

Institution/Company*

University of Cambridge

Institution/Company Website*

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Contact person

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Brief Job Description

We are looking for a PhD student willing to advance the field of neonatal neuroimaging within our fUSioN project combining functional ultrasound and diffuse optical tomography for imaging brain activity during early neurodevelopment.

Each year, approximately one million newborns in Europe are affected by neurodevelopmental disorders, which encompass conditions ranging from motor deficits and cerebral palsy to attention deficit and autism spectrum disorders. Unfortunately diagnosis is often delayed until the child reaches 2 or 3 years of age when cognitive or behavioural alterations become evident. This can be attributed to the limitation of available neuroimaging diagnostic tools in the neonatal phase: low-resolution cortical measurements (e.g., EEG, NIRS) or challenges in neonatal use (e.g., fMRI).

This project integrates two advanced portable imaging technologies for neonatal brain function: functional ultrasound (fUS) and high-density diffuse optical tomography (HDDOT), to achieve deep and high spatial resolution functional mapping in neonates. The ultimate goal is to derive from the combined fUS and HDDOT measurements a quantitative assessment of neonatal brain connectivity, which could act as a biomarker in the case of neurodevelopmental disorders.

The project is at the boundary between biomedical engineering, neuroscience and clinical research, and would benefit from a candidate whose training and interests span these domains. They will recruit patients, perform the neuroimaging data acquisitions

and post process the data (preferably matlab, python), improve the imaging system. The thesis will be co-supervised by Prof Topun Austin (department of Paediatrics, University of Cambridge, UK) and Dr Charlie Demené (Physics for Medicine Paris, PSL Research University, France), and in interaction with clinicians, engineers, physicists, from both institutions. The position will be open for September 2025. Applications should be done by 30th of March 2025. Please contact us with CV and cover letter if you are interested to further discuss the project.