

SEMINAR

Co-Sponsored by the Department of Psychology, Behavioral Neuroscience Division and
Biomedical Engineering

Wednesday, November 18, 2009

4:00-5:00pm

Speaker: Tatjana Tchumatchenko

Title:

Correlations and Synchrony in Threshold Neuron Models

Abstract:

How do neurons transfer correlated inputs into correlated output? This fundamental question is vital for understanding the structure of network correlations, yet it is unanswered. In the past, most theoretical analyses addressing this question utilized coupled stochastic differential equations and the Fokker Planck formalism. These approaches are technically very demanding and are therefore in practice restricted to simple stochastic processes. As a result, explicit expressions for quantities of interest are often lacking or obtainable only in special limiting cases. Here, we show that an alternative modeling framework based on the threshold crossings of smooth random functions can provide a mathematically transparent and highly tractable description of spike correlations driven by inputs of arbitrary temporal structure and correlation strength.

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