UE 3.3. Technological skills for conducting a research project in Biology and Health Science 3 ECTS

Teaching unit shared by the following tracks:
- Cellular, Integrative and Translational Neurosciences
- Diabetes and cardiovascular diseases
- Fundamental and clinical oncology, towards precision medicine
- Immunity, Inflammation et Infection

EC4 - Inference and interrogation of biological networks

Contact : mohamed.elati@univ-lille.fr *Màj 09/06/2022*

Large-scale omics data (proteomics, transcriptomics, etc.) as well as recent advances in statistical learning have enabled significant progress in the inference of cellular networks. A first objective of this course is to present the concepts and tools of statistical learning dedicated to structured data in the concrete context of the inference of regulatory networks. Three issues in systems biology will be addressed: the integration of heterogeneous data and the reduction of dimension, the estimation of the parameters and the structure of models of regulatory networks, the analysis and visualization of large graphs, the completion and interrogation networks of interactions between proteins. Two classical frameworks (logic and graphical models) will be investigated. The latter objective could be elaborated by making use of the knowledge generated by the inference/interrogation blocks to introduce a computer-aided experimental design to guide the design of new high-quality functional experiments (e.g., siRNA, CRISPR/CAS9 system, drug monitoring, etc).