

## Master 2 internship offer in Bioinformatics

Title: NGS approaches to study interactions of viruses with the intracellular innate immune system

Keywords: Transcriptome; Genomes ; Single-cell approaches

Location: team "Innate Immunity", department "Immunity and Cancer" INSERM U932, Center for Immunotherapy, Institut Curie

### Project Summary:

The Manel lab studies how viruses (such as HIV or viral vaccines) are detected by the intracellular innate immune systems. In immune cells, virus infection generates viral nucleic acids that can be subsequently detected by intracellular innate immune sensors. We focus on the NONO-cGAS sensing machinery that plays a crucial role in HIV detection (see references). The lab employs a variety of techniques to study the interplay between innate immune sensors and viral infections in primary human immune cells, including single-cell and bulk RNAseq and bulk CHIP-seq. An important question is to understand how the exposure to the virus affects host gene expression and regulation machinery. While the assessment of gene expression and regulation changes in different conditions (KO of a specific gene; comparison between different stimuli) is well established, optimal ways to analyse the changes in cellular transcriptome and cellular gene regulation in response to different levels of infection are still largely unexplored. The goal of the M2 internship is to dissect the dynamics of cellular and viral RNA during innate immune detection of viruses. Tools already developed for standard analysis will be used into ad hoc pipelines where the virus-specific infection machinery needs to be integrated explicitly. This analysis will be performed in close collaboration with the wet-lab scientists that generate the datasets, and under supervision of experienced bioinformaticians in the lab. In this context, a handful of single-cell RNA-Seq projects focused on viral infection has already been implemented in the lab, which will greatly facilitate the beginning of the internship.

The M2 student will benefit from direct interactions with a core of bioinformaticians in our Immunology & Cancer department (10 people, ranging from Engineer to Postdoc), with the Bioinformatics research department and with the Bioinformatics platform at Institut Curie.

Internship period: First semester of 2020

### References:

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