

# Research Assistant/Associate: Cosmological Simulation Based Inference

Institute of Astronomy

Closing Date: 2<sup>nd</sup> January 2025  
Job Reference: **LG44063**



## Research Assistant/Associate: Cosmological Simulation Based Inference

**Salary:****Research Associate**

£36,924 - £45,163

(Grade 7)

**Research Assistant\***

£33,882 - £34,866

(Grade 5)

(\*if PhD thesis submitted but not yet awarded)

**Staff Category:**

Research

**Contract:**

Fixed Term – 4 years

**Location:**

Cambridge

**Faculty / Department:**

Institute of Astronomy

**Responsible to:**

Dr Will Handley

**Working Pattern:**

Full Time

**Starting:**

October 2025 or earlier

**Purpose of the role**

Applications are invited for up to three Postdoctoral Research Associate positions to support an ambitious research programme at the University of Cambridge, focusing on cosmological data analysis using cutting-edge AI techniques. The successful candidates will join a vibrant team led by Will Handley dedicated to harnessing advanced methodologies such as simulation-based inference, Bayesian forecasting, and experimental design to extract maximal information from next-generation cosmological surveys and experiments. Our research spans a range of cosmological probes, including the Cosmic Microwave Background (CMB), Baryon Acoustic Oscillations (BAO), weak lensing, and gravitational wave data. These positions offer a higher than usual level of research freedom, allowing candidates to tailor their projects according to their interests and expertise while leveraging the strengths of the Cambridge cosmology cluster. Researchers with theoretical inclinations will have opportunities to develop models collaboratively with theorists within the Cambridge community.

These positions are funded for four years, commencing in October 2025 or earlier. We are seeking to appoint candidates of the highest calibre to contribute to this transformative research initiative. The successful applicants will have a strong background in cosmology, astrophysics, or a related field, and experience with AI techniques is highly desirable. This is an excellent opportunity to engage in pioneering research within a world-leading institution and to make significant contributions to our understanding of the Universe.



## Key responsibilities

The postholders will be expected to:

- Develop and apply advanced Bayesian & AI techniques, including simulation-based inference and leveraging new AI tools exemplified by large language models (e.g., GPT, Claude, Gemini), to enhance the scientific discovery process.
- Be responsive to emerging techniques, tensions, and data, addressing key issues such as the Hubble tension, weak lensing discrepancies, curvature constraints, and evolving dark energy scenarios.
- Analyze data from various cosmological probes according to their expertise, contributing to projects that may vary over time.
- Collaborate closely with team members and engage with the wider Cambridge cosmology community, fostering interdisciplinary research.
- Contribute to the supervision and mentoring of PhD and Masters students, as well as summer students, supporting a dynamic learning environment.
- Stay abreast of advancements in AI and cosmology to ensure the research group remains at the cutting edge of these disciplines.

# Person Specification

Criteria	Essential	Desirable
<b>Education</b>		
Holds a PhD (or have submitted PhD thesis by time of appointment) in Astronomy or another related field	✓	
<i>*Appointment at Research Associate* level is dependent on having a PhD (or equivalent experience), including those who have submitted but not yet received their PhD. Where a PhD has yet to be awarded appointment will initially be made at research assistant and amended to research associate when the PhD is awarded (PhD needs to be awarded within 6 months of the start date). If an individual has not submitted a PhD or is not working towards one they could be appointed as a Research Assistant if they have either a degree (and/or Master's) in a relevant area or equivalent experience.</i>		
<b>Specialist Knowledge and Skills</b>		
Specialist knowledge and experience of cosmological analysis techniques.	✓	
Proficiency in modern coding languages and practices including Python and Github	✓	
Experience in working with modern cosmological data		✓
Strong journal publication record.	✓	
The ability to evaluate complex data.	✓	
<b>Experience</b>		
Experience in working in as part of a team of researchers.		✓
Experience of managing own workload.	✓	

# Declaration on Research Assessment

The University of Cambridge is a signatory to the San-Francisco Declaration on Research Assessment (DORA), and in recruitment or promotion evaluations will assess research on the basis of its merits rather than the journal or venue in which it is published. Applicants should not include Journal Impact Factors or uncontextualized metrics in their applications. Full details are at: <https://www.research-strategy.admin.cam.ac.uk/research-policy/DORA>

## Behavioural Attributes

This section summarises the behavioural attributes (or competencies) that we expect the role holder to be able to demonstrate, at what level and whether this is an essential or desirable requirement. Full definitions are at: <https://www.hr.admin.cam.ac.uk/policies-procedures/behavioural-attributes>

Please review these and provide specific examples in your application of how you have demonstrated these attributes in your work, education or other experience. It will assist your application if you explain the situation, what you did and what the outcomes were.

Attribute	Level for Research Associate	Level for Research Assistant
Valuing Diversity	A	A
Achieving Results	B	C
Communication	C	D
Innovation and Change	C	C
Negotiating and Influencing	C	D
People Development	C	C
Relationship Building	B	C
Strategic Focus	C	D

# Professional Services Values

Developed by professional services staff, our values underpin everything we do. By living the values in the work we do, we hope to foster an environment where staff feel empowered. The values encourage staff to; work together and share skills to create a sense of community, act with integrity, take an inclusive and fair approach and develop honest and open relationships that are underpinned by our shared values. We encourage applicants to consider these values within their application.



# The Institute of Astronomy



The Institute of Astronomy (IoA) is one of the largest concentrations of research astronomers in the United Kingdom (17 permanent tenured university teaching staff, approximately 75 post-doctoral researchers, research fellows and long-term visitors, and some 50 graduate students).

The Institute is characterised by an extremely broad range of research interests with active programmes of research in a wide range of theoretical, numerical and observational astronomy and astrophysics. The research includes observational, theoretical and numerical research in: exoplanetary detection, atmospheres and interiors; formation and evolution of stars, their planetary systems and disks; protoplanetary discs; Milky Way structure, formation and evolution; near-field cosmology and Galactic archaeology; star formation in external galaxies; supernovae; formation and evolution of galaxies, supermassive black holes, AGN and quasars;

quasar absorption lines and the intergalactic medium; gravitational lensing; X-ray studies of clusters of galaxies and active galaxies; feedback processes; cosmological hydrodynamic simulations; emergence of structure during the epoch of reionization; and investigations of the Cosmic Microwave Background.

The IoA also hosts the Cambridge Astronomical Survey Unit (CASU) and a Gaia data processing group with many staff shared between the two research groups. CASU is a leading UK participant in data reduction and analysis for survey astronomy, focusing on optical and near infra-red imaging and multi-object spectroscopy research projects. Ground-based projects include VISTA, LSST, MOONS, WEAVE and 4MOST.

Space-based projects include Euclid, CHEOPS and PLATO. Members of the CASU team are also working on CRUK funded medical imaging research projects related to cancer research.

The IoA plays a central role in the Cambridge Astronomy community, maintaining close connections with (separately funded) groups in the Department of Applied Mathematics and Theoretical Physics (DAMTP) and the Department of Physics. Interdepartmental connections have been forged via the recent appointment of the two joint University Lecturers (shared with the Department of Earth Sciences and the Department of Pure Mathematics and Mathematical Statistics) and by two interdepartmental research institutes: the Kavli Institute for Cosmology Cambridge (KICC) and the Cambridge Leverhulme Centre for Life in the Universe (LCLU) which has recently attracted substantial funding from the Leverhulme Trust.

The IoA has an active visitor and conference programme. Several seminars per week are held during term time. In most years, one, and often two, international conferences are held, embracing a wide range of subject areas.

The IoA also aims to inspire members of the public from all backgrounds through our impressive outreach programme. We host both public observing nights and community group/school visits.

The Institute of Astronomy is committed to equality of opportunity and to a proactive and inclusive approach to equality, which supports and encourages all under-represented groups, promotes an inclusive culture, and values diversity.

Members of our large Equality, Diversity & Inclusion (EDI) Committee represent all groups, and include females and males at all career stages: undergraduate, postgraduate students, postdoctoral research associates, public astronomer, academic faculty and administrators. Since its inception, the EDI Committee has instigated and actively supported a number of ongoing EDI initiatives.

<https://www.ast.cam.ac.uk/people/equality-diversity-inclusion>

The IoA holds an Athena SWAN Bronze Award and Juno Practitioner status.



Additional information is available on the website at [www.ast.cam.ac.uk](http://www.ast.cam.ac.uk)



# The School of Physical Sciences

## The School of the Physical Sciences

is one of six Schools making up the academic work of the University. It covers Astronomy, Chemistry, Earth Science, Geography, Materials Science and Metallurgy, Mathematics and Physics.

The School's aim is to contribute to our understanding of the physical world through excellence in observational, theoretical and experimental science and to extend quantitative, qualitative and combined methodologies to address problems in the fields of biology, technology, medicine, social science and the humanities. In pursuit of these goals, the School coordinates objectives in research, teaching, and infrastructure.

### [About the School](#)

The School of the Physical Sciences comprises the following Departments:

Applied Mathematics and  
Theoretical Physics (DAMTP)

Chemistry

Earth Sciences

Geography (including the Scott  
Polar Research Institute)

Institute of Astronomy

Issac Newton Institute of  
Mathematical Sciences

Materials Science and Metallurgy

Physics (Cavendish Laboratory)

Pure Mathematics and  
Mathematical Statistics (DPMMS)



The School is responsible for allocating core funds to departments and provides broad strategic focus across its constituent departments in a number of areas including; research activity, undergraduate and graduate education, estate needs, fundraising and human resources. As part of the University's annual planning cycle, the School prepares a financial and academic plan which sets out strategic objectives, determines budgets as well as the flow of resources to departments. The School manages a wide range of administrative activities and projects across its departments and works alongside other Schools to further interdisciplinary research.

The School has over 1500 members of staff, over 3000 students and an annual budget of over £100 million.

# Terms of Appointment

## Tenure and probation

Appointments will be made on a fixed-term basis for a period of four years due to limited funding for a specific purpose.

Appointments will be subject to satisfactory completion of a six-month probationary period.

## Hours of Work and Working Pattern

The hours of work for the position are full-time, working Monday–Friday.

## Pension

You will automatically be enrolled to become a member of USS (Universities Superannuation Scheme) – a hybrid pension scheme. For further information please visit: [www.pensions.admin.cam.ac.uk/](http://www.pensions.admin.cam.ac.uk/).

## Annual leave

Full time employees are entitled to annual paid leave of 41 days inclusive of public holidays. For new part-time employees, annual leave will be pro rata'd based on days worked.

## General information

### Pre-employment checks

### Right to work in the UK

We have a legal responsibility to ensure that you have the right to work in the UK before you can start working for us. If you do not have the right to work in the UK already, any offer of employment we make to you will be conditional upon you gaining it.

**Health declaration:** Once an offer of employment has been made the successful candidate will be required to complete a work health declaration form.

**Qualifications:** The person specification for this position lists qualifications that are essential and/or desirable. Please note that if you are offered the post you will be asked to provide your relevant original certificates of these qualifications.

**References:** Offers of appointment will be subject to the receipt of satisfactory references.

## Equality and Diversity

The University actively supports equality, diversity and inclusion and encourages applications from all sections of society.

## Information if you have a disability

The University welcomes applications from individuals with disabilities. We are committed to ensuring fair treatment throughout the recruitment process. We will make adjustments to enable applicants to compete to the best of their ability wherever it is reasonable to do so and, if successful, to assist them during their employment.

Information for disabled applicants is available at <http://www.admin.cam.ac.uk/offices/hr/staff/disabled/>

We encourage you to declare any disability that you may have, and any reasonable adjustments that you may require, in the section provided for this purpose in the application form. This will enable us to accommodate your needs throughout the process as required. However, applicants and employees may declare a disability at any time.

If you prefer to discuss any special arrangements connected with a disability, please contact the HR Department on [hr@ast.cam.ac.uk](mailto:hr@ast.cam.ac.uk).

# The University

The University of Cambridge is consistently ranked one of the best universities in the world, achieving academic excellence through its Faculties, Departments and other Institutions, together with the 31 Colleges.

The University is renowned for its record of discovery and innovation. It is one of the great institutions, with a regional, national and global reach, attracting the very best and brightest minds. Our staff and students shape the world around us for the better: we attract and partner with like-minded people.

Whether contributing to the development of new anti-cancer drugs, adding to the understanding of how black holes are formed, revolutionising the study of ancient settlements, convening academic expertise to offer solutions to the climate crisis, or analysing public attitudes towards democracy around the world, the University's research is remarkable in its breadth, quality and impact. The University also sits at the heart of Europe's largest technology cluster and has catalysed more than 1,500 high-tech companies. And yet what inspires our 24,000 students and 13,000 staff is not what has already been achieved, but what is possible in the future.

The education and experience of our students, based on a partnership between the University's academic Departments and Faculties and the 31 Colleges, is second to none. Every student is a member of one of the Colleges, each a community of students, academics and staff drawn from across the University's comprehensive range of subject areas.



## The University (continued)

The University is a self-governing community, with a system for decision-making that provides a high degree of accountability and transparency to its members. Each Department and Faculty is part of one of six academic Schools, but each of them, and each individual academic, has a great deal of autonomy. The Colleges are independent and self-governing, working in a symbiotic relationship with the University.

The University has a number of Institutions that are independent of any Faculty or Department and are not part of the academic Schools. These include the Institute of Continuing Education (which provides high-quality education to adults throughout their lives), the Fitzwilliam Museum, Kettle's Yard (an historic house and gallery that holds important collections of modern art) and the University Library. In addition to their diverse contributions to University and public life, these non-School Institutions are also important centres of teaching and research.

Cambridge University Press & Assessment provides academic publishing, examinations and learning materials worldwide, supporting the dissemination of research, academic development at school and in higher education, and international student mobility. Legally, the Press & Assessment is a department of the University. It provides very important funds to invest in the academic purposes of the University.

The University has made truly remarkable contributions to the sum of human understanding, with breakthrough ideas and discoveries that have changed the way we understand ourselves, our planet, and the universe around us. Yet the global and national contexts in which it operates are fast-changing and increasingly filled with uncertainty. In a world that is becoming - politically, economically, socially, and technologically – ever more interconnected but even less equal, the University's mission – “to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence” – has never been more relevant.



## About Us

**The University is one of the world's leading academic centres. It comprises 150 faculties and departments, together with a central administration and other institutions. Our institutions, museums and collections are a world-class resource for researchers, students and members of the public representing one of the country's highest concentrations of internationally important collections.**

The University has an annual income of £2 billion. Research income, won competitively from the UK Research Councils, the European Union (EU), major charities and industry, exceeds £500 million per annum and continues to grow.

The Colleges and the University remain committed to admitting the best students regardless of their background and to investing considerable resources both in widening access and financial support. The 31 Colleges are self-governing, separate legal entities which appoint their own staff. Many academic staff are invited to join a College as a Teaching Fellow, which provides a further social and intellectual dimension. The Colleges admit undergraduate students, provide student accommodation and pastoral support and deliver small group teaching for undergraduates.

The University awards degrees and its faculties and departments provide lectures and seminars for students and determine the syllabi for teaching.

Our instinct for seeking out excellence and setting up enduring and mutually beneficial collaborations has led us to establish strategic partnerships across the globe. Whether it is the successful Cambridge-Africa Programme involving universities in Ghana, Uganda and elsewhere on the African continent; or the close association with the government of India to pursue new research in crop science; or the creation, with Germany's Max Planck Institutes, of a Cambridge-based centre for the study of ethics, human economy and social change – international partnerships are now an inextricable part of the University's make-up.

“Through its outstanding education, research and innovation, the University of Cambridge has made – and continues to make – a lasting contribution to human knowledge and is flourishing. By working at the University of Cambridge, you will be joining a vibrant community of students, scholars and professional services staff committed to supporting and enhancing the University's mission to contribute to society.”

*Professor Deborah Prentice,  
Vice Chancellor 2023*



# Working at the University

**Working at Cambridge you will join a diverse, talented and innovative community, with more than 24,000 students and over 13,000 staff from all walks of life and corners of the world.**

The University continually explores strategies to attract and retain the best people. It is committed to supporting its staff to achieve their best. We are a fair, diverse and inclusive society and we believe our staff are our greatest asset. There is strong commitment to developing institutional leadership and supporting and encouraging staff development at all levels.

The University offers a variety of roles including academic, research, professional, managerial and support roles. We also offer extensive benefits and excellent learning opportunities within a stimulating working environment.

The University's estate is undergoing the most significant transformation in its history. Cambridge has been able to create a science and technology campus to the west of the city centre, and is expanding further to the north west of Cambridge including investing in affordable homes for University key workers and community facilities. Even with their continued development, the University remains within walking or cycling distance across the campus. The University is a major partner on the Cambridge Biomedical Campus and continues to redevelop its historic city centre sites demonstrating a clear determination to ensure that we can offer the best facilities and opportunities for our staff and students.



## Equality, Diversity and Inclusion

The University has built its excellence on the diversity of its staff and student community. We aim to be a leader in fostering equality and inclusion, and in promoting respect and a sense of belonging for all. We encourage applications from all sections of society. All appointments are made on the basis of merit. We have an Equal Opportunities Policy, along with a range of diversity groups, including the Women's Staff Network, Race Equality Network and LGBT+ Staff Network. More details are available here: <http://www.equality.admin.cam.ac.uk/>

The University has a bronze Race Equality Charter award, with a framework for improving the representation, progression and success of minority ethnic staff and students within higher education. Furthermore, the University's silver Athena swan award recognises and celebrates good practice in recruiting, retaining and promoting gender equality.

# Living in Cambridge

**Cambridge is rich in cultural diversity. From beautiful University and College buildings, museums and art galleries, quaint gardens and punts on the River Cam, to a vibrant restaurant and café scene, our employees are surrounded by the wonderful features of this unique city.**

You can find a wide-range of high street shops and 3 shopping centres, with independent alternatives at the historic market and nestled within the passageways in the city centre. You will find a cinema, bowling alley, a nightclub and various live performances at the Cambridge Leisure Park, with further entertainment options at the Corn Exchange, Arts Theatre and the ADC Theatre. Further information can be found on the Visit Cambridge website.

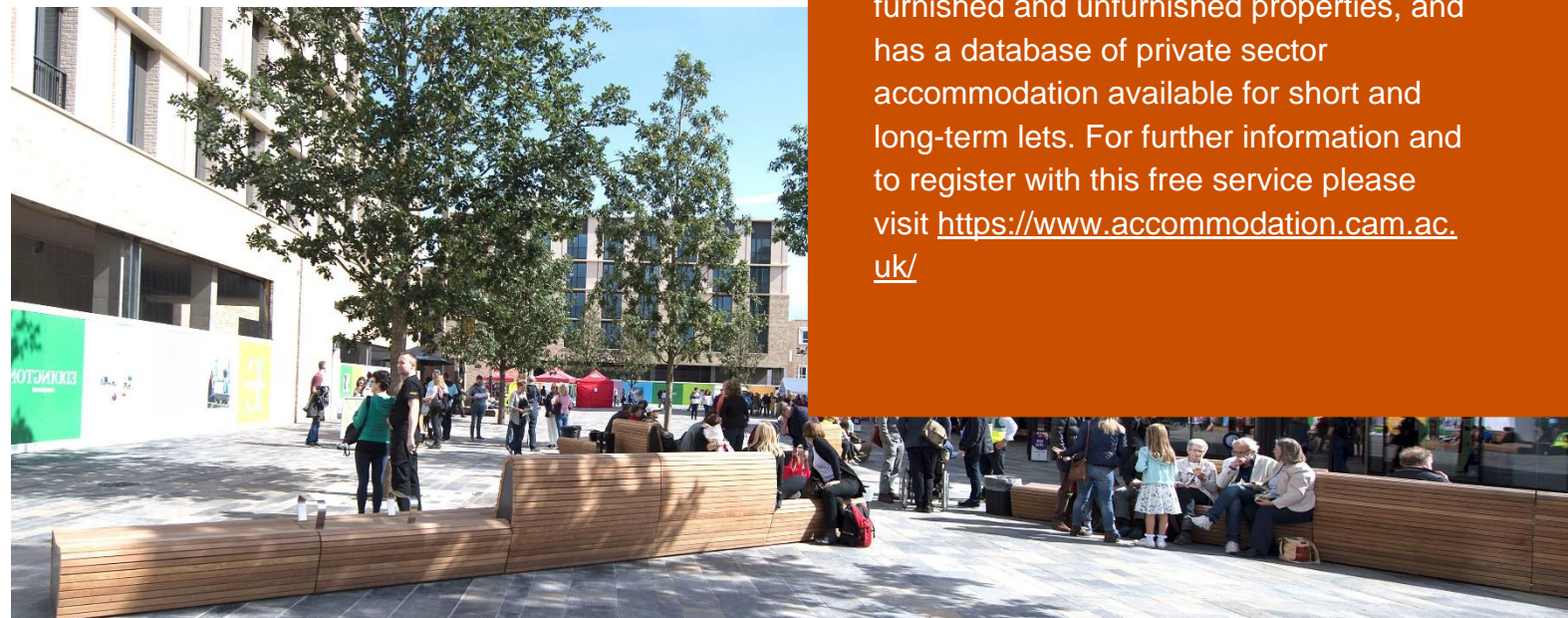
If you prefer the faster pace of life, London is a 45 minute train journey away. For those travelling from overseas, Stansted Airport is just 45 minutes away and Heathrow Airport under 2 hours away. The University is a short distance from a host of other attractions such as Ely Cathedral, Newmarket Races and various wildlife parks and stately homes. Cambridge is also within easy reach of the beautiful Broads and coastlines of Norfolk and Suffolk.

## Relocation Support

The University recognises the importance of helping individuals to move and settle into a new area. We provide support and guidance to those relocating internationally or domestically to take up a post at the University of Cambridge, liaising with other University offices and selected partners to ensure comprehensive relocation support is available. This includes: accommodation, childcare, schools, banking, immigration and transport. If you would like further information, please visit <https://www.accommodation.cam.ac.uk/RelocationService/>. The Shared Equity Scheme and the Reimbursement of Relocation Expenses Scheme provide financial assistance to qualifying new members of staff with the costs of relocating to Cambridge.

## Accommodation Service

The University Accommodation Service helps staff, students and visiting scholars who are affiliated to the University in their search for suitable accommodation in Cambridge. The dedicated accommodation team can provide access to a wide range of University-owned furnished and unfurnished properties, and has a database of private sector accommodation available for short and long-term lets. For further information and to register with this free service please visit <https://www.accommodation.cam.ac.uk/>



# What Cambridge can offer

**We offer a comprehensive reward package to attract, motivate and retain high performing staff at all levels and in all areas of work.**

The University offers a wide range of competitive benefits, from family leave entitlement, to shopping and travel discount schemes. Our generous annual leave package contributes to the positive wellbeing of our University employees. Sabbatical leave enables academics to focus on research and scholarship, whilst still maintaining their full salary. The University also has a [career break scheme](#) for academic and academic-related staff, with additional flexible working policies for all other staff.



## Pay and benefits

The University salary structure includes automatic service-related pay progression in many of its grades and an annual cost of living increase. In addition to this, employees are rewarded for outstanding contribution through a number of regular pay progression schemes. The University offers attractive pensions schemes for employees, with an additional benefit of a salary exchange arrangement providing tax and national insurance savings.

## CAMbens employee benefits

The University offers employees a wide range of competitive benefits, known as CAMbens. CAMbens offers something for everyone across a range of categories, including:

- Financial Benefits, including shopping discounts (both local and national) and a Payroll Giving scheme;
- Relocation and Accommodation Benefits, including relocation assistance and interest-free Rental Deposit Loans;
- Travel Benefits, including Cycle to Work, discounts on train season tickets and interest-free Travel to Work loans;
- Family Friendly and Lifestyle Benefits, including support with childcare and family friendly policies;
- Health and Wellbeing Benefits, including a University Staff Counselling Service, discounts at the University Sports Centre, and other local gyms, and healthcare schemes.





# What Cambridge can offer

## Family-friendly policies

The University recognises the importance of supporting its staff. We have a range of family-friendly policies to aid employees' work-life balance including a generous maternity, adoption and shared parental leave entitlement of 26 weeks full pay, and paid emergency leave for parents and carers (enhanced policy comes into effect from 1<sup>st</sup> October 2024).

Other family-friendly support includes:

Our highly regarded workplace nurseries, a childcare salary exchange scheme and a high-quality holiday Playscheme may be available to help support University employees with caring responsibilities (subject to demand and qualifying criteria). Further childcare information can be found here:

<https://www.childcare.admin.cam.ac.uk/>

The [Newcomers and Visiting Scholars Group](#) is an organisation within the University run by volunteers whose aim is to help newly arrived wives, husbands, partners and families of Visiting Scholars and members of the University to settle in Cambridge and give them an opportunity to meet local people. The Postdoc Academy supports the postdoctoral community within Cambridge. Further details are available here: <https://www.postdocacademy.cam.ac.uk/>

## Your wellbeing

The University's Sport Centre, Counselling Services and Occupational Health are just some of the support services available to University employees to promote their physical and mental wellbeing. The University delivers The Festival of Wellbeing annually, which is a programme of stimulating talks and activities, which aim to promote wellbeing and good mental and physical health. The University also hosts the [Cambridge Festival](#), which is a great opportunity to get your first taste of public engagement, through volunteering, supporting hands-on activities or proposing a talk.

## Development opportunities

We support new employees to settle in through various activities as well as supporting their professional and career development on an ongoing basis. Our Personal and Professional Development (PPD) team provide development opportunities for all University employees, including face-to-face sessions, online learning modules and webinars. All employees also have unlimited access to LinkedIn Learning to support their development. Both new and existing employees can undertake funded Apprenticeships, which lead to a range of vocational and professional qualifications. We offer reduced staff fees for University of Cambridge graduate courses and the opportunity to attend lectures and seminars held by University departments and institutions. A range of University training providers also offer specialist learning and development in their own areas e.g. teaching and learning, digital literacy, finance, health and wellbeing, safety.



# How to apply

Applications should be submitted online via the University of Cambridge jobs page [www.jobs.cam.ac.uk](http://www.jobs.cam.ac.uk) by clicking “Apply online” in the job advert. You will need an email address to register for our online system.

Conversations about flexible working are encouraged at the University of Cambridge. Please feel free to discuss flexibility prior to applying (using the contact information below) or at interview if your application is successful.

Please indicate the contact details of three academic referees on the online application form and upload a full curriculum vitae (CV), list of publications, provide your github username (or equivalent evidence of computational skills and experience) and a research statement (three pages max), including a description of how your research expertise can be applied to the project. Please ensure that your referees are aware that they may be contacted by the Institute of Astronomy.

The University of Cambridge is a signatory of the San Francisco Declaration on Research Assessment (DORA). DORA recognises the need to improve the ways in which the outputs of scholarly research are evaluated. The University expects candidates to apply the principles of DORA when preparing their applications. We do not use journal-level metrics when assessing the quality of research outputs. Applicants should not include journal-level metrics, such as the Journal Impact Factor, anywhere in their application materials. More information about DORA, its principles and aims can be found at: <https://sfdora.org/> and <https://www.research-strategy.admin.cam.ac.uk/research-policy/DORA>.

The application deadline is **23:59 GMT on Thursday 2<sup>nd</sup> January 2025**. Where applicable, referees will be requested to provide references by **Friday 10<sup>th</sup> January 2025**.

Applications will be reviewed after the closing date and interviews are provisionally planned for: **w/c 20<sup>th</sup> January 2025**.

The anticipated start date of the appointment is October 2025 or earlier.

Informal enquires can be addressed via email to Dr Will Handley [wh260@cam.ac.uk](mailto:wh260@cam.ac.uk). If you have any queries regarding the application process please contact [HR@ast.cam.ac.uk](mailto:HR@ast.cam.ac.uk).

Please quote reference **LG44063** on your application and in any correspondence about this vacancy.

