Tom G. Hardy

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Award-winning 1st year astrophysics PhD Student at **Cambridge University** with **three summers'** academic research experience (including at **Cambridge** and **Oxford**); a particular interest in **galaxy evolution & observational cosmology**. Experience in astronomy from **LIGO** to **MeerKAT**. First class graduate of **Durham University** (MPhys).

Education

2026-2030 **University of Cambridge (Institute of Astronomy & Jesus College)**
PhD *Astronomy & Astrophysics*
- Population insights from spectral tracers of galaxy evolution. Sup. Hiranya Peiris & Boryana Hadzhiska
- STFC DLA Studentship and Gonville and Caius Choral Scholarship.

2022-2026 **University of Durham**
MPhys *Physics & Astronomy*: Class I (rank 1)
- **Thesis**: 'Identifying EELGs from VLT-MUSE Massive Cluster Observations'. (sup. Alastair Edge)
- Florence Nightingale and Laboratory Module transcript awards and Full Palatinate (Blue-equivalent).
- Co-chair of Physics Staff-Student Committee; lead student representative to the Board of Studies.
- Music Director of nationally leading DUBB – awarded £8,000+ in arts grants.

2015-2022 **John Hampden Grammar School**
A-Levels: A*A*A*A*A*, **GCSES**: 99999999999
- Nationally leading A-level and GCSE results. Nationally leading GCSE 'value added'.

Research Experience

Three papers, two as **co-lead-author**, one with 100+ citations. ORCID-0009-0004-2616-7076

Summer Internship Positions

2025 **Institute of Astronomy, Cambridge University**
'Machine Learning Tools for Gravitational Wave Mismodelling'
Supervised by Dr James Alvey.
- **Skills**: Machine learning, SBI, Bayesian inference, GPU computing, GW astronomy, signal processing.
- Collaboration with research at UVA, MPA Garching and follow-up work with LVK collaboration.
- Started and ran weekly interns' group meeting/journal club.

2024 **Department of Physics, Oxford University**
'Source Extraction for Radio-Detected HI Galaxies'
Supervised by Prof Matt Jarvis and Dr Catherine Hale.
- **Skills**: Radio astronomy, large survey data, HPC (Glamdring), MPI, source extraction, galaxy evolution.
- Built pipeline for MeerKAT radio-HI extraction for large-survey future with SKA.
- Attended Breakthrough Listen and Steven Balbus conferences.

2023 **Department of Physics, Durham University**
'The Impact of AI in Physics Education: A Comprehensive Review from GCSE to University Levels'
Supervised by Dr Will Yeadon.
- **Skills**: LLM prompt engineering, deep learning, RAG, large data processing, HPC.
- Built pipeline for early LLM deep learning and evaluation from Physics exams & lecture notes.
- Highly cited proceedings publication co-authored with supervisor (100+ citations).

Academic Projects

2025 **MPhys Project**
'Identifying EELGs from VLT-MUSE Massive Cluster Observations'
Supervised by Prof Alastair Edge.
- **Skills**: Survey astronomy, galaxy evolution, integral field spectroscopy, line ratio astrophysics.
- Building representative population of nearby EELGs as spectral analogues for high-z JADES candidates

2024 **Astrolab – Bsc Project Equivalent**
'A New Comprehensive Photometric Model for the W-Type Eclipsing Binary GW Cep'
Supervised by Prof Mark Swinbank and Prof Alastair Edge.
- **Skills**: Photometry (+instrumentation), timeseries, statistical inference, Roche lobe simulations.
- Use of 14-29' reflectors to capture eclipsing binary photometry, inference against RL simulations.
- Awarded Florence Nightingale Award for Graphical Excellence and highest mark in lab (82%).

Presentations

Given

Nov 2025 **Institute of Astronomy: Cambridge University**
'Precision Machine Learning Tools for Gravitational Wave Models'
- Invited speaker for IoA Alumni 30-year Anniversary Event.

Aug 2025 **Institute of Astronomy: Cambridge University**
'Machine Learning Techniques to Detect Gravitational Wave Mismodelling'
- Summer internship end-of-project presentation.

Aug 2024 **Department of Physics: Oxford University**
'Source Extraction for Radio-Detected Hydrogen Galaxies'
- Summer internship end-of-project presentation (astronomy specific).

Aug 2024 **Exeter College: Oxford University**
'Source Extraction for Radio-Detected Hydrogen Galaxies'
- Summer internship funding source presentation (general physics audience).

Contributed

Aug 2023 **Department of Physics: University of Leeds**
'The Impact of AI in Physics Education'
- Given by Dr Will Yeadon; early LLM physics reasoning evaluation work.

Awards

2026	**STFC Doctoral Landscape Award**. Awarded for Astrophysics PhD study at the University of Cambridge	~£90k
2026	**Hintze Scholarship**. Christ Church College, University of Oxford. Awarded for PhD Study (Declined)	~£90k
2025	**Florence Nightingale Award, Department of Physics, Durham University**. Awarded to best data presentation in a laboratory report. One awarded per year.	£100
2025	**Full Palatinate, Durham University**. Highest award for contribution to Durham University Music. Awarded for my 2025 DUBB tour: 'Unspoken Voices' highlighting marginalized voices in Jazz. Full Blue-equivalent.	-
2023	**Module Award, Department of Physics, DU**. Awarded for highest laboratory score in year (89%).	£100

Responsibilities

2025- **Chair:** Durham MPhys Interdisciplinary Group.
2022- **Co-Chair, previously representative (with Prof Alis Deason):** Durham Physics Staff-Student Committee.
2022- **Lead Representative:** Durham Physics Board of Studies. (Regularly selected to represent dept to guests of Chancellor).
2024-26 **Director:** Durham University Big Band & Studio Orchestra (Founder). Awarded over £8,000 in grants and championed marginalised voices in Jazz. Led two national tours and outreach to County Durham.
2022-24 **Director:** Durham University Jazz Orchestra and **Creative Director:** Durham University Jazz Society.

Skills

- **Computational**: Python/Bash/Rust, HPC (Unix), MPI, GPU (jax), pytorch, MPDAF, agentic LLMs.
- **Statistical**: SBI, inference, large survey statistics, MCMC, ML, frequentist statistics.
- **Astronomy**: Galaxy evolution, gravitational waves, radio astronomy, timeseries astronomy, IFU.

Additional Employment

2020- **Composer, Orchestrator and Music Publisher**
- Internationally recognised musician in my spare time. **Winner of Au International Arranging prize in 2025**.
- Clients include Metropole Orkest, Danish Radio Symphony, BBC, Royal Netherlands Air Force.
- Commission Venues include Ronnie Scott's (headlined in 2023) and Berlin Konzerthaus.
- Represented Arts Council UK to HRH Prince Edward in 2023. Previously in-house arranger for NYJO.

2015-2025 **Private Physics & Maths Tutor**
County Durham, London and Buckinghamshire.

2022-2023 **Levelling Up: Futures in Stem**
County Durham - Tutor/Mentor on STEM outreach programme to low-HE uptake areas.