RICHARD DYER

PhD Student, Institute of Astronomy, University of Cambridge

RESEARCH OVERVIEW AND HIGHLIGHTS

Quasinormal modes from Bayesian inference

Developed a Gaussian process model for uncertainties in state-of-the-art numerical relativity simulations, leading to a Bayesian framework for ringdown fitting and model building [1, 2].

Black hole cartography

Developed a numerical method for reconstructing the spatial structure of quasinormal modes. The paper was selected as a Physical Review D Editors' Suggestion [3].

Broader research interests

I am interested in using black hole ringdown to probe black holes and gravity through a combination of theory, data analysis, and modern computational methods. I am currently developing methods to compute the quasinormal mode spectrum of non-vacuum or non-Kerr black holes and contributing to the Simulating eXtreme Spacetimes collaboration `qnmfits` codebase.

ROLES AND EDUCATION

PhD Student — Oct 2023 - Present
Institute of Astronomy — *University of Cambridge*
Supervisors: Dr Christopher J. Moore and Professor Ulrich Sperhake

Data Scientist — Sept 2020 - Aug 2023
Civil Service Fast Stream — *UK Civil Service*

Integrated Master of Physics — Oct 2016 - Jun 2020
Class I (Honours) ∘ 80 % in Master's Thesis — *University of Durham*
Supervisors: Professor Baojiu Li and Dr Alex Peach

PROFESSIONAL PUBLIC ENGAGEMENT

I am a regular writer for *PBS Space Time*, a YouTube channel with over three million subscribers. The scripts I have pitched and written have collectively received nearly 10 million views. I also write popular science articles, give public talks, and produce video content for a combined social media audience of approximately 80,000. My work has featured on *StarTalk Radio* with Neil deGrasse Tyson, Cheltenham Science Festival, BBC Radio 4, Cambridge University social media, the Cavendish physics audio tour, and Cambridge Festival. In addition, I have received professional media and communication training and have collaborated with selected external partners including Taskade and Netflix.

Highlights:

PBS Space Time — Oct 2023 - Present
Senior writer and researcher (link) — *YouTube*

BBC Curious Cases with Hannah Fry — Jun 2025
Guest - 'Clowns in Spacetime' (link) — *BBC Radio 4*

FameLab UK — May 2024
National Finalist and Audience Winner (link) — *Cheltenham Science Festival*

AWARDS AND GRANTS

Cambridge Philosophical Society Fund (£400) — Apr 2025
Corpus Christi Research Fund (£900) — Apr 2025
Durham Outstanding Academic Achievement Award — Jun 2018

TEACHING

Principles of Quantum Mechanics — Oct 2024 - Jan 2025
Small group supervisions — *Part II Astronomy*

TALKS

Invited Talks

Unlocking the Secrets of the Universe Symposium, University of Leiden	Feb 2026
LISA Ringdown Subgroup	Nov 2025
Department of Applied Mathematics and Theoretical Physics GR Seminar	Nov 2025
Cambridge Astronomy Data Science Discussion Group	Jun 2025
Nottingham University SciOUT Conference	Jun 2025

Contributed Talks

BritGrav26	Apr 2026
Nottingham UK:GW	Jan 2026
CamGW	Nov 2025
GR-Amaldi parallel session talk	July 2025
BritGrav25	Apr 2025
Institute of Astronomy Wednesday Seminar	Nov 2024

SKILLS

Python (12+ years)
JAX
R and R Studio
SQL
Linux
Mathematica

DEPARTMENTAL ACTIVITIES

Departmental Meet the Speaker — Oct 2024 - Sep 2025
Co-chair and organiser — *Institute of Astronomy*

International Women's Day — March 2025
Produced videos for social media — *Institute of Astronomy*

Astronomy open days and evenings — Oct 2023 - Present
Host/helper/presenter — *Institute of Astronomy*

PUBLICATIONS

[1] Richard Dyer and Christopher J. Moore. Quasinormal modes from numerical relativity with Bayesian inference **(accepted, Phys. Rev. D)**. *arXiv preprint arXiv:2510.11783*, 2026. URL `https://arxiv.org/abs/2510.11783`.

[2] Richard Dyer and Christopher J. Moore. The quasinormal mode content of binary black hole ringdown **(accepted, Phys. Rev. Lett.)**. *arXiv preprint arXiv:2510.13954*, 2026. URL `https://arxiv.org/abs/2510.13954`.

[3] Richard Dyer and Christopher J. Moore. Black-hole cartography. *Physical Review D*, 111(2), January 2025. ISSN 2470-0029. doi: 10.1103/physrevd.111.024002. URL `http://dx.doi.org/10.1103/PhysRevD.111.024002`.