
*Thursday, November 27th, 2014
13h30, Room AAC 132*

Computational Neuroscience Seminar

Magnus RICHARDSON
Systems Biology Centre,
University of Warwick

Dynamics of the neuromodulator adenosine

Fast activity in neuronal networks can be strongly affected by a variety of neuromodulators. One such neuromodulator, adenosine, has a suppressive effect on activity and its transport in tissue and action on the principal cells of the neocortex will be the focus of this talk. The complex dynamics of diffusive signalling molecules in tissue is poorly understood and has been relatively neglected by the main thrust of computational neuroscience, partly because the extracellular concentration of neuromodulators has been hard to quantify experimentally. Here we show that simple mathematical models can accurately capture the activity-dependent adenosine-release waveforms measured by purine biosensors. We also demonstrate that localised adenosine concentrations mediate the developmental change from depression to facilitation in the synaptic transmission between neocortical layer-5 pyramidal cells and thereby suggest a novel mechanism for long-term plasticity in the adult neocortex.