



PhD student position

Understanding neural underpinnings of cognitive dysfunctions in neurodevelopmental psychiatric disorders and developing personalized interventions

The 22q11.2 Deletion Syndrome (22q11DS) provides an important framework for studying the neurobiological roots of cognitive impairments in neurodevelopmental psychiatric disorders. Individuals with 22q11DS have an increased risk of developing conditions such as schizophrenia, with cognitive dysfunctions often emerging early as central features. These deficits tend to progress over time, significantly impacting functional outcomes and remaining only partially responsive to current pharmacological treatments.

At the **DIPLab**, we have been conducting research on 22q11DS since 2001, following one of the largest longitudinal cohorts of children and adolescents with the syndrome. Our research combines state-of-the-art neuroimaging techniques—including structural and functional MRI, diffusion-weighted imaging, and 7T MRI—with high-density EEG and detailed neurocognitive and clinical evaluations. Additionally, we are exploring non-invasive brain stimulation as a potential intervention.

This PhD project bridges findings from **LgDel+/- mouse models** of 22q11DS with human studies to advance our understanding of the mechanisms driving cognitive impairments. The aims are twofold: to uncover the neurobiology underlying cognitive deficits in individuals with 22q11DS and to identify neural targets that could guide the development of interventions to improve cognitive outcomes.

Methods employed in the lab: high-field cortical morphometry, resting-state fMRI, MR spectroscopy, high-density EEG, neuromodulation.

Tools employed in the lab: Python, R, Cartool, SimNIBS, Matlab, SPM, FSL, FreeSurfer.

Place of work: Campus Biotech; Chemin des Mines; 9 - 1202 Geneva

Department: Department of Psychiatry, Faculty of Medicine, University of Geneva

Your responsibilities:

- To work in collaboration with clinical and engineering departments for the development and application of new neuroimaging methodologies.
- To analyze complex multimodal and longitudinal MRI data.
- To take part in developing preprocessing pipelines compatible with high-field MRI data.
- To analyze high-density EEG data.
- To participate to neuroimaging data acquisition.
- Manuscript redaction.

Your Profile: We are looking for nearly graduated students with skills in programming and neuroimaging data analysis, with a background in medicine, psychology, neurosciences, computer science, or an equivalent title. Experience in 7T MR imaging or Neuromodulation is a plus.

Preferred start date: March 1, 2025

Application: Please send full application documents (motivation letter, CV, copy of the diploma and graduations, and a 3 minutes motivation video filmed in one single sequence on your phone or computer without reading text; Optional: letter of recommendation) by a single email titled **“DIPLab PhD position application – YOUR NAME”** to: Silas FORRER (Silas.Forrer@unige.ch) and Caren LATRECHE (Caren.Latreche@unige.ch).