Corey Ratcliffe, *PhD*

E: corey.alan.ratcliffe@gmail.com **P:** +447807316510

A: Newcastle-upon-Tyne, NE1 2HW **W:** c-ratcliffe.github.io

Post-doctoral Research Associate, Newcastle University

Psychologist to cognitive neuroscientist to clinical neuroimager, aspiring to ***create impact*** for those with neurological conditions from neuroimaging. Confident scientific presenter. Experienced with MRI and neuropsychological research in both clinical and non-clinical settings, from study conception to publication. Primary research themes are epilepsy, surgical prediction, brain infection, network neuroimaging, neuropsychology, imaging methodologies, and phenotyping. Confident scripting for and coordinating between a range of software packages and modalities in MRI research. Advocate for open science, rigorous methodological reporting standards, and international collaboration.

Scientific Career - Education

Jan 2025 - March 2026 — Research Associate — Computational Neurology, Neuroscience & Psychiatry Lab, Newcastle University
PIs: Professor Peter N. Taylor, Professor Yujiang Wang

Project: Quantitative Neuroimaging for Prediction of Surgical Outcomes in Focal Epilepsy Resection

For individuals with drug-resistant focal epilepsy, resective surgery can result in a vastly improved quality of life; however, up to 50% of surgeries will fail to provide adequate seizure control. Surgical planning is a multidisciplinary process, but evidence from quantitative neuroimaging is underutilised. Alongside providing supervision/support to students, my primary role in this position has been to develop a method of predicting surgical outcomes from presurgical anatomical and diffusion MRI, which I have approached (mainly) by leveraging normative modelling and white matter tractography for connectomics. The work I have completed will be incorporated into a tool designed to assist in defining the resection target in focal epilepsy surgery.

Jan 2021 - Jan 2025 — PhD Studentship (Dual international programme) — Brain Research using Advanced Imaging in Neurology Lab, Liverpool University
PI: Professor Simon S. Keller

Jan 2021 - Present — Department of Neuro Imaging & Interventional Radiology, NIMHANS Bengaluru
PI: Professor Jitender Saini

Thesis: Neurocysticercosis-related Seizures: Epilepsy Biomarkers from Advanced Quantitative Magnetic Resonance Imaging

Neurocysticercosis is a parasitic CNS infection endemic to many low-to-middle-income countries, which can result in persistent seizure activity. To explore biomarkers of ictogenesis in this population, I spent a year living and working in a tertiary neurology centre in India, where I gathered prospective multimodal research-quality MRI data in an acute clinical cohort. During this time, I was instrumental in establishing epilepsy as a key research theme for a flourishing (now funded) international research partnership. I authored two first-author papers during this time, two first-author preprints (one of which has now been published) and fostered multiple interdisciplinary clinical collaborations, including research themes such as tremor and meninigioma. Whilst a domestic student, I actively contributed to several conferences (regional and international) and supported the development of the Liverpool Neuroscience Group, now represented by the Liverpool Interdisciplinary Neuroscience Centre.

Oct 2018 - Sep 2019 — MRes Cognitive Neuroscience — Department of Clinical and Experimental Epilepsy, University College London
MRI Unit, Epilepsy Society, Chalfont St Peter
Result: Distinction
Project supervisors: Dr Lorenzo Caciagli, Dr Britta Wandschneider

Dissertation: Neuropsychological Profiles in Patients with Juvenile Absence Epilepsy and their Unaffected Siblings

Cognitive impairment in epilepsy is underexplored, but links to abnormal neurodevelopmental trajectories suggest that phenotypic patterns exist between idiopathic generalised epilepsy syndromes (i.e. Juvenile Absence Epilepsy) and specific profiles of deficits. The goal of my MRes final project was to establish whether individuals with Juvenile Absence Epilepsy presented with cognitive impairment relative to controls, and to what extent their healthy siblings shared putative profiles (suggestive of a familial trait). I was able to demonstrate patterns of impairment that were commensurate with preliminary structural pathology correlates, and supported this work with two publications (one first-author) as well as a platform presentation at the American Epilepsy Society annual meeting—for which I was conferred the Young Investigator Award.

Sep 2014 - Aug 2018 — BSc Psychology with Neuropsychology with International Experience — School of Psychology and Sport Science, Bangor University
Institute of Psychology, Universiteit Leiden
Result: First Class
Project supervisor: Professor Kami Koldewyn

Dissertation: Stimuli Valence, Extrastriate Body Area Activation, and the Person Perception Network

During my undergraduate degree, I was fortunate enough to spend a year studying abroad as part of the ERASMUS programme, where I developed my interest in neuropsychiatry, pharmacology, network neuroscience, and machine learning. I was then admitted into a functional neuroimaging third year project, where I learnt foundational experimental and analysis skills.

Selected Talks

2025 Presentation of work done for the completion of my thesis as part of my dual PhD programme - **NIMHANS, Bengaluru**

2024 Big data and natural disease models of epilepsy - **ILAE-BB Young Epilepsy Section Symposium, Liverpool**

Platform on fibre-ball imaging in drug-resistant focal epilepsy - **UKE, Hamburg**

Imaging biomarkers of seizures in neurocysticercosis - **Pharmacology Away Day, Liverpool**

2023 Platform on quantitative evaluation of machine learning-based image synthesis methods for morphometry in epilepsy - **ILAE-BB Annual Meeting, Newcastle-upon-Tyne**

Platform on fibre-ball imaging in drug-resistant focal epilepsy - **Various regional meetings, Liverpool**

Poster blitz on image synthesis methods for morphometry in epilepsy - **International Epilepsy Congress, Dublin**

2019 Platform on cognitive phenotypes of Juvenile Absence Epilepsy - **American Epilepsy Society Annual Meeting, Baltimore**

For information on poster presentations, please see the relevant page on my website: c-ratcliffe.github.io

Skills - Experience

Specialist knowledge themes

Epilepsy: Surgical prediction, Newly-diagnosed epilepsy, Outcome prediction, Neuropsychology, Phenotyping
Network Neuroscience - Neuroanatomy - Brain infections - Structure-function relationships - Seizure pathology - Neuroplasticity

MRI acquisition, image processing, and data visualisation

- First-hand clinical and experimental MRI scanning experience
- Practical understanding of MR physics, acquisition parameters, and multimodal sequence design - including experimental structural and diffusion sequences
- Ability to interrogate and interpret volumetry, morphometry, microstructure, functional time series, connectivity (structural and functional), lesion mapping, et al.
- Extensive experience with a range of preprocessing software for all common MRI modalities: FSL, FreeSurfer, MRtrix3, SPM, DSI Studio, AFNI, ANTs, PyDesigner, CONN, et al.
- Understanding of—and practice with—machine-learning/model-based methods within image analysis, including: SynthSR, DL+DiReCT, neuronets, TractSeg, et al.
- Familiarity with rodent image analysis, radiomics, MEG, EEG, normative modelling, open-source data repositories, and various other peripheral modalities
- Broad range of data visualisation/presentation techniques, from MRI rendering with Surf Ice, to vector image creation, animation, and graphic design

Statistical analysis, coding, and modelling

- Comfortable working in shell (bash, zsh), R, Python, Matlab, and HTML/CSS (see Github for my published code)
- A strong advocate for open-access code and replicable methodologies
- Able to identify and implement the appropriate quantitative inferential methodology, from linear modelling, to network-based statistics, to machine-learning algorithms
- Conceptual and practical understanding of network neuroscience principles, graph theoretical analyses, and multimodal information integration
- Thorough understanding of best-practice methodologies for systematic reviews and meta-analyses

Scientific communication

- Ability to communicate and disseminate in a variety of environments, from seminars, to platform presentations, to public engagement opportunities—evidenced by the various awards I have received for presenting at conferences and meetings
- Emphasis on the appropriate presentation of information, incorporating skills learnt over a decade of presentation experience—I am particularly mindful of presenting for the audience, not to them
- Enthusiastic about engaging for various purposes—to inform, entertain, and persuade

Other skills, experiences, and roles

- I have lived experience of establishing a nascent international collaboration, including coordinating research goals, clinical data collection, managing logistics, and securing philanthropic funding
- I can write for publication in Latex, Markdown, or richtext format (and comfortable with all of the ancillary requirements)
- I have lead seminars for undergraduate neuroanatomy students, across topics such as Parkinsonsism and iron deposition, and successfully coordinated a third-year undergraduate bioinformatics project
- I am named as an expert mentor (for MRI analysis) on a successfully awarded clinical PhD studentship grant application
- During my PhD, I undertook various postdoc level roles within my lab, which included providing emotional, technical, and administrative support for peers - I have continued with these roles in my current position
- Alongside my own projects, I have collaborated with and assisted in various smaller projects, including a preclincal neuro-oncology imaging study in rats, and an exploration of deep-brain stimulation in Parkinson's Disease

Training - Conferences - Outreach

- American Epilepsy Society Annual Meeting - 2019, Baltimore; 2021, Chicago
- Neuroanatomy for Neuroimagers - 2021, Remote
- R Statistics for Beginners - 2021, Remote
- Northwest Epilepsy Group Quarterly Meeting - 2021, 2023, 2024, Warrington
- International League Against Epilepsy - 2021, Remote; 2023, Newcastle-upon-Tyne; 2024, Liverpool
- International Epilepsy Congress - 2023, Dublin
- Liverpool Brain Infections Group Meeting - 2023, Bala; 2024, Liverpool
- Liverpool Neuroscience Day - 2023, Liverpool
- Pint of Science - 2023, 2024, Liverpool
- Organisation for Human Brain Mapping - 2024, Montreal
- In vivo Histology using qMRI Workshop - 2024, Hamburg
- Bolzano Neuroimaging Retreat - 2024, Bolzano
- Northeast Epilepsy Group Quarterly Meeting - 2025, Newcastle-upon-Tyne

Publications

Ratcliffe, C., Taylor, P. N., de Bézenac, C., Das, K., Biswas, S., Marson, A., & Keller, S. S. (2025). *Machine Learning-based Reconstruction of 2D MRI for Quantitative Morphometry in Epilepsy. Imaging Neuroscience*. https://doi.org/10.1162/IMAG.a.997

Ratcliffe, C., Pradeep, V., Marson, A., Keller, S. S., & Bonnett, L. J. (2024). *Clinical prediction models for treatment outcomes in newly diagnosed epilepsy: A systematic review*. Epilepsia, n/a(n/a). https://doi.org/10.1111/epi.17994

Ratcliffe, C., Adan, G., Marson, A., Solomon, T., Saini, J., Sinha, S., & Keller, S. S. (2023). *Neurocysticercosis-related Seizures: Imaging Biomarkers*. Seizure. https://doi.org/10.1016/j.seizure.2023.04.005

Caciagli, L., **Ratcliffe, C.**, Xiao, F., van Graan, L. A., Trimmel, K., Vollmar, C., Centeno, M., Duncan, J. S., Thompson, P. J., Baxendale, S., Koepp, M. J., & Wandschneider, B. (2023). *The cognitive phenotype of juvenile absence epilepsy: An investigation of patients and unaffected siblings. Epilepsia*. https://doi.org/10.1111/epi.17719

Ratcliffe, C., Wandschneider, B., Baxendale, S., Thompson, P., Koepp, M. J., & Caciagli, L. (2020). *Cognitive Function in Genetic Generalized Epilepsies: Insights From Neuropsychology and Neuroimaging*. Frontiers in Neurology, 11, 144. https://doi.org/10.3389/fneur.2020.00144