



brain+cognitive sciences

2008 Spring Colloquium Series

Speaker Aniruddha Das, Center for Neurobiology and Behavior
Columbia University, College of Physicians and Surgeons

Time 4pm, Departmental Tea immediately following.

Date Friday, 18 April 2008

Place BCS Auditorium, 46-3002

Title Entraining to Task Expectation in Primary Visual Cortex .

Host Mriganka Sur

Abstract:

In functional brain imaging the underlying hæmodynamic signals are assumed to reflect cortical metabolic demand driven by local neuronal responses. To test this assumption we developed a dual-wavelength optical imaging technique that simultaneously measures cerebral blood volume and blood oxygenation, continuously, in alert behaving monkeys. Using this technique, we have discovered a novel cortical blood flow signal that appears to be driven by task timing, independent of local neuronal responses. We see this signal in primary visual cortex (V1) of monkeys engaged in periodic fixation tasks, even in total darkness, with little or no measurable underlying neuronal activity. The entrainment to trial period suggests anticipatory timing in the brain. Given a predicted event, fresh arterial blood appears to be pumped in, in anticipation of the upcoming event, before any spiking driven by the event. This signal could form part of a preparatory mechanism in the brain that is engaged by any periodic or predictable task. It could be governed by a central timing mechanism and mediated through neuromodulatory control of cortical blood flow, independent of local neuronal spiking and related metabolic demands.