Curriculum Vitae

Keywords

- Exoplanet detection and characterisation
- Circumbinary planets
- RVs, Astrometry, and Photometry
- Statistical methods
- Orbital dynamics

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GitHub github.com/ThomasBaycroft

Website thomasbaycroft.github.io

Work Experience

Sep 2025 - present	Shanghai Jiao Tong University, T.D. Lee institute T.D. Lee postdoctoral fellow
Apr 2025 - Sep 2025	University of Birmingham Research Associate

Education

2021 - 2025	University of Birmingham, PhD Astronomy and Astrophysics Thesis title: Developing analysis tools for the detection of circumbinary exoplanets.
2020 - 2021	University of Cambridge, MSci in Astrophysics, 1st class honours Thesis title: Dynamics of Dust and Gas in Debris Discs.
2017 - 2020	University of Cambridge, BA Maths with Astrophysics, Upper 2nd class honours

Code developement

`kima` - Developer - https://www.kima.science/
`RV_dynmc` - Primary Developer - https://github.com/ThomasBaycroft/RV_dynmc

Publications

17 refereed papers published in major research journals with 222 citations in total. h-index: 8
As a first author, I have published 3 refereed papers and 2 conference proceedings/research notes, with 24 citations in total.
See full publication list below.

References

PhD supervisor:	Amaury Triaud (University of Birmingham) a.triaud@bham.ac.uk
Senior Colleague:	Annelies Mortier (University of Birmingham) a.mortier@bham.ac.uk
Collaborator:	David Martin (Tufts University) David.Martin@tufts.edu

Invited conference talks

- *'Circumbinary planets with Gaia'*, Invited talk, The formation and long-term evolution of circumbinary planetary systems across the H-R diagram, January 2025, Florence Italy
- *'Circumbinary planets: a growing population from radial velocities'* Invited talk, 50 years of Binaries and Disks: Lubow@75, May 2024, University of Nevada Las Vegas

Contributed conference talks

- *'Circumbinary planets in main and post main-sequence binaries'* Contributed talk, Celebrating 21 years of Astronomy at Warwick, September 2024, Warwick United Kingdom
- *'Observational overview of current and future circumbinary planet detections'* Contributed talk, National astronomical meeting, July 2024, Hull United Kingdom
- *'Results and new detections from the BEBOP search for circumbinary planets'* Contributed talk, Exoplanets V, June 2024, Leiden Netherlands
- *'The BEBOP search for circumbinary planets in radial velocity'* Contributed talk, Complex Planetary systems II (IAU-Kavli symposium), July 2023, Namur Belgium
- *'Precession in RV binary fits: Updating the* `kima` *orbital fitter'* Contributed talk, EAS annual meeting, June 2022, Valencia Spain

Conducted observations
42 nights spread over 7 runs in total

- 33 nights over 6 runs with SOPHIE on T193 at Observatoire de Haute-Provence (OHP) (Programme: BEBOP)
- 9 night run with NIRPS/HARPS on the 3.6m telescope at La Silla observatory in July/August 2023 (Programme ID: 106.212H)

Observing Proposals

As PI: 6 proposals for 34 nights

- 92 hours in Service Mode (Monitoring) with ESPRESSO on the VLT (UT2) at Paranal observatory (Call: ESO-P115, ID:115.27V2)
- 6.2 hours in Service Mode with ESPRESSO on the VLT (UT2) at Paranal observatory (Call: ESO-P115, ID:115.27VD)
- 32 hours in Service Mode on the Liverpool Telescope (Semester 2025A, ID: XPL25A11)
- 7.5 nights in Visitor Mode with NIRPS/HARPS on the 3.6m telescope at La Silla observatory (Call: ESO-P112 ID: 112.25KP)
- 10 nights in Visitor Mode with NIRPS/HARPS on the 3.6m telescope at La Silla observatory (Call: ESO-P113 ID: 113.26NT)
- 9 hours of Reactive time on the Liverpool Telescope (ID: XPQ24A01)

As Co-I: 5 proposals for 25 nights

- 81.5 hours in Visitor Mode with HARPS/NIRPS on 3.6 meter telescope at la Silla (Call: ESO-P115, Proposal ID: 115.27UZ, PI: Amaury Triaud)
- 95.9 hours in Visitor Mode with HARPS/NIRPS on 3.6 meter telescope at la Silla (Call: ESO-P115, Proposal ID: 115.27V0, PI: Amaury Triaud)
- 11 hours in Service Mode with CRIRES on the VLT (UT3) at Paranal Observatory (Call ESO-P114, ID: 113.276Q, PI: Daniel Sebatian)
- 25.7 hours in Service Mode with ESPRESSO on the VLT (UT2) at Paranal observatory (Call: ESO-P112, ID: 112.25GZ, PI: Matthew Standing)
- 12 hours in Service Mode with ESPRESSO on the VLT (UT2) at Paranal observatory (Call: ESO-P112 ID: 112.25QT, PI: Lalitha Sairam)

Research grants as PI

2024	£1200	Royal Astronomical Society undergraduate summer bursary, *Testing the consistency of circumbinary exoplanet signals around white dwarf binaries*, awarded with Fizza Shah

Travel grants

Totalling $\sim$ \$5000

2025	£200	Travel support for UKEXOM 2025, RAS
2024	£780	RAS conference travel subsistence, travel support for Exoplanets V conference
2024	£760	Moreton travel fund, travel support for Exoplanets V conference
2023	€695	IAU Travel Grant, travel support for Complex planetary systems II conference
2022	$\sim$ \$2000	NExScI, Sagan summer workshop travel support
2022	$\sim$ €1000	MW-GAIA-COST, Exoplanets and astrostatistical analysis techniques workshop travel support

Service and Organising

2024 UK Exoplanet meeting, University of Birmingham, LOC member

Lecturing

February 2023	Introduction to exoplanets, 1st year undergrad, no credit/optional lecture, 10 students

Tutoring/Demonstrating

2021-2023	Maths for physicists example classes, 1st year undergrad, 20 students
2023	Observatory Laboratory, 3rd year undergrad, 20 students

Research Supervision

Masters students - MPhys/MSc/MSci

2022/2023 S.B and H.B (University of Birmingham)
Lead to publication in RNAAS

Summer students

2024 Fizza Shah (University of Birmingham) - Funded by the Royal Astronomical Society
Testing the consistency of circumbinary exoplanet signals around white dwarf binaries

Outreach activities

- Pint of Science public lecture, Night Owl pub Birmingham, May 2024. Audience of 40. Talk title: *The dizzying array of worlds in our galaxy*
- Meet the expert, Thinktank science museum Birmingham, public engagement activity aimed at families and children
- 3 minute wonder, Institute of Physics Public engagement competition, West Midlands heat, January 2024
- School outreach day; October 2022; lesson and workshop with a Y7 (ages 11/12) class on exoplanets and the transit method; activity on the scale of the solar system bodies with multiple classes
- University of Birmingham Astronomy-in-the-city events; number of occasions: 4, panel discussion taking general questions on astronomy/physics; demonstration of the transit method and data collection

Refereed papers
17 in total, 3 as first author

First author publications

- *'Evidence for a polar circumbinary exoplanet orbiting a pair of eclipsing brown dwarfs'* **Baycroft, T.A.**, et al., 2025, Science Advances, 10.1126/sciadv.adu0627
- *'New evidence about HW Vir's circumbinary planets from Hipparcos-Gaia astrometry and a reanalysis of the eclipse timing variations using nested sampling'* **Baycroft, T.A.**, et al., 2023, MNRAS, 10.1093/mnras/stad2794
- *'Improving circumbinary planet detections by fitting their binary's apsidal precession'* **Baycroft, T.A.**, et al., 2023, MNRAS, 10.1093/mnras/stad607

Co-author publications (Significant contribution)

- *'BEBOP VI. Enabling the detection of circumbinary planets orbiting double-lined binaries with the* `DOLBY` *method of radial-velocity extraction'*
  Sairam, L, **Baycroft, T.A.** et al., 2024, MNRAS, 10.1093/mnras/stae2317
- *'New methods for radial-velocity measurements of double-lined binaries, and detection of a circumbinary planet orbiting TIC 172900988'*
  Sairam, L, Triaud, A.H.M.J, **Baycroft, T.A.** et al., 2024, MNRAS, 10.1093/mnras/stad3136
- *'ESPRESSO observations of Gaia BH1: High-precision Orbital Constraints and no Evidence for an Inner Binary'*
  Nagarajan, P et al. including **Baycroft, T.A.**, 2024, PASP, 10.1088/1538-3873/ad1ba7
- *'Radial-velocity discovery of a second planet in the TOI-1338/BEBOP-1 circumbinary system'*
  Standing, M.R. et al. including **Baycroft, T.A.**, 2023, Nature Astronomy, 10.1038/s41550-023-01948

Co-author publications

- *'EBLM XV – Revised dynamical masses for the circumbinary planet host Kepler-16 AB, using the SOPHIE spectrograph'*
  Sebastian, D et al. including **Baycroft, T.A.**, 2025, MNRAS, 10.1093/mnras/staf863
- *'CHEOPS in-flight performance: A comprehensive look at the first 3.5 years of operation'*
  Fortier, A et al. including **Baycroft, T**, 2024, A&A, 10.1051/0004-6361/202348576
- *'BEBOP V. Homogeneous Stellar Analysis of Potential Circumbinary Planet Hosts'*
  Freckelton, A et al. including **Baycroft, T.A.**, 2024, MNRAS, 10.1093/mnras/stae1405
- *'Detection of an Earth-sized exoplanet orbiting the nearby ultracool dwarf star SPECULOOS-3'*
  Gillon, M et al. including **Baycroft, T.A.**, 2024, Nature-Astronomy, 10.1038/s41550-024-02271-2
- *'The EBLM project – XIII. The absolute dynamical masses of the circumbinary planet host TOI-1338/BEBOP-1, and applications to the study of exoplanet atmospheres.'*
  Sebastian, D et al. including **Baycroft, T.A.**, 2024, MNRAS, 10.1093/mnras/stae459
- *'The EBLM Project XII. An eccentric, long-period eclipsing binary with a companion near the hydrogen-burning limit'*
  Davies, Y et al. including **Baycroft, T.A.**, 2024 - MNRAS, 10.1093/mnras/stae842
- *'A long-period transiting substellar companion in the super-Jupiters to brown dwarfs mass regime and a prototypical warm-Jupiter detected by TESS .'*
  Jones, M.I et al. including **Baycroft, T**, 2024 - A&A, 10.1051/0004-6361/202348147
- *'The EBLM Project XI. Mass, radius and effective temperature measurements for 23 M-dwarf companions to solar-type stars observed with CHEOPS'*
  Swayne, M et al. including **Baycroft, T.A.**, 2024 - MNRAS, 10.1093/mnras/stad3866
- *'An M dwarf accompanied by a close-in giant orbiter with SPECULOOS author '*
  Triaud, A.H.M.J. et al. including **Baycroft, T.A.**, 2023, MNRAS, 10.1093/mnrasl/slad097
- *'Two temperate super-Earths transiting a nearby late-type M dwarf'*
  Delrez, L. et al. including **Baycroft, T.A.**, 2022, A&A, 10.1051/0004-6361/202244041

Conference Proceedings & Non-refereed papers

- *'Progress report on the BEBOP search for circumbinary planets with radial velocities'*
  Baycroft, T.A. et al. 2024, Proceedings of IAU-Kavli symposium No. 382, 10.1017/S1743921323004
- *'GJ 9404 b: A Confirmed Eccentric Planet, and not a Candidate'*
  Baycroft, T.A. et al. 2023, Research notes of the AAS, 10.3847/2515-5172/acefc5
- *'SPECULOOS: five years hunting terrestrial planets around ultra-cool dwarfs'*
  Zúñiga-Fernández, S et al. including **Baycroft, T** 2024, Proceedings of the SPIE, 10.1117/12.3020550

Submitted papers

- *'BEBOP VII: SOPHIE discovery of BEBOP-3b, a circumbinary giant planet on an eccentric orbit'*
  Baycroft, T.A. et al. Submitted April 2025, MNRAS
- *'Polar alignment of a circumbinary disc around a brown dwarf binary, with application to the exoplanet claimed in 2M1510 AB'*
  Smallwood, J.L, **Baycroft, T.A.** et al. Submitted April 2025, MNRAS
- *'ASTEP confirmation of two Warm Jupiters transiting TOI-791, featuring the longest continuous full transits ever observed from the ground'*
  Dransfield, G et al. including **Baycroft, T.A** submitted Dec 2024, MNRAS