Cognitive Science Colloquium

Winter term 2024/2025
Tuesday 12.15 – 13.15 h; Lecture Hall 02, Neue Aula

When	What
Tuesday, 12.11.2024 12.15 – 13.15	**Dr. Romy Lorenz (MPG Tübingen): Novel methods for cognitive neuroscience: real-time and layer-fMRI for probing frontoparietal network function**
	Frontoparietal brain networks are integral to high-level cognition, influencing diverse cognitive processes such as working memory, reasoning and cognitive control. In this talk, I'll provide a brief overview of my research journey, which leverages novel neuroimaging techniques to explore frontoparietal network function. Starting with my doctoral work, I will introduce Neuroadaptive Bayesian Optimization—a novel brain-computer interface that combines real-time fMRI and machine learning to efficiently explore many more experimental conditions than is currently possible with standard neuroimaging methodology. This approach has enabled us to better understand the unique functional role of frontoparietal networks in healthy individuals and to map cognitive dysfunction in aphasic stroke patients. Following this, I will present in more detail two recent studies using layer-specific fMRI at ultrahigh field strengths to investigate the laminar circuitry of the dorsolateral prefrontal cortex (dlPFC)—a core region of the frontoparietal network—during working memory (WM). These studies reveal that the superficial layer is particularly active during WM manipulation and increases in WM load, potentially pointing towards a lamina-specific activation of the frontoparietal network to heightened task demands more generally. Additionally, multivariate analyses revealed that superficial layers of the dlPFC are involved in various WM subprocesses by dynamically adapting to current task demands. However, we did not replicate findings of deep layer activation during motor responses, emphasizing the need for rigorous and reproducible approaches in layer-fMRI research.

Organisation: Verena Seibold and Volker Franz

Welcome to everybody!