Dr. Cathal Maguire

Research Associate · University of Bristol

cathal.maguire@bristol.ac.uk | cathal-maguire.github.io | 0000-0002-9061-780X

Professional Experience

University of Bristol — Bristol, UK
Research Associate | PI: Dr. Hannah Wakeford — *Jan 2025 – Present*

European Southern Observatory — Santiago, Chile
Visiting Researcher | Supervisor: Dr. Elyar Sedaghati — *Mar 2023 – May 2023*

CINECA/PRACE — Bologna, Italy
Research Assistant | Supervisor: Prof. Salvatore Orlando — *Jun 2020 – Aug 2020*

Education

Ph.D., Astrophysics — *Trinity College Dublin*, Dublin, Ireland
Supervisor: Prof. Neale Gibson — *2020 – 2024*
Ph.D. Thesis defended November 2024

B.A. (Mod), Physics & Astrophysics — *Trinity College Dublin*, Dublin, Ireland
Graduated with First Class Honours — *2016 – 2020*

Awards & Honours

ESO Science Support Discretionary Fund (SSDF) Studentship — *European Southern Observatory*, Santiago, Chile
Awarded €4,800 — *Mar 2023 – May 2023*
Resulted in a first-author refereed publication (Maguire et al. 2024b, A&A, 692, A8)

Trinity Gold Medal — *Trinity College Dublin*, Dublin, Ireland
Awarded for "exceptional merit at degree examinations" — *2020*

Publications

11 refereed publications (4 first-author) | >400 citations | h-index 9 — *Source: Google Scholar, October 2026*

11 Alderson, Lili; *et al.* (incl. **Maguire, Cathal**), 2026, *A spatial map of the atmospheric limb of a hot Jupiter,* ***Nat Astron.***

10 **Maguire, Cathal** & Ahrer, Eva-Maria; *et al.*, 2026, *The asymmetric limbs of HD 209458 b observed with JWST NIRCam F322W2/F444W,* ***ApJL, 1010, L20.***

9 Gressier, Amélie; *et al.* (incl. **Maguire, Cathal**), 2025, *JWST-TST DREAMS: Sulfur Dioxide in the Atmosphere of the Neptune-mass Planet HAT-P-26 b from NIRSpec G395H Transmission Spectroscopy,* ***AJ, 170, 292.***

8 Ramkumar, Swaetha; *et al.* (incl. **Maguire, Cathal**), 2025, *New perspectives on MASCARA-1b: A combined analysis of pre- and post-eclipse emission data using CRIRES$^+$,* ***A&A, 695, A110.***

7 **Maguire, Cathal**; *et al.*, 2024b, *Assessing methods for telluric removal on atmospheric retrievals of high-resolution optical exoplanetary transmission spectra,* ***A&A, 692, A8.***

6 **Maguire, Cathal**; *et al.*, 2024a, *High-resolution atmospheric retrievals of WASP-76b transmission spectroscopy with ESPRESSO: Monitoring limb asymmetries across multiple transits,* ***A&A, 687, A49.***

5 Fortune, Mark; *et al.* (incl. **Maguire, Cathal**), 2024, *How do wavelength correlations affect your transmission spectrum? Application of a new fast and flexible 2D Gaussian process framework to transiting exoplanet spectroscopy,* ***A&A, 686, A89.***

4 Ramkumar, Swaetha; *et al.* (incl. **Maguire, Cathal**), 2023, *High-resolution emission spectroscopy retrievals of MASCARA-1b with CRIRES$^+$: strong detections of CO, H2O, and Fe emission lines and a C/O consistent with solar,* ***MNRAS, 525, 2985.***

3 Gandhi, Siddharth; *et al.* (incl. **Maguire, Cathal**), 2023, *Retrieval Survey of Metals in Six Ultrahot Jupiters: Trends in Chemistry, Rain-out, Ionization, and Atmospheric Dynamics,* ***AJ, 165, 242.***

2 **Maguire, Cathal**; *et al.*, 2023, *High-resolution atmospheric retrievals of WASP-121b transmission spectroscopy with ESPRESSO: Consistent relative abundance constraints across multiple epochs and instruments,* ***MNRAS, 519, 1030.***

1 Gibson, Neale P.; *et al.* (incl. **Maguire, Cathal**), 2022, *Relative abundance constraints from high-resolution optical transmission spectroscopy of WASP-121b, and a fast model-filtering technique for accelerating retrievals,* ***MNRAS, 512, 4161.***

Professional Activities

Observational Programmes

8 **Co-I**, 31 nights, NAOJ S26B – S28B, *Broken Water, Broken Balance: Atmospheric Cooling of Ultra Hot Jupiters*, Subaru/IRD Intensive Program (S26B0136I, PI: Nugroho)

7 **Co-I**, 2 nights, NAOJ S25B, *Water Dissociation in Extreme Exoplanetary Environments*, Subaru/IRD (S25B0089N, PI: Nugroho)

6 **Co-I**, 1.5 nights, NAOJ S25B, *3D Atmosphere of an Ultra-hot Jupiter*, Subaru/IRD (S25B0050N, PI: Nugroho)

5 **Co-I**, 49.1 hours, JWST Cycle 4, *Meeting their Match: Measuring Cloudy Hot Jupiter Counterparts to Understand the Silicate Cloud Regime with JWST/MIRI*, JWST/MIRI (GO 7849, PIs: Moran/Alderson)

4 **Co-I**, 20.3 hours, ESO P115, *Day-side Chemical Phase-curve of an Ultra-hot Jupiter*, VLT/CRIRES$^+$ (115.289S, PI: Nugroho)

3 **Co-I**, 27.3 hours, ESO P113, *Day-side Chemical Phase-curve of an Ultra-hot Jupiter*, VLT/CRIRES$^+$ (113.26QQ, PI: Nugroho)

2 **Co-I**, 1.5 nights, NAOJ S24A, *InfraRed Coolants in the Atmosphere of the Coldest Ultra Hot Jupiter*, Subaru/IRD (S24A0097N, PI: Nugroho)

1 **Delegated PI**, 21 hours, ESO P106, *Peeking above the clouds: exoplanet atmospheres and winds at high spectral resolution with ESPRESSO*, VLT/ESPRESSO (106.21R1, PI: Gibson)

Conference Presentations

6 **April 2026**, *UK Exoplanet Meeting (UKExoM) 2026*, University of Bristol, UK

5 **July 2025**, *Exoclimes VII*, Université de Montréal, Montréal, Canada

4 **August 2023**, *Irish National Astronomy Meeting (INAM)*, University College Cork, Ireland

3 **July 2023**, *Exoplanets by the Lake*, Starnberg, Germany

2 **September 2022**, *AIP Thinkshop 2022*, Leibniz Institute for Astrophysics, Potsdam, Germany

1 **August 2022**, *Irish National Astronomy Meeting (INAM)*, Dunsink Observatory, Ireland

Invited Seminars & Colloquia

6 **Oct 2026**, *APEx ExoCoffee*, MPIA, Germany

6 **May 2026**, *Astronomy Seminar*, University of Warwick, UK

5 **April 2026**, *BOWIE+ Seminar Series*, UK

4 **November 2024**, *Astrophysics Seminar*, University of Bristol, UK

3 **May 2023**, *European Southern Observatory*, Santiago, Chile

2 **April 2023**, *Universidad Adolfo Ibáñez*, Santiago, Chile

1 **December 2022**, *DUblin STar formation, deBris dIsks and plaNets (DUSTBIN)*, Maynooth University, Ireland

Public Talks

2 **May 2026**, *Pint of Science UK*, Bristol, UK

1 **November 2025**, *Astronomy Ireland Public Lecture*, Ireland

Service & Leadership

2 **April 2026**, *Chair, Local Organising Committee*, UK Exoplanet Meeting (UKExoM) 2026, University of Bristol, UK

- Organised logistics for a record 192 attendees from 32 institutions across 5 countries, with 55 talks & 107 posters.
- Managed registration payments, discounted accommodation and early-career fee waivers.
- Coordinated day-to-day venue setup and presentation programme.

1 **January 2025 – September 2026**, *Organiser*, Astrophysics Seminar Series, University of Bristol, UK

Teaching & Supervision

4 **September 2026 – Present**, *Co-supervisor*, MSci Research Project, University of Bristol, UK

3 **January 2026**, *Guest Lecturer*, 'Stars & Planets', University of Bristol, UK

2 **2020 – 2024**, *Teaching Assistant*, Junior Sophister Astrophysics, Trinity College Dublin, Ireland

1 **2020 – 2022**, *STEM Mentor*, Innumeris Education, Dublin, Ireland

Professional Skills

- **Observing**: Science and calibration observations with VLT/ESPRESSO, Paranal Observatory
- **Data Reduction**: VLT/ESPRESSO, VLT/CRIRES$^+$, JWST/MIRI LRS
- **Data Analysis**: Atmospheric retrievals and Bayesian inference, high-resolution cross-correlation spectroscopy, telluric correction, radiative transfer modelling, transit and radial-velocity fitting (`juliet`)
- **Programming**: Python, C/C++, IDL, Git, HPC, LaTeX
- **Languages**: English (native), Irish (native), Spanish (intermediate)

References are available upon request. Last updated: 2026-10-27.