



Application number/Title: 23509 - Genome-wide and brain-wide association studies

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Funding body: Internally funded by Erasmus MC grant

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

Genetics, neuroimaging, MRI, bioinformatics

Application Lay Summary:

1a: Genome-wide association studies (GWAS) have identified dozens of genetic variants related to brain structure. These studies have focused on a few aggregate measures since GWAS are computationally demanding. However, the brain is complex and can be described using millions of measures. We recently developed methods to perform such genome-wide and brain-wide association studies and applied this in several cohort studies. We would like to replicate our findings in the UK Biobank by jointly meta-analyzing the results.

1b: It fits well with the purpose of the UK Biobank in two ways:

- 1) It build upon this major resource by providing a range of novel neuroimaging biomarkers, which will be made available to other researchers.
- 2) It will hopefully identify novel genetic variants that are important for brain structure and diseases of the brain (e.g., Alzheimer's disease, schizophrenia)

1c: We will analyze brain images to calculate millions of measures that describe the structure of the brain. Next, we will perform genome-wide screens of millions of genetic variants to identify ones that affect brain structure.

1d: The full cohort of individuals with both brain imaging and genetic data available.