From Molecule to Behavior: Towards Quantitative, Systems Level Understanding of Bacterial Chemotaxis

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Bacterial chemotaxis is one of the most interesting and well studied signaling system in biology. Most of the building blocks of the underlying molecular machinery, i.e., the nodes and links of the underlying protein network, have been identified and characterized through years of research in biophysics, biochemistry and genetics. In this talk, we will present our recent works in trying to understand this fascinating network at the integrative, systems level by using quantitative modelling approach.

Three aspects of the network will be addressed: (1) Cooperativity and signal amplification; (2) Adaptation kinetics; (3) The effect of noise. Direct connection to existing experiments and possible predictions from our model will be discussed. Finally, we will outline some interesting new directions for future research.