EPFL

BIO-804   **Summer School Program in Translational Neuroscience (2018)**

Micera Silvestro

Cursus	Sem.	Type
Neuroscience		Obl.

Language of teaching	English
Credits	2
Session	
Exam	Multiple
Workload	60h
Hours	**34**
Courses	30
Exercises	4
Number of positions	

Frequency

Only this year

Remark

Next time: June 4-9, 2018

Summary

The aim of the course organized as a 1 week summer school is to bring fundamental knowledge of the main experimental tools and concepts in neurophysiology to the community of engineers working in neural engineering, neuroprosthetics or biomedical engineering fields.

Content

The scientific program of the course will be organized into panels that cover the fundamentals of experimental and analytic tools used in neurophysiology and applied in neuroprosthetics.

Panel 1:   Interfaces with the peripheral and central nervous systems.

Panel one will cover different types of interfaces with the central (brain and spinal cord) and peripheral (nerves) nervous systems, compare their application range (temporal and spatial selectivity), and provide understanding of their microfabrication for an optimal interfacing with the nervous structure.

Panel 2:   Electrophysiology / Optical imaging.

Panel two focuses around the main tools used to image the neural circuits and systems, including optogenetics. Large scale recording techniques as well as single cell recording techniques will be covered.

Panel 3:   Understanding networks, circuits, and connectivity in neural systems.

Panel three will provide an in-depth understanding of how neural circuits can be dissected, and how their interaction in larger networks can be understood. We aim at looking at this topic both with standard anatomy and optogenetic techniques, as well as computational modeling, both techniques being extremely valuable and complementary.

Panel 4:   Applications to neuroprosthetics.

The last panel is directed towards the applications of the presented concepts in the field of neuroprosthetics. How can these tools refine current existing systems and techniques? How have they engendered translation from the basic understanding to a useful application in clinics, aiding patient treatment, assistance, and rehabilitation?

Note

The course is in fact a summer school that is organized every year by a team of EPFL and Brown University. The school is organized 1 year in Switzerland and 1 year in the US.
When in Switzerland, 20 EPFL students can participate. When it is held in the US, eight EPFL students can participate. Selection of participants is based on a motivation letter.
This event is supported by the ETH Board and Brown University, and is sponsored by the Wyss Center
Apply through https://blogs.brown.edu/neuroengineering/participate/

Learning Outcome: Have a broad knowledge of the different tools used in neuroscience that can be applicatble to translational research. The student should be able to understand how he can expand his PhD project by integration of new techniques that he learned during the course.

Keywords

translational neuroscience, neural engineering, neurophyioslogy

Resources

Websites

- https://actu.epfl.ch/news/bridging-the-gap-from-neuroscience-to-translation/