Benjamin Tendler

Email: benjamin.tendler@ndcn.ox.ac.uk

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** 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](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://doi.org/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://doi.org/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).

- 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](https://doi.org/10.1186/s12868-018-0416-1).

COLLABORATIONS

University of Minnesota (Jan Zimmermann) *BRAIN CONNECTS: Center for Mesoscale Connectomics*	2024 - Present
King's College London (Prof. Shaihan Malik) *Characterising the steady-state diffusion MRI signal*	2022 - 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

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

FORMAL SUPERVISION (POSTDOCTORAL RESEARCHERS)

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

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

OPEN SCIENCE

WIN Digital Brain Bank	2019 - Present
Project lead: Online resource to host exemplary datasets associated with post-mortem MRI projects at the University of Oxford. Available at open.win.ox.ac.uk/DigitalBrainBank	

EQUALITY, DIVERSITY AND INCLUSION (EDI)

Lab Handbook	2020 - Present

Project lead: Program engaging with research communities to encourage labs to write a handbook outlining their ethos and culture. Full details here

TEACHING (UNIVERSITY OF OXFORD)

FMRIB Physics Graduate Program (*tutor*)	2017 - Present
Oxford Health Science CDT Imaging course (*lecturer*)	2020
Oxford-Nottingham Biomedical Imaging CDT MRI course (*lecturer*)	2018 - 2019
FMRIB Advanced Graduate Program (*lecturer*)	2018, 2022

AWARDS (UNIVERSITY OF OXFORD)

Vice Chancellor Awards (Shortlist - Evaluation Ongoing) (*Category: Research Culture Award*)	2024
NDCN Award for Excellence	2023
WIN Good Citizen Award (*Category: Improving Research Culture*)	2023
NDCN Departmental Prize (*Category: Open Science*)	2023

AWARDS (ONGOING RESEARCH)

ISMRM Workshop on Diffusion MRI	2022

Top 3 abstract award for work titled 'Investigating Tissue Microstructure using Steady-State Diffusion MRI'

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