INTEGRATED APPLIED GENETICS TRAINING - AppGENEdu

Online School Programme

Module 1
Genetics perspective – Prof. Bohiltea L   Epidemiology perspective - Conf. Pitigoi D
Genetics Fundamentals I – Bohiltea L, Radoi V, Ursu R
Genetics Fundamentals II – Bohiltea L, Radoi V, Ursu R
Statistics and Bioinformatics - Manolescu A, Poenaru E   • Fundamental elements of biostatistics   • Fundamental elements of statistical genetics   • Elements of statistical study design
Practical sessions – Poenaru E, Dogaru C, Poenaru C, Iacob D, Poenaru A   • Statistical tools; R   • Statistical basic processing
Practical sessions – Poenaru E, Dogaru C, Iordache P, Poenaru C, Iacob D, Poenaru A   • Statistical basic processing   • Basic data visualisation
Epidemiology Fundamentals – Pitigoi D, Manolescu A
Practical sessions – Iordache P, Poenaru E, Manolescu A, Poenaru C   • Phenotype - genotype correlation   • Example of epidemiology study design based on provided "use-cases"

Module 2
Elements of genetic risk analysis, Part I – Manolescu A, Iordache P, Ursu R, Radoi V   • Genetics: LL frequencies, HWE   • Example of population admixture
Practical sessions biostatistical tools - plink – Iordache P, Poenaru E, Manolescu A, Poenaru C, Iacob D, Poenaru A   • Missingness by phenotype   • Missingness by genotype   • Hardy-Weinberg   • Allele frequencies   • LD-based SNP pruning   • Mendel errors

Module 3

Elements of genetic risk analysis, Part II – Manolescu A, Iordache P, Ursu R, Radoi V

Quantitative Statistical Tests ← linear regression (smoking)

Genetics: linkage disequilibrium, haplotypes

Bioinformatics methods & principles

Elements of genetic risk analysis – Manolescu A, Iordache P, Ursu R, Radoi V

Genetics: LL frequencies, HWE; Example of population admixture

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Practical sessions –Poenaru E, Iacob D, Poenaru A, Manolescu A, Poenaru C
- Case/control
- Fisher's exact
- Stratified analysis
- Quantitative trait
- Linear and logistic models
- Multiple-test correction

Practical sessions – Iordache P, Ursu R, Radoi V, Poenaru E, Manolescu A,
- Missingness by phenotype
- Missingness by genotype
- Hardy-Weinberg
- Allele frequencies
- LD-based SNP pruning
- Mendel errors

Module 4

Elements of Data Science – Poenaru C, Poenaru A
- Data load
- Data cleansing
- Data visualisation
- Data processing
- Data comparison
- Reproducible research

Practical sessions – Poenaru C, Poenaru E, Dogaru C, Iacob D, Poenaru A
- Example of data processing (from problem to result)
- Bioinformatic exercises

Module 5

Bioinformatics - Iordache P, Iacob D, Poenaru E
- Biologic consequences of genetic variants/gene mutations
- Genetic variances in Genetic Epidemiology context (GWAS)

Practical sessions – Iordache P, Poenaru A, Iacob D, , Poenaru E
- GWAS study
- Output analysis

Module 6

Advanced Applied Genetics – Ursu R, Radoi V, Iordache P
- Replication studies
- Quantitative trait loci
- Genetic pathways & gene integration

Practical sessions – Iordache P, Ursu R, Radoi V
- Replication study
- Visual representation

Module 7

Bioethics principles – Curca C, Chirica V
    •   Informed consent
    •   GDPR elements
    •   Elements of ethics of scientific publication

Elements of Research methodology – Halldorsson B, Manolescu A, Poenaru E, Vinereanu D Specific steps and examples for genomics data science projects
Specific steps and examples for genomics data science projects – Halldorsson B, Manolescu A, Iordache P
Prepare and writing a scientific article – Vinereanu D, Poenaru E, Chirica V, Trasca L
Project bid
Project work
Projects presentation