Course Title: BIO 628; Block course for MD/PhD students in Neuroscience (6 ECTS), 2025

Course Coordinator: Prof. Simone Hornemann

Contact information- Office: Schmelzbergstrasse 12, Path F67, University Hospital of Zürich, 8091 Zürich; Phone: 044 255 4905; Email: Simone.Hornemann@usz.ch

Content: This course is designed to introduce students to core concepts within the field of Neuroscience that range from basic to clinical research in a fun and intellectually stimulating fashion. At the end of this course you will acquire training for active, self-guided learning of fundamental concepts, develop analysis skills of scientific literature, and synthesize skills for basic research grant writing. This course requires significant independent study from students as they have to submit a review-style research proposal and actively participate in journal club discussions. Students work on a specific research problem from the beginning of the course and develop experimental strategies based on the lectures, journal club, and group discussions towards a short grant proposal. They then formulate their strategy as a presentation and defend their scientific ideas to the class. The course also includes 3 days of lab rotation in different labs of the Neuroscience community.

Learning outcomes:

Upon successful completion of the module, students should be able to:

- learn about select core topics within neuroscience ranging from basic to clinical research.
- learn about cutting-edge molecular tools and techniques that can be easily applied in a multidisciplinary research environment.
- bridge some of the knowledge gap by exposing students to several topics within neuroscience
- learn about grant proposal writing

Key skills:

Upon successful completion of the module, students should be able to:

- think independently, learn to evaluate published literature and write a well-structured project grant.
- present their findings effectively and appropriately.

Lectures core concepts:

1. Introduction to antibody technologies
2. Electrophysiology/ Ca2+ imaging
3. Brain Development
4. Circadian and sleep regulation
5. Spinal cord circuit
6. Brain vasculature
7. Neurodegeneration
8. iPSCs for brain diseases
9. Data analysis techniques

June 4	Lecture 9:00- 11:45 **Y55-L-06/08**	Introduction & Grant writing & Antibody tools in neuroscience	**Prof. Simone Hornemann**
June 5	Lecture 9:00-10:15 **Y55-L-06/08** Lecture 10:30-11:45 **Y55-L-06/08** Journal Club (JC): 13:15-15:00 **Y55-L-06/08**	iPSCs for modelling and treating brain diseases Data analysis and presentations: examples of basic statistics Journal Club	**PD Dr. Christian Tackenberg** **Prof. David Wolfer** **Simone Hornemann**
June 6	Lecture 9:00-10:15 **Y55-L-06/08** Lecture 10:30-11:45 **Y55-L-06/08** JC: 13:15-15:00 **Y55-L-06/08**	Brain development and tools to study it How to look at young neurons in old brains. Journal Club	**Prof. Theo Karayannis** **Prof. Sebastian Jessberger** **Christian Tackenberg**
June 9	Lecture 9:00-10:15 **Y55-L-06/08** Lecture 10:30-11:45 JC: 13:15-15:15 **Y55-L-06/08**	Spinal cord circuit and pain gating Translational neuromodeling and computational psychiatry Journal Club	**Prof. Uli Zeilhofer** **Prof. Klaas Enno Stephan** **Theo Karayannis**
June 10	Lecture 9:00- 10:15 **Y34-J-01** Lecture 10:30- 11:45 **Y34-J-01** JC: 13:15-15:00 **Y55-L-06/08**	Introduction to Electrophysiology/ Ca2+ imaging Approaches to study vascular integrity in the CNS Journal Club	**Prof. Martin Müller** **Dr. Annika Keller** **Uli Zeilhofer**
June 11	Lecture 9:00-10:15 **Y55-L-06/08** Lecture: 10:30-11:45 **Y55-L-06/08** JC 13:15-15:00	Molecular approach to neurodegeneration Mouse models for prion disorders Journal Club	**Prof. Magda Polymenidou** **Prof. Adriano Aguzzi** **Martin Müller**

	Y55-L-06/08		
June 16	Lecture 9:00-10:15 **Y55-L-06/08** Lecture 10:30-11:45 **Y55-L-06/08** JC 13:15-15:00 **Y55-L-06/08**	Immunological tools to study immune cells in the brain Mouse models and techniques to study stroke Journal Club	**Prof. Melanie Greter** **Prof. Susanne Wegener** **Prof. Magda Polymenidou**
June 17	JC 9:00- 11:00 **Y34-J-01**	Journal Club	**Prof. Susanne Wegener**

June 27, 2025 Grant submission before 12:00 **email to Simone.Hornemann@usz.ch and your grant mentor**

Grant writing: Simone Hornemann, Martin Müller, Theo Karayannis, Magda Polymenidou, Annika Keller

July 1, 2025 Grant presentation **13:15 - 17:00**; **Y55-L-06/08**