**Studentship Form**

The Precision Imaging Beacon wishes to promote cross-disciplinary interaction between Schools, with an expectation of at least two supervisors.

|  |  |  |  |
| --- | --- | --- | --- |
| First Supervisors name | Dr Rob Dineen | School Addresses | SoM (Radiological Sciences) |
| Co Supervisors name | Dr Andrew French | School Addresses | SoCS  |
| Co Supervisors name | Prof Niki Sprigg | School Addresses | SoM (Stroke Medicine) |
| Start date  | Sept 2019 | Duration  | 3.5 years |
| Student  | TBC following selection process |
| Project Title | Development of imaging-based stratification for haemorrhagic stroke trials |
| Project Abstract | Spontaneous intracerebral haemorrhage (SICH) accounts for up to 20% of strokes and has higher mortality and worse outcomes than ischaemic stroke. Survival after SICH has not changed for several decades and the only intervention that improves functional outcome is early intensive blood pressure lowering. The Nottingham-led TICH-2 trial was an international randomised controlled trial (n=2325) that was neutral for primary outcome (functional status day 90, aOR 0·88, 95% CI 0·76–1·03) but demonstrated evidence of biological effect in the tranexamic acid-treated group with fewer deaths by day 7 and lower rate of haematoma expansion. It has been suggested that a larger trial is needed to demonstrate efficacy. However, an alternative approach is to utilise existing imaging and clinical data from the TICH-2 trial to develop a **stratification model for prediction of likely positive response** to the trial intervention that can be used to design a trial with stratified recruitment. In this PhD project the student will perform modelling of the quantitative imaging features and baseline clinical characteristics from the TICH-2 placebo group to produce an outcome prediction model; use this model to predict the *expected* outcome based on baseline features in the TICH-2 tranexamic acid-treated group (i.e. to predict the outcome *if* these patients had been given placebo); and then to compare the predicted and actual outcome in the tranexamic acid-treated group to identify the characteristics of responders. The identification of **response predictors** (rather than just outcome predictors) will allow a stratification model to be produced, with predefined response groups (i.e. high likelihood of response, intermediate likelihood of response, low or no likelihood of response). This project supports a new cross-disciplinary collaboration between the Schools of Medicine and Computer Science. The student will be supported to implement **Artificial Intelligence-based approaches** to image analysis and classification of both outcome and response predictors. The student will also receive background training in stroke imaging and trials methodology. The research output will facilitate development of a prospective targeted trial by providing a stratification tool, expected effect sizes and sample size requirements, and will allow an evaluation of feasibility of recruitment into the stratification arms based on the recruitment to the previous TICH-2 trial. Methodology developed in this PhD may be applicable to other clinical trial situations, and will build local capacity and expertise in imaging-guided trial recruitment. |
| Graphic for Advertising(Must be high resolution) |  |