



PhD Studentship: Network Inference and Systems Biology

at the Stockholm Bioinformatics Center (<http://www.sbc.su.se/>), which is located at Science for Life Laboratory Stockholm (<http://www.scilifelab.se/>) and has excellent contacts with a number of life science and computer science departments at Stockholm University, KTH, and the Karolinska Institute. The research project will be supervised by Professor Erik Sonnhammer (<http://sonnhammer.org/>).

Cellular mechanisms depend on the complex interplay between proteins, genes, metabolites, and other components that constitute a living cell. The goal of this project is to develop computational algorithms and methods that use high-throughput biological data to build networks with details on how these components interact with each other. This is approached both by building global association networks of functional coupling (see <http://FunCoup.sbc.su.se/>) and by Gene Regulatory Network inference on perturbation-based gene expression data. There is an overlap between these types of networks which will be exploited in order to improve the quality and usefulness of both.

The methods include regression models, Bayesian integration, various statistical analyses, and in-house developed modelling techniques. In FunCoup, heterogeneous publicly available high-throughput data sources are combined to predict functional coupling between proteins in order to build global networks that model pathways and interaction cascades. The FunCoup links can serve as a prior when inferring regulatory networks in order to limit the search space. We are developing new algorithms for gene expression based regulatory network inference, for instance for sparsity optimisation and experimental design. The project involves programming, data analysis, benchmarking, and modelling, as well as application of the developed methods to experimental data generated by the group.

The successful candidate should be highly motivated and have an M.Sc. in bioinformatics or related field, and knowledge of molecular biology. Alternatively, an M.Sc. in molecular biology or related field and at least 1 year of practical experience in bioinformatics research and programming. Demonstrable familiarity with sequence and molecular data analysis techniques is essential. Computer programming (R, Matlab, Perl, Python, C, C++), UNIX skills, and knowledge of biological database systems are necessary merits.

The position is for 4 years of full-time study and will administratively belong to the Department of Biochemistry and Biophysics, Stockholm University. Applications are made on-line at <https://laransokan.su.se/default.aspx>, stating Ref. No. SU FV-2258-14, the latest on September 5, 2014. For further information about the research project, contact Erik.Sonnhammer@scilifelab.se