

George Webber

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Third-year PhD candidate at King's College London researching generative modeling, inverse problems, and probabilistic machine learning, with applications to medical imaging. Published first-author work at ICLR, ICML, TML, and MICCAI on diffusion and flow-based methods for conditional generation and reconstruction. Holds a First-Class Integrated Master's degree in Mathematics & Computer Science from the University of Oxford. PhD research aims to advance medical image quality through innovative integration of machine learning methods. Looking for a research internship related to generative machine learning methods.

Education

King's College London

Sept 2023 – Present

PhD in Biomedical Engineering & Imaging Sciences

- Project: *Fully Bayesian 3D PET-MR Neuroimaging Reconstruction*.
- Investigating pre-trained diffusion models as generative priors for inverse problems in medical imaging.
- Supervisors: Prof. Andrew J. Reader and Prof. Andrew P. King.
- Award: Won the faculty-level PGR Research Excellence Prize 2025.

St Anne's College, University of Oxford

Oct 2019 – Jun 2023

MMathCompSci – Mathematics & Computer Science

- First Class overall (77 %) and Distinction in final year (81 %).
- Master's thesis: *Improving the Security of Smartwatch Payment with Deep Learning*.

John Mason School, Abingdon

Sept 2012 – 2019

A-Levels and EPQ

- A*A*A*A*A* in Mathematics, Further Mathematics, Computer Science, Physics, and an EPQ.

Selected Publications

Conference Proceedings

Solving Inverse Problems with Flow-based Models via Model Predictive Control

May 2026

G. Webber*, A. Denker* *et al.*, *ICML 2026 (accepted)*

[arXiv:2601.23231](#) [🔗](#)

- Formulated a Model Predictive Control strategy for controlled training-free conditional generation with flow models, and demonstrated its use for inverse problems.

Distributional Consistency Loss: Beyond Pointwise Data Terms in Inverse Problems

Jan 2026

G. Webber & A. J. Reader, *ICLR 2026 (accepted)*

[arXiv:2510.13972](#) [🔗](#)

- Formulated and validated a new data fidelity loss that overcomes the tendency of classical losses to overfit during long training, achieving more robust reconstructions and synergistic combination with regularization.

Supervised Diffusion-Model-Based PET Image Reconstruction

Sept 2025

G. Webber *et al.*, *MICCAI 2025*, Daejeon, South Korea

[arXiv:2506.24034](#) [🔗](#)

- Demonstrated new methodology for conditioning a diffusion model directly on raw PET data, and showed this supervised methodology outperforms equivalent unsupervised approaches.

Journal Articles

Personalized MR-Informed Diffusion Models for 3D PET Image Reconstruction

Aug 2025

G. Webber et al., *IEEE Transactions on Radiation and Plasma Medical Sciences*

[doi:10.1109/TRPMS.2025.3602262](https://doi.org/10.1109/TRPMS.2025.3602262) [↗](#)

- Proposed a novel personalization scheme for generating subject-specific training data, for the purpose of training a diffusion model that reconstructs PET images with superior accuracy.

Likelihood-Scheduled Score-Based Generative Modeling for Fully 3-D PET Image Reconstruction

June 2025

G. Webber et al., *IEEE Transactions on Medical Imaging*

[doi:10.1109/TMI.2025.3576483](https://doi.org/10.1109/TMI.2025.3576483) [↗](#)

- Proposed an algorithm for aligning the conditioning of a diffusion model with clinically-used algorithms, improving reconstruction speed and ease of hyperparameter optimization.

Diffusion Models for Medical Image Reconstruction

Sept 2024

G. Webber & A. J. Reader, *BJR—Artificial Intelligence*

[doi:10.1093/bjrai/ubae013](https://doi.org/10.1093/bjrai/ubae013) [↗](#)

- Explained and surveyed how diffusion models are used as a generative prior for medical image inverse problems.
- Most-read article in the journal (as of May 2026).

Experience

Graduate Teaching Assistant

King's College London

London, UK

Nov 2023 – Present

- Deliver tutorials, labs and marking for undergraduate mathematics and medical imaging courses.

Alpha Tech Intern – Quant Analysis

Man Group

London, UK

Jun – Sep 2022

- Designed experiments on simulated portfolios, enhancing Value-at-Risk calculations by incorporating earnings-announcement effects.
- Co-authored an internal research paper and delivered a 30-minute presentation to senior risk managers.
- Shipped production-ready Python code to calculate daily risk metrics.

Senior Consultant

Oxford Strategy Group Digital

Oxford, UK

Sep – Dec 2021

- Open-sourced and extended Wise's variational-autoencoder model for customer-behaviour prediction.
- Authored tutorials and Jupyter notebooks demonstrating applications for fintech clients.

Software Engineering Intern

Microsoft

Remote / UK

Jul – Aug 2021

- Built and documented an automated monitoring solution for critical infrastructure.
- Acted as technical lead among interns—wrote high-level design docs, test plans, and conducted code reviews.

Peer-Review & Research Service

- Ad hoc reviewer for: Nature Communications; IEEE Transactions on Medical Imaging; Medical Image Analysis; Pattern Recognition; IEEE Signal Processing Letters; IEEE Transactions on Computational Imaging; IEEE Transactions on Radiation and Plasma Medical Sciences.

Technologies

Programming: Proficient with Python (NumPy, Pandas, SciPy; PyTorch, TensorFlow, scikit-learn; Matplotlib, Napari). Familiar with Java, C#, Scala, HTML, SQL, JavaScript, CSS, Haskell.

Tools & Workflow: Git / GitHub, Linux & Windows, Azure + GCS storage, Scrum / Agile (Confluence, Jira), LaTeX.

Additional Activities

- Won sponsor prize at **Oxford Hack 2022** for novel LiDAR-data visualisation for Oxa autonomous vehicles.
- Elected **Student Representative** for the Smart Medical Imaging CDT cohort – organise research-development seminars and social events.
- Play tennis at a university level, representing King's at inter-university league matches.