

Course overview

Kathleen Marchal

UGhent, Dept. Plant Biotechnology and Bioinformatics Dept. of Information Technology, IMinds, Ghent University

From Mol Biol to Systems Biology

Omics era...



microarray platform

MALDI-TOF mass spectrometer

DNA sequencers

From Mol Biol to Systems Biology

- A gene is no longer studied as an isolated entity but as part of a complex regulatory network that determines the phenotype of the cell
- From this perspective the cell is considered as a system that interacts with its environment



Systems Biology



Systems biology is about drafting the manual for assembly and functioning of cellular systems

Systems Biology



"omics era" the function or the expression of a gene can be studied in a global context of the cell

Systems biology



Overview course

Chapt 4: genotype phenotype mapping Chapt5: BSA

Chap 1: Network biology Chapt 2: Network inference

Chap 3: network based dataintegration

- Significance area search methods
- Diffusion methods
- Pathfinding methods

Chapt 6: Network-based GWAS analysis

Chapt 7: systems genetics (cancer)





- Illustrate how acquiring a systems view on an organism can be obtained by integrating organism specific omics data, where the systems view is represented as an interaction network
- Illustrate how the systems view can be used to interpret in house data
- Illustrate the added value of network based data interpretation by one of the most relevant bioinformatics problems (genotype-phenotype mapping).

- Course illustrates how statistical techniques/datamining techniques you have been studying in other courses are applied to the domain of bioinformatics
- Illustrate why solving a bioinformatics problem also requires deep biological insight into the problem at hand
- Exemplarisch
- Exam written, open book