



Hamilton Institute

Modelling the Synapse: from Numbers to Networks

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Abstract

Recent studies have reinforced the important role of synaptic processes, in particular in enabling synaptic plasticity, for understanding brain function as well as neuropsychiatric diseases (e.g. [1], [2]). The talk will first review the evolution of synapse models from mere numerical constants ("weights") in early connectionist models to the emerging systems biological view of complex, dynamic networks. It will then discuss how the study of synaptic networks is contributing not only to understanding neuropsychiatric diseases but also how it could contribute to bringing together traditional computational neuroscience and the emerging systems neurobiology [3,4].

[1] L. Abbott, W.A. Regehr, Synaptic computation (2004), *Nature* 431

[2] Kauer, J.A., Malenko, R.C. Synaptic plasticity and addiction (2007), *Nature Reviews Neuroscience*, Vol. 8, Nov 2007

[3] N. le Novère, The long journey to a Systems Biology of neuronal function (2007), *BMC Systems Biology* 1: 28

[4] E. de Schutter, Why Are Computational Neuroscience and Systems Biology so separate? *PLoS Computational Biology* (2008), Vol 4, Issue 5

Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

