

## Research Associate in Microfluidics

### ***FAST for bio-analysis in microfluidic devices***

REQ200431

**As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.**

***Department of Chemical Engineering***

### **Project Description**

Colloidal particles are ubiquitous in a broad range of industrial applications, including drug delivery, medical diagnostics/therapeutics, pharmaceuticals and food. In this context, microfluidics has proven to be a valuable tool for the synthesis, manipulation and characterisation of such particles, including stimuli-responsive liposomes and functionalised hydrogel/solid nanoparticles. The combination of particle-based and microfluidic technologies can lead to a new generation of bio-analytical microdevices with the potential to overcome many limitations of traditional laboratory technologies.

In this project, new strategies for colloidal particle manipulation based on interface-driven transport phenomena will be adopted to develop proof-of-principle bio-analytical microfluidic devices. The project will focus on the synthesis of bespoke bio-sensing nanoparticles and the design and development of microfluidic systems for the rapid and ultrasensitive detection of target analytes based on nanoparticle manipulation.

This project, based at the Particle Microfluidics Group ([www.particlemicrofluidics.com](http://www.particlemicrofluidics.com)), is funded by the EPSRC research grant "*Particle Filtration and Accumulation by Solute-driven Transport (FAST) for bio-analysis in microfluidic devices*". The project will require close collaboration with internal and external members of the research group, as well as visits to our academic partner in France.

### **Job Description**

**Job Grade:** Specialist and Supporting Academic Grade 6

**Job Purpose:** To undertake research as part of the "*FAST for bio-analysis in microfluidic devices*" research programme and work with academics, researchers, research students and project partners to deliver the programme aim and objectives. To manufacture bio-sensing responsive nanoparticles, to fabricate and operate microfluidic devices for nanoparticle manipulation based on in-house protocols, to develop proof-of-principle microfluidic assays and characterise their performance in terms of speed, sensitivity and selectivity. To disseminate the outcomes of the research project through the preparation of journal articles and presentation at international conferences and scientific meetings.

## **Job Duties**

- To gain a thorough knowledge in the fields of colloid and interface science, low-Reynolds numbers hydrodynamics, bio-physics and bio-chemistry of lipid membranes via independent study.
- To collaborate with our academic partner, including short and medium-term visits.
- To design and develop microfluidic devices by soft-/photo-lithography techniques (e.g. PDMS replica moulding and microfluidic stickers).
- To manufacture and characterise lipid-based functional and responsive nanoparticles for bio-analytical applications by extrusion or other methods.
- To use techniques of epi-fluorescence microscopy, confocal fluorescence microscopy, scanning electronic microscope, dynamic light scattering, electrophoretic light scattering, and others.
- To conduct experimental investigations of the dynamic of nanoparticles in microfluidic devices for bio-analysis and quantify the device performance in terms of sensitivity and time for analysis.
- To develop code in Matlab/Python/C++ for the analysis and post-processing of the experimental data.
- To interpret the experimental data in accordance with existing theoretical framework and develop appropriate theoretical and numerical models to understand and interpret the experimentally observed phenomena.
- To manage technical equipment and provide training to other users as required.
- To write periodic reports and journal articles for publication on research outcomes from the project and make presentations at workshops, meetings and conferences.
- To present research results at periodic teleconferences and meetings with the project partner.
- 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.
- To perform risk assessments, method statements and implement safety procedures.
- To maintain confidentiality at all times and ensure that intellectual property agreements are not violated.
- 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.
- To undertake such other duties as may reasonable be 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 Guido Bolognesi, Lecturer in Bioengineering.

## 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	Recent relevant research in an academic environment	1,3
	Experience in research projects on either colloid and interface science or experimental microfluidics	1,3
	Experience in one or more of the following: epi-fluorescence microscopy, confocal fluorescence microscopy, design and fabrication of microfluidic devices, manufacture of fluorescent liposomes	1,3
	Evidence of writing academic papers	1,3
	Experience of project planning and management	1,3
	Knowledge of colloid and interface science and low Reynolds number hydrodynamics	1,3
Skills and abilities	Ability to coordinate project activities, manage project tasks, prioritise and meet deadlines	1,3
	Ability to manage laboratory equipment, including the organisation of equipment training sessions, preparation of Standard Operating Procedures (SOP) documents, management of equipment booking calendars and equipment troubleshooting.	1,3
	Working knowledge of computing environment for data analysis and post-processing, such as Matlab and Python	1,3
	Ability to work independently and also as part of a team	1,3
	Excellent written and oral communication skills	1,3
	Excellent interpersonal, and organisational skills	1,3
	Ability to network with other academics and engage with project stakeholders	1,3
	Ability to write project reports and make technical presentations to industrial and academic research groups	1,3
	Skills in finding information in the scientific literature and proposing original ideas	1,3
	Knowledge of relevant Health & Safety issues	1,3
Training	A willingness to undertake further training as appropriate and to adopt new procedures as and when required	1,3
Qualifications	A relevant PhD qualification (or near completion) in Chemical or Mechanical Engineering, Physics. Chemistry or a subject relevant to the project.	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1
	Commitment to maintain confidentiality at all times	1,3

	Willingness to travel and do medium-term visits to project partners	1,3
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### Desirable Criteria

Area	Criteria	Stage
Experience	Experience in supervising junior members (e.g. PhD or final year project students)	1,3
	Knowledge of the principles of bio-physics and bio-chemistry of lipid membranes	1,3
	Experience in teaching in Chemical Engineering or other relevant areas	1,3
	Experience in using techniques of optical trapping and optical manipulation	1,3
Skills and abilities	Authoring original work, in the highest quality refereed academic journals	1
	Use of professional work processing software (Latex)	1
Qualification	PhD (or near completion) in colloid and interface science or experimental microfluidics	1,3

### Conditions of Service

The position is full time and fixed term for 12 months. Salary will be on Specialist and Supporting Academic Research, Grade 6, Salary Band £30,942 - £40,322 per 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 **3 August 2020**. Interviews will be held on **10 August 2020**.