



PDRA in Low Temperature Plasma Modelling

Grade and salary: Grade 7. £39,105 – £45,163 pa (pay award pending 1 March)

Working hours: Full time, 35 hours per week

Tenure: Fixed term until 31 August 2028

Location: Liverpool campus

Faculty: Faculty of Science and Engineering, Electrical Engineering and Electronics department

Recruiting department contact: mihasan@liverpool.ac.uk

Job ref: 090213

The Role

Role overview and University context:

We are seeking to recruit an enthusiastic, highly motivated Postdoctoral Research Associate (PDRA) to work on an exciting EPSRC project "Plasma-triggered gelation". The starting date of the project is the 1st of April 2025. This is a highly multidisciplinary skills project involving three universities.

You will be working closely with Dr Mohammad Hasan in the Department of Electrical Engineering and Electronics at the University of Liverpool. Your role will include building a computational model for the interaction of a plasma with a solution undergoing the sol-gel transition process. The role also includes conducting experimental validation against experimentally available data, analysis and dissemination of results in journal papers and conferences.

You should have a PhD degree (or near completion) in Electrical Engineering, Chemical Engineering, Mechanical Engineering, Physics or a closely related subject. Research experience and excellent knowledge in numerical modelling of plasmas is essential. To fulfil all the deliverables of the project you will work closely with team members as well as external collaborators. You should therefore be enthusiastic in the discipline, committed, and motivated, with an aptitude for independent working, as part of a diverse, interdisciplinary team.

Dr. Hasan has been working for many years on numerical modelling of low temperature plasmas and their interaction with solids and liquids. His work covered plasma dynamics over a range of operating pressures and a variety of discharge configurations. He has also studied the associated phenomena such as heat transfer, gas flow, reaction kinetics, and atomic/molecular processes induced by plasma. His models were validated against many advanced laser diagnostics including Particle Image Velocimetry and Laser Induced Fluorescence.

Further information on Mo can be found here:

<https://www.liverpool.ac.uk/people/mohammad-isam-hasan>

By working on this project, you will be a member of the Technological Plasma Group, whose research activities cover a range of topics in experimental and modelling studies of low temperature plasmas. Spanning fundamental science, as well as applications, the group conducts research on environmental clean-up, energy conversion, surface modification, material processing and biology.

In a broader context, the Electrical Engineering and Electronics Department at Liverpool is at the forefront of research in this fast-moving discipline and its postgraduate body is one of the largest in the University, encompassing world-class fundamental and applied research.

The specific research activities in the Department of Electrical Engineering & Electronics have been enhanced by an emphasis on a number of interdisciplinary outward-facing research themes:

- Autonomous Systems and Technologies.
- Data Science.
- Energy Technologies and Complex Systems.

- Networks and Communications.
- Sensors, Diagnostics and Biomedical Devices.

Staff actively contribute to these themes and to University and Faculty priority areas (including: Big Data, Autonomous Systems; Risk and Uncertainty; Computation Biology).

The Department has a very active postgraduate research programme. There are also a large number of visitors from overseas universities, research institutes and industry. There is close involvement with more than 50 major companies and research organisations. Collaboration with UK and foreign universities is a fundamental feature of our research.

Key responsibilities and duties:

- Carrying out high quality research under the supervision of Dr Hasan.
- Constructing multiscale Multiphysics numerical models to describe plasma-liquid interactions, as the liquid undergoes the sol-gel transition.
- Carrying out experimental validation of the built models and refining them to improve consistency with experiments.
- Communicating and disseminating research outcomes to a wider audience through publications and presentations.
- Preparing papers for publication in leading international journals and independently writing reports.
- Working both independently and as part of the team, engaging in knowledge-transfer and outreach activities where appropriate and feasible.

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.
- 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.
- Demonstrate customer service excellence in dealing with all stakeholders.
- Embody and uphold the University's Vision and Values.

About you

Experience

Essential

1. Demonstrated experience with numerical modelling of plasmas, as evident by publications.
2. Excellent research output as appropriate for career stage.

Desirable

1. Demonstrated experience with experimental validation of numerical models of plasma.
2. Demonstrated experience with multi-dimensional plasma models.
3. Demonstrated experience with Computational Fluid Dynamics.

Education, qualifications and training

Essential

1. A PhD degree awarded (or near completion) in Electrical, Chemical, Mechanical Engineering, Physics or a closely related field.
2. Strong background in Mathematics.

Desirable

1. Strong background in numerical methods for solving partial differential equations.
2. Familiarity with complex fluids.

Skills, general and specialist knowledge

Essential

1. Familiarity with at least one finite element package such as COMSOL, OpenFoam, or any other finite element package.
2. Familiarity with chemical reactions and how they are modelled numerically.

Desirable

1. Excellent knowledge of Low Temperature plasmas.
2. Excellent knowledge of Computational Fluid Dynamics
3. Familiarity with numerical modelling of complex fluids.
4. Familiarity with advanced stabilisation techniques for strongly coupled numerical models.

Personal attributes

Essential

1. Demonstrated ability to work both independently and as a member of a team.
2. Demonstrated ability to work proactively to progress a research project.
3. Demonstrated ability to take ownership and responsibility for projects and to manage own workload and that of others.
4. Willingness to travel within the UK and internationally for research collaboration and/or to attend conferences and workshops.

Desirable

1. Confident in networking with the ability to build, maintain and grow collaborations with colleagues both domestically and internationally.
2. Willingness to explore new ideas and develop new concepts beyond the scope of the project.

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.

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 we make to you will be conditional upon you gaining it. The UKVI have an interactive tool allowing you to immediately see if vacancies are eligible for a Skilled Worker visa. You will need to know the SOC code for the role, view our [most used SOC codes](#), if none of these apply to this role, there are more codes on the eligibility checker. The skilled worker eligibility checker can be found on [GOV.UK](#).

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.

