



Basics In Genomic epidemiology (BIGGY)

From June 3th to June 5th, 2024 (3 days)

Location : Carreire Campus
University of Bordeaux

Training fees :

Individual participation: €360

Institutional participation : €900

Instructors and coordinators:

- Stéphanie DEBETTE (Coordinator)
- David-Alexandre TRÉGOUËT (Co-coordinator)
- Ilana CARO
- Quentin LE GRAND
- Aniket MISHRA
- Gaëlle MUNSCH
- Omar SOUKARIEH

Objectives

- › Discover the basics of genetic epidemiology together with some recent advanced concepts
- › To be able to conduct a Genome Wide Association Study (GWAS) from data quality control till the identification of the most plausible causal variants/genes
- › Learn about additional and complementary approaches that go beyond DNA analysis and explore other molecular phenotypes

Requirements

- › Basics in statistical tests and regression analysis
- › Basics in R (recommended for the last session)

Program

- › From genes to proteins, and beyond
 - DNA, single nucleotide polymorphisms, protein, gene, molecular phenotypes (metabolite, methylatio, microRNAs...)
- › Basic concepts in genetic association studies
 - Allele frequency, Hardy-Weinberg Equilibrium, Linkage Disequilibrium, Haplotypes, Association testing
- › Genome Wide Association Studies (GWAS)
 - Quality control, Imputation (reference panel), population stratification, unrelated individuals vs family data, GWAS (+Manhattan, QQplot, Locuszoom), correction for multiple testing, meta-analyses of GWAS data
- › Beyond GWAS results
 - Genetic and polygenic risk scores + heritability + genetic correlation
 - Transcriptome Wide Association Studies (TWAS) et extensions (PWAS, MWAS,...)
- › Genomics as a tool to explore causality
 - Mendelian Randomization (principles, methodes & recent advances in illustrations)
 - Rare variants analysis in unrelated samples and family data
- › My first GWAS in practice
 - Content : Initiation (plink / R), data visualisation, how to analyze genome-wide significant signal (extraction, LD, Locuszoom)