

Seminar

IRA A. FULTON SCHOOL OF ENGINEERING

JOINTLY HOSTED BY:
THE DEPARTMENT OF MATHEMATICS & STATISTICS,
MATHEMATICAL BIOLOGY SEMINAR



IS IT TIME FOR SPIKES? PRECISION AND RELIABILITY OF THE NEURAL CODE

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Abstract When a neuron in vitro is injected with frozen noise, the timing of the spikes is highly precise from trial to trial. I will present evidence that the same repeated stimulus can in fact produce more than one reliable temporal pattern of spikes.

A method is introduced to find these patterns in raw multi-trial data. Using this method, multiple coexisting spike patterns were discovered in pyramidal cells recorded from rat prefrontal cortex in vitro, in data obtained in vivo from area MT of the monkey and from the cat lateral geniculate nucleus.

The spike patterns lasted from a few tens of milliseconds in vitro to several seconds in vivo. I will present a generalization of this technique to near multi-unit data, where patterns of synchronous firing may transiently occur.



Dr. Fellous current research focuses on how large networks of neurons transfer and process information in the face of large amounts of neuronal and synaptic noise to yield such a reliable output. Members of his laboratory use a combination of experimental in vitro and in vivo techniques together with sophisticated computer simulations to understand the basic neural processing principles that are required to yield such effective and selective computations.

Dr. Fellous teaches courses in Neural Data Analyses, Computational Neuroscience, and Physiological Psychology. He supervises and advises undergraduate, graduate and postdoctoral students in Psychology, Applied Mathematics, Neuroscience and Physiological Science.

Location and Time:

Location: ECG Bldg. Rm. 237
Date: Friday, April 4, 2008
Time: 3:30 pm— 4:30 pm

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"designing adaptive engineered systems to promote adaptation in neural systems"