

Research Associate in Polymer science (Simulation) **CERPS - Core exposure in responsive polymer systems** **(Full Time and Fixed term for 18 months)**

Job Ref: REQ241086

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

For nearly 50 years Materials Science and Technology has been a core strength here at Loughborough, contributing to the advancement of the field through teaching, research and enterprise activities. Computational work will be supported by access to the High Performance Computing service (<https://www.lboro.ac.uk/services/hpc-support/>). This role is embedded within the thriving Polymer Synthesis and Processing group within the Department of Materials, in which key research areas are; responsive polymers for sensing and medical imaging, sustainable polymer synthesis and processing of degradable composites. This is a vibrant, inclusive research group and the corresponding synthetic work will be supported by researchers within the group using a wide range of polymer synthesis, processing and characterisation techniques, including the Loughborough Materials Characterisation Centre (LMCC <https://www.lboro.ac.uk/research/lmcc/>).

Project Description

Polymer nanoparticles – that have diameters around one thousand times less than the thickness of a human hair - are used in a wide variety of applications, from drug delivery and medical imaging, through to engine oil additives. Responsive polymers are becoming more widely used in these applications, offering advantages such as controlled release or selective thickening of liquids. These particles typically have an unreactive coating to shield from unwanted interactions with their surroundings. However, if the correct balance of smart polymer with unreactive shell within the particles is not achieved, problems can occur such as; rapid clearance by the liver or cell death (in drug delivery and imaging) or irreversible binding to surfaces (in oil additives and recovery). In this project computer simulations will be coupled with practical experiments, to predict what the outside of a responsive smart polymer particle will look like when it responds to its environmental conditions. This will allow us to predict when the surface will change, and design more effective, safer smart polymer particles for use in drug delivery, imaging and oil additives.

This is an EPSRC funded project, supervised by Dr Helen Willcock (Loughborough University, UK) and Dr Martin Greenall (University of Lincoln, UK).

The Research Associate will be responsible for the simulation of responsive polymer particles, working alongside a synthetic chemist.

Experience in applying computational and/or theoretical techniques to materials is required, with a background in soft matter or physical chemistry preferred but not essential.

The candidate is expected to possess a first degree and have or be near to completing a PhD in a relevant subject, with proven capacity to work independently and in a team.

The Research Associate will be based in the Department of Materials in the School of Aeronautical and Automotive Engineering at Loughborough University.

Job Description

Job Grade: Specialist and Supporting Academic Grade 6

Job Purpose

To conduct research in computational polymer science and to work with synthetic polymer chemists to develop design rules to predict the solution behaviour of core-crosslinked responsive polymer particles.

Job Duties [suggested wording to include a breakdown of at least 3 project specific requirements of the role]

- *To use computational tools (dissipative particle dynamics) to study the solution behaviour of core-crosslinked responsive polymer particles.*
 - *To work with synthetic polymer chemists to understand and guide the experiments.*
 - *To develop design rules to predict the solution behaviour of the particles.*
-
- Be responsible for conducting the day to day running of the project.
 - To formulate detailed plans for the project based on broad guidance from the project team.
 - To feed back to the project team on progress, to make recommendations for next steps.
 - Produce regular progress presentations and present outcomes to other team members.
 - Travel to attend meetings and make presentations both within the project partners working group and to external stakeholders.
 - To support the project team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.
 - To write research papers suitable for publication in high quality academic journals.
 - To attend and contribute to conferences.
 - To contribute to project promotion and public engagement events.
 - Contribute ideas for new research and enterprise directions.
 - Maintain confidentiality at all times and ensure that intellectual property (IPR) agreements are not violated.
 - To assist the academic staff in the project team with the supervision of undergraduate MSc and PhD project work and day-to-day supervision and support of other researchers.
 - Where appropriate, to deliver teaching, tutorial and laboratory sessions to students.
 - Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.
 - Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

Organisational Responsibility

Reports to Dr Helen Willcock, Senior Lecturer (Department of Materials)

Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Assessment Centre/Presentation
- 3 – Interview

Essential Criteria

| Area | Criteria | Stage |
|----------------------|--|---------|
| Experience | Background in applying computational and/or theoretical techniques to materials. | 1, 2, 3 |
| | Authoring original work for academic journal papers, conference papers or technical reports | 1 |
| Skills and abilities | Willingness to work closely with experimental scientists to exchange knowledge and design experiments | 3 |
| | Excellent written and oral communication skills | 3 |
| | Self-motivated with ability to meet deadlines and show initiative | 1, 2, 3 |
| | Excellent interpersonal, and organisational skills | 3 |
| | Ability to write project reports and make technical presentations to industrial and academic research groups | 1, 2, 3 |
| | Ability to work independently and in a team. | 1, 2, 3 |
| Qualifications | PhD (or near completion) in a relevant subject | 1 |
| Other | Commitment to observing the University's Equal Opportunities policy at all times. | 3 |

Desirable Criteria

| Area | Criteria | Stage |
|----------------------|---|---------|
| Experience | Experience of simulation techniques in soft matter or physical chemistry. | 1, 2, 3 |
| | Working in a high-quality academic research environment | 1 |
| Skills and abilities | Authoring original work, in the highest quality refereed academic journals | 1 |
| | A strong publication track record | 1 |
| | Working knowledge of dissipative particle dynamics | 1, 2, 3 |
| Training | Demonstrate evidence of having undertaken further training in the essential and desirable skills listed above | 1 |

Conditions of Service

The position is FULL TIME and FIXED TERM for 18 months . Salary will be on Specialist and Supporting Academic Research, Grade 6, Salary Band £34,866 - £45,163per annum, at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's Terms and Conditions of Employment for STAFF GRADES 6 AND ABOVE, details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which can be found [here](#).

The University offers a wide range of employee benefits which can be found [here](#).

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements. We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>

Applications

The closing date for receipt of applications is **10 January 2025**.