INTEGRATED APPLIED GENETICS TRAINING - AppGENEdu

A Project Financed through the EEA Grants 2014-2021, Education, Scholarships, Apprenticeships and Youth Entrepreneurship Programme in Romania, Cooperation projects in The Higher Education Area

Project Curricula

Genetics perspective Epidemiology perspective
Genetics Fundamentals
Statistics and Bioinformatics • Fundamental elements of biostatistics • Fundamental elements of statistical genetics • Elements of statistical study design
Workshop • Statistical tools; R • Statistical basic processing
Workshop • Statistical basic processing • Basic data visualization
Fundamentals of Genetic Epidemiology • Quantitative Statistical Tests, linear regression (smoking) • Phenotype - genotype correlations
Workshop • Phenotype - genotype correlation • Example of epidemiology study design based on provided "use-cases"
Elements of genetic risk analysis, • Genetics: LD frequencies, HWE • Relative risk
Workshop biostatistical tools - plink • Missingness by phenotype • Missingness by genotype • Hardy-Weinberg • Allele frequencies • LD-based SNP pruning • Mendel errors
Elements of genetic risk analysis • Genetics: linkage disequilibrium, haplotypes • Example of population admixture • Bioinformatics methods & principles

• Genetics: LD frequencies, HWE

Workshop
• Case/control
• Fisher's exact
• Stratified analysis
• Quantitative trait
• Linear and logistic models
• Multiple-test correction

Workshop
• Missingness by phenotype
• Missingness by genotype
• Hardy-Weinberg
• Allele frequencies
• LD-based SNP pruning
• Mendel errors

Elements of Data Science
• Data load
• Data cleansing
• Data visualization
• Data processing
• Data comparison
• Reproducible research

Workshop
• Example of data processing (from problem to result)
• Bioinformatics exercises

Bioinformatics
• Biologic consequences of genetic variants/gene mutations
• Genetic variances in Genetic Epidemiology context (GWAS)

Workshop
• GWAS study
• Output analysis

Advanced Applied Genetics
• Replication studies
• Quantitative trait loci
• Genetic pathways & gene integration

Workshop
• Replication study
• Visual representation

Bioethics principles
• Informed consent
• GDPR elements
• Elements of ethics of scientific publication

Elements of Research methodology
Specific steps and examples for genomics data science projects

Specific steps and examples for genomics data science projects

Prepare and writing a scientific article

Project bid and presentations

Visits to the clinics associated with the project topic
• Phenotypic and epidemiological data collection
• Genetic sampling
• Clinical visit
• Clinical case report

Project work

Project presentation and evaluation