MAX PLANCK INSTITUTE
FOR HUMAN COGNITIVE AND BRAIN SCIENCES

Monday, November 06, 2023, 15:00 hrs
Hybrid Meeting (Lecture Hall and via Zoom)

Institute Colloquium

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Layer fMRI in the prefrontal cortex

Layer fMRI is a promising tool to study the cortical basis of cognitive processes non-invasively in human subjects. After introducing layer fMRI and outlining current challenges I will present two studies in which we have been using layer fMRI to probe the laminar circuitry of the human prefrontal cortex during working memory tasks. In the first study we attempted to replicate recent pioneering results of Finn et al. (2019) who used cerebral blood volume sensitive VASO fMRI to show layer specific activity in dlPFC during a working memory task. Specifically, they showed that manipulation of a sequence of letters resulted in higher dlPFC superficial layer delay period activity than mere remembering. To test the robustness of these findings, we repeated their experiment and preregistered an automatic processing pipeline. In the second study, this time using BOLD fMRI, we were interested in the nature of such elevated delay period activity. Using images of faces and scenes we sequentially presented multiple items to be held in working memory and introduced an attentional modulation between those by presenting a retrocue. To assess working memory content representations, we then employed multivariate pattern analysis to decode the category of the attended and unattended items from activity at different cortical depths.