

Rigorous, Relevant Research

► Introduction

The focus of the Neurophysiology & Clinical Neuroimaging research group is the development and application of non-invasive functional imaging techniques to the study of structure function. Using primarily Magnetoencephalography and functional Magnetic Resonance Imaging, these techniques allow us to study, at the regional level, which areas of the brain are implicated in specific cortical functions, and what happens to this functional network in disease.

Our work concerns both fundamental neuroscience: addressing the key question of how the brain performs the complex operations that define a person and their interaction with the environment; and clinical research that will have a direct impact in diagnosis and treatment of neurological diseases.

Our future research will focus on the application of neuroscience to study the developing child's brain and behaviour.

► Sponsors and funders

- Wellcome Trust
- BBSRC
- MRC
- EPSRC
- Dr Hadwen Trust for Humane Research
- Lord Dowding Fund for Humane Research
- Birmingham Children's Hospital Charities

► Current Projects

- **Neuroimaging** has significant potential for enhancing our understanding of how the human brain works in health and disease, but to realise this potential we need to be able to make measurements during both normal and atypical development, i.e., during childhood. Our research programme therefore includes
- **Typical Neurodevelopment** – The study of vision, hearing, language and sensory motor function throughout childhood

• Atypical neurodevelopment

Improved characterisation of brain and behaviour biomarkers for developmental disorders – particularly dyslexia, epilepsy, autism and attention deficit hyperactivity disorder. Development of objective diagnostic tools for developmental disorders.

- **Improved understanding of drug/brain interactions** – applications to epilepsy, Parkinson's Disease, stroke and complex regional pain syndrome.

A key objective of the group is to design and build the **world's first high resolution whole-brain paediatric-compliant Magnetoencephalographic (MEG) system**. All current whole head commercial systems are optimised for adult measurements and present a number of problems when seeking to make comparative measurements on children. By working with a commercial partner to produce a bespoke design, we aim to overcome several fundamental technological limitations

► Link to group web page

www.aston.ac.uk/lhs/research/neurosciences/neuroimaging

► Key contact

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