Cardiff University School of Psychology

Studentship Title:	MRC Doctoral Training Grant studentships in MEG **<u>8 studentships available</u>**
Research Area/ Project Title:	*Building capacity in UK clinical MEG research*
Location:	School of Psychology, Cardiff University (Initial recruitment) Potential locations: Aston, Cambridge, Cardiff, Glasgow, Nottingham, Oxford, UCL, York
Expected Start Date:	1st October 2013 (initial cohort)
Duration:	3 Years
Deadline for Application:	3rd May 2012 (5pm).

Description of Research Opportunity:

The MRC (60%) and EPSRC (40%) recently awarded the UK MEG community a partnership grant of £1.3M to build clinical research capacity in Magnetoencephalography (MEG). The partnership, led by Cardiff University, includes all 8 universities with current MEG laboratories: Aston, Cambridge (MRC-CBSU), Cardiff, Glasgow, Nottingham, Oxford, University College London (UCL) and York.

The partnership aims to drive forward the field of MEG, both by increasing scientific networking amongst the partners, as well as collaborative research in methodology and clinical applications. As part of this, an MRC Doctoral Training Grant (DTG) was awarded that funds a **<u>cohort of eight PhD</u>** students to work on collaborative research programmes between two or more of the partner sites. It is anticipated that the first **<u>four students will be appointed in 2013</u>** and the second four in 2014, but this could change depending on the quality of the students who apply in the initial round.

We are seeking excellent candidates for a range of PhD projects all of which are related to clinical applications of MEG and, potentially, its multimodal combination with other technologies.

The proposed projects can be methods or applications focused and hence applicants will be considered from any relevant scientific discipline, including those from Psychology, Biosciences, Neuroscience, Physics, Engineering or similar.

All students will initially be recruited to Cardiff, but due to the nature of the partnership, the project offered to a student will be collaborative between any two or more of the partner universities. The final location of the student will hence depend on the balance of work and the location of the supervisors and is a topic that can be discussed at

interview. There are significant funds earmarked for each student to facilitate travel and accommodation between sites.

One major advantage of this programme is that the Partners will provide integrated training of the cohort throughout the studentships. This is because the Partnership grant provides significant funds for research training and interaction, including bringing in international speakers and a yearly MEG-UK conference.

The precise details of the projects are not yet finalised for all 8 places, but priority will be given to projects that match the key aims of the partnership, namely:

1) Developing new multimodal analysis and acquisition methods for using MEG in clinical applications, and deploying these methods to multiple sites.
2) Larger normative data collection projects across the age-ranges that combine MEG data across sites using novel analysis and bioinformatics approaches to store and query this data.
3) Projects targeting specific clinical application areas, particularly psychiatric conditions such as Schizophrenia and neurological diseases such as Epilepsy that are well suited to study by MEG.

In addition to MEG, potential methodologies include MRS, fMRI, DTI, TMS, behavioural studies of healthy and clinical cohorts, computational modelling and genetics.

Supervisors:

Students will have at least two co-supervisors, one at each partner site. The potential supervisor pool is large across all eight groups, encompassing all researchers using MEG, but mainly will come from the principal investigators at each site, namely:

Aston: Prof. Paul Furlong and Prof. Ian Holliday
Cambridge (MRC-CBSU): Prof. Rik Henson and Prof. Yury Shtyrov
Cardiff: Prof. Krish Singh and Dr Khalid Hamandi
Glasgow: Prof. Joachim Gross and Dr Klaus Kessler
Nottingham: Dr Matt Brookes and Prof. Peter Morris
Oxford: Prof. Kia Nobre and Dr Mark Woolrich
UCL: Dr Gareth Barnes and Dr Vladimir Litvak
York: Prof. Gary Green

Projects:

The following are a non-exhaustive sample of those on offer - other projects may be offered depending on the interests of the candidate, as long as the proposed scientific programme fits the aims of the Partnership.

- MEG oscillatory dynamics and cortical excitation/inhibition in health and disease, as assessed with 3T and 7T GABA/Glutamate/Glutamine MRS: Cardiff (Singh) and Nottingham (Brookes).
- MEG of resting state networks and epilepsy: Cardiff (Hamandi and Singh), Aston (Furlong) and Nottingham (Brookes).
- The dynamics of network connectivity in health and epilepsy: York (Green, Whittington) and Cardiff (Singh, Hamandi).

- MEG Biomarkers of Schizophrenia: Glasgow (Gross and Uhlhaas), Cardiff (Singh, Walters and Linden), Nottingham (Brookes et al.), Cambridge (Shtyrov).

- Assessing changes in connectivity and induced/evoked responses, in aging, dementia and neurological conditions, during both rest and simple cognitive tasks. Methodological development and validating use in distinguishing healthy from unhealthy ageing, e.g. biomarking early stages of dementia: Cambridge (Henson, Shtyrov), UCL (Litvak), Oxford (Nobre, Woolrich, Murphy) and Cardiff (Graham, Singh).
- Patient classification (e.g. MCI vs AD) using machine-learning methods applied to MEG induced/evoked activation and dynamic connectivity metrics: Cambridge (Henson) and Oxford (Woolrich and Stokes).
- Typical and atypical (autism) information throughput in temporo-parietal areas during joint actions and co-representation: Aston (Kessler, Rippon, Furlong) and York (Tipper, Green)
- Abnormal functional and effective oscillatory connectivity in obsessive-compulsive disorder (OCD): Aston (Kessler), Glasgow (Gross), and UCL (Barnes, Litvak).
- Age-related changes in working memory functioning: GABA, Theta, gamma, and theta-gamma coupling: Aston (Kessler), Cardiff (Linden, Singh) and Glasgow (Gross).
- MEG measurements of dynamic changes in functional connectivity: assessing non-stationarity in resting-state and task-induced data: Nottingham (Brookes), Oxford (Woolrich) and UCL (Barnes).
- Development of new MEG analysis methods for non-invasive millisecond imaging of activity within different cortical layers: UCL (Barnes, Litvak), Nottingham (Brookes) and Oxford (Woolrich).
- Model-based MEG analysis: Relating MEG measures to computational models of behaviour validated using physiologically realistic neural simulations and analysis of real data: UCL (Litvak, Barnes, Friston) and Oxford (Woolrich).

- MEG studies of the effect of rhythmic sensory stimulation/entrainment on brain oscillations: Glasgow (Gross) and Oxford (Nobre).

Award and Eligibility:

The studentship is open to UK and EU nationals and will commence in October 2013 or October 2014 and will cover your tuition fees as well as a maintenance grant.
In 2013-14 the maintenance grant for full-time students is £13,726.
To check if you are eligible for the full studentship please see the MRC website:
http://www.mrc.ac.uk/Fundingopportunities/Applicanthandbook/Studentships/Eligibility/index.htm

Entry Requirements:

To be successful, you should possess or expect to obtain, a first-class or upper second honours degree (or equivalent) in a relevant subject area. A postgraduate Masters degree (or equivalent) would strengthen your application, but is not a requirement. Excellent literacy, numeracy and IT skills are required, in addition to good English language skills.

How to apply:

The application procedure is the same as applying for any PhD at Cardiff Psychology, with an **Oct 2013 start date**. Please use our online application service at http://www.cardiff.ac.uk/apply. Application deadline: **5pm**, **Friday 3rd May 2013**.

General Information:

The School of Psychology is one of the largest and most successful in the UK (http://www.cf.ac.uk/psych/), as recognised in every Research Assessment Exercise. We have with state-of-the art testing facilities, including CUBRIC, a fully equipped neuroimaging centre (http://psych.cf.ac.uk/cubric/), which will form the initial host site for these studentships. We have a thriving postgraduate research community, regular seminars and training sessions, and close collaborations with Psychological Medicine and Biosciences through the Neuroscience and Mental Health Research Institute.

For further information about the application process please contact: Postgraduate Research Enquiries	
Email:	Psych-PhD@cardiff.ac.uk
Phone:	+44 (0)29 208 75381
Address:	Miss Kate North-Lewis School of Psychology Cardiff University Tower Building, Park Place Cardiff CF10 3AT