

Title	Building network consensus models to understand health and disease
Group	Systems and Synthetic Biology
Project type	Thesis
Credits	36
Supervisor(s)	Dr. Edoardo Saccenti (SSB) Dr. Helena Zacharias (University of Kiel)
Examiner(s)	Dr. Edoardo Saccenti
Contact info	edoardo.saccenti@wur.nl
Begin date	Ope

Used skills: Network inference, data analysis and multivariate statistics; programming; relating results to existing or novel biological knowledge.

Requirements: Ability to program in R and Python, basic statistics and biological knowledge are highly desired skills.

Description: Different types of information can be represented in the shape of networks in order to model a biological system. A network is a graphical representation of different biological entities (nodes) and their relationships (edges): the meaning of the nodes and edges used in a network representation depends on the type of data used to build the network.

Many methods exist to build a network from the same set of data and they often produce different results.

In this project we will focus on metabolite-metabolite association networks that can be built from metabolomics data: the ultimate goal is to understand to which extent different methods produce different results and devise an appropriate strategy to arrive at consensus and to pool the results.

These new solutions will be then applied to address real life biological problems like phenotyping healthy subjects or understanding pathological mechanisms underlying disease.

At the end of the project you will have gained ample experience in network analysis, network topology, statistics and in handling and modelling complex information.

This project is in collaboration with the group of Dr. Helena Zacharias (Clinical Metabolomics) at the University of Kiel.

References

Alm, E. and A. P. Arkin (2003). "Biological networks." Current opinion in structural biology **13**(2): 193-202.

Glass, L. (1975). "Classification of biological networks by their qualitative dynamics." Journal of Theoretical Biology **54**(1): 85-107.