



Machine Learning in Science

Conference on 12.-13. July 2022 in Tübingen

[Link to Zoom](#), valid for both days

Tuesday, 12 July 2022

Venue: Westspitze, Eisenbahnstraße 1, 72072 Tübingen

09:00	<i>Opening Remarks</i> Ulrike von Luxburg, Philipp Berens Speakers of the Cluster of Excellence “Machine Learning”, University of Tübingen
09:15	<i>Virtual Humans — From Appearance to Behaviour</i> Gerard Pons-Moll Department of Computer Science, University of Tübingen
10:00	<i>Understanding Past, Present and Future Climate Evolution: Between Facts, Physics and Fiction</i> Kira Rehfeld Department of Geoscience, University of Tübingen
10:45	<i>Coffee Break</i>
11:15	<i>Linear Combinatorial Semi-Bandit with Causally Related Rewards</i> Setareh Maghsudi Department of Computer Science, University of Tübingen
12:00	<i>Keynote: Digging Historical Diversity Patterns out of Large-Scale Genomic Data using Exchangeable and Generative Neural Networks</i> Flora Jay The Interdisciplinary Computer Science Laboratory, Paris-Saclay University
13:00	<i>Lunch</i>
14:15	<i>The EU's Legislative Agenda on AI</i> Michèle Finck Faculty of Law, University of Tübingen

15:00	<i>Machine Learning Applied to Scattering</i> Frank Schreiber Department of Physics, University of Tübingen
15:45	<i>Social Dynamics in Learning and Decision-Making</i> Celestine Mandler-Dünner Max Planck Institute for Intelligent Systems, Tübingen
16:30	Poster Session and Coffee
19:00	<i>Dinner</i>

Wednesday, 13 July 2022

Venue: Westspitze, Eisenbahnstraße 1, 72072 Tübingen

09:00	<i>Machine Learning for Science - and What About the Real World? Challenges for ML in Medicine</i> Sergios Gatidis Max Planck Institute for Intelligent Systems, Tübingen
09:45	<i>Probabilistic Models of Language Use</i> Michael Franke Department of General and Computational Linguistics, University of Tübingen
10:30	<i>The Trajectory of Human Development Resembles Stochastic Optimization in the Space of Learning Strategies</i> Charley Wu Cluster of Excellence "Machine Learning", University of Tübingen
11:00	<i>Coffee Break</i>
11:15	<i>Keynote: Machine Learning Supporting Ecology Supporting Machine Learning</i> Devis Tuia Environmental Computational Science and Earth Observation Laboratory, EPFL
12:15	<i>Simulation-based inference for discovering mechanistic models of neural population dynamics</i> Richard Gao Cluster of Excellence "Machine Learning", University of Tübingen
12:45	<i>Multi-Modal Learning with Visual Information, Language, and Sound</i> Almut Sophia Koepke Cluster of Excellence "Machine Learning", University of Tübingen

13:15	<i>Lunch</i>
14:15	<i>Machine Learning in Education</i> Cluster Network Project Cluster of Excellence “Machine Learning”, University of Tübingen
14:45	<i>Modeling and Understanding Spatiotemporal Environmental Interactions</i> Cluster Network Project Cluster of Excellence “Machine Learning”, University of Tübingen
15:15	<i>Probabilistic Inference in Mechanistic Models</i> Cluster Network Project Cluster of Excellence “Machine Learning”, University of Tübingen
15:45	<i>Compositionality in Minds and Machines</i> Cluster Network Project Cluster of Excellence “Machine Learning”, University of Tübingen
16:15	<i>Uncovering the inner structure of medical images through generative modeling</i> Cluster Network Project Cluster of Excellence “Machine Learning”, University of Tübingen
16:45	<i>Closing Remarks</i> Ulrike von Luxburg, Philipp Berens Speakers of the Cluster of Excellence “Machine Learning”, University of Tübingen

Machine Learning in Science
Annual Conference 2022 – Poster Session

Tuesday, July 12, 2022, 4:30 to 6:30 pm

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Authors	Title
Seth Axen, Alexandra Gessner, Elena Sizana Hanqi Zhou, Álvaro Tejero Cantero	<i>The ML \rightleftharpoons Science Colaboratory</i>
Valentyn Boreiko, Hanna Faber, Philipp Berens, Matthias Hein, Indu Ilanchezian, Murat Seckin Ayhan, Sarah Müller, Lisa Koch	<i>Counterfactual explanations of decisions of deep neural networks with applications in medical diagnostics</i>
Klara Burger, Peter Pfaffelhuber, Franz Baumdicker	<i>NNs for Self-Adjusting Mutation Rate Estimation</i>
Francesco Carnazza, Sabine Andergassen, Igor Lesanowsky	<i>Understanding quantum effects in neural network models through ML</i>
Maximilian Dax, Stephen Green, Jonathan Gair, Jakob Macke, Alessandra Buonanno, Bernhard Schölkopf	<i>Amortized Bayesian inference of gravitational waves with normalizing flows</i>
Jonas Ditz, Nico Pfeiffer, Matthias Schwab	<i>Extending deep kernel approaches for better prediction and understanding of ADME phenotypes and related drug response</i>
Jonathan Fuhr, Dominik Papies, Philipp Berens	<i>Applied Causal Inference in Social Sciences and Medicine</i>
Zohreh Ghaderi, Leonard Salewski, Harald Baayen, Hendrik P. A. Lensch	<i>End-to-End Transformer-based Model for Diverse Video Captioning</i>
Rita González Márquez, Philipp Berens, Dmitry Kobak	<i>Visualizing the landscape of biomedical literature</i>
Christian Gumbsch, Maurits Adam, Birgit Elsner, Georg Martius, Martin V. Butz	<i>Learning Latent Event Codes for Robust Planning and Hierarchical Prediction</i>
Moritz Haas, Ulrike von Luxburg, Bedartha Goswami	<i>Pitfalls of Climate Network Construction: A Statistical Perspective</i>
Lisa M. Koch, Christian M. Schürch, Arthur Gretton, Philipp Berens	<i>Hidden in plain sight: subgroup shifts escape OOD detection</i>

Jakob Kruse, Beatrice Ellerhoff, Ullrich Köthe, Jonathan Wider, Nils Weitzel, Kira Rehfeld	<i>Climate variability across space and time: Predicting extremes and water isotopes</i>
David Künstle, Felix Wichmann	<i>Machine learning approaches for psychophysics with ordinal comparisons</i>
Janne K. Lappalainen, Fabian D. Tschopp, Sridhama Prakhya, Mason McGill, Aljoscha Nern, Kazunori Shinomiya, Shin-ya Takemura, Eyal Gruntman, Nathan Klapoetke, Jakob H. Macke, Srinivas C. Turaga	<i>Cell-type specific visual selectivity emerges through connectivity and task constraints</i>
Michael Nagel, Lukas Fischer, Augustin Kelava, Tim Pawlowski	<i>Emotional cues and alcohol use: evidence from intensive longitudinal multilevel data in sports</i>
Kerstin Rau, Thomas Glässle, Philipp Hennig, Thomas Scholten	<i>Interpretable spatial machine learning for environmental modelling</i>
Pablo Sanchez Martin, Sonja Utz, Isabel Valera	<i>Extracting expertise from tweets</i>
Lennart Schlieder, Athanasios Athanassiadis, Nikilesh Murty, Valentin Volchkov, Alexander Song, Peer Fischer, Bernhard Schölkopf	<i>Acoustic and optical diffractive networks (holography)</i>
Hassan Shahmohammadi, Hendrik P. A. Lensch, R. Harald Baayen	<i>Learning Zero-Shot Visually Grounded Word Embeddings</i>
Alessandro Simon, Martin Oettel, Georg Martius	<i>Analytic classical density functionals from an equation Learning network</i>
Manuel Traub, Sebastian Otte, Tobias Menge, Matthias Karlbauer, Jannik Thümmel, Martin V. Butz	<i>Learning What and Where - Unsupervised Disentangling Location and Identity Tracking</i>
Daniel Weber, Andreas Zell, Enkelejda Kasneci	<i>Human-robot interface with eye-tracking</i>
Stefano Woerner, Christian F. Baumgartner	<i>Strategies for Meta-Learning with Diverse Tasks</i>