

数学与系统科学研究院学术报告

报告题目: Towards Systems Biology from Theoretical and Engineering Perspectives.

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摘要:

Abstract:

One of major challenges for post-genomic biology is to understand how genes, proteins and small molecules interact to form cellular systems. It has been recognized that a complicated living organism cannot be fully understood by merely analyzing individual components, and that interactions and dynamics of those components or networks are ultimately responsible for an organism's form and functions. Instead of analyzing individual components or aspects of the organism, systems biology is to study an organism, viewed as a dynamical and interacting network of genes, proteins and biochemical reactions which give rise to life. In recent years, with rapid progress of biological science, many high-throughput technologies have been developed for systematically studying interactions or networks of molecules, such as microarray, the two-hybrid assay, co-immunoprecipitation and the chIP-chip approach, which can be used to screen for protein-protein interaction (PPI) or to infer gene regulatory network. With increasingly accumulated data from those high-throughput technologies, molecular networks and their dynamics have been studied extensively from various aspects of living organisms. Those research works help biologists not only to understand complicated biochemical phenomena but also to elucidate the essential principles or fundamental mechanisms of cellular systems at the system-wide level. In this talk, I will focus on reviewing our recent works related to systems biology from the theoretical perspective, in particular emphasizing on aspects of systems, interactions, dynamics, networks and integration for biological systems.

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