

INVITED LECTURE H10

BioComputing@Biopolis - Opening new frontiers at the interface of computing, biology and medicine

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Biology and Information Technology (IT) are two of the most rapidly changing fields today. They both deal with entities of astounding complexity although in the case of IT, the significance of the constituent connections among the building blocks is much better understood than in the biological context. An intellectual fusion of IT and biological/clinical sciences in conjunction with state-of-the-art cyber-infrastructure, when effectively deployed, is allowing us to acquire, store, process and interpret enormous amounts of data generated at the laboratory and the clinic. This has the potential to contribute to improving human health and well-being through earlier detection/diagnoses and targeted treatments for disease etc. The mission of our Institute is to develop and deploy appropriate tools and capabilities at the interface of computing, biology and medicine to catalyze the search for the treatment of disease by translating the fruits of research at the bench to the bedside and vice versa. However, there are many challenging problems that need to be addressed and overcome if this goal is to be met. In this talk, I will outline how we at our Institute working in partnership with our research and clinical collaborators, are meeting this challenge. Specifically, I will discuss how we are developing and deploying quantitative modeling techniques over state-of-the-art cyber-infrastructure to address key questions in bio-medicine from a systems-level perspective.