



Faculty of Mathematics and Computer Science
The Weizmann Institute of Science

Distinguished Lecturer Series

Sponsored by the Arthur and Rochelle Belfer
Institute of Mathematics and Computer Science

Professor Philip Holmes

Princeton University

will speak on

Optimal decisions in the brain? From neural oscillators to stochastic differential equations

Abstract

The sequential probability ratio test (SPRT) is optimal in that it allows one to accept or reject hypotheses, based on noisy incoming evidence, with the minimum number of observations for a given level of accuracy. There is increasing neural and behavioral evidence that primate and human brains employ a continuum analogue of SPRT: the drift-diffusion (DD) process. I will review this and describe how a biophysical model of a pool of spiking neurons can be simplified to a phase oscillator and analysed to yield spike rates in response to stimuli. These spike rates tune DD parameters. This study is a small step toward the construction of a series of models, at different time and space scales, linking neural spikes to human decisions.

This work is joint with Eric Brown, Jeff Moehlis, Rafal Bogacz and Jonathan Cohen at Princeton, and Garry Aston-Jones' group at the Laboratory of Neuromodulation and Behavior, University of Pennsylvania.

***The lecture will take place in the Lecture Hall, Room 1, Ziskind Building
on Tuesday, June 6, 2006
at 11:00***