Thomas Keith Roberts

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Computational Neuroscientist and educator.

Education

Jul 2026 **MSc Computational Neuroscience**
University of Birmingham

Jul 2025 **BSc Psychology**
University of Birmingham

Aug 2024 **Neuroscience and Data Science**
Korea University

Research Intern 2025 – Present
Centre for Human Brain Health

- Working with OPM-MEG data using MNE-python and the FLUX Pipeline.
- Analysis using LLMs, Neural networks and other computational techniques.
- Conducting analysis using UoB's HPC cluster.
- Designing analysis using BIDS open-source data.
- Writing publishable report for academic journals.
- Shadowing MEG studies.
- Studying cross-trial temporal face processing.

Post Graduate Teaching Assistant 2025 – Present
University of Birmingham

- Teaching data science and python to UG and PG students.
- Teaching students basic linux and git.
- Responsible for drop-in and 1 to 1 sessions for coding support.
- Marking students reports and coding assignments.
- Creating and testing materials for face-to-face classes.
- Responding to students via online discussion boards.

Student Ambassador 2021 - Present
University of Birmingham

- Representing the university to prospective students and government officials.
- Providing accurate information about the university.
- Conducting campus tours for open days and school visits.
- Leading groups of visitors through different types of events.
- Helping engage visitors during taster sessions particularly in psychology.
- Providing a helpful and pleasant experience to every visitor.

Projects

Spatial attention modulated by read write direction

- Designed and implemented spatial attention tasks in both Python and MATLAB.
- Created analysis pipeline from collection to statistics using user friendly facing jupyter notebooks.
- Implemented standardised procedures and step-by-step documentation for data collection and analysis (See GitHub for code and documentation)

OPM-MEG Cross-Trial Face component analysis

- Building off existing paper to design follow up analysis.
- Implemented analysis using MNE python and ML libraries.
- Use of SVMs, representational similarity matrix, computational modelling.

Decoding Imagined Speech

- Analysed EEG and MEG data.
- Techniques: Transfer Learning, Incremental Learning, RNNs.
- Developing analysis pipelines for MEG pipeline.

Implementation of supervised and unsupervised neural networks

- Modelled working memory from existing dataset.
- Modelled image processing performance from existing dataset.

Contributor to lab documentation

- Neureca web page.
- CHBH HPC cluster open-source documentation.

Future Research Interests

My future research interests are in developing and optimising data collection and computational analysis for OPM-MEG research. I would like to develop high performance analysis workflow to consolidate and standardise OPM-MEG analysis into a single replicable, high quality data collection and analysis pipeline.

I would like to use these methods and leverage OPMs ability to study the central nervous system, as a whole, to understand human perception. I would like to see how the mind and body interact with one another to create the perception of the world that we experience.

Skills

- **Coding Languages:**
  - **Proficient:** Python, Rust.
  - **Comfortable:** MATLAB, R, SQL.
  - **Working Understanding:** C/C++, Lua, Javascript, Julia.
- **Neuroimaging Analysis:**
  - MEG/EEG
  - Computational Modelling
  - Neural Networks
- **Computing Skills**
  - Proficient in Linux (Redhat, Ubuntu)
  - Git (Version Control)
  - HPC Cluster

References are available upon request.