Eilidh **MacNicol**, PhD

MRI Data Processing and Analysis, Brain Networks, Healthy Ageing

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London, United Kingdom

Research Experience

Postdoctoral Research Associate, Dep. of Neuroimaging, King's College London, UK 2021–Present
Generating and curating rodent-specific resources for MRI preprocessing and analysis
Creating and applying pipelines for fMRI/phMRI studies
Applying graph theoretical and network-based analyses to processed datasets
Interpreting and disseminating findings for pharmaceutical companies, peers, and lay audiences

Visiting Student Researcher, Dep. of Psychology, Stanford University, CA, USA 2020
Providing preclinical MRI expertise to extend compatibility of NeuroImaging PRE-Processing (NiPreps) software with rodent data

Doctoral Researcher, Dep. of Neuroimaging, King's College London, UK 2016–2021
Acquiring, curating, processing, and analysing data from a multimodal longitudinal study of healthy ageing in rats

MRI experience also includes seed-based functional connectivity, block-design functional MRI, and diffusion MRI in clinical data. ***In vivo*** experience also includes behaviour testing in rats, conscious and unconscious autoradiography, and examination of antibody binding to lipid complexes across ELISA, glycoarray, and tissue samples.

Projects

NiRodents 2020–Present
NiRodents is an open-source Python package reliably adapting human-specific workflows for non-human data to maximise congruence between preclinical and clinical MRI. For example, fMRIPrep is a functional MRI (fMRI) data processing pipeline designed to be robust to variable scanning protocols with minimal user intervention. fMRIPrep-rodents adapts the original pipeline to provide analogous tools for rodent MRI data.
Supervision: Dr Oscar Esteban

Longitudinal Characterisation of Healthy Ageing in Rats using Multimodal MRI 2016-2021
The RESILIENT study examined lifestyle modifications in a rat model of healthy ageing. Rats were longitudinally followed and given behavioural tests and non-invasive MRI imaging at up to four sessions across adulthood.
Supervision: Dr Diana Cash and Prof Federico Turkheimer

Education

Doctor of Philosophy in Neuroimaging Research 2016–2021
Dep. of Neuroimaging, King's College London, UK
Master of Science (with Distinction) in Neuroimaging 2014–2015
Institute of Psychiatry, Psychology, and Neuroscience, King's College London, UK
Bachelor of Science with upper second-class honours in Neuroscience 2009-2013
Faculty of Life Sciences and Medicine, University of Glasgow, UK

Awards

Exceptional Training Opportunity at Stanford University 2020
£4989, MRC Flexible Supplement
Best Verbal Poster Presentation 2017
1st annual King's College London MRC doctoral training partnership symposium
Stipend and Bench Fees 2016-2020
King's College London's MRC doctoral training partnership
Best Research Project 2015
MSc neuroimaging 2014/15

Publications

Peer-reviewed journals

[1] **A consensus protocol for functional connectivity analysis in the rat brain**
Joanes Grandjean et al. *Nature Neuroscience* (2023), pp. 1–9, DOI: 10.1038/s41593-023-01286-8

[2] **The effects of acute Methylene Blue administration on cerebral blood flow and metabolism in humans and rats**
Nisha Singh, *Eilidh MacNicol*, Ottavia DiPasquale, Karen Randall, David Lythgoe, Ndabezinhle Mazibuko, Camilla Simmons, Pierluigi Selvaggi, Stephanie Stephenson, Federico E Turkheimer, Diana Cash, Fernando Zelaya, and Alessandro Colasanti *Journal of Cerebral Blood Flow & Metabolism* (2023), p. 0271678X231157958, DOI: 10.1177/0271678X231157958

[3] **Quality control in functional MRI studies with MRIQC and fMRIPrep**
Céline Provins, *Eilidh MacNicol*, Saren H Seeley, Patric Hagmann, and Oscar Esteban *Frontiers in Neuroimaging* 1 (2023), DOI: 10.3389/fnimg.2022.1073734

[4] **TemplateFlow: FAIR-sharing of multi-scale, multi-species brain models**
Rastko Ciric, William H Thompson, Romy Lorenz, Mathias Goncalves, *Eilidh MacNicol*, Christopher J Markiewicz, Yaroslav O Halchenko, Satrajit S Ghosh, Krzysztof J Gorgolewski, Russell A Poldrack, et al. *Nature Methods* 19.12 (Dec. 2022), pp. 1568–1571, DOI: 10.1038/s41592-022-01681-2

[5] **Non-Invasive measurement of the cerebral metabolic rate of oxygen using MRI in rodents**
Tobias C Wood, Diana Cash, *Eilidh MacNicol*, Camilla Simmons, Eugene Kim, David J Lythgoe, Fernando Zelaya, and Federico Turkheimer *Wellcome Open Research* 6 (Aug. 2022), p. 109, DOI: 10.12688/wellcomeopenres.16734.4

[6] **Age-specific adult rat brain MRI templates and tissue probability maps**
Eilidh MacNicol, Paul Wright, Eugene Kim, Irene Brusini, Oscar Esteban, Camilla Simmons, Federico E Turkheimer, and Diana Cash *Frontiers in Neuroinformatics* 15 (Jan. 2022), p. 74, DOI: 10.3389/fninf.2021.669049

[7] **MRI-derived brain age as a biomarker of ageing in rats: validation using a healthy lifestyle intervention**
Irene Brusini, *Eilidh MacNicol*, Eugene Kim, Örjan Smedby, Chunliang Wang, Eric Westman, Mattia Veronese, Federico Turkheimer, and Diana Cash *Neurobiology of Aging* (Oct. 2021), S019745802100316X, DOI: 10.1016/j.neurobiolaging.2021.10.004

Peer-reviewed conference proceedings

[1] **Atlas-Based Brain Extraction Is Robust Across Rat MRI Studies**
Eilidh MacNicol, Rastko Ciric, Eugene Kim, Davide Di Censo, Diana Cash, Russell A Poldrack, and Oscar Esteban *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)*, 2021, DOI: 10.1109/ISBI48211.2021.9433884

Presentations

Selected talks

[1] **Species agnostic tools for translational MRI processing**
RIOT Science Club (June, 2022); URL: https://youtu.be/8n0kOctrjN0

[2] **Quality Control in Preclinical MRI: Where Do Artifacts Come From & How to Fix Them**
Joint Annual Meeting ISMRM-ESMRMB, London (May, 2022); URL: https://www.nipreps.org/qc-book

[3] **The future of open tools/technologies**
Organization of Human Brain Mapping Open Science Room (June, 2021); URL: https://youtu.be/kJi6QF46szw

[4] **RESILIENT: a longitudinal MRI study of healthy ageing in rats**
Center for Alzheimer's Research, Karolinska Institutet, Stockholm, Sweden (Mar., 2021)

[5] **Data visualisation in preclinical MRI**
The Francis Crick Institute, London (Sept., 2019)