

Research Role Profile

Job Title:	Research Fellow A
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Responsible to:	Head of research group, or principal investigator
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Responsible for:	Not applicable
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Job Summary and Purpose:

To undertake research in accordance with the specified research project(s) under the supervision of the principal investigator.

Main Responsibilities/Activities

To undertake a range of research activities within a specified research area, assuming responsibility for specific areas of projects and making use of new research techniques and methods, in consultation with the research award holder or supervisor. This may include fieldwork, interviews, laboratory experimentation, critical evaluation and interpretation, computer-based data analysis and evaluation or library research.

Using initiative and creativity to identify areas for research develop new research methods and extend the research portfolio. Analysing and interpreting results of own research. Write up results and prepare papers for submission to appropriate journals and conferences, and other outputs as required and/or appropriate. Attend appropriate conferences for the purpose of disseminating research results of personal development. The post holder may also contribute to writing bids for research grants and will contribute to collaborative decision making with colleagues in areas of research.

Continually to update knowledge and develop skills, and translate knowledge of advances in the area into research activity.

To plan and manage own research activity in collaboration with others. To carry out administrative tasks associated with specified research funding, for example risk assessment of research activities, organisation of project meetings and documentation. Implementation of procedures required to ensure accurate and timely formal reporting and financial control.

To contribute to teaching in the Faculty by carrying out student supervision and/or demonstrating within the post holder's area of expertise and under the direct guidance of a member of departmental academic staff, as appropriate.

The post holder may occasionally be required to supervise more junior research staff.

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Person Specification

The post holder must have:

A doctoral degree in a relevant discipline (although individuals who have almost completed a doctoral degree may be appointed). Consideration may also be given to individuals who do not hold a doctoral degree but have required skills based on a number of years experience in specified / relevant fields

The post holder will have authority over some aspects of project work and must be capable of providing academic judgement, offering original and creative thoughts and be able to interpret and analyse results.

Relationships and Contacts

Direct responsibility to the principal investigator or academic supervisor. The post holder may be asked to serve on a relevant Faculty committee. There may be additional reporting and liaison responsibilities to external funding bodies or sponsors. The post holder may work on original research tasks with colleagues in other institutions.

Special Requirements

To be available to participate in fieldwork as required by the specified research project

All staff are expected to:

- Positively support equality of opportunity and equity of treatment to colleagues and students in accordance with the University of Surrey Equal Opportunities policy.
- Help maintain a safe working environment by:
 - Attending training in Health and Safety requirements as necessary, both on appointment and as changes in duties and techniques demand
 - Following local codes of safe working practices and the University of Surrey Health and Safety Policy
- Undertake such other duties within the scope of the post as may be requested by your Manager.

Research Role Profile

Addendum to Role Profile

Job Title: Research Assistant for Lithium-sulfur batteries (LiSTAR project)	Research Fellow (1A)
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Job Summary and Purpose:

This information sheet should be read in conjunction with the accompanying generic Research RA1A Role Profile and will be used for shortlisting processes. More specifically the post holder will be expected to:

The post is funded by the Faraday Institution through the ‘Lithium Sulfur Technology Accelerator (LiSTAr)’ research grant. The Faraday Institution is the UK’s independent institute for electrochemical energy storage research and skills development; with a vision to bring together scientists and industry partners on research projects to reduce battery cost, weight, and volume; to improve performance and reliability (faraday.ac.uk).

The LiSTAr programme aims to establish the foremost international programme on Li-S batteries; launching the UK as a global hub for this emerging technology. Li-S is amongst the most attractive post Li-ion chemistries, with notable operational, cost and weight benefits, however fundamental improvements to cycle life and rate are required to realise its potential. Using a multi-disciplinary, ‘whole-cell’ approach, LiSTAr will systematically tackle these challenges, demonstrating transformative improvements during the project. As part of the ‘whole-cell’ philosophy researchers in the partner universities will focus on improvements to the cathode, develop new electrolytes and redox agents in addition to developing spatio-temporal models across a broad range of scales and optimising the engineering of Li-S devices.

LiSTAr involves close collaboration of the University of Surrey and this post with the research teams from other universities, namely: University College London, Imperial College London and the universities of Southampton, Nottingham, Cambridge and Oxford. The university research is supported by a core group of seven strategic industrial partners, together with a group of additional industrial supporters.

Research Role Profile

Main Responsibilities/Activities

1. Carry out simulations at molecular scale, including DFT (density functional theory) simulations and MD (molecular dynamics) simulations.
2. Develop models of equations, discretise them following finite difference technique and implement them in computer code, currently in fortran.
3. Carry out simulations of ion transport using the continuum mesoscopic model above to design materials and optimise performance of Li-S battery.
4. Extend the continuum model and computer code to incorporate phenomena and effects, as per the project plan.
5. Carry out experimental work to determine parameters, microstructural data, material properties and reaction kinetics constants to be used as input data for the continuum model simulations. Carry out experimental work to validate the model.
6. Write reports on different parts of the project work and annual reports.
7. Organise, participate and give out presentations at project meetings to funder representatives, project academic partners, and Industrial Advisory Board.
8. Maintain confidentiality and respect the policy for confidentiality of the LiSTAR project, in particular before any publications or conference presentations.
9. Write and publish research papers in high reputation/high impact journals.
10. Give presentations at international conferences.

Person Specification

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The post holder must have:

1. A first degree in Physics, Engineering or Materials.
2. A PhD or an EngD or equivalent work experience in the areas of materials science and engineering or electrochemical devices, with research focus as specified below in 3a and 3b.
3. Excellent research expertise in the following two areas:
 - a. Expertise in simulations and results analysis at atomic level (DFT (density functional theory) simulations and MD (molecular dynamics) simulations).
 - b. Programming in Fortran, C, or C++ and model development at continuum level for meso/micro scales. A model, in this case, means developing the full set of equations and the numerical solution for the mass transport problems such as ion transport in batteries and supercapacitors. If such exact expertise is missing, we shall consider candidates with experience in programming/coding for computational fluid dynamics or heat transfer/mass transfer (continuum level).
4. Excellent record of publications of research papers in journals.

It would also be desirable for the post holder to have:

1. Experimental skills in the areas of: materials processing; electrochemical device fabrication and testing; and microstructural, physical and chemical material characterisation (e.g. UV/vis, XPS, XRD).

Relationships and Contacts

The posts will be shared between two Departments at the University of Surrey: the Materials Group in the Department of Mechanical Engineering Sciences, and the Electrochemical Group in the Department of Chemical and Process Engineering.

The main academic staff responsible for all PDRA_s in this project is:

Professor Tina Lekakou and Dr Teng Zhang from Mechanical Engineering Sciences (MES); email: C.Lekakou@surrey.ac.uk

and Dr Qiong Cai from Chemical and Process Engineering; email: Q.Cai@surrey.ac.uk