

# CANCER SCIENCE INSTITUTE OF SINGAPORE

## SEMINAR ANNOUNCEMENT

# Francesco Ferrari, Ph.D.

Principal Investigator - Computational Genomics Laboratory  
 IFOM - The FIRC Institute of Molecular Oncology



## Chromatin 3D Organization and Regulation of Transcription

**Date:** Tuesday, 1 October 2019

**Time:** 3.00pm – 4.00pm

**Venue:** L1 Auditorium, Clinical Research Centre (MD11)

10 Medical Drive, Singapore 117597

**Host:** Dr Melissa Fullwood

### Abstract:

The three-dimensional (3D) organization of chromatin within the cell nucleus is crucial for regulating genome functionality. The knowledge of its role has greatly advanced thanks to the development of novel imaging and molecular biology techniques. In particular, chromosome conformation capture (3C) and its high-throughput derivatives, based on next generation sequencing, allow investigating chromatin architecture on a genome-wide scale. My research group is focused on the use of 3D chromatin organization data to gain mechanistic insights into transcription and epigenetic regulation at different levels. On a large scale, we investigate mechanisms for the coordinated regulation of large chromatin domains in physiological and disease conditions. These involve, for example, the organization of the genome in distinct structural domains, such as Topologically Associating Domains (TADs), or Lamina Associated Domains (LADs). On a finer scale, instead, we study distal regulatory elements (enhancers) and their epigenetic or genetic alterations in genetics diseases and cancer. In this context, we leverage chromatin 3D organization data to refine the association of distal regulatory elements and their target genes, to characterize the functional role of enhancers in epigenetics and gene expression regulation, within the broader gene regulatory network. I will discuss recent work from my lab and in particular how the development of specific computational biology solutions has been instrumental to address unanswered biological questions.

### Biosketch:

Francesco Ferrari obtained his PhD in Biotechnology and Molecular Medicine in 2008 from the University of Modena and Reggio Emilia. He then specialized in computational biology and genomics. After a first postdoc at the University of Padova, he joined the group of Peter J. Park at Harvard Medical School where he worked on the use of high-throughput sequencing techniques to study chromatin and transcription dynamics in different experimental models. In 2015 he joined IFOM as group leader of the “Computational Genomics Laboratory”. His laboratory is particularly focused on understanding the role of chromatin organization and epigenetics in regulating gene expression, and how these mechanisms are altered in cancer.