

Job Description and Selection Criteria

Job title	Marie Curie Early-Stage Researcher (ESR)
Division	Mathematical Physical and Life Sciences
Department	Physics
Location	Clarendon Laboratory
Grade and salary	MC ESR – from £31,377 per annum (depending on employer deductions, personal circumstances and the applicable exchange rate)
Hours	Full time - 37.5 hours per week
Contract type	Fixed-term until 31 Aug 2019
Reporting to	Prof Laura Herz, Prof Michael Johnston, Prof Henry Snaith
Vacancy reference	130574
Additional information	<p>Closing date – midday (UK time) on 25 September 2017</p> <p>Under the terms of the EC funding, which aims to promote mobility within the research community, to be eligible for the post, candidates must not have been resident in the UK for more than a total of 12 months in the past three years. Persons who have obtained a doctorate by the starting date of the fellowship, or had more than 4 years of full time research experience are ineligible.</p>



For Research posts:

Research topic	Interfaces in opto-electronic thin film multilayer devices
Principal Investigator / supervisor	Prof Laura Herz
Project team	Prof Laura Herz, Prof Henry Snaith, Prof Michael Johnston
Project web site	https://www-herz.physics.ox.ac.uk/research.html https://www-thz.physics.ox.ac.uk/Michael.html https://www2.physics.ox.ac.uk/research/photovoltaic-and-optoelectronic-device-group
Funding partner	European Commission (Horizon 2020)
Recent publications	Energy Environ. Sci., 10 (2017), pp. 361-369 Nature Communications, 7 (2016), p. 11755 Science, 354 (2016), pp. 861-865 Science, 351 (2016), pp. 151-155 Acc. Chem. Res., 49 (2016), p. 146–154

The role

Marie-Curie Early-Stage Researcher (ESR)

The main purpose of these Early Stage Researcher (ESR) positions is to provide training through research into novel optoelectronic materials. This interdisciplinary project is part of the Marie Curie Integrated Training Network for the advancement of research into Interfaces in opto-electronic thin film multilayer devices, INFORM. The overall goal of INFORM is an understanding of fundamental electronic processes (charge injection & extraction, charge transfer & transport, charge separation & recombination) that occur at interfaces in organic/organic and inorganic/organic-based multilayer devices. More specifically, work will elucidate how interfacial composition, microstructure, structural and energetic order/disorder and conformation at the interfaces impact the optoelectronic phenomena, how they determine the performance of organic and inorganic/organic hybrid devices and their lifetime. The gained knowledge will benefit the design of more reliable structures that can be manufactured cheaply over large areas. A particular emphasis of the projects based at Oxford is on materials designed for low-cost photovoltaic cells that have the potential to offer energy generation from renewable sources. The Oxford investigators currently have leading research portfolios in the areas of hybrid photovoltaics research, including materials such as hybrid perovskites and organic-inorganic semiconductor nanocomposites with which these ESR projects will link. In addition, several secondments to participating project partner are planned, which will serve to broaden the ESRs' training experience and research breadth. Other partners in this project are Imperial College London, Technion, University of Bayreuth, Humboldt Universität Berlin, TU Eindhoven, Holst Center, InnovationLab, Université de Fribourg, University of Cyprus & Universitat de Valencia.

Please see below for individual research project descriptions

Please note that stringent Marie Curie ESR eligibility criteria apply under the terms of the EC funding, which aims to promote mobility within the research community. Therefore, to be eligible for the post, candidates must not have been resident in the UK for more than a total of 12

months in the past three years. Persons who have obtained a doctorate by the starting date of the fellowship, or had more than 4 years of full time research experience are ineligible.

Under these terms, these positions can be suitable for a student embarking on a first doctoral degree. But they may also serve as early postdoctoral positions for researchers who, at the time of appointment, are close to completing a PhD at another university but have not yet been awarded this degree.

A PhD Studentship may be available, but in these circumstances different terms and conditions will apply.

Description of the research project

Project Title: “Optimization of charge-carrier diffusion lengths in hybrid metal halide perovskite light absorber layers”

Project supervisors: Prof Laura Herz, Prof Henry Snaith

Project description: Hybrid organic-inorganic metal halide perovskites have emerged very recently as surprisingly effective light-harvesting and charge-collecting materials, with photovoltaic devices based on these materials now exceeding 20% power conversion efficiencies. However, some issues remain to be resolved including the production of stable, efficient lead-free halide perovskites that are less toxic, which we will tackle in this project by identifying best-functioning building blocks for optoelectronic processes to establish structure-property relations. In addition, we will aim to achieve control over grain/particle size, orientation when deposited on flat and rough substrates, and examine particle-particle interaction when perovskite is deposited from solution. To examine the optoelectronic properties of these perovskite materials, we will gain an understanding through spectroscopic probes such as THz photoconductivity spectroscopy. Here, we will identify factors contributing to the large charge diffusion ranges that have been observed, including effects of atomic substitutions, e.g. incorporation of different metals or halides, crystal structure, presence of polymer binder. Another objective of the project is the identification of trap states through spectroscopic means, and the development of methods for their passivation. Overall, we aim to gain a fundamental understanding of perovskite materials regarding diffusion length, its dependence on structure, processing aids, and composition.

Responsibilities

- Participate in the INFORM training programme, including secondments to network partners
- Develop a Personal Career Development Plan which will address generic, transferable and task-specific skills training needs
- Manage own academic research and administrative activities. This involves small scale project management, to co-ordinate multiple aspects of work to meet deadlines
- Adapt existing and develop new scientific techniques and experimental protocols
- Use specialist scientific equipment in a laboratory environment
- Test hypotheses and analyse scientific data from a variety of sources, reviewing and refining working hypotheses as appropriate
- Contribute ideas for new research projects

- Work collaboratively with colleagues on all aspects of research, including in the preparation of scientific reports and journal articles and presentation of papers and posters
- Represent the research group at external meetings/seminars, either with other members of the group or alone
- Carry out collaborative projects with colleagues in partner institutions and research groups.
- Share in communal tasks associated with the smooth running of the research group.
- Provide help and advice to colleagues where appropriate.
- Participate in journal club meetings and research group meetings
- Contribute to teaching and outreach activities of the INFORM network

This job includes the following hazards or safety-critical activities which will require successful pre-employment health screening through our Occupational Health Service before the successful candidate will be allowed to start work:

- Working with category 3b or 4 lasers (laser safety class)

Selection criteria

Essential

- A good (first or upper second class) Masters degree in physics, chemistry or materials science
- Good problem solving skills
- A willingness to foster scientific interactions with other members of the INFORM project
- A willingness to learn new techniques, knowledge and experimental skills and to apply them in an interdisciplinary research environment
- Excellent verbal and written communication skills in English
- Ability and willingness to undertake and contribute to training activities both in Oxford and externally.
- The candidate must conform to the Marie Curie ESR eligibility criteria outlined above
- Candidates wishing to enrol for a doctoral degree (DPhil) during their ESR project need to also satisfy the University of Oxford's requirements for admissions as a graduate student studying for a DPhil in Condensed Matter Physics - in these circumstances different terms and conditions will apply

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. Income from external research contracts in 2014/15 exceeded £522.9m and we rank first in the UK for university spin-outs, with more than 130 companies created to date. 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 Physics

Oxford Physics is one of the largest and most eminent departments in Europe – pursuing forefront research alongside training the next generation of leaders in Physics.

With an academic staff of almost one hundred our activities range from fundamental particles to the furthest reaches of the universe to manipulating matter on an atomic scale. Oxford physicists are probing new ways to harness solar energy, modelling the Earth's atmosphere to predict the future climate, exploring computation on the quantum scale and executing calculations that reveal the fundamental structure of space and time.

For more information please visit: <http://www2.physics.ox.ac.uk/>

Sub-department

The post-holder will be based in the Condensed Matter Physics sub-department, which is one of the six sub-departments that together make up the Department of Physics; these are Astrophysics, Atomic and Laser Physics, Atmospheric, Oceanic and Planetary Physics, Condensed Matter Physics, Particle Physics and Theoretical Physics, with a seventh function (Central Physics) providing administrative and technical support to these sub-departments. Members of all sub-departments take part in research, teaching and matters such as examinations, discussion of syllabi, lectures and liaison with undergraduates and postgraduate students.

Athena Swan Charter

The Department of Physics holds a silver Athena Swan award to recognise advancement of gender equality: representation, progression and success for all.

Mathematical, Physical & Life Sciences Division

The Mathematical, Physical and Life Sciences (MPLS) Division is one of the four academic divisions of the University of Oxford.

The MPLS Division's 10 departments and 3 interdisciplinary units span the full spectrum of the mathematical, computational, physical, engineering and life sciences, and undertake both fundamental research and cutting-edge applied work. Our research addresses major societal and technological challenges and is increasingly focused on key interdisciplinary issues. We collaborate closely with colleagues in Oxford across the medical sciences, social sciences and humanities, and with other universities, research organisations and industrial partners across the globe in pursuit of innovative research geared to address critical and fundamental scientific questions.

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

How to apply

Before submitting an application, you may find it helpful to read the 'Tips on applying for a job at the University of Oxford' document, at www.ox.ac.uk/about/jobs/supportandtechnical/.

If you would like to apply, click on the **Apply Now** button on the 'Job Details' page and follow the on-screen instructions to register as a new user or log-in if you have applied previously. Please provide details of three referees and indicate whether we can contact them now.

You will also be asked to upload a CV, supporting statement, academic transcripts and details of 3 referees. 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).

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

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

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

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 departments.

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)

Should you experience any difficulties using the online application system, please email recruitment.support@admin.ox.ac.uk. Further help and support is available from [www.ox.ac.uk/about the university/jobs/support/](http://www.ox.ac.uk/about_the_university/jobs/support/). To return to the online application at any stage, please go to: www.recruit.ox.ac.uk.

Please note that you will be notified of the progress of your application by automatic emails from our e-recruitment system. **Please check your spam/junk mail** regularly to ensure that you receive all emails.

Important information for candidates

Pre-employment screening

Please note that the appointment of the successful candidate will be subject to standard pre-employment screening, as applicable to the post. This will include right-to-work, proof of identity and references. We advise all applicants to read the candidate notes on the University's pre-employment screening procedures, found at:

www.ox.ac.uk/about/jobs/preemploymentscreening/.

The University's policy on retirement

The University operates an employer justified retirement age for all academic and academic-related posts (grade 6 and above), for which the retirement date is the 30 September immediately preceding the 68th birthday. The justification for this is explained at: www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revaim/.

For **existing** employees any employment beyond the retirement age is subject to approval through the procedures: www.admin.ox.ac.uk/personnel/end/retirement/revisedejra/revproc/

There is no normal or fixed age at which **support staff** in posts at **grades 1–5** have to retire. Support staff may retire once they reach the minimum pension age stipulated in the Rules of the pension scheme to which they belong.

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

Training and Development

A range of training and development opportunities are available at the University. Further details can be found at www.ox.ac.uk/staff/working_at_oxford/training_development/index.html.

For research staff only: Support for Research Staff

There is a particularly wide range of support for career development for research staff. Please visit: www.ox.ac.uk/research/support-researchers to find out more.

Pensions

The University offers generous occupational pension schemes for eligible staff members. Further details can be found at www.admin.ox.ac.uk/finance/epp/pensions/pensionspolicy/.

Information for international staff (or those relocating from another part of the UK)

A wealth of information is available on the University's International Staff website for staff who are relocating to Oxford from abroad, at www.admin.ox.ac.uk/personnel/staffinfo/international/.

The University of Oxford Newcomers' Club

The Newcomers' Club is aimed at helping partners of newly-arrived visiting scholars, graduate students and academic members of the University to settle in and to meet people in Oxford.

Transport schemes

The University offers a range of travel schemes and public transport travel discounts to staff. Full details are available at www.admin.ox.ac.uk/estates/ourservices/travel/.

University Club and University Sports Facilities

The University Club provides social, sporting and hospitality facilities. It incorporates a Club bar, a cafe and sporting facilities, including a gym. See www.club.ox.ac.uk for all further details.

University staff can use the University Sports Centre at discounted rates, and have the chance to join sports clubs. Please visit www.sport.ox.ac.uk/oxford-university-sports-facilities.

Childcare and Childcare Vouchers

The University offers quality childcare provision services at affordable prices to its employees. For full details about the services offered, please visit www.admin.ox.ac.uk/childcare/. **NB: Due to the high demand for the University's nursery places there is a long waiting list.**

The University also offers nursery fee payment schemes to eligible staff as an opportunity to save tax and national insurance on childcare costs. Please visit www.admin.ox.ac.uk/childcare.

Disabled staff

The University is committed to supporting members of staff with a disability or long-term health condition and has a dedicated Staff Disability Advisor. Please visit www.admin.ox.ac.uk/eop/disab/staff for further details.

BUPA - Eduhealth

Bupa Eduhealth Essentials private medical insurance offers special rates for University of Oxford staff and their families www.eduhealth.co.uk/mini-site/.

All other benefits

For other benefits, such as free entry to colleges, the Botanic Gardens and staff discounts offered by third party companies, please see www.admin.ox.ac.uk/personnel/staffinfo/benefits/.