Newcastle University PhD Studentship award

**Title**
Computational models of brain connectivity dynamics for personalised brain stimulation

**Value of award**
100% of International tuition fees paid

**Number of awards**
1

**Start date and duration**
September 2019 for 3 years

**Application closing date**
8th February 2019

**Overview**
At the moment, 30% of brain disorders are not adequately treated. Using invasive or non-invasive brain stimulation is of increasing interest, especially when taking pharmaceutical drugs is not beneficial or leads to severe side effects. Unfortunately, stimulation currently leads to results that differ widely between individuals being ineffective for many patients. This highlights the need for personalised models of treatment effects.

We have developed a computational framework for simulating the effect of invasive and non-invasive stimulation on the brain, VERTEX ([www.vertexsimulator.org](http://www.vertexsimulator.org)). VERTEX provides a novel simulation platform and research tool for estimating the effect of intervention (electrical, magnetic, or focused ultrasound). This opens up the possibility to test which interventions have a maximal effect while reducing unwanted side effects in individual patients.

Within this PhD project, we will apply our framework to human patient data provided by Newcastle and collaborators at Shanghai Jiao Tong University. We will test whether our model can (a) predict the changes in brain activity after stimulation for epilepsy, obsessive-compulsive disorder, and Parkinson’s disease patients, (b) can predict whether treatment will be successful or not, and (c) whether we can identify alternative stimulation approaches (different brain target structure or stimulation protocol) what would lead to better outcomes.

**Sponsor**
Faculty of Science Agriculture and Engineering and Chinese Scholarship Council (CSC)

**Name of supervisor(s)**
Prof. Marcus Kaiser, School of Computing ([https://www.dynamic-connectome.org/](https://www.dynamic-connectome.org/))
Dr Roman Bauer, School of Computing ([https://www.ncl.ac.uk/computing/people/profile/romanbauer.html](https://www.ncl.ac.uk/computing/people/profile/romanbauer.html))
Dr Mark Baker, Institute of Neuroscience ([https://www.ncl.ac.uk/ion/staff/profile/markbaker.html](https://www.ncl.ac.uk/ion/staff/profile/markbaker.html))
Dr John-Paul Taylor, Institute of Neuroscience ([https://www.ncl.ac.uk/ion/staff/profile/johnpaultaylor.html](https://www.ncl.ac.uk/ion/staff/profile/johnpaultaylor.html))
Eligibility Criteria
You must be a citizen and permanent resident of the People's Republic of China at the time of application. Applicants should have strong numerical and programming skills and should ideally be familiar with neuroimaging or computational neuroscience.

How to apply
You must apply through the University’s online postgraduate application system. [Apply here.](#) To do this please ‘Create a new account’. All relevant fields marked with a red asterisk must to be completed.

The following information will help us to process your application. You will need to:
- Insert the programme code **8050F** in the programme of study section
- Select **PhD Computer Science (full time) – Computing Science** as the programme of study
- Insert the studentship code **CSC1801** in the studentship/partnership reference field
- Attach a covering letter and CV. The covering letter must state the title of the studentship, quote reference code **CSC1801** and state how your interests and experience relate to the project
- Attach degree transcripts and certificates and, if English is not your first language, a copy of your English language qualifications

Contact
Prof. Marcus Kaiser ([marcus.kaiser@newcastle.ac.uk](mailto:marcus.kaiser@newcastle.ac.uk))