

Benjamin Tandler

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RESEARCH DIRECTION

I am a physicist based at the Wellcome Centre for Integrative Neuroimaging (WIN). My research focuses on establishing novel neuroimaging methods using magnetic resonance imaging (MRI). I have considerable experience in translating concepts founded in theoretical physics to transform images into biologically meaningful measurements. I have a particular interest in using these methods to identify processes in brain disease.

EMPLOYMENT

Wellcome Centre for Integrative Neuroimaging (WIN), University of Oxford

Sir Henry Wellcome Postdoctoral Fellow

2021 - Present

Next-generation diffusion MRI: Illuminating the black holes of the brain (222829/Z/21/Z)

Postdoctoral Researcher

2017 - 2021

Examining the pathology of amyotrophic lateral sclerosis (ALS) within the human brain using multi-modal magnetic resonance imaging (MRI) and histology

EDUCATION

Sir Peter Mansfield Imaging Centre, University of Nottingham

2013 - 2017

PhD in Physics - *‘Investigating the Magnetic Properties of Tissue with MRI Phase at 7T’*

University of Warwick

2009 - 2013

MPhys (Physics - 1st Class Honours) - *‘Dynamic Nuclear Polarisation via Electron Nuclear Resonance (ENDOR-DNP) using N@C₆₀’*

FUNDING

Sir Henry Wellcome Postdoctoral Fellowship (222829/Z/21/Z) (£300,000)

2021 - Present

Personal Research Fellowship (Next-generation diffusion MRI - Illuminating the black holes of the brain):

Establishing methods using Steady-State Diffusion MRI, a non-invasive imaging technique sensitive to how water diffuses within and surrounding cells.

KEY PUBLICATIONS

- **Tandler BC**. *Investigating tissue microstructure using steady-state diffusion MRI*. bioRxiv 2024; [10.1101/2024.05.15.594140](https://doi.org/10.1101/2024.05.15.594140).
- **Tandler BC** et al. *Why every lab needs a handbook*. eLife 2023; [10.7554/eLife.88853](https://doi.org/10.7554/eLife.88853).
- **Tandler BC**, Wang C, Miller KL. *Magnetic signatures of brain health characterized in UK Biobank population imaging study*. Research Briefing, Nature Neuroscience 2022; [10.1038/s41593-022-01083-9](https://doi.org/10.1038/s41593-022-01083-9).
- Wang C, ..., **Tandler BC***, Miller KL*. *Phenotypic and genetic associations of quantitative magnetic susceptibility in UK Biobank brain imaging*. Nature Neuroscience 2022; (*equal contribution); [10.1038/s41593-022-01074-w](https://doi.org/10.1038/s41593-022-01074-w).
- **Tandler BC**, et al. *The Digital Brain Bank, an open access platform for post-mortem imaging datasets*. eLife 2022; [10.7554/eLife.73153](https://doi.org/10.7554/eLife.73153).
- **Tandler BC***, Feng Qi*, et al. *A method to remove the influence of fixative concentration on post-mortem T₂ maps using a Kinetic Tensor model*. Human Brain Mapping 2021; (*equal contribution); [10.1002/hbm.25661](https://doi.org/10.1002/hbm.25661).
- Wang C, ..., Miller KL* **Tandler BC***. *Methods for quantitative susceptibility and R²* mapping in whole post-mortem brains at 7T applied to amyotrophic lateral sclerosis*. NeuroImage 2020; (*equal contribution); [10.1016/j.neuroimage.2020.117216](https://doi.org/10.1016/j.neuroimage.2020.117216).
- **Tandler BC***, Foxley S*, et al. *Use of multi-flip angle measurements to account for transmit inhomogeneity and non-Gaussian diffusion in DW-SSFP*. NeuroImage 2020; (*equal contribution); [10.1016/j.neuroimage.2020.117113](https://doi.org/10.1016/j.neuroimage.2020.117113).

- **Tendler BC**, et al. *Modeling an equivalent b-value in diffusion-weighted steady-state free precession*. Magnetic Resonance in Medicine 2020; [10.1002/mrm.28169](https://doi.org/10.1002/mrm.28169).
- **Tendler BC**, Bowtell R. *Frequency difference mapping applied to the corpus callosum at 7T*. Magnetic Resonance in Medicine. 2019; [10.1002/mrm.27626](https://doi.org/10.1002/mrm.27626).

ADDITIONAL PUBLICATIONS

- Yao J, **Tendler BC**, et al. *Both noise-floor and tissue compartment difference in diffusivity contribute to FA dependence on b-value in diffusion MRI*. Human Brain mapping 2023; [10.1002/hbm.26121](https://doi.org/10.1002/hbm.26121).
- Huszar IN, et al. *Tensor image registration library: Deformable registration of stand-alone histology images to whole-brain post-mortem MRI data*. NeuroImage 2023; [10.1016/j.neuroimage.2022.119792](https://doi.org/10.1016/j.neuroimage.2022.119792).
- Sundaresan V, et al. *Automated detection of cerebral microbleeds on MR images using knowledge distillation framework*. Frontiers in Neuroinformatics 2023; [10.3389/fninf.2023.1204186](https://doi.org/10.3389/fninf.2023.1204186).
- Kor DZL, et al. *An automated pipeline for extracting histological stain area fraction for voxelwise quantitative MRI-histology comparisons*. NeuroImage 2022; [10.1016/j.neuroimage.2022.119726](https://doi.org/10.1016/j.neuroimage.2022.119726).
- Schilling KG, et al. *Recommendations and guidelines from the ISMRM Diffusion Study Group for preclinical diffusion MRI: Part 2-Ex vivo imaging*. arXiv 2022; [10.48550/arXiv.2209.13371](https://arxiv.org/abs/10.48550/arXiv.2209.13371).
- Schilling KG, et al. *Recommendations and guidelines from the ISMRM Diffusion Study Group for preclinical diffusion MRI: Part 1-In vivo small-animal imaging*. arXiv 2022; [10.48550/arXiv.2209.12994](https://arxiv.org/abs/10.48550/arXiv.2209.12994).
- Bryant K, et al. *Diffusion MRI data, sulcal anatomy, and tractography for eight species from the Primate Brain Bank*. Brain Structure and Function 2021; [10.1007/s00429-021-02268-x](https://doi.org/10.1007/s00429-021-02268-x).
- Cottaar M, et al. *Quantifying myelin in crossing fibers using diffusion-prepared phase imaging: Theory and simulations*. Magnetic Resonance in Medicine 2021; [10.1002/mrm.28907](https://doi.org/10.1002/mrm.28907).
- Anaby D, **Tendler BC**, et al. *Distributional changes in myelin-specific MRI markers uncover dynamics in the fornix following spatial navigation training*. bioRxiv 2020; [10.1101/2020.12.13.422557](https://doi.org/10.1101/2020.12.13.422557).
- Roumazeilles L, et al. *Longitudinal connections and the organization of the temporal cortex in macaques, great apes, and humans*. PLOS Biology 2020; [10.1371/journal.pbio.3000810](https://doi.org/10.1371/journal.pbio.3000810).
- Grewal JS, et al. *Brain gyrification in wild and domestic canids: Has domestication changed the gyrification index in domestic dogs?* Journal of Comparative Neurology 2020; [10.1002/cne.24972](https://doi.org/10.1002/cne.24972).
- Bridge H, et al. *Preserved extrastriate visual network in a monkey with substantial, naturally occurring damage to primary visual cortex*. eLife 2019; [10.7554/eLife.42325](https://doi.org/10.7554/eLife.42325).
- Pallegage-Gamarallage M, et al. *Dissecting the pathobiology of altered MRI signal in amyotrophic lateral sclerosis: A post mortem whole brain sampling strategy for the integration of ultra-high-field MRI and quantitative neuropathology*. BMC Neuroscience 2018; [10.1186/s12868-018-0416-1](https://doi.org/10.1186/s12868-018-0416-1).

SOFTWARE

- **Tendler BC**; [Personal GitHub Software Database](#).
- Tisca C, et al. *R2*- and quantitative susceptibility mapping (QSM) post-processing pipelines for ex vivo rodent brains*. Zenodo 2023; [10.5281/zenodo.8130909](https://doi.org/10.5281/zenodo.8130909)

COLLABORATIONS

University of Minnesota (Jan Zimmermann) <i>BRAIN CONNECTS: Center for Mesoscale Connectomics</i>	2024 - Present
University of Oxford (Prof. Rogier Mars) <i>Identifying structural brain connectivity in different species using post-mortem imaging</i>	2017 - Present
Zhejiang University (Prof. Hongjian He) <i>Post-mortem imaging in human brains</i>	2020 - 2023
University of Oxford (Prof. Kristine Krug) <i>Investigating the visual network in an exemplary post-mortem macaque brain</i>	2018 - 2019
Cardiff University (Prof. Derek Jones) & Tel Aviv University (Dr. Debbie Anaby) <i>Investigating tissue changes in mice undergoing training tasks</i>	2016 - 2020

INVITED EXTERNAL TALKS

Radboud University	2024
Seminar & Round Table Discussion - <i>Why Every Lab Needs a Handbook</i>	
MRI Together Conference	2023
Seminar - <i>Why Every Lab Needs a Handbook</i>	
Ultra High Field MRI Workshop	2023
Seminar - <i>Oxford at 7T</i>	
Annual Meeting of the European Society for Magnetic Resonance In Medicine & Biology (ESMRMB)	2023
Educational Talk - <i>Sources of Susceptibility Contrast in T₂*-weighted and phase imaging</i>	
Cardiff University	2022
Seminar - <i>Investigating tissue microstructure using steady-state diffusion MRI</i>	
King's College London	2022
Seminar - <i>Unlocking the potential of Diffusion-Weighted Steady-State Free Precession (DW-SSFP)</i>	
Imperial College London	2021
Seminar - <i>Post-mortem MRI of whole human brains</i>	
Zhejiang University	2020
Seminar - <i>Postmortem diffusion MRI in whole brains</i>	
King's College London	2020
Seminar - <i>Imaging whole human postmortem brains at ultra-high field: quantifying the postmortem ALS brain</i>	
Cardiff University	2016
Seminar - <i>Mag. prop. of skeletal muscle at 7T/Using FDM to assess WM microstructure in the human CC</i>	
Educational Talk - <i>Susceptibility - Origins, Properties & Importance</i>	
Cardiff University	2015
Seminar - <i>Measuring variation in white matter microstructure using gradient echo imaging at 7T</i>	
Educational Talk - <i>Imaging microstructure using MRI – Theory and techniques</i>	

FORMAL SUPERVISION (POSTDOCTORAL RESEARCHERS)

Chaoyue Wang	University of Oxford, 2021 - 2022
Project: <i>'Quantitative Susceptibility Mapping in UK Biobank'</i>	

FORMAL SUPERVISION (DOCTORAL STUDENTS)

Zhiyu Zheng	University of Oxford, 2022 - Present
Thesis (Proposed): <i>'Investigating the effect of microstructural phenomena on the measured MRI signal'</i>	
Chaoyue Wang	University of Oxford, 2017 - 2021
Thesis: <i>'Mapping of the MR susceptibility property and its biological correlates'</i>	
Feng Qi	University of Oxford, 2017 - 2019
Thesis: <i>'Quantitative T₂ imaging of whole post-mortem brains in ALS'</i>	

COURSES & WORKSHOPS

FMRIB Physics Graduate Program (<i>co-organiser & lead tutor</i>)	University of Oxford, 2022 - Present
FMRIB Advanced Graduate Program (<i>co-lead</i>)	University of Oxford, 2019 - 2021
WIN Microstructure Workshop (<i>co-lead</i>)	University of Oxford, 2019

TEACHING

Oxford Health Science CDT Imaging course (<i>lecturer</i>)	University of Oxford, 2020
Oxford-Nottingham Biomedical Imaging CDT MRI course (<i>lecturer</i>)	University of Oxford, 2018 - 2019
FMRIB Advanced Graduate Program (<i>lecturer</i>)	University of Oxford, 2018, 2022
FMRIB Physics Graduate Program (<i>tutor</i>)	University of Oxford, 2017 - Present
Physics First Year Labs (<i>demonstrator</i>)	University of Nottingham, 2013 - 2016

OPEN SCIENCE

WIN Digital Brain Bank (*Project Lead; Resource available [here](#)*). 2019 - Present

EQUALITY, DIVERSITY AND INCLUSION (EDI)

NDCN Research Culture Committee 2024 - Present

Lab Handbook Initiative (*Project Lead; Description [here](#)*). 2020 - Present

AWARDS (UNIVERSITY OF OXFORD)

Vice Chancellor Awards (*Lab Handbook Initiative; Highly Commended - Research Culture Category*) 2024

NDCN Award for Excellence 2023

WIN Good Citizen Award (*Category: Improving Research Culture*) 2023

NDCN Departmental Prize (*Category: Open Science*) 2023

PROFESSIONAL ACTIVITIES

Reviewer (*Magnetic Resonance in Medicine, NeuroImage, NeuroImage Clin. and Sci. Reports*)

Medicine and Health Sciences Research Ethics Committee University of Nottingham, 2015 - 2016

PUBLIC ENGAGEMENT

Neuroscience Experience Program University of Oxford, 2021

Week of neuroscience for visiting year 12 students - presenter

Explain your research to everyone ('Magnetic Moments') competition ISMRM, 2018

Winner of the 'Master of Simplicity' award for entered [video](#) and presentation

The Big Brain Roadshow University of Oxford, 2018 - 2019

Public engagement activity visiting secondary schools. More information [here](#)

May Fest University of Nottingham, 2014 - 2015

Activity day for members of the public