



BiRC Seminar – open to all

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(The group is currently in transition from the Max Planck Institute for Informatics, Germany.)

Title: Biomedical key pathway mining - Combining networks and OMICS data

Time: Friday 8 February, 2013, 14:15 - 15:00

Place: BiRC, Aud. 223, Building 1110, C.F. Møllers Allé 8, 8000 Aarhus C

Abstract:

Systems biology has emerged over the last decade. Driven by the advances in sophisticated measurement technology the research community generated huge molecular biology data sets. This comprises rather static data on the interplay of biological entities, for instance protein-protein interaction network data, as well as quite dynamic data collected for studying the behavior of individual cells or tissues in accordance to changing environmental conditions, such as DNA microarrays, RNA sequencing or genome-wide methylation assays.

Here we bring the two different data types together for unraveling the molecular basis of complex diseases, such as cancer. Therefore, we developed KeyPathwayMiner. Given a biological network modeled as graph and a set of expression studies, KeyPathwayMiner efficiently finds and visualizes connected sub-networks where most components are expressed in most cases. It identifies all maximal connected sub-networks where all nodes but K exceptions are expressed in all experimental studies but at least L exceptions. I will very briefly introduce a set of exact and heuristic algorithms that tackle this hard combinatorial optimization problem. Afterwards, we will use KeyPathwayMiner for analyzing the human interactome together with gene expression data from a case/control Huntington's disease study. To demonstrate its flexibility and applicability to non-array data we will also analyze genome-scale DNA methylation profiles from colorectal tumor cancer patients.

KeyPathwayMiner is publicly available at <http://keypathwayminer.mpi-inf.mpg.de>

Citation: Alcaraz N, Friedrich T, Koetzing T, Krohmer A, Mueller J, Pauling J, Baumbach J (2012) Efficient key pathway mining - Combining networks and OMICS data. Integr Biol., 2012, 4(7), 756-764.

After the seminar there will be beer/soda/coffee and chips in the coffee room on the 4th floor.

<http://birc.au.dk/activities/seminar-series/>

