Benjamin C. Tendler

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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 $N@C_{60}$'*

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

- **Tendler BC**. *Investigating time-independent and time-dependent diffusion phenomena using steady-state diffusion MRI.* Scientific Reports 2025; 10.1038/s41598-025-87377-x.

- **Tendler BC** et al. *Why every lab needs a handbook.* eLife 2023; 10.7554/eLife.88853.

- **Tendler 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.

- Wang C, ..., **Tendler 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.

- **Tendler BC**, et al. *The Digital Brain Bank, an open access platform for post-mortem imaging datasets.* eLife 2022; 10.7554/eLife.73153.

- **Tendler BC***, Feng Qi*, et al. *A method to remove the influence of fixative concentration on post-mortem T_2 maps using a Kinetic Tensor model.* Human Brain Mapping 2021; (*equal contribution); 10.1002/hbm.25661.

- Wang C, ..., Miller KL* **Tendler 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.

- **Tendler 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.

- **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.

- **Tendler BC**, Bowtell R. *Frequency difference mapping applied to the corpus callosum at 7T.* Magnetic Resonance in Medicine. 2019; 10.1002/mrm.27626.

ADDITIONAL PUBLICATIONS

- Boch M, ..., **Tendler BC**, Mars RB. *Comparative neuroimaging of the carnivoran brain: Neocortical sulcal anatomy.* eLife 2024; 10.7554/eLife.100851.1.

- Schilling KG, et al. *Considerations and recommendations from the ISMRM Diffusion Study Group for preclinical diffusion MRI: Part 3 – Ex vivo imaging: data processing, comparisons with microscopy, and tractography.* arXiv 2024; 10.48550/arXiv.2411.05021.

- 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.

- 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.

- 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.

- 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.

- Schilling KG, et al. *Considerations and recommendations from the ISMRM Diffusion Study Group for preclinical diffusion MRI: Part 2 – Ex vivo imaging: added value and acquisition.* arXiv 2022; 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- 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.

- Pallebage-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.

ABSTRACTS (ONGOING RESEARCH)

- **Tendler BC** et al. *Diffusion MRI acquisition methods for post-mortem imaging at 10.5 T.* BIC ISMRM 2024.

- Zheng Z, ..., **Tendler BC**. *A modelling and experimental framework to investigate the sensitivity of steady-state diffusion MRI to microstructure.* ISMRM 2024, 0585.

- Zheng Z, Miller KL, **Tendler BC**, Cottaar M. *Investigating the impact of magnetisation transfer and water exchange via permeability on diffusion MRI measurements.* ISMRM 2024, 0077.

- **Tendler BC**. *Theoretical framework to characterise motion artefacts arising from steady-state diffusion MRI.* ESMRMB 2023; LB298.

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](#)

COLLABORATIONS

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

INVITED EXTERNAL TALKS

University of Minnesota Educational Talk - *BRAIN CONNECTS: What is Diffusion-Weighted Steady-State Free Precession?*	2024
Radboud University Seminar & Round Table Discussion - *Why Every Lab Needs a Handbook*	2024
MRI Together Conference Seminar - *Why Every Lab Needs a Handbook*	2023
Ultra High Field MRI Workshop Seminar - *Oxford at 7T*	2023
Annual Meeting of the European Society for Magnetic Resonance In Medicine & Biology (ESMRMB) Educational Talk - *Sources of Susceptibility Contrast in T_2^*-weighted and phase imaging*	2023
Cardiff University Seminar - *Investigating tissue microstructure using steady-state diffusion MRI*	2022
King's College London Seminar - *Unlocking the potential of Diffusion-Weighted Steady-State Free Precession (DW-SSFP)*	2022
Imperial College London Seminar - *Post-mortem MRI of whole human brains*	2021
Zhejiang University Seminar - *Postmortem diffusion MRI in whole brains*	2020
King's College London Seminar - *Imaging whole human postmortem brains at ultra-high field: quantifying the postmortem ALS brain*	2020
Cardiff University Seminar - *Mag. prop. of skeletal muscle at 7T/Using FDM to assess WM microstructure in the human CC* Educational Talk - *Susceptibility - Origins, Properties & Importance*	2016
Cardiff University Seminar - *Measuring variation in white matter microstructure using gradient echo imaging at 7T* Educational Talk - *Imaging microstructure using MRI – Theory and techniques*	2015

FORMAL SUPERVISION (POSTDOCTORAL RESEARCHERS)

Chaoyue Wang Project: *'Quantitative Susceptibility Mapping in UK Biobank'*	University of Oxford, 2021 - 2022

FORMAL SUPERVISION (DOCTORAL STUDENTS)

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

COURSES & WORKSHOPS

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

TEACHING

FMRIB Physics Graduate Program (*tutor*)   University of Oxford, 2017 - Present
FMRIB Advanced Graduate Program (*lecturer*)   University of Oxford, 2018, 2022
Oxford Health Science CDT Imaging course (*lecturer*)   University of Oxford, 2020
Oxford-Nottingham Biomedical Imaging CDT MRI course (*lecturer*) University of Oxford, 2018 - 2019
Physics First Year Labs (*demonstrator*)   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
Returning Carers Workshop (*Round Table Discussion: Panel Member*)   2024
Lab Handbook Initiative (*Project Lead; Overview Video here*).   2020 - Present

AWARDS (UNIVERSITY OF OXFORD)

Vice Chancellor Awards (*Lab Handbook Initiative; Highly Commended - Research Culture Category*)   2024
NDCN Award for Excellence   2023, 2024
WIN Good Citizen Award (*Category: Improving Research Culture*)   2023
NDCN Departmental Prize (*Category: Open Science*)   2023

AWARDS (CONFERENCE PROCEEDINGS - ONGOING RESEARCH)

Annual Conference of the British & Irish Chapter of the ISMRM   2024
Mansfield Prize (First Place) - 'Diffusion MRI acquisition methods for post-mortem imaging at 10.5 T'

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
The Big Brain Roadshow   University of Oxford, 2018 - 2019
Public engagement activity visiting secondary schools. More information here
Explain your research to everyone ('Magnetic Moments') competition   ISMRM, 2018
Winner of the 'Master of Simplicity' award for entered video and presentation
May Fest   University of Nottingham, 2014 - 2015
Activity day for members of the public