Seminar

Brain activity sequences as a fundamental operation in computation

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Sequences of brain activity are ubiquitous. Many natural stimuli take their salience from their temporal as well as spatial order of occurrence. For example, speech, movement, and navigation all involve generation, perception, and memory of ordered brain activity. Two key characteristic of all these sequences is that 1. they are specific instances in an enormous combinatorial space, and 2. they occur on behavioural time-scales of seconds.

We are pursuing the core hypothesis that sequence recognition occurs in a massively parallel manner, on short segments of individual neuronal dendrites. This potentially addresses the problem of combinatorial explosion of sequence space. We have recently proposed a mechanism for sequence recognition through reaction-diffusion mechanisms. We have shown that this can occur on behavioural time-scales, as well as on the requisite small length-scales.

I will describe our recent work including recordings of sequences that emerge when animals learn a behavioural association between stimuli, computer models of sequence recognition in cells, and an exploration of network constraints on sequence computation.

Thursday, Apr 27th 2017

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS