Matthew Lyon

Manchester, United Kingdom mslyon93@gmail.com m-lyon m-lyon.github.io

My research focuses on improving MRI data through deep learning, and incorporating geometric priors into deep learning models. I am available to work from July 2024 upon PhD completion.

Education

2020 – 2024 **PhD in Computer Science,** *University of Manchester, UK*
- Conducted research on deep generative models for super-resolution within medical imaging data.
- Published work and presented findings within top research conferences including NeurIPS '23.
- Developed and maintained several open source deep learning projects.

Python, TensorFlow, Keras, PyTorch, PyTorch Lightning

2015 – 2016 **Master of Medical Physics,** *University of Sydney, Australia*

2011 – 2014 **BSc (Hons) in Physics,** *University of Warwick, UK*

Professional Experience

06/2022 – present, Manchester, UK **Research Assistant,** *University of Manchester*
- Designed and implemented data cleaning and preprocessing pipelines.
- Performed exploratory analysis on large time-series datasets.
- Lead tutorials on several machine learning courses.
- Marked assignments and exams for several machine learning courses.

Python, PyTorch, pandas, NumPy, SQL

08/2019 – 08/2020, Sydney, Australia **Research Software Engineer,** *Save Sight Institute*
- Developed, tested, and documented neuroimaging processing pipelines.
- Lead algorithm design and optimisation workflows.
- Consulted on neuroimaging analysis techniques and signal processing.

Python, TensorFlow, NumPy, Bash

08/2019 – 01/2020, Sydney, Australia **Neuroimaging Analyst,** *Sydney Neuroimaging Research Centre*
- Developed, implemented, and led QC on neuroimaging analysis pipelines.
- Conducted exploratory data analyses.

Python, Docker, Bash

07/2017 – 07/2019, Sydney, Australia **Research Software Engineer,** *Heart Research Institute*
- Built and managed a distributed computing cluster.
- Developed, tested, and documented neuroimaging processing pipelines.
- Oversaw data ingestion and QC/QA, created dashboard visualisations.
- Conducted clinical research using MRI data.

Python, Bash, Matlab, OpenCV, pandas, NumPy, PyQt5

Technologies

Python • TensorFlow • Keras • PyTorch • PyTorch Lightning • OpenCV • NumPy • pandas

Matlab • TypeScript • React • Express • GraphQL • SQLite • MongoDB • C++ • Matlab • Bash

Docker • PyQt5

Publications

2023 **Spatio-Angular Convolutions for Super-resolution in Diffusion MRI,** *NeurIPS 2023*
Matthew Lyon, Paul Armitage, Mauricio A Álvarez

2022 **Angular Super-Resolution in Diffusion MRI with a 3D Recurrent Convolutional Autoencoder,** *MIDL 2022*
Matthew Lyon, Paul Armitage, Mauricio A. Álvarez

2019 **Gender-specific structural abnormalities in major depressive disorder revealed by fixel-based analysis,** *NeuroImage: Clinical*
Matthew Lyon, Thomas Welton, Adrina Varda, Jerome J. Maller, Kathryn Broadhouse, Mayuresh S. Korgaonkar, Stephen H. Koslow, Leanne M. Williams, Evian Gordon, A. John Rush, Stuart M. Grieve

2019 **Is occipital bending a structural biomarker of risk for depression and sensitivity to treatment?,** *Journal of Clinical Neuroscience*
Karen Fullard, Jerome J. Maller, Thomas Welton, Matthew Lyon, Evian Gordon, Stephen H. Koslow, Stuart M. Grieve

2019 **Profound and reproducible patterns of reduced regional gray matter characterize major depressive disorder,** *Translational Psychiatry*
Sarah C. Hellewell, Thomas Welton, Jerome J. Maller, Matthew Lyon, Mayuresh S. Korgaonkar, Stephen H. Koslow, Leanne M. Williams, John A. Rush, Evian Gordon, Stuart M. Grieve

2019 **Structural core of the executive control network: A high angular resolution diffusion MRI study,** *Human Brain Mapping*
Kai-kai Shen, Thomas Welton, Matthew Lyon, Andrew N. McCorkindale, Greg T. Sutherland, Samantha Burnham, Jurgen Fripp, Ralph Martins, Stuart M. Grieve

Talks

New Orleans, USA **Conference on Neural Information Processing Systems,** *NeurIPS 2023*
Spatio-Angular Convolutions for Super-resolution in Diffusion MRI

Zurich, Switzerland **Medical Imaging with Deep Learning,** *MIDL 2022*
Angular Super-Resolution in Diffusion MRI with a 3D Recurrent Convolutional Autoencoder

Manchester, United Kingdom **Advances in Data Science and AI Conference,** *ASDAI 2022*
Angular Super-Resolution in Diffusion MRI with a 3D Recurrent Convolutional Autoencoder

Invited Reviewer

Hawai'i, USA **International Conference on Machine Learning,** *ICML 2023*

Valencia, Spain **International Conference on Artificial Intelligence and Statistics,** *AISTATS 2022*

New Orleans, USA **Conference on Neural Information Processing Systems,** *NeurIPS 2022*