Course:

BIOLOGICAL NETWORKS AND MOLECULAR PROFILES

### January - April 2016
UNIVPM, Ancona, Italy

Prof. Zoran NIkoloski,

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Summary

The course will focus on providing an overview and hands-on experience on network-based analysis of plant phenotypes for students studying agriculture and biology with beginner's skills in statistics. The course will present differential network analysis and network reconstruction from transcriptomics and metabolomics data, obtained from both perturbation and time-series experiments.
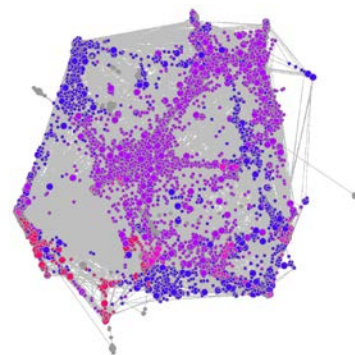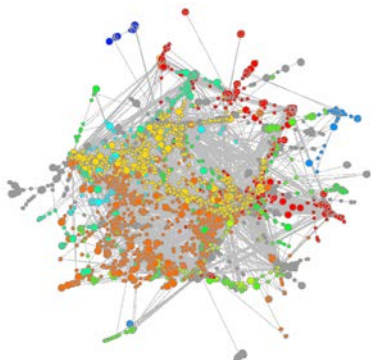
The course will cover 10 s of lectures, with one lecture per followed by a ly exercise illustrating the introduced computational and statistical concepts. The details of the exercises will be discussed before the proceeding lecture. The exercises will be completed in the R programming environment; students should have minimum experience with R, since the exercises will contain a detailed list of commands / scripts which are to be executed.

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Lecture schedule

29 January	**1** - Analysis of differential behavior for single molecular components
5 February	**2** - Distance and similarity measures for comparison of data profiles I
12 February	**3** - Distance and similarity measures for comparison of data profiles II
19 February	**4** - From similarity measures to networks
4 March	**5** - Regression models and networks I
11 March	**6** - Regression models and networks II
18 March	**7** - Network properties for components and their relationships
25 March	**8** - Network communities
1 April	**9** - Enrichment analysis and subnetworks
8 April	**10** - Differential analysis of networks and network motifs

Class schedule:
Each lecture is constituted by 2 hours of lecture in the morning (**10:30-12:30 am**; **AULA H**) and four hours in the afternoon for exercises (**2:30-6:30 pm**; **AULA INFORMATICA CESMI2**).

A maximun of 20 participants will be accepted. Applications can be submitted by 15 January 2016 sending the Course Application Form to r.papa@univpm.it using the subject "COURSE_FORM"; the applications will be evaluated by the Organizers of the Course and acceptance/ rejection will be sent to participants by 20 January 2016