



PhD Position in Layer-fMRI of High-Level Cognition in Real-Time at 9.4 T

The newly established **Cognitive Neuroscience & Neurotechnology group** led by **Dr. Romy Lorenz** is looking for an enthusiastic PhD student to join our growing team at the **Max Planck Institute for Biological Cybernetics** in Tübingen, Germany.

Our lab focuses on advancing our understanding of the frontoparietal brain network mechanisms that underpin high-level cognition and adaptive behaviour. For this, we pursue an interdisciplinary research programme that allows studying this brain system at multiple levels of granularity. Our methodology involves subject-specific brain-computer interface technology, fMRI at 3 T, and ultrahigh (i.e., 7 T and 9.4 T) magnetic field strengths (for resolving cortical layers), EEG, non-invasive brain stimulation, as well as machine learning. You can find out more about our work at <https://www.kyb.tuebingen.mpg.de/711763/cognitive-neuroscience-neurotechnology>.

We are seeking an ambitious PhD student who is interested in pushing the frontiers of ultrahigh resolution fMRI and aim to resolve laminar activation in high-level brain regions in *real-time*. In this novel project, we want to combine real-time fMRI at 9.4 T with machine learning (e.g., neuroadaptive Bayesian optimization) to advance our understanding about the specific functional role of different layers in the frontoparietal cortex. The PhD student will conduct *offline* (i.e., not real-time) and *online* (i.e., real-time) experiments with healthy human participants undergoing different cognitive tasks in the 3 T and 9.4 T scanner. The student will also actively contribute to method development and construct *offline* as well as *real time* laminar analyses pipelines or a 9.4 T fMRI data.

The ideal candidate should have a strong interest in research on high-level cognition and curiosity for closed-loop experimentation with machine learning. A strong background in fMRI data analysis (e.g., FSL, FreeSurfer, ANTS) and very good programming skills in Bash on Linux, MATLAB, and/or Python are required. Prior experience in MRI data acquisition and experience with ultrahigh resolution fMRI (e.g., at 7 T) or real-time fMRI is desirable but not necessary. Equally, experience with PsychoPy (for task programming), machine learning methods, code sharing platforms (e.g. GitHub,) and high-performance computing clusters are highly desirable. Candidates are expected to have a master's degree in cognitive (neuro)science, psychology, computer science, biomedical or electrical engineering, physics, or related discipline

The Max Planck Institute for Biological Cybernetics offers a world-leading research environment with access to the latest cutting-edge MRI hardware (inclusive a Siemens 9.4 T and Prisma 3 T for humans as well as a 14.2 T small animal system) and other excellent research facilities (EEG, eye-tracking, fMRI-TMS). The PhD student will receive generous support for professional travel and research needs (approximately 2,500 euros / year). Additionally, the student will have the opportunity to become part of the Graduate Training Centre of Neuroscience that provides training courses, summer schools, and conferences to further educate doctoral students. Further, the Institute is part of the Tübingen Neuro Campus (with more than 100 active groups), offering a vibrant community of international researchers and enriching environment of collaboration.

The position is available from **May 2024** on and remains open until filled. The salary is paid in accordance with the Collective Agreement for the Public Service (65%, E 13 TV-L, **amounting to approximately 2,000 euros net per month**). The Max Planck Society seeks to employ more handicapped people and strongly encourages them to apply. Furthermore, we actively support the compatibility of work and family life. The Max Planck Society strives for gender equality and diversity.

To apply, please send your application containing a personal statement describing your personal qualifications, research interests, and motivation (max. two pages), CV including publication list, academic certificates / transcript of records, names and contact details of three referees, and desired starting date as a single PDF file with the subject line **"Application for PhD-2: Functional specification"** to Dr. Romy Lorenz (romy.lorenz@tuebingen.mpg.de). Applications will be assessed on a rolling basis and considered until the position is filled.