Emerging Topics in Biological Networks and Systems Biology

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Statistics for Biological Networks

Abstract:
Learning biological networks from data is not as straightforward as it may seem. The whole concept of network inference in genomics has multiple meanings and interpretations. It can refer to "causal" or "topological" considerations, i.e., learning about functional relationships in the genomic system or to considerations about the structure of the overall genomic network. Moreover, the genomic network does not really exists and can refer to gene regulatory networks, cell signalling networks, metabolic networks etc. In this talk I aim to motivate a hierarchy of 4 network inference strategies, starting at the single cell level and finishing at global structural network inference. It will involve stochastic and ordinary differential equation models, causal inference and graphical modelling.

About:
Professor Ernst Wit is the head of the Statistics and Probability group at the University of Groningen in the Netherlands. In 2000 Wit obtained his PhD in Statistics at the University of Chicago with Peter McCullagh on the "Categorical Imperative", an algebraic invariance analysis of statistical models. In 2004 he published a book on Statistics for Microarrays. In 2006 he took over the Medical Statistics Unit at the University of Lancaster as Professor of Biometrics. Since 2008 Wit is at the University of Groningen, where he has continued to work on methodological development in high-dimensional inference with a specific focus on network modelling. He is the author of more than 100 peer-reviewed publications. He has served as the President of the European Bernoulli Society and member of the Board of Directors of the IBS, is the president of the Dutch Biostatistics Society. He is currently leading a European COST Action, COSTNET, that deals with novel methods for statistical network science.