Job Description

DEPARTMENT OF CHEMISTRY

Summary

Job title	**Postdoctoral Research Associate in Sustainable Thermoplastics and Elastomers (Sustainable Chemicals and Materials Manufacturing Hub)**
Division	**Mathematical, Physical and Life Sciences**
Department	**Department of Chemistry**
Location	**Chemistry Research Laboratory, 12 Mansfield Road, Oxford, OX1 3TA**
Grade and salary	**Grade 7: £38,674 - £46,913 per annum (inclusive of Oxford University Weighting)**
Hours	Full time
Contract type	Fixed-term (24 months)
Reporting to	Professor Charlotte Williams
Vacancy reference	176219
Additional information	Applications are particularly welcome and encouraged from women, black, and minority ethnic candidates, who are under-represented in posts in Chemistry. The Department of Chemistry is committed to equality, and values diversity. Best practice in Equality, Diversity and Inclusion has been core to our design of the SCHEMA Hub and we seek to create a model and culture for inclusive world-leading research regardless of sector. The Department of Chemistry holds an Athena Swan Silver award in recognition of our commitment and success in addressing gender equality. Current areas of focus are on positive and inclusive culture for neurodiversity and disability, as well as departmental culture and values.

Research topic	This post is part of our Sustainable Chemicals and Materials Manufacturing Hub which aims to deliver a step change in sustainable chemical and polymer manufacturing in the UK. This research project will apply recent advances in controlled polymerization catalysis to make new oxygenated polymers which function as thermoplastics and elastomers. The research topic involves polymer synthesis, characterization, and property assessment.

	These materials will be prepared from renewable monomers, including carbon dioxide, cyclic esters (lactones) and carbonates, epoxides, and anhydrides. These polymers are designed to be functional and maintain high performance over several "recycle-re-use" loops through mechanical recycling. Target polymers include materials comprising polyester and polycarbonate blocks, and take advantage of toughening mechanisms such as strain-induced crystallization and ionomer networks. The use of precision polymer synthesis methods will allow for the evaluation of structure-property relationships, influenced by various factors including polymer molar mass, architecture, and block composition.
Principal Investigator / supervisor	Professor Charlotte Williams
Project team	Williams Research Group
Project web site	Home | Charlotte Williams Research (ox.ac.uk) Sustainable Chemicals and Materials Manufacturing Hub (schemahub.ac.uk)
Funding partner	The funds supporting this research project are provided by the Sustainable Chemicals and Materials Manufacturing Hub (SCHEMA)
Recent publications	

The role

The development and production of next generation, sustainable, polymers for use in applications including transportation, electronics and energy generation/storage is vital to addressing the sustainability goals. This project tackles the problem throughout the polymer lifecycle – using circular economy principles to (1) select monomers based on sustainable sourcing (bio-based, wastes, carbon dioxide), (2) apply efficient and controlled catalysis to polymer manufacturing, and (3) design polymers to deliver a suite of materials with properties spanning thermoplastics and elastomers. To meet these stringent criteria, the project will focus on the production of innovative oxygenated polymers, including polyesters and polycarbonates, that meet high performances in use and complete recycling (and ultimately structural degradability) after use. The project also integrates closely with machine learning and data analysis research, facilitating data-driven insights for the prediction of appropriate polymer compositions and structures.

The research will involve the application of controlled heterocycle ring-opening polymerisations and epoxide/carbon dioxide/anhydride ring-opening copolymerisation to prepare new block polymers. Processes enabling efficient polymer syntheses are prioritised, particularly those operating in a single reactor and with just one catalyst (switchable catalyses). The manufacturing methods are selected to be compatible/suitable for use with a range of different monomers, including those already commercialised, and are already scaled. The polymer chemistry and characterization will include spectroscopy, GPC, thermal, mechanical, and microstructural evaluation. The goal is to develop renewably sourced and recyclable block polymers with characteristics of high-performance thermoplastics and elastomers.

You will join a diverse team of researchers, in the Williams research group and working with the SCHEMA Hub, focussed on the important challenge of creating a sustainable future chemical and material manufacturing industry. Our broader multi-disciplinary team includes experts in catalysis, automation, polymer chemistry, environmental impact analysis, and computational modelling. You should be interested to work as an expert member of a larger-scale team focussed on a major challenge. To support your research, we will provide training in the methods necessary for the fundamental research as well as

technology translation and application development. We will work with you to help develop your leadership and transferable skills.

About the Sustainable Chemicals and Materials Manufacturing Hub (SCHEMA)

The SCHEMA Hub is led by Prof. Charlotte Williams at Oxford's Department of Chemistry and involves other academics at the Universities of Oxford, Bath, Liverpool, Cardiff, York and Cambridge. The Sustainable Chemicals and Materials Manufacturing Hub (SCHEMA) also involves a large consortium of commercial and international partners focussed on delivery of sustainability across chemical and polymer production by transforming their design, manufacture, and recyclability. For more information on the hub see: Home | Sustainable Chemicals and Materials Manufacturing Hub (schemahub.ac.uk)

Responsibilities

1. anage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines
2. Adapt existing and develop new scientific techniques and experimental protocols
3. Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
4. Contribute ideas for new research projects
5. Develop ideas for generating research income, and present detailed research proposals to senior researchers
6. Undertake comprehensive and systematic literature reviews and write up the results for publication in peer-reviewed journals
7. Collaborate in the preparation of scientific reports and journal articles and occasionally present papers and posters
8. Use specialist scientific equipment in a laboratory environment
9. Act as a source of information and advice to other members of the group on scientific protocols and experimental techniques
10. Represent the research group at external meetings/seminars, either with other members of the group or alone
11. Carry out collaborative projects with colleagues in partner institutions, and research groups
12. Actively participate in journal club meetings
13. PDRAs may be required to teach, this may include lecturing, small-group teaching, and tutoring of undergraduates and graduate students

Selection criteria

Essential selection criteria

1. Hold a PhD in Polymerization Catalysis or Polymer Chemistry or a related area (or be close to completion), prior to taking up the appointment.

2. Have expertise in polymer synthesis, preferably relevant to the preparation of oxygenated polymers (polyesters/carbonates). Have training in the synthesis of polymers using anaerobic techniques and methods.

3. Have expertise in polymer characterization, including thermal and mechanical characterization of plastics and elastomeric materials.

4. Be able to demonstrate competence and success in the thesis research area (and postdoctoral work if appropriate), e.g. as judged by publications (or papers in press) in high quality peer reviewed journals. Evidence will be sought of a deep understanding of the applicant's previous fields of research and evidence of independent intellectual and practical contributions to previous research projects, as indicators that such attributes can be brought to bear on the present project.
5. Be viewed as a motivated, enthusiastic, organised self-starter; one who can work with a minimum of supervision but at the same time extract the benefits of an excellent research environment.
6. Have an excellent general knowledge of related areas through reading of the literature, online database searching, and attendance at seminars and conferences.
7. Be willing to learn new techniques and apply them in an interdisciplinary research environment. Be willing to participate in group journal clubs and workshops as a means to continuously improve technical and theoretical knowledge.
8. Communicate well in English in writing and in oral and visual presentations.
9. Be able to keep detailed laboratory records and report on progress at regular intervals.
10. Show an ability to work supportively in a laboratory environment, and to supervise and educate junior co-workers and take part in joint projects through co-operation and the exchange of information, skills and reagents.
11. Be willing to play a role in keeping the laboratory running by assuming a share of group responsibilities.

Desirable selection criteria

1. Experience of polymer processing (blending and compounding, extrusion, injection moulding).
2. Experience of mechanical and chemical recycling of polymers.

Pre-employment screening

Standard checks

If you are offered the post, the offer will be subject to standard pre-employment checks. You will be asked to provide: proof of your right-to-work in the UK; proof of your identity; and (if we haven't done so already) we will contact the referees you have nominated. If you have previously worked for the University we will also verify key information such as your dates of employment and reason for leaving your previous role with the department/unit where you worked. You will also be asked to complete a health declaration so that you can tell us about any health conditions or disabilities for which you may need us to make appropriate adjustments.

Please read the candidate notes on the University's pre-employment screening procedures at:
https://www.jobs.ox.ac.uk/pre-employment-checks

Hazard-specific / Safety-critical duties *[if not relevant delete whole section]*

This job includes hazards or safety-critical activities. If you are offered the post, you will be asked to complete a health questionnaire which will be assessed by our Occupational Health Service, and the offer of employment will be subject a successful outcome of this assessment.

The hazards or safety-critical duties involved are as follows:

- Work with any substance which has any of the following pictograms on their MSDS:

About the University of Oxford

Welcome to the University of Oxford. We aim to lead the world in research and education for the benefit of society both in the UK and globally. Oxford's researchers engage with academic, commercial and cultural partners across the world to stimulate high-quality research and enable innovation through a broad range of social, policy and economic impacts.

We believe our strengths lie both in empowering individuals and teams to address fundamental questions of global significance, while providing all our staff with a welcoming and inclusive workplace that enables everyone to develop and do their best work. Recognising that diversity is our strength, vital for innovation and creativity, we aspire to build a truly diverse community which values and respects every individual's unique contribution.

While we have long traditions of scholarship, we are also forward-looking, creative and cutting-edge. Oxford is one of Europe's most entrepreneurial universities and we rank first in the UK for university spin-outs, and in recent years we have spun out 15-20 new companies every year. We are also recognised as leaders in support for social enterprise.

Join us and you will find a unique, democratic and international community, a great range of staff benefits and access to a vibrant array of cultural activities in the beautiful city of Oxford.

For more information, please visit www.ox.ac.uk/about/organisation.

Department Of Chemistry

The mission of Oxford Chemistry is to advance the global understanding of chemistry and to use that knowledge to address major challenges for society. Oxford Chemistry maintains world-class strengths in fundamental research, including the training of outstanding young scientists, whilst being an outward-looking department engaging with other disciplines, industry, public services, government and the general public. We are a large department within the University's Mathematical, Physical and Life Sciences Division with over 70 research groups and 900 researchers including 400 graduate research students. Our MChem degree takes 180 students a year and features the distinctive tutorials of Oxford, an innovative three-year programme of practical teaching within our state-of-the-art teaching laboratory, and a 4th year focused on research based within one of our research groups.

Research in Oxford Chemistry focuses on fundamental science aimed at making significant and sustained long-term impact. We provide an environment that enables research by hiring, developing, and supporting talented researchers, many recognised as international leaders, across the spectrum of the chemical sciences. Our students and staff work in excellent research facilities to deliver field-leading research that crosses traditional boundaries and engages strongly with other disciplines, both within Oxford and across a range of external sectors.

The impact of our research in the wider economy and society is manifest in our many industrial and clinical collaborations and successful start-ups. Our eight research themes and business engagements showcase the breadth and depth of our research across the chemical sciences.

We are committed to providing an inclusive and supportive work and study environment for all our staff and students based on core values of respect, equality and collaboration. We have held an Athena SWAN silver award since 2015 reflecting our commitment to improving gender equality within our discipline.

Oxford Chemistry is accommodated within five buildings in the University's science area, including a modern RIBA award-winning dedicated research facility and a state-of-the-art practical teaching laboratory. Researchers are supported by a research infrastructure within Chemistry that includes NMR, Mass Spectrometry, Crystallography, Surface Analysis, Inorganic Materials Characterisation, Advanced Electron Spin Resonance and high-performance computing facilities as well as access to facilities across the wider University and at national research facilities including the Rosalind Franklin Institute and Diamond Light Source.

To support the Teaching and Research in the Department, there are a number of administrative functions including Finance, Human Resources, Facilities, Information Technology, Student Administration, Health and Safety, Communications and Alumni Relations.

Find out more about the Department, our work and our people at chem.ox.ac.uk

Equality, Diversity and Inclusion in Oxford Chemistry

We are committed to promoting an inclusive and diverse community of students and staff based on core values of respect, equality and collaboration. The Department has an active Equality, Diversity and Inclusion (EDI) committee and since 2015 we have held an Athena SWAN silver award in recognition of our efforts to introduce organisational and cultural practices which promote gender equality and create a better working environment for all. We promote family-friendly policies and support flexible working arrangements where possible. For more information about the University's family friendly benefits, please also see https://hr.admin.ox.ac.uk/information-for-parents-and-carers

Mathematical, Physical and Life Sciences Division

The academic administration of the University is conducted through four divisions (Humanities, Social Sciences, Mathematical, Physical and Life Sciences, and Medical Sciences). The Mathematical, Physical and Life Sciences Division consists of ten constituent departments: The Department of Chemistry, the Department of Computer Science, the Department of Earth Sciences, the Department of Engineering Science, the Department of Materials, Mathematical Institute, the Department of Physics, Department of Plant Sciences, Department of Zoology and the Department of Statistics. The division provides a framework for interdisciplinary teaching and research. There are also links with the Medical Sciences Division.

The disciplines within the MPLS Division regularly appear at the highest levels in rankings, including the Times Higher Education and QS world rankings. Nationally, the quality of the Division's research outputs and environment, and the resulting impact, was recognised through strong performances in the UK Research Excellence Framework in both 2014 and 2021.

For more information please visit: http://www.mpls.ox.ac.uk/

How to apply

Applications are made through our online recruitment portal. Information about how to apply is available on our Jobs website https://www.jobs.ox.ac.uk/how-to-apply.

Your application will be judged solely on the basis of how you demonstrate that you meet the selection criteria stated in the job description.

As part of your application you will be asked to provide details of two referees and indicate whether we can contact them now.

You will be asked to upload a CV and a supporting statement. The supporting statement must explain how you meet each of the selection criteria for the post using examples of your skills and experience. This may include experience gained in employment, education, or during career breaks (such as time out to care for dependants)

Please upload all documents **as PDF files** with your name and the document type in the filename

All applications must be received by **midday** UK time on the closing date stated in the online advertisement.

If you currently work for the University please note that:

- as part of the referencing process, we will contact your current department to confirm basic employment details including reason for leaving
- although employees may hold multiple part-time posts, they may not hold more than the equivalent of a full time post. If you are offered this post, and accepting it would take you over the equivalent of full-time hours, you will be expected to resign from, or reduce hours in, your other posts(s) before starting work in the new post.

Information for priority candidates

A priority candidate is a University employee who is seeking redeployment because they have been advised that they are at risk of redundancy, or on grounds of ill-health/disability. Priority candidates are issued with a redeployment letter by their employing department(s).

If you are a priority candidate, please ensure that you attach your redeployment letter to your application (or email it to the contact address on the advert if the application form used for the vacancy does not allow attachments).

If you need help

Application FAQs, including technical troubleshooting advice is available at: https://staff.web.ox.ac.uk/recruitment-support-faqs

Non-technical questions about this job should be addressed to the recruiting department directly *at recruitment@chem.ox.ac.uk*

To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will receive an automated email from our online recruitment portal to confirm receipt of your application. **Please check your spam/junk mail** if you do not receive this email.

Important information for candidates

Data Privacy

Please note that any personal data submitted to the University as part of the job application process will be processed in accordance with the GDPR and related UK data protection legislation. For further information, please see the University's Privacy Notice for Job Applicants at: https://compliance.admin.ox.ac.uk/job-applicant-privacy-policy. The University's Policy on Data Protection is available at: https://compliance.admin.ox.ac.uk/data-protection-policy.

The University's policy on retirement

The University operates an Employer Justified Retirement Age (EJRA) for very senior research posts at **grade RSIV/D35 and clinical equivalents E62 and E82** of 30 September before the 70th birthday. The justification for this is explained at: https://hr.admin.ox.ac.uk/the-ejra.

For **existing** employees on these grades, any employment beyond the retirement age is subject to approval through the procedures: https://hr.admin.ox.ac.uk/the-ejra.

There is no normal or fixed age at which staff in posts at other grades have to retire. Staff at these grades may elect to retire in accordance with the rules of the applicable pension scheme, as may be amended from time to time.

Equality of opportunity

Entry into employment with the University and progression within employment will be determined only by personal merit and the application of criteria which are related to the duties of each particular post and the relevant salary structure. In all cases, ability to perform the job will be the primary consideration. No applicant or member of staff shall be discriminated against because of age, disability, gender reassignment, marriage or civil partnership, pregnancy or maternity, race, religion or belief, sex, or sexual orientation.

Benefits of working at the University

Employee benefits

University employees enjoy 38 days' paid holiday, generous pension schemes, flexible working options, travel discounts including salary sacrifice schemes for bicycles and electric cars and other discounts. Staff can access a huge range of personal and professional development opportunities. See https://hr.admin.ox.ac.uk/staff-benefits

Employee Assistance Programme

As part of our wellbeing offering staff get free access to Health Assured, a confidential employee assistance programme, available 24/7 for 365 days a year. Find out more https://staff.admin.ox.ac.uk/health-assured-eap

University Club and sports facilities

Membership of the University Club is free for University staff. It offers social, sporting, and hospitality facilities. Staff can also use the University Sports Centre on Iffley Road at discounted rates, including a fitness centre, powerlifting room, and swimming pool. See www.club.ox.ac.uk and https://www.sport.ox.ac.uk/.

Information for staff new to Oxford

If you are relocating to Oxfordshire from overseas or elsewhere in the UK, the University's Welcome Service includes practical information about settling in the area, including advice on relocation, accommodation, and local schools. See https://welcome.ox.ac.uk/

There is also a visa loan scheme to cover the costs of UK visa applications for staff and their dependants. See https://staffimmigration.admin.ox.ac.uk/visa-loan-scheme

Family-friendly benefits

We are a family-friendly employer with one of the most generous family leave schemes in the Higher Education sector (see https://hr.web.ox.ac.uk/family-leave). Our Childcare Services team provides guidance and support on childcare provision, and offers a range of high-quality childcare options at affordable prices for staff. In addition to 5 University nurseries, we partner with a number of local providers to offer in excess of 450 full time nursery places to our staff. Eligible parents are able to pay for childcare through salary sacrifice, further reducing costs. See https://childcare.admin.ox.ac.uk/.

Supporting disability and health-related issues (inc menopause)

We are committed to supporting members of staff with disabilities or long-term health conditions, including those experiencing negative effects of menopause. Information about the University's Staff Disability Advisor, is at https://edu.admin.ox.ac.uk/disability-support. For information about how we support those going through menopause see https://hr.admin.ox.ac.uk/menopause-guidance

Staff networks

The University has a number of staff networks including for research staff, BME staff, LGBT+ staff, disabled staff network and those going through menopause. Find out more at https://edu.admin.ox.ac.uk/networks

The University of Oxford Newcomers' Club

The University of Oxford Newcomers' Club is run by volunteers that aims to assist the partners of new staff settle into Oxford, and provides them with an opportunity to meet people and make connections in the local area. See www.newcomers.ox.ac.uk.

Research staff

The Researcher Hub supports all researchers on fixed-term contracts. They aim to help you settle in comfortably, make connections, grow as a person, extend your research expertise and approach your next career step with confidence. Find out more https://www.ox.ac.uk/research/support-researchers/researcher-hub

Oxford's Research Staff Society is a collective voice for our researchers. They also organise social and professional networking activities for researchers. Find out more https://www.ox.ac.uk/research/support-researchers/connecting-other-researchers/oxford-research-staff-society