Workshop program, CNS meeting 2009, Berlin:

Title: Activity-Dependent Structural Plasticity – from cell cultures to cortical networks

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Abstract:
Recent trends in modelling activity-dependent network formation focus on the role of structural plasticity for homeostasis and self-organized criticality. Understanding the full range of principles guiding self-organization of neuronal networks is relevant for repair of brain lesions (i.e. due to stroke) as well as for reorganization associated with learning. Recent time-lapse imaging studies of the living brain reveal new insights into how the brain rewires its networks under physiological and pathological conditions. A main principal of this reorganization as shown by a wealth of experimental data is the mutual interdependency of neuronal activity, neurotransmission and neural morphogenesis. Here, we propose a one-day workshop for presenting theoretical approaches that complement concrete experimental studies as these raise further questions for experimental testing. Thus, the workshop consists of four blocks of talks each focusing on one particular aspect of structural plasticity. The discussion following each block of talks is to exchange ideas between modellers and experimentalists.

Workshop program: (1 day)

8:30am
Opening and welcome
(Markus Butz)

Block A: Neuronal morphology and network formation

8:45am
Modelling neuronal morphology and network formation
Arjen van Ooyen, Amsterdam – confirmed

9:05am
A simple role for axon outgrowth and synaptic competition generates realistic connection lengths and filling fraction
Markus Kaiser, Newcastle – confirmed

9:25am
From single cell morphology to global patterns of network connectivity
*Luciano da Fortura Costa, Sao Paulo, Brazil – invited

9:45am Time for discussion with the speakers

Relevant literature:
10:15am – 10:45am Break

**Block B: Network formation and self-organized criticality**

10:45am
Self-organizing criticality and homeostasis in a model for activity-dependent network formation and predictions for experimental studies
Christian Tetzlaff, Goettingen – **confirmed**

11:05am
Experimental data from dissociated cortical cell cultures on self-organized criticality
Samora Okujeni, Freiburg – **confirmed**

11:25am *Time for discussion with the speakers*

**Relevant literature:**

12:00am Lunch Break

**Block C: Structural plasticity of neuronal circuits**

1:30pm
Structural plasticity of circuits in cortical neuropil – **confirmed**
Armen Stepanyants, Boston, Massachusetts, USA

1:50pm
Structural plasticity controlled by calcium based correlation detection
Moritz Helias / Stefan Rotter, Freiburg – **confirmed**

2:10pm *Time for discussion with the speakers*

**Relevant literature:**

2:40pm – 3:10pm Break

**Block D: Structural plasticity of cortical networks**

3:10pm
Massive restructuring of neuronal circuits during functional reorganization of adult visual cortex
Tara Keck, Muenchen – **confirmed**

3:30pm
Modelling experience-dependent structural plasticity in cortical networks
Markus Butz, Amsterdam – **confirmed**

4:10pm *Time for discussion with the speakers*

**Relevant literature:**

5:00pm *End of the workshop*