MASTER THESIS RESEARCH PROJECT IN SYSTEMS NEUROSCIENCE:

Neuronal Mechanisms Underlying Curriculum Learning

Throughout human history, the process of learning has been strategically designed to optimize efficiency. We often use a method, where we start learning simpler tasks before moving on to more complex ones. Take education, for instance. We don›t dive headfirst into advanced math like calculus; we build a solid foundation with arithmetic and algebra first. This same principle applies outside the classroom, like when parents teach their kids to ride a bike, starting with a tricycle. This pedagogical segmentation, referred to as 'Curriculum Learning', expedites the process of acquiring proficiency in a more complex task by harnessing the knowledge and skills gained from simpler tasks.

In this project, we are investigating the neuronal mechanisms underlying curriculum learning. To study this, we perform behavior experiments in which mice are trained on tasks of varying difficulty and complexity. We also study how the performance differs over the course of development, in particular, around certain critical periods of plasticity. We use chronic in vivo electrophysiology to record neurons across learning to investigate learning-related functional changes. We also use confocal imaging to track neuronal markers of activity in different brain regions across different stages of learning.

If you are interested in learning about learning and would like to be a part of this project for your master's thesis, please contact us. The selected candidate will have the opportunity to be trained on behavior tasks, imaging, in vivo electrophysiology and data analysis.

This work will take place in the Brain and sound lab (http://www.brainsoundlab.com/) directed by Prof. Tania Rinaldi Barkat at the University of Basel under the supervision of Maria Shujah. Motivated candidates should send CV and a motivation letter to Prof. Tania Rinaldi Barkat (tania.barkat@unibas.ch) and Maria Shujah (maria.shujah@unibas.ch).