



Postdoctoral Research Associate

Reactivity at the electrode-electrolyte interfaces in Li-ion batteries revealed by Operando X-ray Photoelectron Spectroscopy

Grade and salary: Grade 7 £39,906 – £46,049 pa

Working hours: Full-time 35 hours per week/fte

Tenure: Fixed term contract until November 2029

Location: Liverpool campus

Faculty: School of Physical Sciences

Recruiting department contact: spshr@liverpool.ac.uk. For enquiring about the project please email Elisabetta.Arca@liverpool.ac.uk

Job ref: 118513

The School of Physical Sciences is working to create an inclusive environment which values a diverse workforce, and we recognise that many individuals value flexibility in their work/life balance. We particularly welcome applications from groups that are currently under-represented within the School of Physical Sciences. As an Athena Swan Silver Award holder, we are committed to gender equality. As an institution awarded the Race Equality Charter Bronze Award, we are dedicated to enhancing the representation, advancement, and achievement of minority ethnic staff members. The Department of Physics is a practitioner for the Institute of Physics Project. Additional resources on staff networks and EDI initiatives can be found here: <https://www.liverpool.ac.uk/hr/diversityandequality/>

The Role

Role overview and University context.

Role overview

This post-doctoral research associate (PDRA) position is available as part of the UKRI Future Leaders Fellowship led by Dr Elisabetta Arca and it will be based in the Department of Physics and in the Stepheson Institute for Renewable Energy.

As part of the team, you will be working on developing cutting-edge operando XPS methodologies to understand solid-liquid interfaces in Li-ion batteries. The goal is to develop approaches that apply to full battery systems under real operating conditions, starting with Si-anode as case study, to unravel the dynamics at the electrode-electrolyte interfaces and interphases at an atomic and molecular level.

As part of the project, you will have the opportunity to collaborate with partnering institutions and travel to state-of-the-art facilities to build a profile at the forefront of the field.

In addition to delivering excellence in science, you are expected to contribute to disseminating the results to both a technical audience and the wider public, by contributing to design and delivering outreach events.

As part of the team, you will work in close collaboration and mentor junior team members, while having the opportunity to build a training portfolio that suits your career goals and ambitions.

Key responsibilities and duties:

- Generate results in line with project objectives
- Contribute to the development of the field with your own ideas and initiatives
- Contribute to the dissemination of results both in technical format (e.g., papers, conferences) and to the wider public by engaging with outreach activities
- Support the Department in particular with respect to Equality, Diversity and Inclusion initiatives
- Contribute to maintain the highest standards of Health and Safety in the workplace
- Support the development of junior member of team, such as PhD students and undergraduate interns.
- Undertake other duties commensurate with the grade as required

The Department of Physics

The Department of Physics is part of the School of Physical Sciences, and it was one of the first departments established in the University in 1881. The Department has a long tradition of excellence in physics research and an international reputation in the fields of particle physics, nuclear physics, condensed matter physics and accelerator science.

Our department combines excellent teaching with internationally leading research, recognised in REF 2021 with a Top 10 UK ranking for research outputs and joint 7th for research environment, spanning fundamental discovery and enabling technologies, from national and international experimental programmes to AI- and quantum-enabled physics. We collaborate with the leading institutes and laboratories around the world, including CERN in Switzerland, STFC's Diamond Light Source and Daresbury Laboratory in the UK, ESRF and GANIL in France, GSI and DESY in Germany, and TRIUMF in Canada. Further details on the department can be found on the web site: <http://www.liverpool.ac.uk/physics>

The Stepheson Institute for Renewable Energy (SIRE)

SIRE is a specialist energy technologies research institute, focused on the physics and chemistry that will transform the future of energy generation and storage. It bridges the gap between fundamental science and applied engineering by combining both academically, as well as industrially relevant questions. The institute comprises of staff from the Departments of Physics and Chemistry tackling topics such as lithium batteries, solar fuels, photovoltaics and sustainable chemistry, with a range of interdisciplinary activities. SIRE has a battery research lab equipped with multiple battery cycler, Raman spectrometers, Infrared spectrometers and X-ray Photoelectron spectroscopy systems. Further information can be found at <https://www.liverpool.ac.uk/renewable-energy/>

Additional requirements:

Ability to travel to facilities when needed and upon suitable arrangement.

Manual Handling: The post involves bending, stretching and the manual handling of loads up to 15kg. A system to control the risks is in place. You will be required to complete a health questionnaire. Appointment will be subject to Occupational Health screening

In addition to the above, all University of Liverpool staff are required to:

- Adhere to all University policies and procedures, completing all obligatory training and induction modules, including Equality & Diversity and Health & Safety.
- Support the University's vision to drive forward environmental and social equity through delivery of our [Sustainability Strategy](#) and associated action plans.
- Demonstrate customer service excellence and continuous improvement in engaging with all stakeholders.
- Respect confidentiality: all confidential information should be kept in confidence and not released to unauthorised persons.
- Participate in the University's Professional Development Review scheme and take a proactive approach to own professional development.
- Embody and uphold the University's Vision and Values.

- Demonstrate flexibility in on-campus-presence to enable participation in business-critical activities, including reasonable participation in such things as: open days, invigilation, welcome week activities, confirmation and clearing and financial year-end activities.

About you

Experience

Essential

1. Excellent track record in at least one of these fields:

- Lithium-Ion Batteries
- X-ray Photoelectron Spectroscopy.

Please apply if you have experience in just one of the two. You will have to develop competency on the other as part of your post for which trainings will be provided. Please address explicitly in your application how you will engage with trainings to develop the expertise needed.

2. Experience with at least two of the following techniques: electrochemical methods, XPS, X-ray diffraction, Raman Spectroscopy, Fourier-transform infrared spectroscopy (FTIR).
3. Proven experience in disseminating results to technical audience both written (scientific publications) and verbal (e.g., conference presentations) in an area relevant to this post
 - Quality of the work is the primary criteria, rather than volume of publications or journals impact factors
 - You should demonstrate how you contributed to the publication, and how the expertise you developed in it (including transferable skills) are relevant to this post
4. Proven ability to draft manuscripts.

Desirable

1. Participation in outreach activities
2. Experience or contribution to mentoring junior team members (e.g., undergraduate students, summer interns etc.)
3. Experience using operando/in situ experimental approaches
4. Experience with designing components by CAD programs
5. Coding skills (e.g. Python, IgorPro, Matlab or similar)

Education, qualifications and training

Essential

1. A PhD in Science e.g., Physics, Chemistry, Materials Science or Engineering. Candidates expecting to complete their PhD within 3 months from the closing date are encouraged to apply.

Desirable

1. Placement in a laboratory/research group or industrial host outside the candidate's main research group.

Skills, general and specialist Knowledge

Essential

1. Ability to document and organise work effectively
2. Abilities to work independently, including ability to manage time, tasks and deadlines
3. Ability to process data – please include what software you use for this purpose
4. Knowledge and understanding of common Health and Safety Regulations in laboratory environments, including writing COSHH, SOPs and risk assessments.

Desirable

1. Experience with the preparation and submission of successful proposals (examples include and they are not limited to raising funding, securing time at facilities such as synchrotrons or internal competition for summer projects, depending on your career stage).

Personal attributes

Essential

1. Ability to work effectively as part of a team
2. Demonstrate ability to learning new skills and engaging with complex problems
3. Demonstrate a solution-based approach to research challenges
4. Ability to work in an international, highly diverse and multidisciplinary work environment
5. Uphold the highest standards of research integrity

Desirable

6. Ability to mentor junior colleagues and help them organising tasks where appropriate.

About us

Established in 1881, we are an internationally renowned Russell Group university recognised for our high-quality teaching and research. We are consistently ranked as one of the best universities both nationally and globally, and the majority of our research is rated world leading or internationally excellent. [Find out more about us.](#)

Why Work Here

We recognise, appreciate and celebrate the incredible work our staff do every day. As well as generous terms and conditions, we offer a range of enviable benefits and provide support for colleague's wellbeing and development. Discover more [about working here.](#)

Moving from abroad

As a global institute, we welcome applicants from all nationalities. Moving from a different country can be challenging and we would like to help as much as we can. We have put together some information on eligibility to work documentation, accommodation, schools, healthcare, life in Liverpool and the UK as well as other practical information. Discover more about [moving from abroad.](#)

Our Staff

Whether it be their friendly colleagues, supportive managers or our outstanding facilities, our staff can explain better than anyone what it is like to work for us and why they enjoy their role. See what our [colleagues have to say.](#)

How to Apply

Application process

Our e-recruitment system enables you to register for an online account, where you can view, copy and edit your applications. Set up your account on our [Vacancies Portal.](#)

Once you submit your application you will receive an automatic email acknowledgment. You can view your application at any time by clicking into the application history section of your account.

The recruiting department will endeavour to respond to each application. However, if you have not heard within six weeks of the closing date, please take it that your application has not been successful on this occasion.

In addition to the online application form, please provide the following documents:

- CV of no more than 3 pages
- Covering letter, no more than 1.5 page
- Description of your short- and long-term career plans (no more than 1 page)

- Sample of a written work (e.g., a journal article) with a brief description (150 words maximum) of your contribution to the work and its relevance to this project
- The names of two referees

For questions or informal enquiries about this post please contact Dr Elisabetta Arca (Elisabetta.Arca@liverpool.ac.uk).

Job description

After the closing date this job description will be removed from our website. Should you wish to refer to this information at a later date please ensure you save a copy of this document.

Right to work

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 will be conditional upon you gaining it. If the role is based outside the UK, you will need to demonstrate your right to work for the country in which you are to be based.

Disabilities and alternative formats

If you have any other requirements which will help you access the application or interview process or employment opportunities at the University, or if you require copies documentation in alternative formats, please email: jobs@liverpool.ac.uk or telephone 0151 794 6771.



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DORA