Dr Hannah Ruth Wakeford

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Professional Appointments

University of Bristol — **Bristol, UK**
Associate Professor in Astrophysics — *Aug 2023 – Present*
Senior Lecturer in Astrophysics — *Feb 2023 – Aug 2023*
Lecturer in Astrophysics — *Feb 2020 – Feb 2023*

Space Telescope Science Institute — **Baltimore, USA**
Giacconi Prize Fellow — *Nov 2017 – Jan 2020*

University of Exeter — **Exeter, UK**
Senior Research Fellow — *July 2017 – Oct 2017*

NASA Goddard Space Flight Center — **Greenbelt, USA**
NASA Postdoctoral Prize Fellow — *July 2015 – May 2017*

Education

University of Exeter — **Physics Building, Stocker Rd, Exeter, UK**
PhD in Physics — *2011–2015*

University of Wales: Aberystwyth — **Llandinam Building, Aberystwyth, UK**
MPhys: Physics with Planetary and Space Physics — *2007–2011*

University Center in Svalbard (UNIS) — **Longyearbyen, Svalbard**
Advanced Geophysics Masters program — *2011*

Honours and Awards

Academic

2024: **NASA Exoplanet ExoGuide**. Selected by my peers to be a leading mentor in the field.
2022: Fellow of Advance Higher Education: certificate of higher education teaching excellence
2020: **STScI Achievement Award** Successful deployment of ExoCTK
2019: National Academy of Sciences Kavli Fellow
2017: **Geological Society of Washington's Bradley Award** - Best technical paper presented in 2017
2017: **NASA Robert H. Goddard Honor Award** - individual recognition award for scientific achievement
2014/15: UK Women in Astronomy Network Role Model
2014: International Women's Day Inspirational Women, Univ. of Exeter
2010: RAS student fellowship, Univ. of Wales: Aberystwyth, UK
2007-2010: Univ. of Wales Scholarship, Univ. of Wales: Aberystwyth

Science Communication

2016: **Winner** of the NASA@Work public engagement video competition
2015: X-Media Awards **Winner** - **Best Show** for The Science Hour on XpressionFM
2015: X-Media Awards **Winner** - **Best Innovation** for Top Female Scientists Card Game
2015: **Ogdon Trust Award** to fund the Top Female Scientist Card Game
2014: **National Grand Prize Winner** of the Institute of Physics "3 Minute Wonder"competition (£100)
2013: **South West Regional Winner** of the Institute of Physics "3 Minute Wonder" competition (£500)
2013: **Catalyst Seed Trust Fund** for marketing the XRT-C Exeter Radio Telescope project (£4.5k)
2013: **BBC Academy Expert Women**, Selected in the top 3% of all national applicants.

Awarded PI Research Grants

1. **European Research Council (ERC) Starting Grant (PI, £1.5M; 2023 –)**
   "ExoTiC-Webb: Exoplanet Timeseries Characterization: Unlocking the third dimension of atmospheres with JWST". Prestigious 5 year grant to support three PDRAs in my group to study exoplanet atmospheres.
2. **STFC Consolidated Grant Project (PI, £410k, 2021 - 2024)**

"Exoplanet Characterization with JWST MIRI". Competitive award for 3-yr PDRA and PI at 15% FTE.

3. **Giacconi Prize Postdoctoral Fellowship ($302k, 2017–2020)**
   Fellowship held at the Space Telescope Science Institute, Baltimore, USA.
4. **NASA Postdoctoral Fellowship ($171k, 2015–2017)**
   Planetary Science Laboratory, NASA's Goddard Space Flight Center, Greenbelt, USA.

Professional Activity Highlights

Conference presentations:: 20+ invited plenary and reviews [2 (2024), 5 (2023), 2 (2022), 4 (2021), 1 (2020), 10 (2017-2019)]); 17 contributed talks (2012-2024); 8 (posters 2012-2022)

Invited seminars and colloquium:: 35+ [3 (2024), 4 (2023), 2 (2022), 3 (2021), 25+ (2015-2020)]

Public talks: 50+ [4(2024), 10(2023), 10(2022), 10 (2021), 6 (2020), 5 (2019), 11 (2014-2018)]

Conference Leadership and Organization:: Exoclimes VI, University of Exeter, UK (2023); BOWIE Exoplanet Meeting, University of Bristol, UK (2023)

Conference Science Organizing Committee:: UK Exoplanet Meeting, University of Birmingham, UK (2024); RAS NAM, Warwick UK (2022); RAS specialist meeting, ONLINE (2022); TESS Data Workshop, STScI (2019). ExoMOS Instrument Science Consortium meeting, Exeter (2014)

Committees:: Habitable Worlds Observatory, Characterizing Exoplanets Steering Committee (2024–). STScI Equitable Data Access Advisory Committee (2024 –). Hubble Space Telescope Users Committee STUC, STScI (2022-2025). Exoclimes Steering Committee (2023–). JWST DD-ERS Exoplanet Community Program, Transmission Working Lead (2017-present). Webb science working group, STScI (2017-2022). The Exoplanet MAST database lead science consultant (2018-2020). The Exoplanet Characterization Toolkit (ExoCTK) development team (2017-2020).

Refereeing:: **Journals** - ApJ, ApJ Letters, AJ, MNRAS, Nature, Nature Astronomy. **Proposals** - JWST Cycle 3 TAC; NASA Hubble Fellowship Program 2023; Hubble Space Telescope TAC Cycle 30; NASA Exoplanet Research Program; NASA Earth and Space Science Fellowship; Swiss National Science Foundation

Teaching:: **Bristol:** Environmental Physics, Unit Director, 3rd yr 10cp (2020-); Stars and Planets, Lecturer, 1st yr 20cp (2020-2023); Practical Physics 301, Project lead, 3rd yr 10cp (2021-2023); MSci Research projects, supervisor, 4th yr 60cp (2021-2023). **JHU:** Planets, Life, and the Universe, Guest Lecturer (2017-2019). **STScI:** Astronomy for non-Astronomers, Scientific Lead (2018-2020).

Awarded Observational Program Highlights

P.I / Co-I on 19 James Webb Space Telescope (**JWST**) programs (**600+ hours as part of competitive GO programs, 130 hours GTO, 78 hours DD-ERS**), 30+ Hubble Space Telescope Programs (**over 1000 hours of competitively awarded GO time**), 3 Spitzer, 2 CFHT programs, 2 Subaru programs (2012 - present) - funding listed in USD where awarded as a PI

1. **PI: HST,** 122 orbits *Hubble Ultraviolet-optical Survey of Transiting Legacy Exoplanets (HUSTLE) treasury program* - ∼$437,000
2. **PI: JWST,** 9.2 hours *Good vibrations: Directly measuring Exoplanet aerosol compositions with MIRI spectroscopy* - ∼$82,000
3. **PI: HST,** 10 orbits *Definitive measurement of WASP-17b's H_2O abundance in prep. for JWST* - ∼$23,000
4. **PI: HST,** 5 orbits *Measuring the absolute H_2O abundance of WASP-39b's atmosphere* - ∼$18,000
5. **Science-PI: JWST,** 74.3 hours *Transit and Eclipse Spectropscopy of a Hot Jupiter* - ∼$590,000
6. **Science-PI: HST,** 114 orbits *Collecting the Puzzle Pieces: Completing HST's UV+NIR Survey of the TRAPPIST-1 System ahead of JWST* - ∼$48,500 as Science-PI
7. **Co-PI: HST,** 10 orbits *Charaterizing the atmosphere of the Neptune-mass planet HAT-P-26b* - ∼$22,000
8. Co-I: JWST, 141.6 hours *Seeing the Forest and the Trees: Unveiling Small Planet Atmospheres with a Population-Level Framework*
9. Co-I: JWST, 78 hours *The Transiting Exoplanet Community Early Release Science Program*
10. Co-I: HST, 10 orbits *How small and how high? Enabling UV exoplanet science with WFC3/UVIS*
11. Co-I: JWST, 7.4 hours *Formation and impact of silicate clouds on L dwarfs*

Research Group

Postdoctoral Fellows:

Dr Katy Chubb: Senior Research Associate (2024–) - *Modelling exoplanet spectra*

Dr David Grant: Senior Research Associate (2021–2024) - *MIRI pipeline development and data analysis*

PhD Students

Ailsa Chapmann: PhD (2024–2029) - *Exoplanet atmospheres in reflected and polorized light*

Charlotte Fairman: PhD (2023–2028) - *Inferring multi-dimensional properties of exoplanet atmospheres*

Daniel Valentine: PhD (2023–2027) - *Eclipse mapping hot Jupiters with JWST*

Matt Lodge: PhD (2022–2026) - *The effect of fractal particles on cloud spectral properties*

Dr Lili Alderson: PhD (2020–2024) - *Exoplanet atmospheres from hot Jupiters to super Earths*, soon to be a Klarman Prize Fellow at Cornell University, USA

MSc by Research Students

Charlotte Fairman: MSc (2022–2023) - *The importance of optical data on inferred atmospheric properties*, now PhD student at University of Bristol

Previous Members

Visiting Researchers: Professor Nikole Lewis, Cornell University Sabbatical (01/23-06/23); Michael Radica, University of Montreal, CRAQ Internship (PhD student 02/23-05/23)

Research Instrument Analyst: Iva Laginja, STScI (2018–2020); Jules Fowler, STScI (2018)

Publication Summary

Total of 97+ peer reviewed publications: 19 Nature/Nature Astronomy, 1 Science, 11 Letters, 2 Invited Reviews; 11 1st author publications & 2 joint 1st author, 25+ Co-authored with significant contribution; 10+ as lead advisor/supervisor to an early career researcher, 15+ press releases.

Statistics: H-index = 40; citations = 5,800+.
Underlined names are those in my research group or where I was the primary project supervisor.

1st Author and Selected Impactful Contributions

1. Fairman, C., **Wakeford, H. R.**, & MacDonald, R., ApJ, 167, 240 (2024)
2. Alderson, L., Batalha, N. E., **Wakeford, H. R.**, et al., ApJ, 167, 216 (2024)
3. Grant, D., Lewis, N. K., **Wakeford, H. R.**, et al., ApJ Letters, 956, L32 (2023)
4. Grant, D., Lothringer, J. D., **Wakeford, H. R.**, et al., ApJ Letters, 949, L15 (2023)
5. Alderson, L., **Wakeford, H. R.**, et al., Nature, 614, 664 (2023)
6. Grant, D., & **Wakeford, H. R.**, MNRAS, 519, 5114 (2023)
7. Garcia, L. J., Moran, S. E., Rackham, B., **Wakeford, H. R.**, et al., A&A, 665, A19 (2022)
8. Alderson, L., **Wakeford, H. R.**, et al., MNRAS, 512, 4185 (2022)
9. Lothringer, J. D., Sing, D. K., Rustamkulov, Z., **Wakeford, H. R.**, et al., Nature, 604, 49 (2022)
10. Gao, P., **Wakeford, H. R.**, et al., Journal of Geophysical Research (Planets), 126, e06655 (2021)
11. Goyal, J. M., Lewis, N. K., **Wakeford, H. R.**, et al., ApJ, 923, 242 (2021)
12. **Wakeford, H. R.**, & Dalba, P. A., Philosophical Transactions of the Royal Society, Series A, 378 (2020)
13. Lewis, N. K., **Wakeford, H. R.**, et al., ApJ Letters, 902, L19 (2020)
14. Laginja, I., & **Wakeford, H.**, The Journal of Open Source Software, 5, 2281 (2020)
15. **Wakeford, H. R.**, Sing, D. K., et al., ApJ, 159, 204 (2020)
16. **Wakeford, H. R.**, Lewis, N. K., et al., ApJ, 157, 11 (2019)
17. Goyal, J. M., **Wakeford, H. R.**, et al., MNRAS, 482, 4503 (2019)
18. **Wakeford, H. R.**, Sing, D. K., et al., ApJ, 155, 29 (2018)
19. de Wit, J., **Wakeford, H. R.**, et al., Nature Astronomy, 2, 214 (2018)
20. **Wakeford, H. R.**, Sing, D. K., et al., Science, 356, 628 (2017)
21. **Wakeford, H. R.**, Visscher, C., et al., MNRAS, 464, 4247 (2017)
22. **Wakeford, H. R.**, Stevenson, K. B., et al., ApJ Letters, 835, L12 (2017)
23. de Wit, J., **Wakeford, H. R.**, et al., Nature, 537, 69 (2016)
24. **Wakeford, H. R.**, Sing, D. K., et al., ApJ, 819, 10 (2016)
25. Sing, D. K., Fortney, J. J., Nikolov, N., **Wakeford, H. R.**, et al., Nature, 529, 59 (2016)
26. **Wakeford, H. R.**, & Sing, D. K., A&A, 573, A122 (2015)
27. **Wakeford, H. R.**, Sing, D. K., et al., MNRAS, 435, 3481 (2013)

Science Communication Highlights

Author - Popular Science Book: Bang!! The Complete History of the Universe: Co-authored the 15-year update to the best selling book Bang! with co-authors Drs Brian May and Chris Lintott I expanded on 9 billion years of universal history adding in information on planetary formation and death.

Exocast: The Exoplanet Podcast: Monthly podcast on the study of exoplanets, with highlights on the latest news in the field (2016-present). Home of the ExoCup competition. The show has over 1,000 downloads per episode and we made over 500,000 engagements in the 2020 ExoCup alone.

5+ Documentaries: Highlights include: **IMAX** Documentary **"Deep Sky"**; **BBC Nova**, Universe episode; Exoplanets (2021); 2021 Emmy winning Documentary **"The Hunt for Planet B"** ; 30 Years of Hubble, **National Geographic** (2018) **BBC Horizon**: The Wildest Weather in the Universe (2016)

15+ Television Interviews, live and recorded: Highlights include: **BBC The Sky at Night** (2014, 2020, 2021, 2024); ESA TV (2018); NHK TV Japan (2018); **NASA TV** Live (2016-2017)

10+ Radio interviews: Highlights include: Radio 5Live Spotlight on a scientist (2022); RAS Supernova podcast (2020); BBC Sky At Night Podcast (2017-2018); NPR (2016-2018); BBC Radio Devon (2013-2015)

The Science Hour on XpressionFM: Producer and host of a 1 hour live broadcast. 2013-2015, 32 shows, 2 live 3 hour+ broadcasts and events, 2 awards, 4 nominations (inc. National Student Radio Awards).

Developer of Top Female Scientists card game: Award winning card game promoting women in science

SimonOxPhys YouTube: "Could these planets really exist?" Star Wars (2018, 1.6M+ views), Marvel Cinematic Universe (2019, 1M+ views), Warhammer 40k Universe Part 1 & Part 2 (2020, 400k+ views).

Print Media: Highlights include: BBC Sky at Night Magazine TV spotlight (2024); BBC Sky At Night Magazine Regular book reviewer (2017-); The Planetary Society Magazine, Ice Giants issue (March 2019); Astronomy Magazine (2017-2018).

Organiser and Presenter: AwesomeCon 2017, Washington DC, USA - 'The Total Solar Eclipse from NASA' and 'Alien Climates on Planets Near and Far'. AwesomeCon 2016, Washington DC, USA - 'Exoplanets: Stranger than Fiction'. Solar Eclipse Viewing Party, Univ. of Exeter - 1700+ public in attendance, BBC Radio Devon live interviews, ITV news interviews (March 2015).