

Master Project

Understanding how distinct Thalamocortical subpopulations support Short-Term Memory

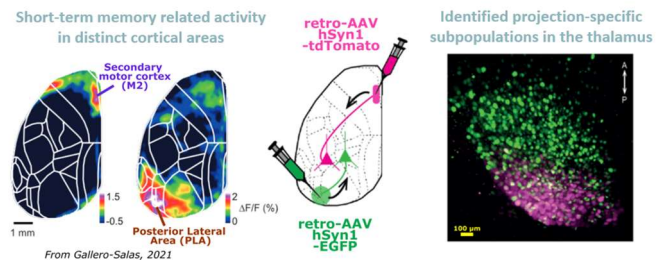
This project investigates how two neighboring thalamic subpopulations, each connected to distinct cortical areas, contribute to short-term memory processing in their respective target cortices. The student will perform stereotaxic surgeries, train animals on behavioral tasks, record neural activity using fiber photometry, and analyze both photometric signals and behavioral video data.

Background

The thalamus is far more than a simple relay station. Strikingly, two anatomically neighboring thalamic subpopulations can project to entirely separate cortical areas — and distinct cortical areas can independently

support short-term memory. This raises a fascinating question: how do these parallel thalamocortical pathways participate in allocating short-term memory resources to one cortex or the other? Using fiber photometry, we monitor the activity of genetically defined neuronal populations in head-fixed animals performing a short-term memory task, offering powerful insights on the activity of these circuits tasks.

This project will add to a pre-existing experimental dataset, acquired in the context of a broader PhD project. Additionally, it offers the unique opportunity for the student to use the mix of self-acquired and existing dataset to address their own scientific subquestion on thalamocortical contributions to short-term memory or mouse behavior.



Goals

In this project you will be able to:

- (1) Perform stereotaxic surgeries to target distinct thalamocortical subpopulations with fiber photometry probes
- (2) Train animals on short-term memory behavioral tasks
- (3) Analyze photometric signals and behavioral video data to characterize population activity

Your profile

- Completion of the **LTK module** prior to the start of the project is a strong advantage (*registration can be supported by the lab*)
- Programming experience (**Python**)

Supervision

This project will be supervised by Arthur Levasseur, a Ph.D. student, hosted within the lab of Prof. Fritjof Helmchen at the Brain Research Institute

Contact

Interested students should send an e-mail to levasseur@hifo.uzh.ch. Please attach a brief statement explaining your background and motivation, and a copy of your CV. The project optimally starts in **September 2026** and will run for **9 to 12 months**.