



ELLIS talk

# Bridging the Explanatory Gap between Neuronal Activity and Cognition by Multilevel Causal Modeling

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Host: Christoph Lampert

Explaining how neuronal activity gives rise to cognition arguably remains the most significant challenge in cognitive neuroscience. In the first part of this talk, I introduce neuro-cognitive multilevel causal modeling (NC-MCM), a mathematical framework that bridges the explanatory gap between neuronal activity and cognition by construing cognitive states as causally consistent abstractions of neuronal states. NC-MCM enables us to consistently reason about the neuronal- and cognitive causes of behavior while maintaining a physicalist (in contrast to adualist) position. In the second part of this talk, I introduce an algorithm for learning cognitive level causal models from neuronal activation patterns and demonstrate its ability to learn cognitive states of the nematode *C.~elegans* from calcium imaging data.

**Tuesday, April 26, 2022 11:00am - 12:30pm**

Mondi Seminar Room 3, Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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