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Gaul-Lecture - Causality and Autoencoders in the Light of Drug Repurposing for COVID-19

Wednesday, October 6, 2021 5:00 PM (1 hour)

Massive data collection holds the promise of a better understanding of complex phenomena and ultimately, of better decisions. An exciting opportunity in this regard stems from the growing availability of perturbation / intervention data (for example in genomics, advertisement, policy making, education, etc.). In order to obtain mechanistic insights from such data, a major challenge is the development of a framework that integrates observational and interventional data and allows causal transportability, i.e., predicting the effect of yet unseen interventions or transporting the effect of interventions observed in one context to another. I will propose an autoencoder framework for this problem. In particular, I will characterize the implicit bias of overparameterized autoencoders and show how this links to causal transportability and can be applied for drug repurposing in the current COVID-19 crisis.

<h1>Bio</h1>

<p><img src="https://indico.kit.edu/event/2389/images/1449-Portrait$_U hler.jpg"alt = "Portrait Uhler" >< /p>$

<p>Caroline Uhler is the Henry L. and Grace Doherty Associate Professor in EECS (Electrical Engineering Computer Science) and IDSS (Institute for Data, Systems and Society) at Massachusetts Institute of Technology (MIT). She is also the Co-Director of the newly founded Eric and Wendy Schmidt Center at the Broad Institute, an associate member of LIDS (Laboratory for Information and Decision Systems), the Center for Statistics, Machine Learning and the Operations Research Center (ORC) at MIT. Her research focuses on machine learning, statistics and computational biology, in particular on causal inference, generative modeling and applications to genomics, for example on linking the spatial organization of the DNA with gene regulation. She is an elected member of the International Statistical Institute and a recipient of a Simons Investigator Award, a Sloan Research Fellowship, an NSF Career Award, a Sofja Kovalevskaja Award from the Humboldt Foundation, and a START Award from the Austrian Science Foundation. She received her PhD in statistics from UC Berkeley and was an Assistant Professor at IST Austria before moving to MIT in 2015. She held visiting positions at ETH Zurich, the Simons Institute at UC Berkeley and the Institute of Mathematics and its Applications at the University of Minnesota. </p>

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