

# Masterarbeit

## Structure of Complex Biological Networks

In the last few years, significant progress has been achieved in understanding topological aspects of very large and growing networks. The study of such complex networks has proven fruitful in many areas of research, ranging from physics or economy to biology. Many biological processes are organized as networks, for example social communities, ecological structures, or molecular interactions in a living cell. Understanding how life is organized and maintained in a cell requires methods that can model the millions of interactions between genes, proteins and metabolites. This complex interaction network is largely uncharacterized, and there is great interest to establish methods and models that can allow us to capture significant events taking place. GENEVESTIGATOR is a very large database containing around 2000 gene expression arrays, where every array has about 50 000 measurement cells. The large amount of genomics data can be used to mine complex gene regulation and expression networks.

We are looking for a student which would participate in a challenging task to define, data-mine and investigate the topology of such networks. The work contains some implementation at the beginning but later the focus would be on theoretical aspects of network topology. The knowledge used during the thesis can be applied to other fields like Internet topology, Web, communication networks etc.

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