THE CAMBRIDGE STATISTICS DISCUSSION GROUP

Thursday 3rd February 2000 7:15 for 7:45

The Large Seminar Room, Institute of Public Health,
University Forvie Site, Robinson Way, Cambridge

How Do Neurons Compute? A Dual-Purpose Control System

David Brown

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Cambridge

Abstract: The oxytocin network is a dual function neuronal system, with two corresponding patterns of electrical activity. Oxytocin neurons display low activity (typically 3-5 spikes/sec), and release the hormone oxytocin into the bloodstream at a steady, low rate, when maintaining homeostatic control of plasma osmotic pressure. During parturition and lactation, the neurons change their activity pattern markedly. They then burst briefly (at 50 spikes/sec for 2 seconds every 5 minutes or so) but synchronously, resulting in pulsatile release of oxytocin. These pulses are essential for appropriate physiological responses associated with reproduction such as uterine contractions and milk ejections. Some statistical and modelling studies, carried out with the aim of understanding how the system achieves this, will be described.

Speaker: David Brown has worked in ecology, agriculture and physiology. From a role over many years as consultant statistician, he has in the last few years moved into a more specialised biological area, currently being Head of the Laboratory of Computational Neuroscience at the Babraham Institute. As well as statistical analysis of electrophysiological data, this involves nonlinear dynamical systems modelling, with the additional complications of stochastic process input and plasticity of response on various time scales. He is co-author, with Peter Rothery, of 'Models in Biology: Mathematics, Statistics and Computing'.

Directions: (From Central Cambridge) Turn right off Hills Road into the Addenbrooke's site then turn left at the hospital roundabout onto Robinson Way. Follow Robinson Way until you see an access road on the left signed 'Forvie Site' (but note that the sign is on your right). Turn into the access road and follow signs - first to the Institute and then to the Large Seminar Room. There is ample car parking. The front doors will be locked at 7:45.

Next Meetings:
(Provisionally 2nd) March – Karen Moore (Statwood Partnership) on 'Anecdotal evidence for a statistician by environment interaction'.
6th April – Jim Slattery (Medicines Control Agency).
4th May – Jennifer Potts (Cognition and Brain Sciences Unit).

Supper: Some members eat regularly in the University Centre before each meeting at 6-15. Feel free to join them.
Subscriptions: of 4 pounds per member are now due for the 1999-2000 session. Cheques should be made payable to Robert Milroy and may be posted to the secretary at the address below.
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