EILIDH MACNICOL

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QUALIFICATIONS AND PRIZES

PhD in neuroimaging research (10/2016 – 05/2021) Institute of Psychiatry, Psychology & Neuroscience (IoPPN), King's College London

4-year programme funded by Medical Research Council doctoral training partnership (MRC DTP)

Awarded Best Verbal Poster Presentation at 1st annual DTP symposium (2017)

Awarded £4989 by MRC Flexible Supplement Panel for exceptional training opportunity at Stanford University, CA, USA (2020)

MSc with Distinction - neuroimaging (09/2014 – 09/2015) IoPPN, King's College London

Awarded Best Research Project – MSc neuroimaging 2014/15

Upper second-class BSc (Hons) - neuroscience (09/2009 – 05/2013) University of Glasgow

RESEARCH EXPERIENCE

Postdoctoral Research Associate (01/2021 - Present)

Department of Neuroimaging, IoPPN, King's College London

Providing rodent-specific MRI resources and pipelines for fMRI/phMRI studies, and applying graph theoretical and network-based analyses to processed datasets

'NiRodents' – Visiting student researcher (01/2020 – 03/2020)

Supervision: Prof R. Poldrack and Dr O. Esteban, Stanford University, CA, USA

Provided preclinical MRI analysis expertise to extend existing open-source image processing packages (including mriqc, sMRIPrep, and fMRIPrep) for use with rodent data

'Longitudinal characterisation of the macro-scale connectome in a healthy ageing rat model' – PhD candidate (10/2016 – 12/2020)

Supervision: Dr D. Cash and Prof F.E. Turkheimer, King's College London

Relating MRI-derived brain networks to cognitive decline in a healthy ageing rodent model

'Contrasting functional and structural connectivity to predict memory decline in healthy ageing' – Visiting Researcher (09/2015 – 10/2016) and MSc project (03/2015 – 09/2015)

Supervision: Prof M.J. O'Sullivan, King's College London

Related seeded functional connectivity to white matter integrity measures while contributing to construction of a processing pipeline combining resting-state and diffusion-weighted MRI

'Ventral temporal cortex activation in response to shapes with and without face-like attributes' – MSc mini project (01/2015 – 04/2015)

Course leader: Dr V. Giampietro, King's College London

Designed, carried out, and analysed a block-design functional MRI experiment with three peers

'Binding characteristics of mouse monoclonal anti-ganglioside antibodies with relation to Guillain-Barré Syndrome' – BSc (Hons) project (09/2012 – 12/2012)
Supervision: Prof H.J. Willison, University of Glasgow
Compared the binding of antibodies to lipid complexes across ELISA, glycoarray, and tissue samples

MANUSCRIPTS

Preprints

MacNicol, E., Wright, P., Kim, E., Brusini, I., Esteban, O., Simmons, C., Turkheimer, F., Cash, D., 2021. Age-specific adult rat brain MRI templates and tissue probability maps [Preprint]. Available from: osf.io/htgqn

Brusini, I., **MacNicol, E.**, Kim, E., Smedby, Ö., Wang, C., Westman, E., Veronese, M., Turkheimer, F.E. and Cash, D., 2021. MRI-derived brain age as a biomarker of ageing in rats: validation using a healthy lifestyle intervention [Preprint]. Available from: doi.org/10.1101/2021.04.19.440433

Ciric, R., Lorenz, R., Thompson, W.H., Goncalves, M., **MacNicol, E.**, Markiewicz, C., Halchenko, Y., Ghosh, S.S., Gorgolewski, K.J., Poldrack, R. and Esteban, O., 2021. TemplateFlow: a community archive of imaging templates and atlases for improved consistency in neuroimaging [Preprint]. Available from: doi.org/10.1101/2021.02.10.430678

Wood, T.C., Cash, D., **MacNicol, E.**, Simmons, C., Kim, E., Lythgoe, D.J., Zelaya, F. and Turkheimer, F., 2021. Non-Invasive measurement of the cerebral metabolic rate of oxygen using MRI in rodents. *Wellcome Open Research*, 6, p.109.

Published Conference Proceedings

MacNicol, E., Ciric, R., Kim, E., Di Censo, D., Cash, D., Poldrack, R.A. and Esteban, O., 2021, April. Atlas-based brain extraction is robust across rat MRI studies. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)* (pp. 312-315). IEEE.

PRESENTATIONS

Invited talks and oral presentations

Panellist: 'The future of open tools/technologies' (Organisation for Human Brain Mapping (OHBM) Open Science Room, Virtual, 06/2021, available: https://www.youtube.com/watch?v=kJi6QF46szw)

Invited talk: 'RESILIENT: a longitudinal MRI study of healthy ageing in rats' (Imaging Seminar Series, Center for Alzheimer's Research, Karolinska Institutet, Stockholm, Sweden, 03/2021)

Departmental talk: 'Adapting fMRIPrep for Rodent MRI' (NeuroImaging Students Seminars, King's College London, 04/2020)

Invited talk: 'Data visualisation in preclinical MRI' (Voxelwise: preclinical neuroimage analysis workshop – The Francis Crick Institute, London 09/2019)

Divisional talk: 'Exploring changes to brain structure in a rat model of healthy ageing' (Division of Neuroscience PhD Symposium, King's College London, 05/2019)

Departmental talk: 'Metabolic modification in rat functional MRI' (Neuroimaging Erratic Research Development Seminars – King's College London, 02/2018)

Panellist: Question and answer session with Bioscience PhD students (Institute for Research in Schools Authentic Biology Symposium – The Wellcome Trust London, 11/2017)

Poster presentations

'Atlas-based brain extraction is robust across rat MRI studies' (IEEE 18th International Symposium on Biomedical Imaging (ISBI), Nice, France, 05/21)

'Multimodal MRI data from a rat model of healthy ageing' (Society for Neuroscience 49th Annual Meeting – Chicago, IL, USA, 10/2019)

'Multimodal characterisation of Methylene Blue's effects on rat neurovascularity and metabolism' (Society for Neuroscience 48th Annual Meeting – San Diego, CA, USA, 11/2018)

'Multimodal characterisation of an environmentally enriched diet restricted (EEDR) rat model of healthy lifestyle' (2nd Annual KCL DTP symposium – King's College London, 10/2018)

'The effects of Methylene Blue on evoked BOLD response in rats' (1st Annual KCL MRC DTP symposium – King's College London, 10/2017)

'How are structural and functional connectivity of critical memory networks related in healthy ageing?' (10th Federation of European Neuroscience Societies Forum of Neuroscience – Copenhagen, Denmark, 07/2016)

'How are structural and functional connectivity related in healthy ageing?' (Divisional symposium – King's College London, 09/2015)

'The disconnected brain' (Alzheimer's Research UK network science day – King's College London, 09/2015)

Research Skills and Certification

MRI data processing and analysis skills

Multi-modal dataset curation and organisation
Shell, MATLAB, Python, and R scripting
High-performance computing using Sun Grid Engines and Slurm
Multi-modal MRI pre-processing with python, bash, and MATLAB
Seed-based, graph theory, and data reduction analyses of functional data with bash and MATLAB
Regional, voxel, and tensor-based morphometry of structural images with bash and MATLAB
Software development with python, including IDEs, GitHub, and Docker
Processing resource development and distribution
Bruker 9.4T Biospec MR scanner setup and Paravision software
Microsoft Office, Google G Suite, SPSS, & GraphPad Prism (macOS & Windows)

Preclinical Research

UK Home Office personal licence holder
Rat behaviour testing
Venous cannulation and blood sampling
In vivo 2-deoxyglucose autoradiography
Frozen tissue preparation
Fluorescent immunohistochemistry
Western blotting
Confocal microscopy

Clinical Research

NHS passport for research
Screening and cognitive testing

Field-specific Workshops

Organiser: Voxelwise Preclinical Neuroimaging Analysis Workshop (coordinated by Dr D. Cash, Dr B. Siow, Dr G. Zhang, and Dr B. Crum – The Crick Institute, London 09/2019)

Comprehensive workshop of analysis methods in preclinical neuroimaging

Participant: Cognitive decline and aging (coordinated by Dr J.H. Morrison, University of California, Davis for Neuroscience School of Advanced Studies – Siena, Italy 09/2017)

Teaching Experience

Graduate Teaching Assistant: Imaging the Brain, Reading the Mind (Dr Y. Paloyelis; Module 6BYN3010, Department of Neuroscience, King's College London, 10/2018 – 01/2019)

Facilitated the undergraduate workshop series which introduces fMRI data analysis with SPM

Public Engagement Experience

Demo guide: Biomarker Research and Imaging in Neuroscience (BRAIN) Centre, for the King's College London dementia research open day, (coordinated by King's College London Alzheimer's Research UK Network Early Career Researchers, 05/2019)

Conducted tours of the preclinical MRI facility, while providing tailored answers for a non-specialist audience, promoting the necessity of preclinical imaging, and highlighting the importance of researching healthy ageing in addition to ageing in the presence of disease

Membership of Scientific Societies

Neuroimaging Department Diversity & Inclusion Committee (2020 – Present)

Organisation and chairing the departmental book club with a focus on highlighting various diversity and inclusion themes. Notably, book choices have reflected the local communities in South London, diversity and inclusion in research and data analysis, and mental health

IoPPN Student Forum (taught postgraduate co-chair 10/2014 – 10/2015)

Engaged with several academic committees to provide a better student experience
Solely responsible for disseminating details of events and news via social media channels
Promoted inter-departmental networking and collaboration opportunities

University of Glasgow Neuroscience Society (president 2012-13; secretary 2011-12)

Successfully extended membership to non-honours students and made the society more recognisable on campus by employing creative solutions to recruitment obstacles