

Postgraduate student: **Bourdakou Marilena**

Thesis Title:

Investigating the influence of the biological networks combination with differential gene expressions on the selection of biomarker genes for breast cancer classification

Abstract

It is widely accepted that is better off analyzing genes and proteins in an organism as a system rather than isolated, in order to achieve insights about the underlying regulatory mechanisms or their interactions. This systemic perspective on genes and proteins, which participate either in a mechanism or in a disease, entails the use of several types of networks, for example protein-protein interaction, metabolic networks, etc., with the aid of graphs. In those graphs, nodes represent biomolecules whereas edges describe on the one hand the existence of an interaction while on the other the magnitude of this interaction. The aim of this study is to reveal the potential influence of molecular networks in determining "significant" genes related to a specific disease. In particular, combining differential gene expression values and interaction networks we aim at producing re-ranked gene lists where the top ranked genes are those associated closely with mechanisms of the inspected disease. The gene lists produced through common feature selection techniques, are initially enriched with information derived from gene networks and finally re-ranked accordingly.

SUBJECT AREA: System Biology

KEYWORDS: differential gene expression values, interaction networks, reconciling methods, classification, validation

Examining Committee

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