

Targeted Project / AY 2025 -2026

Rare and common variants in mental health dimensions in UKB and linking to trajectories of mental health symptoms in birth cohorts

Project Reference: TRG-PD-VW

Supervisor: Dr Varun Warriar (vw260@cam.ac.uk)

Department/Institute: Psychiatry

Website: <https://www.neurodevelopmentalresearch.group> and
<https://www.sanger.ac.uk/group/martin-group/>

Co-supervisor: Dr Hilary Martin (Sanger Institute)

BBSRC DTP main strategic theme: Bioscience for an integrated understanding of health

BBSRC DTP secondary strategic theme: Understanding the rules of life

Project outline:

Both common and rare genetic variants are associated with mental health conditions. However, how these variants collectively influence mental health dimensions, both at single time points and across development, remains incompletely understood. In this proposed project, the PhD candidate will analyse large-scale sequencing and genotyping data from the UK Biobank and three birth cohorts (ALSPAC, Millennium Cohort Study, and MoBa). Using state-of-the-art statistical genetics methods, they will investigate the direct and indirect relationships between common and rare genetic variants and mental health dimensions, as well as how these relationships evolve developmentally. The candidate will also employ quasi-causal models to examine the bidirectional effects between mental health and cognition.

Throughout the project, the PhD candidate will develop expertise in large-scale data analysis, statistical genetics methods, and longitudinal and quasi-causal study designs. Successful candidates should demonstrate both interest and aptitude in statistics and human genetics, along with programming experience in languages such as R, Python, or Bash.

This project will be co-supervised by Varun Warriar (Psychiatry) and Hilary Martin (Sanger), who bring extensive experience in researching neurodevelopmental and mental health conditions, including both common and rare genetic variants. Examples of previous work from Warriar and Martin are:

1. <https://www.medrxiv.org/content/10.1101/2024.09.04.24313061v1>
2. <https://www.medrxiv.org/content/10.1101/2024.03.05.24303772v1>
3. <https://www.nature.com/articles/s41588-022-01072-5>
4. <https://www.medrxiv.org/content/10.1101/2024.07.31.24311279v1>