

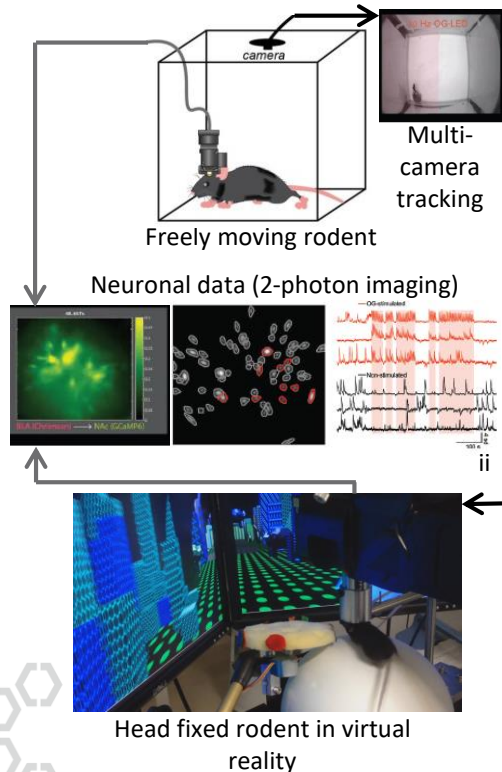
All Master projects at a glance



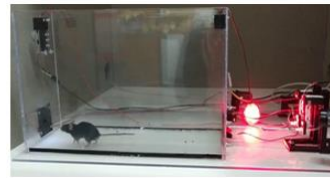
IMBIT //

Intelligent Machine-Brain Interfacing
Technology

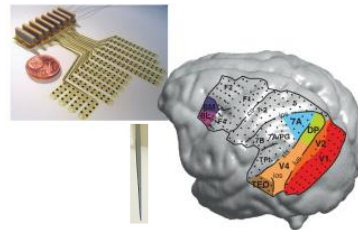
OptoRoboRat



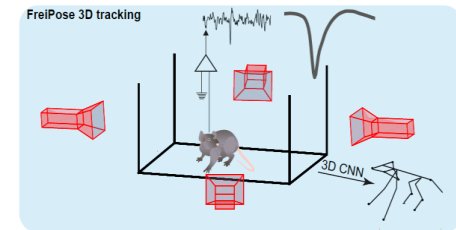
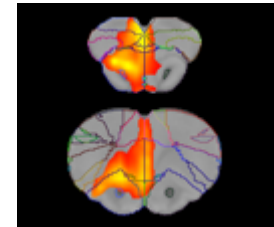
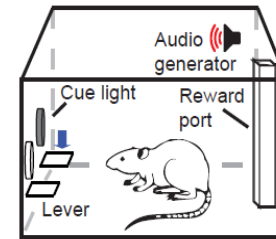
Miniscope & reversal learning



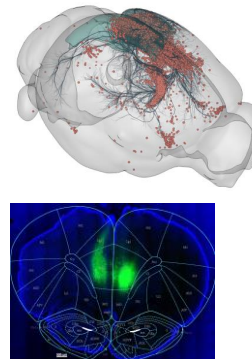
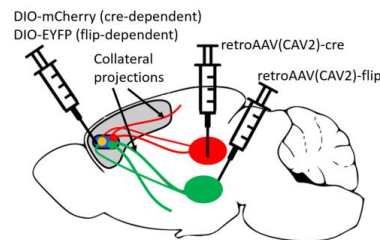
Neural Engineering



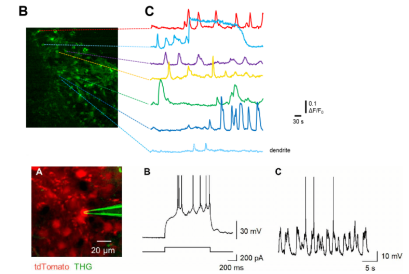
Behavior and analysis



Histology & analysis

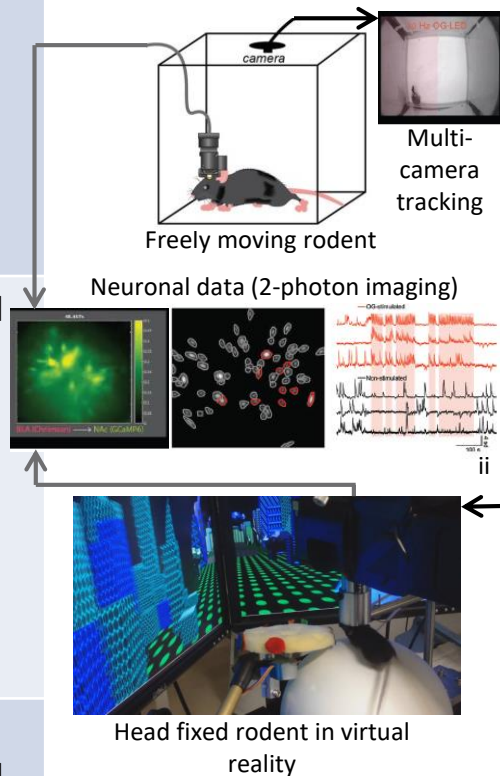


Slice work



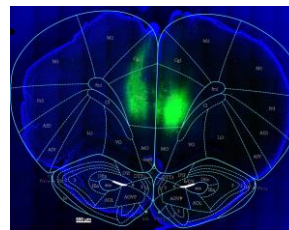
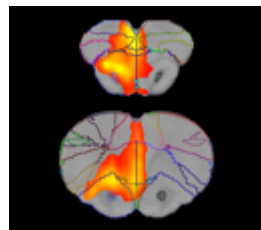
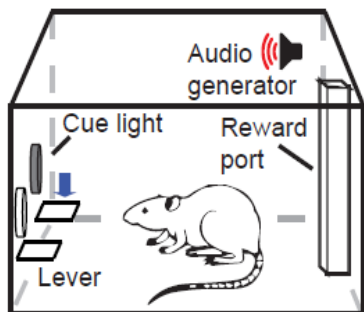
Master thesis Topics

Topic	Start	Tutor	Description	FELASA
Establishing behavior in real lab environment	Immediately	Florian Steenbergen	The focus will be on establishing a novel context-rule task paradigm and to implement a training schedule. Potentially compare behavioral differences between PV- and SOM-cre (and WT) mice. (Depending on the progress, possibility to engage in data analysis of preliminary calcium imaging data).	required
Establishing behavior in virtual reality	fall 2022	Dr. Julian Ammer	The focus of the project will be to establish a training paradigm for mice that navigate in a virtual environment and engage in a context-dependent motor task. In addition, there will also be the possibility to engage in data analysis and immunohistochemistry.	required
Compare head fixed 2P and freely moving miniscope recordings	Immediately <i>taken</i>	Dr. Julian Ammer, Dr. Brice de la Crompe, Florian Steenbergen	The goal is to image from the same cells with both techniques. The project will involve some hardware development and the development of analysis methods (mice 3d printed skull, pollen agar brain).	not required



Master thesis Topics

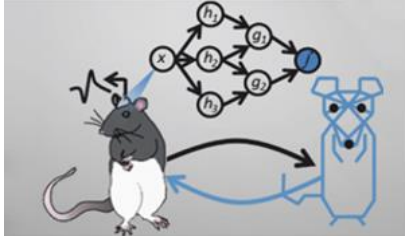
Topic	Start	Tutor	Description	FELASA
Histology of optofMRI rats	Immediately	Zoe Jäckel	The project is part of the PFC optofMRI study. The brains of injected rats who were imaged in the optofMRI setup will be histologically evaluated and the results will be correlated to the optofMRI outcome.	Not required
Analysis of behavioral data of the response preparation task	Immediately	Zoe Jäckel	The goal of this project is the detailed analysis of an existing behavioral data set. In particular, we will look into the phenomenon of post error slowing. Python knowledge recommended.	Not required
Combined rat behavior and optofMRI	fall	Ahmed Ademovic/Zoe Jäckel/Niels Schwaderlapp	Building on the existing behavioral and optofMRI results, we will conduct a study in which rats get first trained in a response preparation task and subsequently get imaged in the optofMRI setup.	required



Master thesis Topics

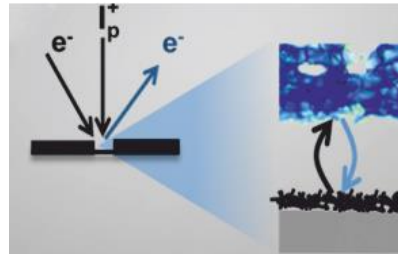
Topic	Start	Tutor	Description	FELASA
Probe development for combined surface and depth electrophysiological recordings	Immediately	Ahmed Ademovic	in the course of a project between the Diester lab and the Stieglitz lab, new probe designs will be developed and tested	Not required
Optimizing the neurofeedback loop for beta bursts and other frequency bands	Immediately	Ahmed Ademovic	figure out which aspects of the task can be dynamically changed in response to bursts and then to program it. Some data analysis can be added in there	Not required

NeuroCore

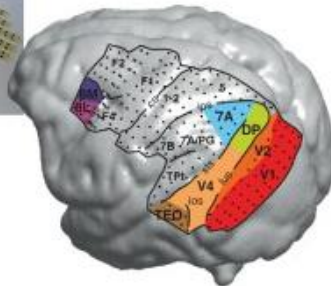
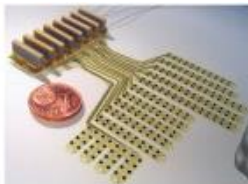
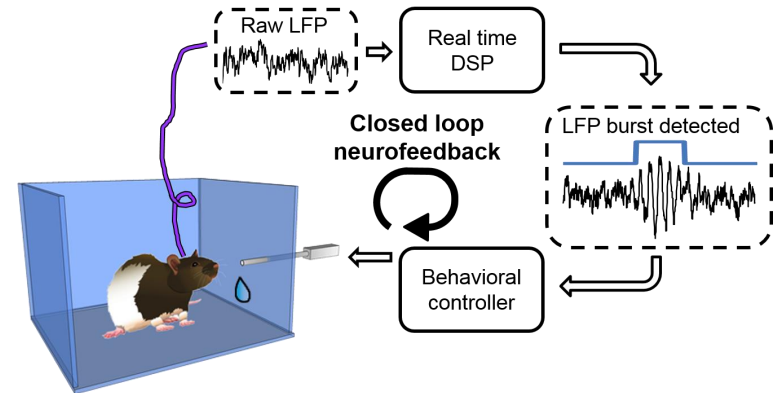


OptoRoboRat

NeuroProbes

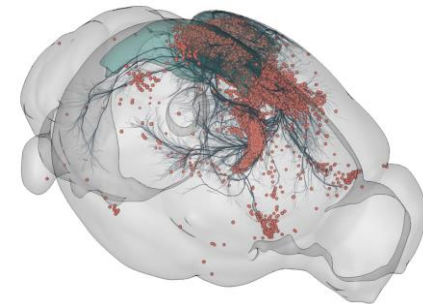
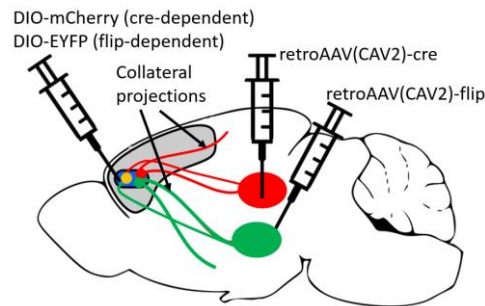
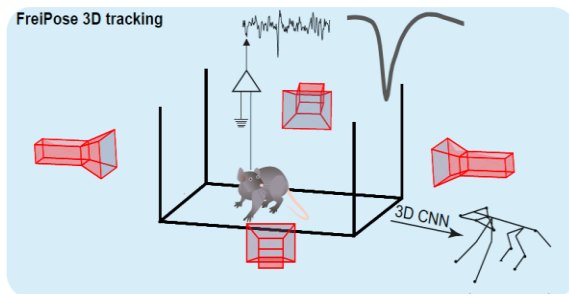


Soft-FIB

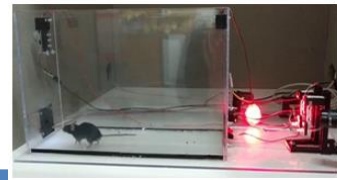


Master thesis Topics

Topic	Start	Tutor	Description	FELASA
Training of rats in a dynamic foraging task combined with movement tracking and analysis of behavior	winter 2022	Artur Schneider	The project is part of a larger research unit working on prefrontal flexibility. The rats will be involved in a decision making task.	required
Behavioral modeling of dynamic foraging task	Immediately <i>taken</i>	Artur Schneider	Same as above. Potentially reinforcement learning involved. Python knowledge and general computational background recommended.	Not required
Histological evaluation of PFC projections	August/ Sept 2022	Artur Schneider	The goal is the identification of target sites of the PFC. For this, an analysis pipeline has to be established based on the BrainGlobe software which allows a slice Registration to a rat brain atlas. Python knowledge recommended.	Not required



Master thesis Topics



Topic	Start	Tutor	Description	FELASA
Exploring the role of the thalamo-cortical circuit during reversal learning	fall 2022	Dr. Brice de la Crompe	By combining 1-photon calcium imaging and optogenetic inhibition in freely moving mice, we want to study the specific role of the thalamo-cortical circuit during reversal learning. The MSc student will train mice in order to perform both photoinhibition experiments and miniscope recordings (including data analysis).	required
Modeling behavioral response of the mice during reversal learning under uncertainty	immediately	Dr. Brice de la Crompe	model fitting to predict performance when reward probability changes and possibility to record with miniscope in OFC/PFC/mCx	not required
Histological evaluation and behavioral data analysis of DREADD experiments	August	Megan Schneck	DREADD is a technique to modify neuronal activity via a systemic injection. We recently started this technique in the lab. The goal is to evaluate the expression patterns and the impact on behavior.	Not required
Behavioral training + optogenetics in a cognitive flexibility task (reversal learning)	summer or fall 2022	Megan Schneck	Investigation of the role of OFC in behavioral flexibility via optogenetic inhibition and behavioral training in mice.	required

Master thesis Topics

Topic	Start	Tutor	Description	FELASA
GluA4 in organotypical slices + optogenetic 2P stimulation	Oct 2022 <i>taken</i>	Ashlyn Creamer	GluA4 is a receptor on inhibitory neurons. We will test a viral vector whihc binds to these receptors. The project will evaluate the efficacy of the transduction and the functionality of the expression.	Not required
Ephys patch clamp	Oct 2022 <i>taken</i>	Ashlyn Creamer	Same as above.	Not required

