



Developing a physiological imaging toolbox to monitor stroke evolution

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Theme: Physiological and metabolic imaging

Project description: Stroke is the fourth biggest killer in the UK. There are over 1.2 million stroke survivors in the UK, but almost two thirds leave hospital with a disability. Despite immense progress in the treatment of stroke, with the death rate falling by almost a half between 1990 and 2010, there is much work still to be done to reduce rates of disability.

The University of Nottingham has a long history of involvement in large stroke trials to test new treatments. However, many stroke trials fail because underlying treatment mechanisms are not well understood. We believe Magnetic Resonance Imaging (MRI) is well placed to monitor the evolution of stroke during these treatments using a standardised suite of physiological imaging techniques to map perfusion, oxygen extraction and oedema.

This project will implement this suite of tools and tailor them to the specific context of stroke imaging. We will concentrate on three modalities; arterial spin labelling to measure perfusion, quantitative BOLD to measure oxygen extraction and intravoxel free water mapping to quantify oedema. There are a number of challenges to be solved in this project:

Taking measurements to the patient – Harmonised protocols across magnetic field strength and MRI scanner vendor will be developed, which will be aided by the use of a perfusion phantom to make objective comparisons.

Improving measurement accuracy – Further development of the quantitative BOLD technique will maximise accuracy across the brain. Biophysical modelling will be used to investigate confounding factors and to optimise protocols.

Providing new physiological insights – The ability to quantify oedema is an unmet need in stroke imaging. Existing techniques based on diffusion and structural imaging will be compared with a novel relaxometry based approach.

This project offers the opportunity to work closely with world leading stroke clinical trialists and neuroimaging experts.

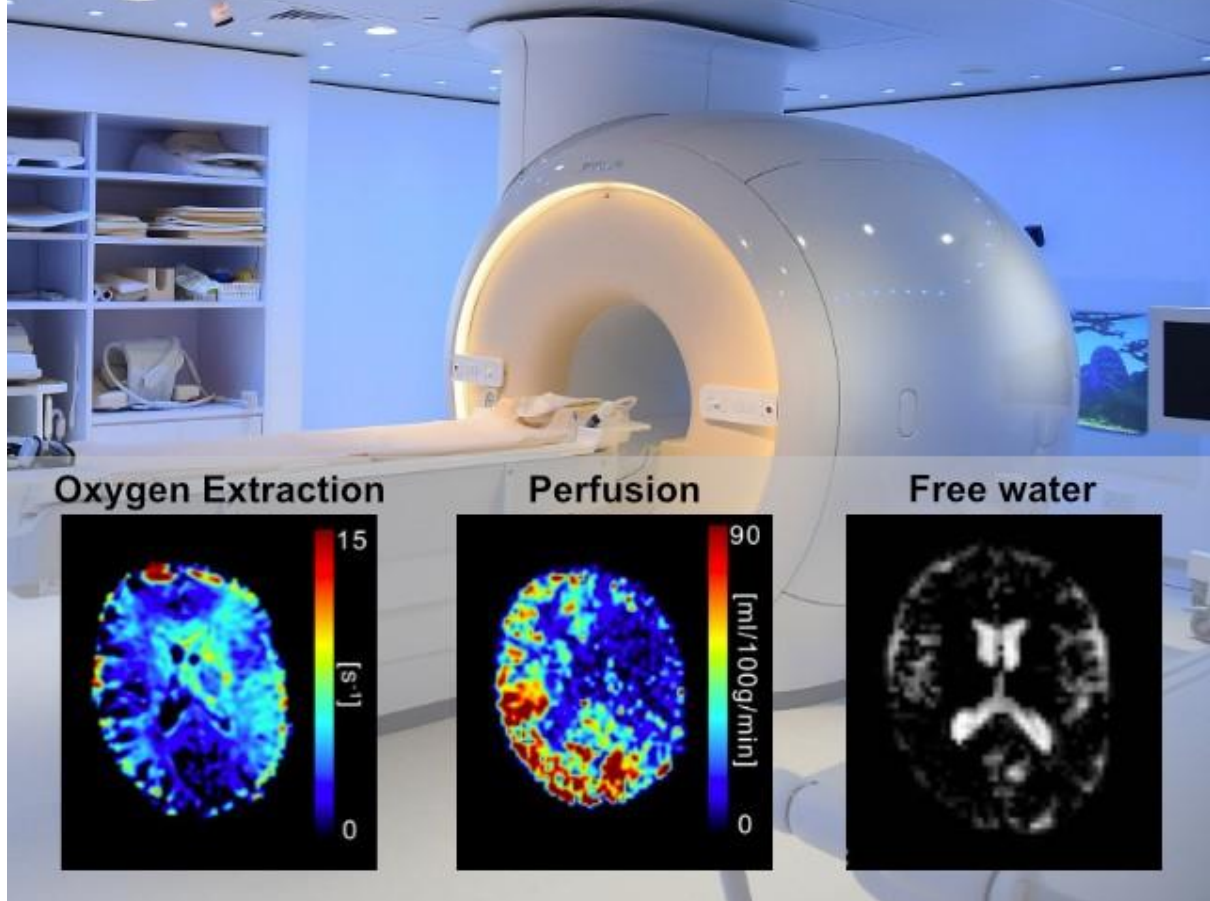
Lead school: School of Life Sciences

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Stroke Medicine



Neuroimaging



To apply for a place on the programme you will need to:

1. join the open day on **9 January** or contact a potential supervisor. If you wish to join the open day, please e-mail PI-Beacon@nottingham.ac.uk

2. [apply online here by 17 January](#)

3. on submission send an email to PI-Beacon@nottingham.ac.uk stating your preferred project, application ref number and enclose a CV

For any enquiries please email PI-Beacon@nottingham.ac.uk