SIGA COURSE

Association Mapping: theory and practice

With the use of array and NGS data

Department of Agricultural, Forest and Food Sciences, University of Turin

11-14 July 2022

PROGRAMME

Monday 11 July

Registration: 13:30-14:30

Theory

14.30-16:30 Prof. Ezio Portis, University of Turin

- QTL localization of agronomic and yield-related traits by analyzing association between markers and phenotypic traits within natural populations and germplasm collections.
- Linkage disequilibrium (LD) and association mapping: LD concept, factors influencing LD, statistical parameters for LD quantification, LD extension and decay plots, association mapping strategies, statistical models for the whole genome scanning approach.

Theory

16:30-17.30 Prof. Silvio Salvi, Università degli Studi di Bologna

The power and deceit of genome wide association mapping in crops.
How searching for a statistical association between SNPs and a phenotypic trait using GWAs can contribute knowledge about the causal molecular and cellular mechanisms behind traits of agronomic importance, and how this can be harnessed for breeding.

18.00 Welcome cocktail

Tuesday 12 July

Practice

9.00-12.30 Prof. Lorenzo Barchi, University of Turin

- High density genotyping data management: main filtering parameters (R and bash)
- Phenotypic data preparation (R with dedicated packages)
- Population structure (R with dedicated packages)

12.30-14.00 Lunch

Theory

14.00-18.00 Prof. Ezio Portis, University of Turin

Low density GWAS data analysis by means of Tassel and Haploview softwares

Wednesday 13 July

Practice

9.00-12.30 Prof. Lorenzo Barchi, University of Turin

GWAS analysis with GAPIT using high density genotyping data (in R)

12.30-14.00 Lunch

Theory

14.00-18.00 Prof. Fabio Marroni, University of Udine

eQTL mapping: identification of variants with regulatory effect. Theoretical introduction to eQTL mapping.

Practice section:

Hands-on workshop.

Thursday 14 July

Practice

8.30-10.30 Prof. Fabio Marroni, University of Udine

eQTL mapping: identification of variants with regulatory effect. Final part of hands-on workshop.

10.30-12.00 Case Studies and General Discussion

12:00-12:30 Final test and Course closure