

BIO-697

Neuronal circuits underlying goal-directed behavior (2019)

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Cursus	Sem.	Type
Neuroscience		Obl.

Language of teaching	English
Credits	1
Session	
Exam	Written
Workload	30h
Hours	28
Courses	14
Exercises	14
Number of positions	8

Frequency

Only this year

Remark

Next time: Spring 2018

Summary

The brain can be viewed as a network of neurons receiving sensory input and carrying out experience- and context-dependent computations through complex synaptic interactions to drive motor output, i.e. behavior. Here, we will study recent advances in knowledge of neural circuits in the mouse brain.

Content

Students will learn state-of-the-art analyses of neuronal circuit function contributing to simple learned goal-directed behaviors in mice. We will critically evaluate current understanding through in depth discussion of various topics, guided by selected papers (Thursdays 5 - 7 pm; 7 x 2 hours = 1 ECTS):

22nd March 2018

Guo ZV, Li N, Huber D, Ophir E, Gutnisky D, Ting JT, Feng G, Svoboda K (2014) Flow of cortical activity underlying a tactile decision in mice. *Neuron* 81:179-194.

29th March 2018

Pinto L, Dan Y (2015) Cell-type-specific activity in prefrontal cortex during goal-directed behavior. *Neuron* 87:437-450.

12th April 2018

Kuchibhotla KV, Gill JV, Lindsay GW, Papadoyannis ES, Field RE, Sten TAH, Miller KD, Froemke RC (2016) Parallel processing by cortical inhibition enables context-dependent behavior. *Nature Neuroscience* 20: 62-71.

19th April 2018

Guo W, Clause AR, Barth-Marion A, Polley DB (2017) A corticothalamic circuit for dynamic switching between feature detection and discrimination. *Neuron* 95: 180-194.

26th April 2018

Leinweber M, Ward DR, Sobczak JM, Attinger A, Keller GB (2017) A sensorimotor circuit in mouse cortex for visual flow predictions. *Neuron* 95: 1420-1432.

17th May 2018

Driscoll LN, Pettit NL, Minderer M, Chettih SN, Harvey CD (2017) Dynamic reorganization of neuronal activity patterns in parietal cortex. *Cell* 170: 986-999.

28th June 2018

Aronov D, Nevers R, Tank DW (2017) Mapping of a non-spatial dimension by the hippocampal-entorhinal circuit. *Nature* 543: 719-722.

13th July 2018 (written report submission deadline)

For written evaluation, each student will critically discuss a neuronal circuit for a specific mouse behavior.

Note

Maximum number - 8 students

Keywords

Neuronal circuits
Mouse behavior

Learning Prerequisites

Important concepts to start the course

Strong interest in Neuronal Circuit function

Learning outcome - to critically evaluate studies of neural circuits and behavior.

Assessment methods

13th July 2018 (written report submission deadline)

For written evaluation, each student will critically discuss a neuronal circuit for a specific mouse behavior.