

Richard Anslow

Address: Institute of Astronomy, University of Cambridge, Madingley Rd, Cambridge CB3 0HA, UK

email: rja92@cam.ac.uk | **ORCID iD:** 0000-0001-7464-7411 | **GitHub:** richard17a | **website:** richard17a.github.io

Research interests

Planetary System Dynamics: numerical and analytical modelling of the orbital dynamics of small bodies in planetary systems and their interactions with rocky (exo-)planets, particularly focussing on the impact-driven evolution of these planets. Habitability: characterising the consequences of late impacts on planets' atmospheres and composition; modelling the effects of planetary environment on late delivery; constraining late impacts. Origins of life: using dynamical modelling and exoplanet demographics to propose tests for origins scenarios, and constrain potential environments for prebiotic chemistry. White dwarf planetary systems: modelling debris in post-main sequence planetary systems to understand white dwarf pollutants.

Education

- 2022 – pres. [PhD in Astronomy, University of Cambridge \(UK\)](#). Supervisors: Dr A. Bonsor & Dr P. B. Rimmer
Investigating the connection between the dynamics of small bodies in (exo-)planetary systems and their impacts, in the context of popular origins-of-life scenarios, and the habitability of rocky exoplanets.
- established how both stellar-mass and planetary architecture determine the velocity distribution of impactors onto rocky exoplanets, constraining the cometary delivery of prebiotic molecules. This publication was ranked 7th in the [Royal Society's Top 10 papers of 2023](#).
 - with A. Rae and C. Walton, constraining the timing of cometary delivery to the early-Earth, modelling both atmospheric ablation and fragmentation of cometary impactors before impact crater formation.
 - with M. Landeau and O. Shorttle, exploring geodynamical constraints on the origin of highly siderophile elements on the Earth and Moon (subm.).
- 2017 – 2021 [MPhys in Physics, University of Oxford \(UK\)](#). Final grade: 1st Class (Rank: 10th in cohort)
Numerical investigation of the dynamics, and associated gravitational wave signal, of binary stellar-mass black holes in SMBH accretion discs. Supervisor: Prof. S. Balbus FRS
- Part C courses: Astrophysics (87%), Atmospheric and Oceanic Physics (88%, Rank 1/33).
- 2015 – 2017 [A-Levels, St. Aidan's and St. John Fisher's Associated Sixth Form \(UK\)](#). A*A*A*A*
Mathematics, Further Mathematics, Physics, Extended Project Qualification (EPQ)

Work experience

- 2021 – 2022 [Technology Associate, Morgan Stanley \(UK\)](#).
Business and Data Analyst in the Technology large programmes change group, developing novel Python tooling and coordinating company-wide software testing.
- Developed and packaged a novel, automated, Python tool which identified cross-dependencies between large software systems across the institutional securities division.
- 2020 & 2021 [Technology Analyst, Morgan Stanley \(UK\)](#).
Analysed real-time data flow from the Brexit transition programme, developing new Python and SQL tooling.
- Completed 4 month intensive technology qualification, focussing on object-oriented programming, and developing large codebases.
 - Led a team of 15 analysts on a volunteering initiative in which we mapped over 600 buildings across different communities in Northern India for the charity Educate Girls.

Publications

1 first author publication (2 refereed, 1 submitted), 1 co-author publication (1 refereed)

- Anslow, Landeau, Bonsor, Itcovitz & Shorttle (subm.) *The efficient delivery of highly-siderophile elements to the core creates a mass accretion catastrophe for the Earth*. EPSL
- 3) Anslow, Bonsor, Rimmer, Rae, McDonald & Walton (in press) *The plausibility of origins scenarios requiring two impactors*. Proc. R. Soc. A
- 2) Rogers, Debes, Anslow, et al. 2024 *WD0141-675: A case study on how to follow-up astrometric planet candidates around white dwarfs*. MNRAS
- 1) Anslow, Bonsor & Rimmer 2023 *Can comets deliver prebiotic molecules to rocky exoplanets?*. Proc. R. Soc. A.

Conference talks and seminars

1. *Origins Federation Conference* (Cambridge, 2024), [invited poster](#)
"The plausibility of origins scenarios requiring two impactors"
2. *EPOE 2024* (Paris, May 2024), contributed talk
"The significance of small impactors on late accretion to the early-Earth and rocky exoplanets"
3. *IoA Wednesday Seminar* (Cambridge, May 2024), contributed seminar
"The cometary delivery of prebiotic feedstock molecules to the early-Earth and rocky exoplanets"
4. *IPGP Origins Seminar Series* (Paris, May 2024), [invited seminar](#)
"The accretion of small impactors to the early-Earth and rocky exoplanets"
5. *LCLU Annual Science Day* (King's College, Cambridge, March 2024), contributed poster
"Can comets deliver prebiotic molecules to rocky exoplanets?"
6. *LCLU Coffee Meetings* (Cambridge, February 2024), [invited seminar](#)
"The accretion of small impactors to the early-Earth and rocky exoplanets"
7. *Life in the Universe II* (Boston, September 2023), [invited poster](#)
"Can comets deliver prebiotic molecules to rocky exoplanets?"
8. *UK Exoplanet Meeting 2023* (UCL, August 2023), contributed talk
"Can comets deliver prebiotic molecules to rocky exoplanets?"
9. *Molecular Origins of Life* (online, June 2023), contributed poster
"Can comets deliver prebiotic molecules to rocky exoplanets?"

Awards, scholarships and funding

- 2024 Funding for Widening Participation Summer Intern (Leverhulme Centre for Life in the Universe, £3200)
- 2024 Graduate student stipend (€1600) for 2024 [MIAPbP Habitability workshop](#) (Excellence Cluster ORIGINS)
- 2023 7th in the [Royal Society's Top 10 papers, 2023](#) ([Can comets deliver prebiotic molecules to rocky exoplanets?](#))
- 2023 Travel funds for Life in the Universe II (Northeastern University, \$700)
- 2022–2026 STFC Studentship for study towards a PhD in Cambridge (£85K)
- 2020 Karastergiou General Relativity Prize, performance in Part B General Relativity (University of Oxford)
- 2021 Open Scholarship for academic performance (St Edmund Hall, University of Oxford, £250)
- 2020–2021 Open Scholarship for academic performance (St Edmund Hall, University of Oxford, £250)
- 2019–2020 Open Scholarship for academic performance (St Edmund Hall, University of Oxford, £250)

Academic service and outreach

- September 2024: Local Organising Committee (Origins Federation Conference, Cambridge)
 - Co-ran breakout session "What are the prerequisites for an origin of life?"
- August 2024: Co-ran half-day exoplanet detection workshop for [Sutton Trust](#) Computer Science summer school.
 - Interactive workshop delivered to ~30 high-achieving students from disadvantaged backgrounds.
- August 2024: Seminar: "Introduction to Life in the Universe Sciences and PhDs" (Leverhulme Centre for Life in the Universe, Cambridge)

- 2024 – pres.: Work-life balance Focus Group, EDI Committee (Institute of Astronomy, Cambridge)
- 2023 – 2024: International Women’s Day Organising Committee (Institute of Astronomy, Cambridge)
 - Co-ran exoplanet detection coding workshop for 120 Year 8 students from local state schools (6 groups of 20).
- 2023 – 2024: Organiser of weekly *Meet the colloquium speaker* sessions (Institute of Astronomy, Cambridge)
- March 2023: Outreach for IOA+KICC Public Open Day, (Institute of Astronomy, Cambridge).
 - Organised, and ran a cloud chamber demonstration (> 1000 Open Day attendees).
- 2018 – 2019: Access Officer for underrepresented groups (St. Edmund Hall, Oxford)
 - Recipient of award for contribution to Outreach work by the VP for Access & Academic affairs (2019)
 - Organised, and ran 2 week-long ‘Access Roadshows’ visiting (approx. 15) state schools in Hampshire and Leicestershire. (approx. 1000 students overall)

Media coverage

- November 2023: Over 400 news articles worldwide about [Can comets deliver prebiotic molecules to rocky exoplanets?](#), including the [New Scientist](#), [Independent](#), [Forbes](#), [BBC Science Focus](#), [Newsweek](#), [Daily Mail](#), [Interesting Engineering](#) and the [Evening Standard](#), amongst others.
- November 2023: Podcast interview about cometary delivery with BBC Cambridge’s [The Naked Scientists](#). Listen to the podcast [here!](#)
- December 2023: [Youtube interview](#) (~ 30 min) with Fraser Cain (publisher of [www.universetoday.com](#)) on recent paper [Can comets deliver prebiotic molecules to rocky exoplanets?](#). Audience: approx. 395,000 subscribers.

Teaching

- Michaelmas 2024: Demonstrator (Astrophysics Practicals), *Planetary Science and Life in the Universe MPhil* (Institute of Astronomy), University of Cambridge
- Michaelmas – Lent 2024: Demonstrator (Reading Group), *Planetary Science and Life in the Universe MPhil* (Institute of Astronomy), University of Cambridge
- Michaelmas 2023, 2024: *Part III Planetary System Dynamics*. Example Class instructor for ~15 masters students, Department of Applied Mathematics and Theoretical Physics (DAMTP), University of Cambridge.
- 2017 – pres.: *Advanced Mathematics and Physics* tutor for pre-University students
 - Agencies worked with include: [The Profs](#), [U2Tuition](#), and [Polaris & Dawn Consulting](#).

Student supervision

- Summer 2024: Co-supervision of Jerric Chong (with Catriona McDonald), Institute of Astronomy (Cambridge).

Technical skills

Computing: Python and SQL (advanced), C/C++ (intermediate). Have a look [here](#) for my public codes. \LaTeX , GitHub and UNIX (advanced).

Languages: English (native speaker), French (beginner), German (beginner), Italian (beginner)