Emerging Topics in Biological Networks and Systems Biology

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Causal Networks in Molecular Biology

Abstract:
When we draw networks in molecular biology what are they intended to mean? Does an edge between two nodes mean simply that the corresponding variables are somehow correlated or statistically dependent, or rather that there is a causal link between them? If the latter, how should we think about networks and their estimation from data when we cannot even be assured that all relevant molecular species are measured, nor that our models are correctly specified? In this talk, I will give an introduction to an emerging area at the interface between statistics, computer science, philosophy and biology, concerning causal relationships in high-dimensional biological systems. I will describe some approaches for learning causal networks from data but also touch on some key caveats and limitations and on the practically important question of how to empirically assess such approaches

About:
Sach Mukherjee is a Principal Investigator at the German Centre for Neurodegenerative Diseases (DZNE) in Bonn, Germany, where he leads the Statistics and Machine Learning group. He has previously held faculty and PI appointments at Warwick, the NKI Amsterdam and Cambridge. He earned his DPhil (PhD) at Oxford and was a postdoctoral fellow at UC Berkeley. He has been a Fulbright Fellow and a recipient of the Wolfson Research Merit Award of the UK Royal Society.