

M2 internship 2022

Exploring unique bio-electric signatures of cancer cells

Laboratory: Physicochimie Curie - Institut Curie / CNRS UMR 168 / UPMC

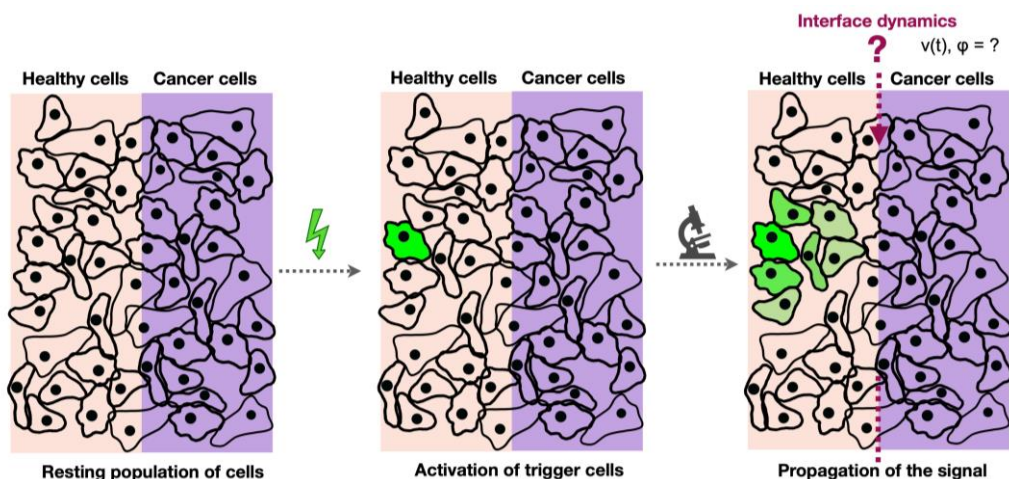
Team: Light Observation and Control of Cellular Organization (LOCCO)

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Abstract:

While the rapid exchange of electrical impulses is a well-known hallmark of communication between neurons, electrical phenomena in non-neuronal cells remain largely unexplored. A particularly intriguing hypothesis is the existence of ‘bioelectric signatures’ in cancer — patterns of electrical activity that distinguish cancer cells from their healthy counterparts. With the advancement of optogenetics, we are freed from the constraints of rigid experimental setups and have the unique opportunity to probe the bioelectric activity in intact epithelia. In this internship, the student will actively participate in fleshing out a novel approach to studying cancer. Using established mammalian cell lines, the student will use light input to perturb the cells’ membrane potentials and analyze the spatio-temporal propagation of signals that arise in cell population after such stimulation. Once the groundwork is laid out, the student will be free to creatively explore the effect of different geometries and arrangements of cancer cells embedded in a population of healthy cells. By working on this interdisciplinary project, the student will acquire a range of experimental and data analysis skills. In turn, this inherently novel project has the potential of opening new venues into cancer research and will benefit from the student’s creativity and curiosity.



Experimental techniques: Live cell microscopy, cell culture, optogenetics, optics, programming (Matlab), image analysis, quantitative biology