits**
- 14:40 - 15:10 Coffee Break
- 15:10 - 16:00 Misha Belkin  
University of California San Diego, USA  
**Feature learning and "the linear representation hypothesis" for monitoring and steering LLMs**
- 16:00 - 16:25 Armin Iske  
University of Hamburg, Germany  
**On the Convergence of Multiscale Kernel Regression under Minimalistic Assumptions**
- 16:25 - 16:50 Christoph Brune  
University of Twente, Netherlands  
**Deep Networks are Reproducing Kernel Chains**
- 16:50 - 17:20 Coffee Break
- 17:20 - 17:45 Marcello Carioni  
University of Twente, Netherlands  
**Atomic Gradient Descents**
- 17:45 - 18:10 Nisha Chandramoorthy  
University of Chicago, USA  
**When, why and how are some generative models robust?**

## Tuesday

SEP 23, 2025

- 09:00 - 09:50 Gitta Kutyniok  
LMU Munich, Germany  
**Reliable and Sustainable AI: From Mathematical Foundations to Next Generation AI Computing**
- 09:50 - 10:15 Parvaneh Joharinasab  
MPI for Mathematics in the Sciences, Germany  
**Dimensionality Reduction and Geometric Evaluation**
- 10:15 - 10:40 Diaaeldin Taha  
MPI for Mathematics in the Sciences, Germany  
**Topological Message Passing, Computation Graphs, and Relational Structures: A Case Study on Oversquashing**
- 10:40 - 11:10 Coffee Break
- 11:10 - 11:35 Amanjit Singh Kainth  
University of Toronto, Canada  
**Bregman-Wasserstein divergence: Transport and Barycenters**
- 11:35 - 12:00 Adwait Datar  
Hamburg University of Technology, Germany  
**Wasserstein KL-divergence for Gaussian distributions**
- 12:00 - 13:00 Lunch **(Building N)**
- 13:00 - 14:00 Poster Session 1 **(Building N)**
- 14:00 - 14:25 Semih Cayci  
RWTH Aachen University, Germany  
**Convergence of Gauss-Newton in the Lazy Training Regime: A Riemannian Optimization Perspective**
- 14:25 - 14:50 Johannes Müller  
TU Berlin, Germany  
**Functional Neural Wavefunction Optimization**
- 14:50 - 15:15 Alexander Friedrich  
Umeå University, Sweden  
**A First Construction of Neural ODEs on M-Polyfolds**
- 15:15 - 15:40 Thomas Martinetz  
University of Lübeck, Germany  
**Good by Default? Generalization in Highly Overparameterized Networks**
- 15:40 - 16:10 Coffee Break
- 16:10 - 17:00 Francis Bach  
INRIA Paris Centre, France  
**Denoising diffusion models without diffusions**
- 19:00 - 22:00 Dinner  
**TEMPOWERK 6**  
Tempowerkring 6  
21079 Hamburg  
**More information**



## Wednesday

SEP 24, 2025

- 09:00 - 09:50 Stefanie Jegelka  
MIT, USA, and TU Munich, Germany  
**TBA**
- 09:50 - 10:15 Marco Mondelli  
ISTA, Austria  
**Learning in the Age of LLMs: Theoretical Insights into Knowledge Distillation and Test-Time Training**
- 10:15 - 10:40 Yury Korolev  
University of Bath, United Kingdom  
**Large-time dynamics in transformer architectures with layer normalisation**
- 10:40 - 11:10 Coffee Break
- 11:10 - 11:35 Leon Bungert  
University of Würzburg, Germany  
**Robustness on the interface of geometry and probability**
- 11:35 - 12:00 Martin Lazar  
University of Dubrovnik, Croatia  
**Be greedy and learn: efficient and certified algorithms for parametrized optimal control problems**
- 12:00 - 13:00 Lunch **(Building N)**
- 13:00 - 14:00 Poster Session 2 **(Building N)**
- 14:00 - 14:50 Frank Nielsen  
Sony Computer Science Labs, Japan  
**Recent perspectives on Bregman divergences**
- 14:50 - 15:15 Vahid Shahverdi  
KTH, Sweden  
**Mapping the Shape of Learning: An Algebraic Perspective on Neural Networks**
- 15:15 - 15:40 Mariia Seleznova  
LMU Munich, Germany  
**Neural Tangent Kernel Alignment as a Lens on Trained Neural Networks**
- 15:40 - 16:10 Coffee Break
- 16:10 - 17:00 Jürgen Jost  
MPI for Mathematics in the Sciences, Germany  
**Geometric and statistical methods of data analysis in memoriam Sayan Mukherjee**
- 17:00 - 17:25 Marzieh Eldi  
MPI for Mathematics in the Sciences, Germany  
**Geometric learning in complex networks**
- 17:25 - 17:50 Sebastian Kassing  
TU Berlin, Germany  
**On the effect of acceleration and regularization in machine learning**