



# Cluster of Excellence

## Machine Learning: New Perspectives for Science

[www.ml-in-science.uni-tuebingen.de](http://www.ml-in-science.uni-tuebingen.de)

## Machine Learning in Science

*Virtual Cluster Conference from July 21 to July 23, 2020*

### Program

The conference will take place virtually on **Crowdcast** with a live stream on **Youtube**.

#### Registration

The conference is open to the public.

**To participate in the discussions you will have to register via Crowdcast** for each conference day by clicking on the corresponding event on our Crowdcast profile:

<https://www.crowdcast.io/ml4science>

You need to enter your email address first and then your full name (first name and surname). The participants' cameras and microphones will remain switched off during the event.

**If you only want to follow the talks, you can watch them via Youtube.** Here's the playlist of the live streams of all talks:

<https://www.youtube.com/playlist?list=PL05umP7R6ij1qBaWovWYINzgFZJrBey4L>

**Each talk** takes 30 minutes and is followed by a discussion of 15 minutes.

**Each spotlight** presentation takes 5 minutes and is followed by a 5-minute discussion.

#### Important

All times are given in CEST, Central European Summer Time.

## Tuesday, July 21, 2020

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| 14:00 – 14:15 | <b>Ulrike von Luxburg, Philipp Berens</b><br>Speakers of the Cluster of Excellence “Machine Learning”, University of Tübingen<br><i>Opening Remarks</i><br><br><b>Dr. Simone Schwanitz</b><br>Head of Section, State Ministry for Science, Research and Art, Baden-Württemberg<br><i>Welcome Address</i> |
| 14:15 – 15:00 | <b>Kyle Cranmer</b><br>Center for Cosmology and Particle Physics, New York University<br><i>Keynote Lecture: How Machine Learning Can Help us Get the Most out of our Highest Fidelity Physical Models</i>   |
| 15:00 – 15:45 | <b>Zeynep Akata</b><br>Department of Computer Science and Cluster of Excellence “Machine Learning”, University of Tübingen<br><i>Learning Decision Trees Recurrently through Communication</i>   |
| 15:45 – 16:00 | <i>Break</i>   |
|               | <i>Spotlight Presentations</i><br><i>Innovation Fund Projects of the Cluster of Excellence “Machine Learning”</i>  |
| 16:00 – 16:10 | <b>David Künstle</b><br><i>Machine Learning Approaches for Psychophysics with Ordinal Comparisons</i>  |
| 16:10 – 16:20 | <b>Zohreh Ghaderi / Hassan Shahmohammadi</b><br><i>Enhancing Machine Learning of Lexical Semantics with Image Mining</i>   |
| 16:20 – 16:30 | <b>Matthias Karlbauer</b><br><i>Causal Inference with a Spatio-Temporal Generative Model</i>   |
| 16:30 – 16:40 | <b>Thomas Gläbke / Kerstin Rau</b><br><i>Interpretable Spatial Machine Learning for Environmental Modelling</i>  |
| 16:40 – 17:00 | <i>Break</i>   |
| 17:00 – 17:45 | <b>Jakob Macke</b><br>Department of Computer Science and Cluster of Excellence “Machine Learning”, University of Tübingen<br><i>Training Neural Networks to Identify Mechanistic Models of Neural Networks</i>   |

## Wednesday, July 22, 2020

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| 14:00 – 14:45 | <b>Peter Dayan</b><br>Max Planck Institute for Biological Cybernetics, Tübingen<br><i>Modelling and Manipulating Behaviour Using Recurrent Networks</i>  |
| 14:45 – 15:30 | <b>Dominik Papies</b><br>Faculty of Economics and Social Sciences, University of Tübingen<br><i>Machine Learning Applications in Business and Economics - Can it Help us Understand the Relevance of Visual Product Characteristics?</i> |
| 15:30 – 15:45 | <i>Break</i>   |
|               | <i>Spotlight Presentation</i><br><i>Innovation Fund Projects of the Cluster of Excellence “Machine Learning”</i>   |
| 15:45 – 15:55 | <b>Eric Raidl / Thomas Grote</b><br><i>Artificial Intelligence, Trustworthiness and Explainability</i>   |
| 15:55 – 16:05 | <b>Thilo Hagendorff</b><br><i>The Big Picture: Ethical Considerations and Statistical Analysis of Industry Involvement in Machine Learning Research</i>  |
| 16:05 – 16:15 | <b>Daniel Weber</b><br><i>Human-robot Interface with Eye-tracking</i>  |
| 16:15 – 16:25 | <b>Pablo Sanchez Martin</b><br><i>Exploring Ambient Awareness in Twitter</i>   |
| 16:25 – 16:30 | <i>Mini Break</i>  |
| 16:30 – 17:15 | <b>Ingo Steinwart</b><br>Department for Stochastics and Applications, University of Stuttgart<br><i>Some Thoughts towards a Statistical Understanding of Deep Neural Networks</i>  |
| 17:15 – 17:30 | <i>Break</i>   |
| 17:30 – 18:15 | <b>Claire Monteleoni</b><br>Department of Computer Science, University of Colorado Boulder<br><i>Deep Unsupervised Learning for Climate Informatics</i>  |

Thursday, July 23, 2020

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| 14:00 – 14:45 | <b>Manfred Claassen</b><br>Faculty of Medicine, University of Tübingen<br><i>Machine Learning in Translational Single Cell Biology</i>  |
| 14:45 – 14:50 | <i>Mini Break</i>   |
|               | <i>Spotlight Presentation</i><br><i>Innovation Fund Projects of the Cluster of Excellence “Machine Learning”</i>  |
| 14:50 – 15:00 | <b>Jonas Ditz</b><br><i>Extending Deep Kernel Approaches for Better Prediction and Understanding of ADME Phenotypes and Related Drug Response</i>   |
| 15:00 – 15:10 | <b>Susanne Zabel</b><br><i>Visualizing Uncertainty from Data, Model and Algorithm in Large-Scale Omics Data</i>   |
| 15:10 – 15:20 | <b>Paolo Mazza</b><br><i>Understanding Quantum Effects in Neural Network Models through Machine Learning</i>  |
| 15:20 – 15:30 | <b>Jonathan Fuhr</b><br><i>Applied Causal Inference in Social Sciences and Medicine</i>   |
| 15:30 – 15:45 | <i>Break</i>  |
| 15:45 – 16:30 | <b>Stefanie Jegelka</b><br>Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology<br><i>Keynote Lecture: Representation and Learning in Graph Neural Networks</i> |
| 16:30 – 17:15 | <b>Bedartha Goswami</b><br>Cluster of Excellence “Machine Learning”, University of Tübingen<br><i>Inferring Climate Variability from Patterns Hidden in Modern and Paleo Time Series Data</i>               |
| 17:15 – 17:30 | <i>Break</i>  |
| 17:30 – 18:15 | <b>Igor Lesanovsky</b><br>Department of Physics, University of Tübingen<br><i>Neural Network Dynamics in Quantum Many-Body Systems</i>  |
| 18:15 – 18:30 | <b>Ulrike von Luxburg, Philipp Berens</b><br>Speakers of the Cluster of Excellence “Machine Learning”, University of Tübingen<br><i>Closing Remarks</i>   |