WORKSHOP
Mathematical Neuroscience
September 16 – 19, 2007

Measuring and modelling the neuronal response function of cortical neurons

Magnus Richardson
Warwick Systems Biology Centre
University of Warwick
Coventry House
Coventry, CV4 7AL
UK
magnus.richardson@warwick.ac.uk

Abstract

A method will be described for extracting the neuronal IV curve measured while the intracellular voltage is fluctuating and producing spikes under naturalistic stimulation protocols. The link between IV curves and non-linear integrate-and-fire models allows for the generation of reduced analytical models. The technique is applied to different classes of cortical neuron and the resulting model used to predict the response of the cells to novel stimuli. To complement the modelling of experiment, a rather simple method for generating solutions for the firing-rate modulation of any non-linear IF model will also be described.