Post-Doctoral Position:

Deciphering electrophysiology of human brain organoid based on high resolution interfacing of in-vitro connected “mini-brains”.

Laboratory, group: LIMMS, UMI CNRS 2820, the University of Tokyo, TOKYO Japan.
Institute of Industrial Science, Ikeuchi Lab: http://www.bmce.iis.u-tokyo.ac.jp/
Duration: 2 years - Starting date: flexible (between June to September 2021)

Context and Scientific project:

Brain organoid technologies, based on human induced pluripotent stem cells (iPSCs) have attracted increasing attention due to their unprecedented potential for modeling human organs *in vitro* by mimicking *in vivo*-like differentiation and self-organization. It can help to overcome current issues facing neuroscience studies, as the limited access to viable human primary tissue, the difficulties of investigating human brains non-invasively or the poor match between animal models of neurological diseases and the human pathophysiology. One limitation of the current development is the lack of technological tool enable to monitor the electrophysiology activity along long period with high resolution. By using a Nano Electrode Arrays technology [1] developed at LAAS-CNRS in Toulouse, we demonstrated at Ikeuchi Lab (Institute of Industrial Science, Tokyo), high resolution interfacing of organoids thanks to the high affinity of the nanoprobes with the cells, leading to unpreceded electrophysiology details on such in-vitro 3D tissues. The Ikeuchi Lab put effort on developing methods to generate macroscopic circuits by connecting organoids through axon bundles mimicking the physical environment in custom-made microchips [2]. With this original strategy and the state-of-the-art technologies, our team is poised to understand brain circuits and related diseases.

Position and environment:

We are looking for a postdoc researcher to join our project to further pursue these developments at Ikeuchi lab with emphases on the construction, integration and thorough investigation of connected organoids from different regions of the brain using the nanoelectrode array platform, in collaboration with LAAS-CNRS.
The laboratory is well equipped with apparatus for tissue culture, imaging, and electrophysiological analyses. The lab is interdisciplinary, international and diverse.

Prerequired qualifications:

Candidate is expected to have a background of electrophysiological characterization and analysis (Multi Electrodes Array or patch clamp preferably), and/or brain-on-chip, and/or neural organoid/iPSC development. Skills on electrophysiological signal treatment will be helpful. A challenging spirit would help a lot for tackling this interdisciplinary and cutting-edge research area.

[1] A. Casanova et al. J. Phys. Cond. Mat. 30 (2018)
[2] T. Kirihara et al. iScience (2019), J. Kawada et al. Stem Cell Reports 14;9(5):1441 (2017)

Contact:

To apply, send an application including a CV with a list of publications, a letter of motivation and statement of research experience and interests as well as 2-3 references with e-mail contacts to:

Guilhem Larrieu: glarrieu@iis.u-tokyo.ac.jp