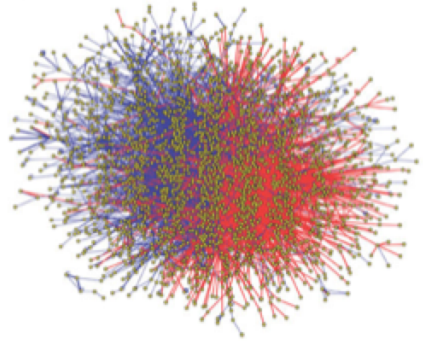


Workshop

# Network Biology/Integromics Bioinformatics – Applications Towards Medicine



23-25 August 2017  
Bergen

## External Lecturers:

Albert-László Barabási	Northeastern University, Boston, USA
Benno Schwikowski	Institut Pasteur, Paris, France
Laura I. Furlong	Universitat Pompeu Fabra, Barcelona, Spain
João Pedro de Magalhães	University of Liverpool, UK
Leonidas Alexopoulos	National Technical University of Athens, Greece
Pablo Porras Millan	EMBL-EBI, the European Bioinformatics Institute EBI, UK
Christos Ouzounis	CERTH, Centre for Research and Technology Hellas, Thessaloniki, Greece
Ruth Barshir	Ben-Gurion University of the Negev, Beer-Sheva, Israel
Aristidis Vrahatis	University of Patras, Greece
Alfonso Valencia	BSC-Barcelona Supercomputing Center, Spain

**Organizers:** Konstantina Dimitrakopoulou, Inge Jonassen, Lars Akslen, Christine Stansberg, Eileen Marie Hannah, Elisabeth Wik, Kjell Petersen (University of Bergen)

**Read more and register here, by 15 June 2017:** <https://goo.gl/88f06k>



## **Network science meets omics data.**

Many systems are highly complex and behind their collective behavior there is a network of interactions among the system's components. Network science can rationalize diverse complex systems, for example, the *cellular network* depicts the interactions between genes, proteins, and metabolites, the *neural network* describes the connections between neurons, the *social network* captures the family, friendship and professional relations formulating the society and the *communication network* depicts communication devices interacting through wired internet connections or wireless links.

The functioning of living organisms is controlled by highly complex networks of interacting molecular components like signal transduction, protein-protein interaction, metabolic and gene regulatory networks. Disease analysis has recently undergone a paradigm shift due to the unprecedented amount of multiple omics data produced and the introduction of network science which moved understanding of disease etiology and progression from the level of single molecules to perturbations upon the complex intracellular network. Moreover, systems-level approaches integrate omics data from different sources as an effective means to deal with the high noise in each individual source and provide a more realistic cellular landscape. Integromics approaches have been shown to improve our comprehension of biological systems and enable more robust disease classification and discovery of biomarkers and drug targets.

In this workshop, we will introduce participants to graph theory, provide an overview of different types of biological networks and present approaches for integrating omics data. Hands-on tutorials on tools used in network-based approaches will also be provided.

## **Who this workshop is for**

This workshop is intended for all students/researchers with an interest in bioinformatics and systems biology. Tutorials require installation of Cytoscape software and basic R scripting skills.

Recommended readings can be found here:

<http://barabasi.com/networksciencebook/>

<https://www.coursera.org/learn/network-biology>

**Figures:**

doi:10.1038/nrc3891

doi:10.1038/nature04209