

**Research Assistant/Associate – Howe Group:
Electrical Engineer for BioPhotoVoltaic Project**

Department of Biochemistry

Closing Date: Friday 20th December 2024

Job Reference: PH44131



Research Assistant/Associate

Salary:

Grade 5: £29,605-£33,966

Grade 7: £36,024-£44,263

Contract:

Fixed term contract, the funds are available until 31st December 2025.

Location:

Central Cambridge

Department:

Biochemistry

Responsible to:

Professor Christopher Howe

Purpose of the Role:

We are seeking a highly motivated Electrical Engineer to join our innovative BioPhotoVoltaic (BPV) project at the Department of Biochemistry, under the supervision of Prof. Howe and Dr. Bombelli. This full-time, fixed-term position is funded by a BBSRC-FoF grant, starting December 1st, 2024, and ending December 31st, 2025. The selected candidate will play a crucial role in advancing BPV technology by merging electrical engineering expertise with biological systems to develop cutting-edge, sustainable energy solutions. This is a unique opportunity to be part of a multidisciplinary team at the forefront of renewable energy research. We are seeking someone with a strong understanding of components such as peak-power trackers, energy harvesters, current/voltage converters, and capacitors. Experience in designing and prototyping integrated circuits, as well as reverse-engineering existing ones, is highly desirable. While programming knowledge isn't essential, it would be an asset. Please note, our focus is on small-scale electrical engineering with power requirements in the sub-milliwatt range—not large-scale electricity systems. Although a PhD is preferred, we are open to candidates with equivalent experience and qualifications.

About the BioPhotoVoltaic (BPV) Project:

BPV technology harnesses the power of photosynthetic microorganisms to convert solar energy into electrical energy. The ideal applications for BPVs include powering electronic devices with low energy consumption in off-grid and indoor environments, particularly in the growing field of the Internet of Things (IoT). For example, one of our recent studies demonstrated that BPVs could continuously power a commercial microprocessor (Arm Cortex M0+) for over six months. Through extensive market research, we have identified a potential commercial partner interested in utilising BPV technology to power small electronic devices. The primary goal of this project is to design, develop, and test a BPV-driven electronic device tailored to the partner's specific needs.

Research Assistant/Associate

Key Responsibilities:

- Lead the electrical design and engineering aspects of the BPV prototype.
- Collaborate closely with Dr. Bombelli, the product design team, and our commercial partner on prototyping and testing.
- Contribute to technical reporting and the dissemination of results.

Desired Qualifications:

- Ability to identify, analyse, and solve complex electrical engineering problems.
- Proficiency in designing and analysing analog, digital, and mixed-signal circuits, with the capacity to diagnose and repair faults.
- Experience in hands-on prototyping and testing in multidisciplinary projects is highly desirable.

Suggested readings:

[1] KL Saar KL, et al., (2018) Enhancing power density of biophotovoltaics by decoupling storage and power delivery. *NatEnergy*. 2018;3:75–81.

[2] X Chen et al., (2022) 3D-printed hierarchical pillar array electrodes for high-performance semi-artificial photosynthesis. *Nature Materials* 21 (7), 811-818.

[3] AJ McCormick et al., (2015), Biophotovoltaics: oxygenic photosynthetic organisms in the world of bioelectrochemical systems. *Energy & Environmental Science* 8:1092-1109.

[4] CJ Howe and P Bombelli, (2020), Electricity production by photosynthetic microorganisms. *Joule*, 4 (10), 2065-2069.

[5] P Bombelli et al., (2022) Powering a microprocessor by photosynthesis. *Energy & Environmental Science* 15 (6), 2529-2536.



Research Assistant:	Essential	Desirable
Education & qualifications		
Educated to first degree level	✓	
Specialist Knowledge & Skills		
Use initiative and creativity to solve routine problems in relation to the research project, e.g. methodological/technical problems.	✓	
Relevant Experience		
Possess sufficient breadth or depth of knowledge in the discipline and of research methods and techniques to work within own area	✓	
Interpersonal & Communication Skills		
Contributes to discussions as a member of a research team.	✓	
Provide guidance as required to support staff /students who may be involved with the research.	✓	
Liaise with colleagues and students on routine matters	✓	
Research Associate:		
Education & qualifications		
Holds a PhD in a relevant subject	✓	
Specialist Knowledge & Skills		
Will continually update knowledge in the specialist area and engage in continuous professional development.	✓	
Relevant Experience		
The role holder would possess some research experience with sufficient breadth/depth of specialist knowledge in the discipline and of research methods and techniques to work within established research programmes.	✓	
Interpersonal & Communication Skills		
Contributes to discussions as a member of the research team Encourage others in a team	✓	
Provide guidance as required to support staff/students who may be involved with the research.	✓	
May assist in the supervision of others.	✓	
Communicate material of a specialist or highly technical nature.	✓	

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.

Research

Associate

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

Research

Assistant

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

The department



To

The Department of Biochemistry at the University of Cambridge is a world-leading biochemical research and education facility, building on the University's tradition of scientific enquiry to enable and support outstanding science. As part of the School of the Biological Sciences our excellent undergraduate and postgraduate education programmes develop the next generation of scientists, whilst over 50 research groups led by investigators of international standing collaborate with colleagues around the world to answer fundamental questions on how cells and their constituent molecules work in life and relate to disease.

The Department is located in two main buildings located on Tennis Court Road. The original Hopkins Building on the Downing Site started life in 1924 as the Sir William Dunn Institute of Biochemistry, under the inspirational leadership of our founder, Frederick G. Hopkins. The Hopkins Building is beautiful, elegant and, equally important for a modern teaching and research department, has been extensively refurbished in recent years. Our other main building, located on the Old Addenbrooke's Hospital Site, is named after the late, great Fred Sanger, an alumnus of the Department and winner of two Nobel Prizes in Chemistry – one for the sequencing of proteins and the second for developing the technology to sequence DNA that precipitated the genomics revolution. The Sanger Building was funded by generous donations from Peter and Paula Beckwith, the Wolfson Foundation, the Wellcome Trust and many others and was opened formally by Fred Sanger himself in November 1997.

Research:

The focus of our scientific investigation can broadly be broken down into nine research themes: Chemical Biology & Drug Design, Disease Biology, DNA & Chromatin Biology, Molecular Microbiology, Plant Biochemistry & Bioenergy, RNA Biology, Signalling & Trafficking, Stem Cell Biology, and Systems Biology. These themes are not mutually exclusive, however, with many of our Research Group Leaders conducting research spanning multiple areas.

support our world-leading biochemical research and education programmes, the Department of Biochemistry houses state-of-the-art core facilities, including cryo-electron microscopy, NMR spectroscopy, crystallography, biophysics, mass spectrometry, protein chemistry, metabolomics, and advanced services for protein and nucleic acid sequencing.

Teaching:

The teaching programmes of the Biochemistry Department embody a fundamental approach to the chemistry of life and convey the strongly unifying contribution of biochemistry and molecular biology to other scientific disciplines. We teach students in four undergraduate years, in both the Natural Sciences Tripos (NST) and the Medical Sciences Tripos and Veterinary Sciences Tripos. Courses in the Faculty of Biology increasingly flow across departmental boundaries, where there is scientific common ground, in terms of personnel and planning.

The Department also delivers Part III Biochemistry course which caters for students who expect to continue with postgraduate research, and leads to a Master of Natural Science Degree (MSci) as well as the usual BA to which all Cambridge undergraduate science courses lead. The Department also has major contribution to the Part III in Systems Biology.

The Department contributes to a highly competitive postgraduate programme that support 160 postgraduate students in all fields of Biochemistry.

For more information about the Department:
<https://www.bioc.cam.ac.uk>

The School of the Biological Sciences

The School of the Biological Sciences encompasses the Faculty Board of Biology and the Faculty Board of Veterinary Medicine and is represented on the Faculty Board of Clinical Medicine. It has responsibilities across four Triposes (the Natural Sciences Tripos, the Medical Sciences Tripos, the Veterinary Sciences Tripos and the Psychological and Behavioral Sciences Tripos).

It shares the Graduate School of Life Sciences, Graduate Committee and Medical Education Committee with the Clinical School. It has its own Degree Committee. It includes nine Departments and the Centre for Family Studies, plus five major research Institutes and an animal hospital. The School is a key player in the Cambridge Conservation Initiative as well as the majority of Cambridge Strategic Initiatives. The School is associated with the Museum of Zoology and the Botanic Garden. Key officers of the School plus details of relevant Research Ethics Committees (Human Biology, Psychology) can be found on the School's website. Various sub-committees report to the Council, as required.

Formal representation on the Council of the School (its most senior decision-making body) is outlined in Chapter 8 of the University's Statutes and Ordinances. Heads of School Institutes, as well as Heads of Departments, are currently co-opted on to the Council, together with representatives of the three Faculty Boards. In addition, the Head of the Botanic Garden and a representative from the School of Technology attend as observers.

Most of the detailed information about research and teaching in the School is to be found on the departments' web sites. The members of the Gurdon Institute, the Sainsbury Laboratory and the Systems Biology Centre have affiliations with departments in the School. The Stem Cell Institute and Milner Institute also have affiliations within the School of Clinical Medicine.



Terms of appointment

Tenure and probation

The appointment is until 31/12/2025, in the first instance. Probation ends after 6 months.

Hours of Work and Working Pattern

The hours of work for this position is full time with a some flexibility to be agreed with the PI.

Pension

Universities Superannuation Scheme (USS).

The University does not operate a retirement age for assistant staff/research staff/ unestablished academic staff/ unestablished academic-related staff.

Annual leave

For information <http://www.hr.admin.cam.ac.uk/policies-procedures/annual-leave-entitlement>

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.

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 Department Administrator, who is responsible for recruitment to this position.

The University

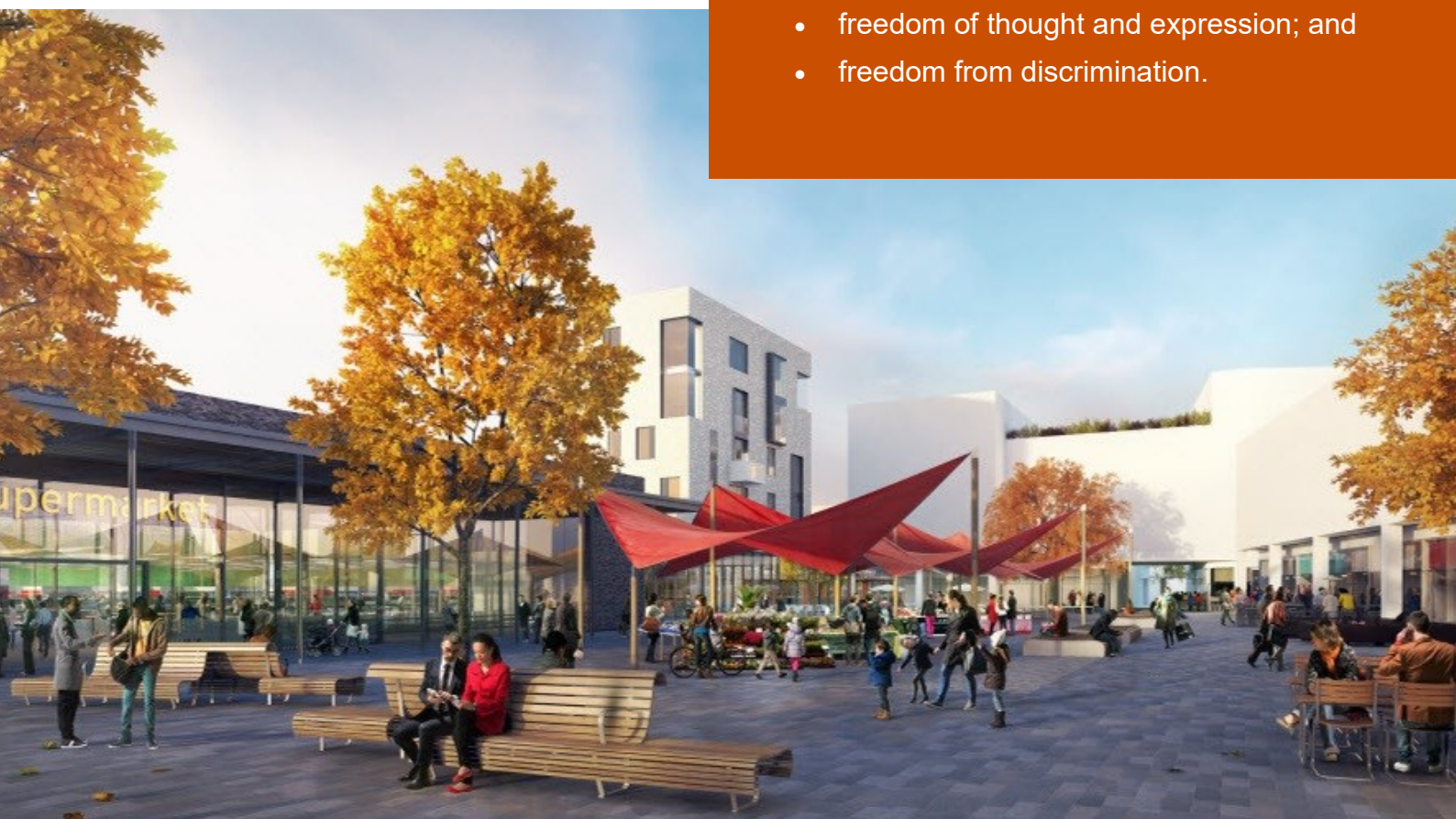
The University of Cambridge is one of the world's oldest and most successful universities. We are a renowned centre for research, education, and scholarship that makes a significant contribution to society. The University is consistently ranked amongst the top universities in the world. Our affiliates have won more Nobel Prizes than any other University.

Our sustained pursuit of academic excellence is built on a long history of first-class teaching and research within a distinctive collegiate system. For eight centuries our ideas and innovations have shaped the world. Our principal goal is to remain one of the world's leading universities in an increasingly competitive global higher education sector. Today the University of Cambridge is at the centre of a cluster of over 4,300 businesses employing 58,000 people.

Our capital investment projects include the West Cambridge site, the North West Cambridge development and the growth of the Biomedical Campus in the south of the city. The North West Cambridge development includes the opening of a primary school – the first in the UK to be managed by a University. So we are deeply embedded in, and committed to serving, our local community. These are all conspicuous signs of a University that is not only adapting to new needs, but also anticipating the future.

Our mission is to contribute to society through the pursuit of education, learning, and research at the highest international levels of excellence. Our core values are:

- freedom of thought and expression; and
- freedom from discrimination.



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 students, provide student accommodation and deliver small group teaching.

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

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.

“Cambridge graduates and researchers have made – and continue to make – a colossal contribution to human knowledge and the understanding of the world around us. Their work touches on the lives and livelihoods of everyone from patients diagnosed with life-threatening diseases, to residents of areas critically affected by climate change, to children growing up in conflict zones. It has a lasting impact on our society, our economy and our culture: the world is truly a better place thanks to their efforts.”

Stephen Toope, Vice Chancellor 2019



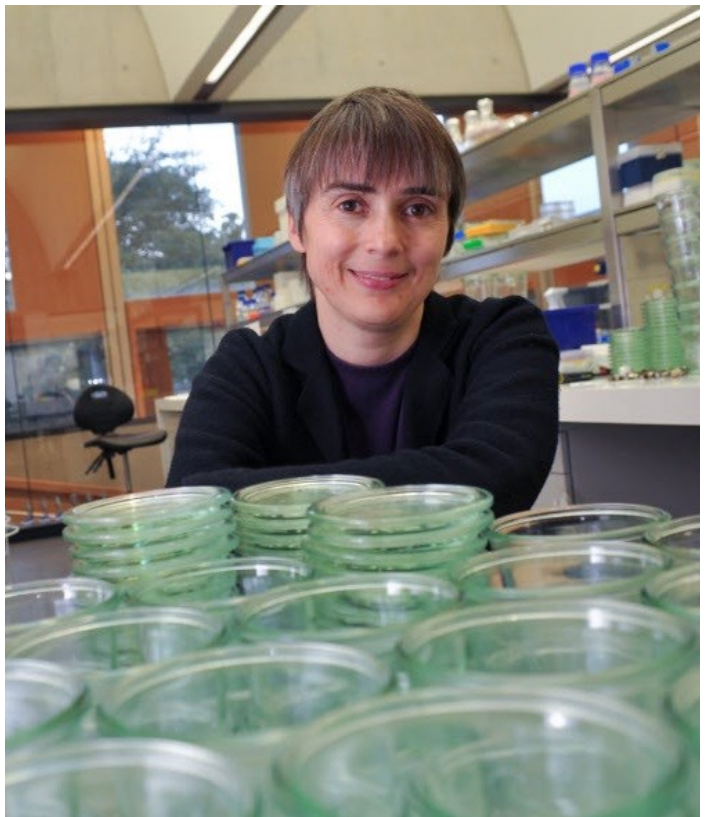
Working at the University

Working at Cambridge you will join a diverse, talented and innovative community, with more than 18,000 students and over 16,000 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.

We offer 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 new science and technology campus to the west of the city centre, and is now expanding further to the north west of Cambridge including investing in affordable homes for University key workers and community facilities. Even with our 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 we continue to redevelop our historic city centre sites demonstrating our determination to ensure that we can offer the best facilities and opportunities for our staff and students.



Equality & diversity

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 networks for women, black and minority ethnic and lesbian, gay, bisexual and transgender staff. More details are available here: <http://www.equality.admin.cam.ac.uk/>

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

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.

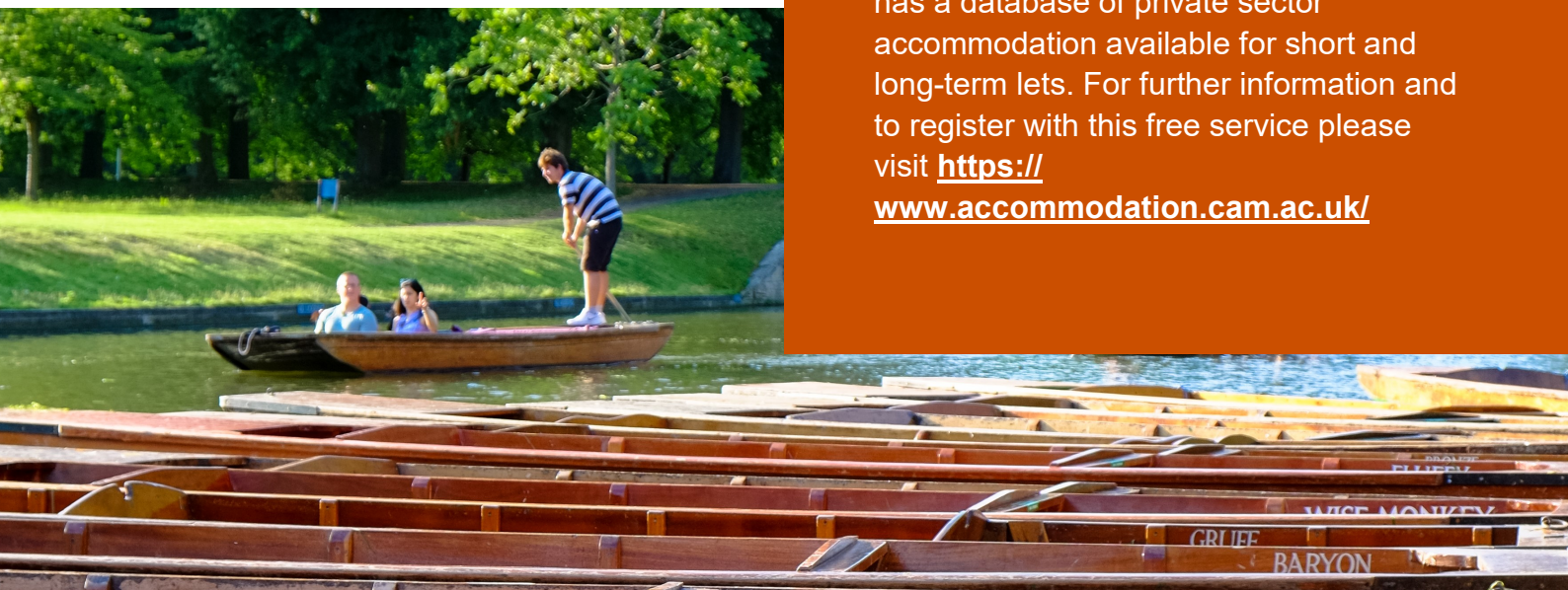
If you prefer the faster pace of life, London is a 45 minute train journey away. For those travelling from overseas, Stansted Airport is just 45 minutes away and Heathrow Airport under 2 hours away. The University is a short distance from a host of other attractions such as Ely Cathedral, Newmarket Races 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/>. 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. Payroll giving is also a simple, tax-efficient way for employees to make monthly donations to charity.



CAMbens employee benefits

We offer a CAMbens scheme for University employees, providing access to online and in-store shopping discounts and cashback. With more than 2,000 participating retailers, employees can save money on a wide range of household expenses, from groceries and clothes, to holidays and insurance and much more. A range of local discounts are also available, helping employees to save money whilst also supporting local Cambridge businesses and a CAMbens Cycle to Work salary sacrifice scheme is also available, which enables employees to save money on transport costs. A 10% discount rate on the purchase of train season tickets, bulk buy tickets and an interest free travel to work loan are also available for staff of the University.



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 18 weeks full pay and emergency family care support via My Family Care.

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 Office of Postdoctoral Affairs supports the postdoctoral community within Cambridge. Further details are available here: <https://www.opda.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. There are many societies in Cambridge catering for almost every taste and interest. Whether you want to take part in a sport, participate in music or drama, pursue a hobby, or join a political group, you will almost certainly find that a society exists for this purpose. The University also hosts the [Cambridge Science Festival](#) and [Cambridge Festival of Ideas](#), as well as [Open Cambridge](#) weekend, which together attract over 50,000 visitors per year. The festivals are 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. The encouragement of career development for all staff is one of the University's values and we put this into practice through various services and initiatives. Our Personal and Professional Development Department provides development opportunities and courses for all University employees. These include face-to-face sessions, online learning modules and webinars. Employees may also apply for financial support to undertake training that will lead to a qualification. 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. The CareerStart@Cam programme also supports employees in assistant staff roles who do not hold higher education qualifications to develop their skills, experience and qualifications.



How to apply:

Applications should be submitted online via the University of Cambridge jobs page 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.

Informal enquiries are welcomed and should be directed to Professor Christopher Howe: ch26@cam.ac.uk

If you have any queries regarding the application process please contact the Biochemistry HR Team: personnel@bioc.cam.ac.uk

The closing date for applications is:
Friday 20th December 2024.

