The research commercialisation office of the University of Oxford, previously called **Isis Innovation**, has been renamed **Oxford University Innovation**

All documents and other materials will be updated accordingly. In the meantime the remaining content of this Isis Innovation document is still valid.

URLs beginning www.isis-innovation.com/... are automatically redirected to our new domain, www.innovation.ox.ac.uk/...

Phone numbers and email addresses for individual members of staff are unchanged

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Beyond Perfusion – Accuracy and Confidence when Measuring Blood Supply in Disease

Perfusion can be rapidly and non-invasively imaged using MRI and is finding increased use in clinical practice.

The application of mathematical modelling and probabilistic inference means that it is now possible to quantify not only perfusion, but also haemodynamics in patients and do so with measures of confidence in the estimated values.

Perfusion magnetic resonance imaging is increasingly being adopted in clinical practice using methods that are both rapid and non-invasive. Rather than simply providing an

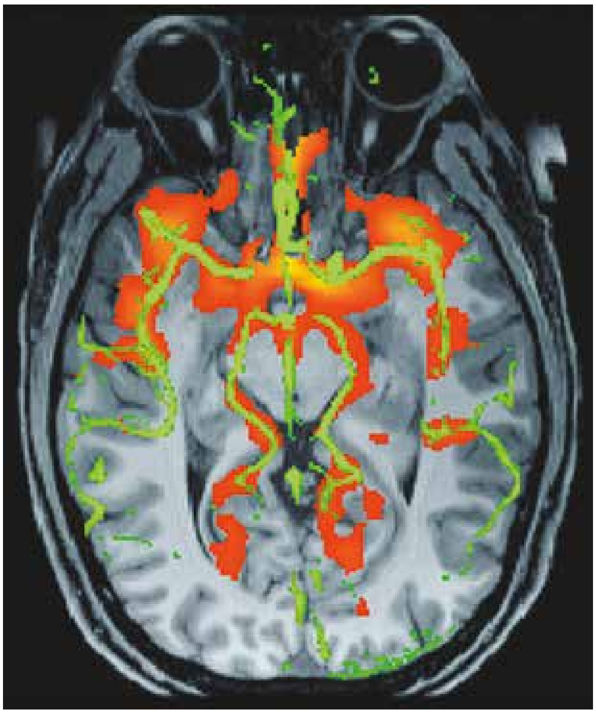
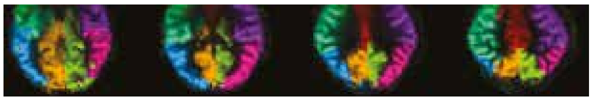


image weighted by the amount of blood delivered, new dynamic acquisitions allow for a range of fully quantified information to be extracted, improving the value of the technique for individual patient assessment in a range of diseases. For example, Arterial Spin Labelling (ASL) can provide a combination of perfusion and angiographic information in the brain, allowing blood delivery and arterial blood flow to be visualised and quantified in cerebrovascular diseases.

Methods built on the ASL approach also allow the contributions from different arteries in the brain to be separately identified allowing individual variations in vascular anatomy to be taken into account. Elsewhere in the body Gadolinium based contrast agents are used to visualise perfusion and permeability, particularly in tumours where different regions of tumour development can be identified. These methods can also provide a window on haemodynamics at the micro vascular level, for example in identifying changes in the capillary structure seen as a result of angiogenesis.



Extraction of these novel measures of perfusion and haemodynamics is achieved through the combination of mathematical modelling and probabilistic inference using software components developed in Oxford.

These tools allow not only robust measurements to be obtained, but also the confidence that can be placed in these measurements to be determined. Clinical interpretation can then account for the reliability of the specific measurements that have been made in an individual patient. This approach will increase the quality of information provided by perfusion imaging for the benefit of patients and clinicians.

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