



Centre for Biosystems Science and Engineering

SEMINAR

at 4:00 PM on November 16, 2015
Seminar Hall, MRDG, Biological Sciences

Listening to the chitter-chatter in the hippocampus (In silico experiments on small synapses using Monte Carlo simulations)

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IISER Pune

Information transfer between neurons takes place at a specialized junction called a synapse. Activity dependent changes in synaptic strength, called synaptic plasticity, is the sub-cellular framework required for learning. Synapses are immensely complex and are operated by a family of ion channels and neurotransmitters that operate over multiple timescales. Furthermore, synaptic morphology varies widely across the nervous system. This complexity contributes to the rich spatiotemporal repertoire of the nervous system required to respond appropriately to complex patterns of stimulus and carry out extensive computations. Far from behaving as well-mixed bags of biochemical soup, the intra- and inter-cellular environments in and around neurons are highly organized reaction-diffusion systems. Here we will show how biophysically accurate computational experiments performed on cell signaling pathways can be a powerful way to study synapses and can help formulate and test new hypotheses in conjunction with bench experiments. I will talk about our recent insights on synaptic plasticity in health and disease, gained through building realistic models of small synapses of the hippocampus, a part of the brain crucial for acquiring new memories.

About the speaker:

Suhita Nadkarni obtained her B.Sc and M.Sc. (Physics) in 1998 from University of Mumbai; and PhD in Physics from Ohio University in 2005. Her postdoctoral work was at the Center for Theoretical Biological Physics, University of California, San Diego and Computational Neuroscience Laboratory at the Salk Institute, La Jolla. Suhita has been at IISER Pune since August 2012.