



Application number/Title: 1969 - Development of structural and functional brain connectivity during normal and pathological ageing

Applicant PI: Dr Marcus Kaiser

Applicant institution: Newcastle University, School of Computing Science, Claremont Tower, Newcastle upon Tyne, NE1 7RU, United Kingdom

Funding body: EPSRC Pioneering Research and Skills Grant

Keywords provided by the Applicant PI to describe the research project:

Brain disorders, network analysis, development, modelling

Application Lay Summary:

1a: The network of connections between brain regions undergoes changes during the ageing process. In some cases, these changes lead to developmental disorders at young ages (epilepsy, schizophrenia, depression) or at older ages (dementia, Parkinson's disease). To assess which changes are linked to brain disorders, it is crucial to compare results with healthy subjects of the same gender, comparable age, and similar cognitive features. This proposal aims to use such data to detect characteristic features of brain diseases, when compared to healthy brains, and to understand how brains change during the normal ageing process.

1b: This research fits UK Biobank's stated purpose in that it is in the public Interest. We will build optimised brain connectivity biomarkers for brain disorders as well as computational models of changes during normal and pathological brain network development.

1c: We will use brain imaging data to reconstruct how different parts of the brain are connected as a network. Using a large pool of networks from subjects of a particular age range, we will observe how networks differ between different ages and how these networks are different from networks of individuals suffering from brain disorders. These networks of patients are already available through other sources including diseases such as epilepsy, schizophrenia, and dementia.

1d: We require data from the full cohort of subjects with brain MRI data.