



PhD students and Postdocs

at the Hertie Institute for Clinical Brain Research

The Hertie Institute for Clinical Brain Research (HIH), together with the University of Tübingen's Neurology Hospital, forms the Center of Neurology. It is dedicated to research, treatment, and teaching focused on the diseases of the human brain.

The Helfrich lab at the HIH is inviting applications for fully funded positions for

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with an interest in the neuronal network dynamics underlying cognitive processing and sleep physiology. The lab is conducting cognitive neuroscience studies in a clinical environment. Our key goal is to understand the network neuroscience underlying higher cognitive functions in the human brain. We are particularly interested in recruiting in the following areas:

I. Rhythmic building blocks of human attention:

Attention is a fundamental cognitive function necessary to efficiently translate sensory experiences into goal-directed actions. Recently, several lines of inquiry probing attention on a fine-grained temporal scale revealed frequency-specific behavioral fluctuations that align with ongoing brain oscillations, indicating that attention is a discrete process. Our aim is to understand the structural and functional basis as well as the physiologic purpose of attentional rhythmic fluctuations. See also Helfrich et al. (2018b) *Neuron*, Helfrich et al. (2019) *Current Opinion in Psychology*

II. Context-dependent predictive processing in human prefrontal cortex.

Over the last few decades, several lines of research indicated that the prefrontal cortex (PFC) provides the structural basis for goal-directed behavior based on endogenous predictions, but its functional architecture is not well understood.

Our goal is to investigate how predictions are implemented in the human brain to optimize sensory processing and goal-directed behavior.

Background information Helfrich and Knight (2016) *Trends in Cognitive Science*; Helfrich et al. (2017) *PNAS*

Key Methodology: We are combining behavioral testing with intracranial EEG recordings in humans (ECoG, sEEG, Single Unit Activity) as well as non-invasive neurophysiology (EEG, MEG) and electrical brain stimulation (direct cortical stimulation, deep brain stimulation, responsive neurostimulation). We offer hands-on training on all aspects of study design and data collection as well as state-of-the-art analysis methods of electrophysiological data.

Skills and qualifications: The positions are well suited for candidates from a wide-range of backgrounds, including biology, computer science, psychology, medicine, cognitive- and neuroscience. We particularly encourage applications from researchers with previous experience in human imaging or primate neurophysiology who are seeking to apply their skills to basic science questions in a clinical context. We welcome researchers with an international background. German language skills are not necessary. PhD students will be enrolled in the Neuroscience Graduate Center Training School in Tübingen (<https://www.neuroschoo-uebingen.de/>).

If we have sparked your interest, please send your application, including a CV, relevant certificates or diplomas and a cover letter outlining your research interest in English or German to: randolph.helfrich@med.uni-tuebingen.de

For additional information see: <https://www.hih-tuebingen.de/en/forschung/independent-research-groups/junior-research-group-randolph-helfrich/>