

BIostatistics - STATISTICAL ANALYSIS OF BIG DATA IN SYSTEMS IMMUNOLOGY (SYSTIMMUN)

DATES : FROM MAY 20 AM TO MAY 24 PM (30 HOURS)

OBJECTIVES

Systems immunology involve various high dimensional data coming from high throughput technologies such as RNA sequencing, flow cytometry data, etc. The statistical analysis of these data as well as the understanding of the published papers on this topic require knowledge in specific statistical approaches.

The objectives of this course are

- To give key ideas about various statistical approaches currently used for the analysis of the data generated in systems immunology studies.
- To present the statistical methods used for the analysis of large data in immunology
- To apply these methods and to interpret their results
- To review recent publications of systems immunology and discuss their methodology and results

COURSE FEES

Individual : 750 Euros
Institution : 1500 Euros

INSTRUCTORS

Marta AVALOS
Robin GENUER
Boris HEJBLUM
Edouard LHOMME
Mélanie PRAGUE
Laura RICHERT (DIRECTOR OF STUDIES)
Rodolphe THIEBAUT (DIRECTOR OF STUDIES)

LOCATION

University of Bordeaux

MODULE PROGRAM

- Overview of systems immunology through examples
- Statistical methods used in systems immunology for dimension reduction, classification, gene network analysis: FDR, PCA, RDA, MDS, PLS, RGCCA, SVM, deep learning, hierarchical clustering, spade, citrus, t-SNE...
- Analysis of gene expression data in practice including gene set analyses
- Applications in whole blood and single cell analyses
- Principal component analysis, Multidimensional scaling and hierarchical clustering
- Applications for gene expression and flow cytometry data
- Regularized approaches, Lasso
- Random Forest, Partial Least Squares
- Applications for integrative analyses
- Understanding published papers
- Discussion on participants' projects

REQUIREMENTS

Experience in data analysis (PCA, regression analysis, R software) and in immunology is welcomed