

University of Reading PhD Studentship

Project Title: Dendrites and layers: Neural field models in three dimensions

Supervisor: Prof Ingo Bojak

School/Department: School of Systems Engineering

Overview: Neural field models treat cortical tissue as continuous with emergent properties. While classical theories consider just a single 2D “cortical sheet”, neurons are actually organized into six anatomical layers and their connectivity depends systematically on neuron type and depth, creating “microcircuits” across layers. We will develop a 3D neural field theory that incorporates synaptic inputs arranged in realistic depth patterns and produce a software package for their rapid evaluation (possibly with GPU acceleration). We will fit laminar electrode and/or EEG data from schizophrenic patients, and explore (speculative) functional consequences of dendritic processing, like burst-suppression in anesthesia or acquired epilepsy.

This is a computational neuroscience project, which requires skills and knowledge in neuroscience, applied mathematics and programming. Candidates with a good background in at least two of these fields are encouraged to apply, if enthusiastic about the third. The core of this project is formed by scientific computing and data analysis, but according to prior experience and preference of the candidate more emphasis could be put on mathematical development or biological experiment, respectively. Concerning the latter the student has the opportunity to engage with ongoing relevant electrophysiological and animal experiments of the Co-Supervisor, Dr Ben Whalley (School of Pharmacy), if they wish.

Eligibility: Applicants should hold a minimum of a UK Honours Degree at 2:1 level or equivalent in a relevant subject. Please note that this studentship is for UK/EU applicants only.

Funding Details: The studentship will cover Home/EU Fees and pay the Research Council minimum stipend (£13,590 for 2011/12) for up to 3 years. It will begin in October 2013.

How to apply: Please submit an application for a **PhD in Cybernetics (full time)** to the University at <http://www.reading.ac.uk/Study/apply/pg-applicationform.aspx>. Please quote the reference **GS13-07** in the ‘*Scholarships applied for*’ box which appears within the *Funding Section* of your online application.

Once you have submitted your application, you should receive an *email to confirm receipt*. Please forward this email, along with a *covering letter*, to Prof Ingo Bojak (i.bojak@reading.ac.uk) by the application deadline.

Application Deadline: Friday, 14th June 2013.

Further Enquiries: Please contact Prof Ingo Bojak (i.bojak@reading.ac.uk).