



OPERA (www.oxfordpsychosis.com) undertakes translational research to understand the mechanisms underlying psychosis and develop more effective, personalised treatments. Our work spans multimodal neuroimaging, neurophysiology, experimental medicine, clinical trials and computational modelling.

We welcome enquiries from prospective DPhil students interested in the projects below. The precise questions and methods would be tailored to the student's interests and background.

Developing scalable, low-friction EEG biomarkers for psychosis

EEG can provide direct, inexpensive measures of brain function, but conventional high-density recordings require specialist equipment, lengthy preparation and considerable participant tolerance. These limitations prevent promising neurophysiological markers from being used routinely in clinical services or large-scale studies.

This project will develop and validate a brief, low-friction EEG platform for measuring brain dysfunction in psychosis. Candidate measures include aperiodic or "1/f" activity, auditory steady-state responses, mismatch responses and task-evoked activity. These measures have been linked to excitation–inhibition balance, cognition and psychosis, but it remains unclear how reliably they can be captured using a small number of electrodes and short recording periods.

The project could involve:

- using existing high-density EEG datasets to determine the smallest sensor configuration and shortest recording protocol that preserve clinically relevant information;
- developing robust automated preprocessing and quality-control procedures;
- testing the reliability and tolerability of the resulting low-friction protocol;
- validating the protocol in people with psychosis and healthy volunteers; and
- examining whether scalable EEG measures predict cognition, symptoms or treatment response within studies such as FOCUS.

The project would combine signal processing, clinical neuroscience and prospective experimental work, with the longer-term goal of developing measures that can move beyond specialist laboratories into routine clinical research and care.

All projects potentially suitable for both full or part-time study

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