

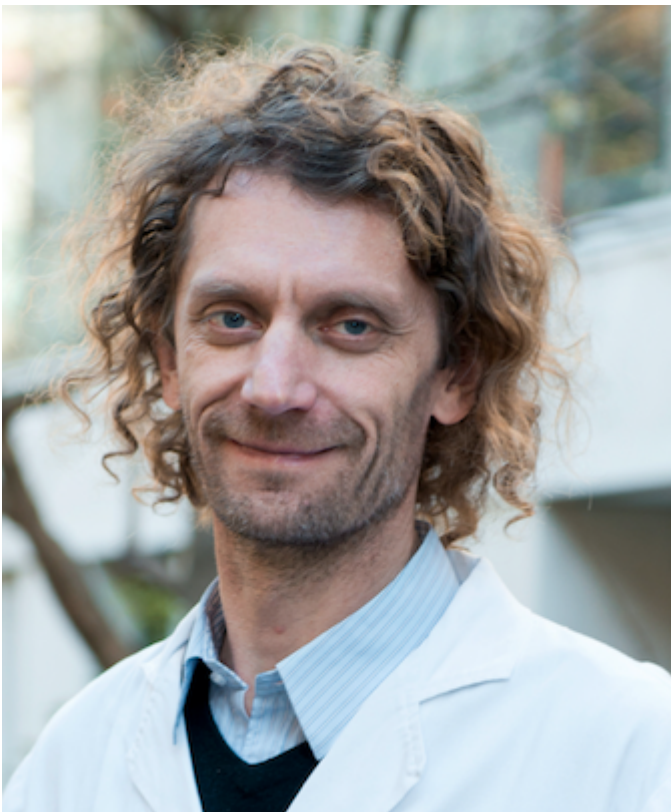
## Virtual BSC RS/Life Session: Multi-omics and Artificial Intelligence to fight cancer

### Objectives

**Abstract:** We now have many modalities to explore the tumor and its environment: many types of omics, imaging, clinical records... One burning question is to convert this heaps of data into knowledge useful in clinics. This requires ad hoc algorithms which are capturing the underlying biological nature of the data while being computationally efficient which means keeping a reasonable level of complexity.

I will present some examples of our research in that direction:

- how to reconstruct evolutionary path from clinical data?
- how to integrate multi-omics to gain biological insights and clinical perspectives in a devastating pediatric disease: medulloblastoma.
- how to model the spatial dimension of the tumor, a critical though neglected aspect of cancer.



**Short bio:** Emmanuel Barillot obtained his PhD in 1992

in biomathematics and genomics at CEPH-Généthon where he contributed to the construction of the first human genome physical map. In 1995 he joined Infobiogen, the former French Institute of Bioinformatics where he developed research in omics data integration. In 2000 he joined INRA where he headed Génoplante-Info (the bioinformatics integration center of Génoplante program) and created the Unité de Recherche Génomique-Info (URGI). In December 2002, he joined institut Curie to develop cancer

bioinformatics. Since 2008, Emmanuel Barillot heads the Department of Epidemiology, Biostatistics, Bioinformatics and Computational Systems Biology of Cancer (U900), a joint Institut Curie and INSERM research department, in partnership with Mines ParisTech at PSL Research University. His own research focuses on Computational Systems Biology of Cancer, and aims at understanding tumorigenesis and tumor progression using computational approaches and developing methodological approaches when needed. This means on one hand developing original statistical methods and biological network modeling approaches; and on the other hand conducting statistical analysis of high-throughput biological data, integration of heterogeneous data, and network modeling in the context of cancer. E. Barillot is also Scientific Director of the Institut Curie Bioinformatics Core Facility. He also holds a Chair in Cancer Genomics at the Paris Artificial Intelligence Research Institute (PRAIRIE). E. Barillot has published more than 200 papers in the fields of bioinformatics, genomics, systems biology, cancer biology, translational and clinical research, biophysics, and computer science.

## Speakers

**Speaker:** Emmanuel Barillot, Institut Curie - INSERM - PSL Research University / Mines ParisTech  
Head of Cancer Computational Systems Biology Department (U900 Institut Curie - INSERM)  
Scientific Director of Institut Curie Bioinformatics Core Cancer omics AI Chair at Paris Artificial  
Intelligence Research Institute (PRAIRIE)

**Host:** Alfonso Valencia, BSC Life Sciences department director  
Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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