

Wednesday, July 1, 2026 at 13:00

Speaker:

Professor Moritz Grosse-Wentrup

University of Vienna



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

Location: Room 2.082 | 2nd floor | Am Propsthof 49 | 53121 Bonn

(Online link: <https://shorturl.at/SG2CQ>)

Abstract:

Explaining how neuronal activity gives rise to cognition arguably remains one of the most significant challenges in cognitive neuroscience. In the first part of this talk, I will 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. In the second part, I will present an algorithm for learning NC-MCMs from neuronal dynamics and demonstrate on calcium imaging data from the nematode *C. elegans* how a NC-MCM represents the topology of a neuronal manifold as a graph.

Moritz Grosse-Wentrup is full professor, head of the Research Group Neuroinformatics, and director of the Middle European Interdisciplinary Cognitive Science Program at the University of Vienna. He develops machine learning and AI algorithms that provide insights into how large-scale neural activity gives rise to (disorders of) cognition and applies these algorithms in the domain of cognitive neural engineering, e.g., to build brain-computer interfaces for communication with severely paralyzed patients, design closed-loop neural interfaces for stroke rehabilitation, and develop personalized brain stimulation paradigms.

For more information on the event, please contact:
Konstantinos Armaos at karmaos@uni-bonn.de or
Olivier de Vries at odevries@uni-bonn.de

Host:
Professor Dominik Bach,
Centre of Artificial Intelligence and
Neuroscience (caian)