



UNIVERSITY OF LEEDS

Access to Research

Research Internship Programme



Candidate brief:

Laser-based flow measurement in a molten salt (Leeds Institute for Fluid Dynamics)



Access to Research (A2R) Internships give you the opportunity to experience the research environment in your chosen field, think about whether a career in research is the right choice for you, and develop invaluable knowledge and skills to strengthen your application to PhD programmes.

Laser-based flow measurement in a molten salt

Project supervisors: Dr Alistair Baker, Dr David Harbottle, Professor Bruce Hanson
Department: Leeds Institute for Fluid Dynamics (Centre for Doctoral Training in Fluid Dynamics)

Role type: Full-time

Duration: 6 weeks

Start date: Monday 01 July 2024

Salary: £2,709 (£12.90/hr)

Location: This is a lab-based research project which will take place on-campus at the University of Leeds. If you do not live within commuter distance but are interested in applying, or may require assistance to cover the cost of your commute if your application is successful, please contact pgrdiversity@leeds.ac.uk

Project summary

This internship involves working in the MULTIFORM facility to assist in the testing and commissioning of instruments.

MULTIFORM (Multiphase Fluid Flow In Nuclear systems) is a facility based at the University of Leeds with the dedicated aim to enable world class research on multiphase fluid flow, at a scale that is representative of a real system. The facility will provide top-of-the-range instrumentation for high-fidelity validation of computational fluid dynamics models in order to predict performances in a variety of nuclear reactors, transportation or separation units.

MultiFORM consists of five major components:

1. A bank of high precision, state of art, instruments for measuring a wide range of fluid flow properties.
 - a. PIV – particle image velocimetry
 - b. LDA – laser doppler anemometry
 - c. FBRM – focussed beam reflectance measurement
 - d. Rheometer
 - e. High speed camera
2. A pilot scale test bed, based on a water flow system that can also be used with nitric acid.
3. A pilot scale test bed, based on a molten chloride flow system.
4. A 3-stage pilot scale centrifugal contactor rig
5. A multi-scale centrifugal contactor rig

The project will test and commission laser-based flow measurement (items 1a and 1b) on the molten salt loop (item 3).

Currently there are no molten salt flow facilities anywhere in the UK, one in the EU and one in the US, none with PIV and LDA measurement capability. MULTIForm has a completely new and novel approach to applying PIV and LDA in a molten salt system using a machined sapphire block as the window.

The intern will work with the Experimental Officer to run a series of experiments on the molten salt loop, capturing fluid flow data via the PIV + sapphire window. Initially, this is to prove the concept works, but if fully successful, this will lead to a “first” publication of data. Once data has been successfully captured, the knowledge will underpin an operating manual for future researchers to use.

Developmental benefits

This internship offers a great opportunity for any student who wishes to go onto a PhD after their degree, work in a technical support organisation (e.g. national laboratory) or is going into their final year, with a research project. The intern will learn how to set up experiments, analysed data and disseminate the results.

Essential criteria

Applicants to this project should have:

- A passion and enthusiasm for experimental research. Whilst it is recognised the candidates may have little direct experience of laboratory-based research, they need to show that this is an area they want to develop
- A willingness and ability to learn new skills; e.g. operation of a PIV instrument and molten salt loop
- Good IT skills, specifically programmes that may be used for data analysis such as Excel, MATHCAD, Origen
- A good awareness and understanding of safety culture
- Proven ability to write high quality documents. Students should be prepared to submit an example of their work as part of their application

Who should apply

This research internship is funded by the Yorkshire Consortium for Equity in Doctoral Education (YCEDE). In line with the consortium’s mission, applications are open to individuals who:

- Are currently registered on a relevant undergraduate or taught postgraduate degree programme at any UK university
- Are eligible for Home (UK) rate of higher education tuition fees
- Self-identify as being Black, Asian or belonging to another minoritised ethnic group

If your application is successful you will need to provide proof of your right to work, such as a UK passport, as well as confirmation of enrolment on your current degree programme (if not currently a student at the University of Leeds).

If you have any questions or would like to discuss your eligibility, please contact pgrdiversity@leeds.ac.uk

How to apply

You should review the essential and eligibility ('Who should apply') criteria carefully, then complete the [A2R Internship Application Form](#), specifying which research project you are applying to. If your application is shortlisted, you will be invited to attend a short online panel interview with the project supervisor and colleagues from the Faculty of Biological Sciences.

Applications open on Wednesday 13 March and close at 17:00 on Monday 29 April

Support in completing your application

If you have any questions about your application, require information for candidates with disabilities, impairments or health conditions, or would like to request alternative formats, please do not hesitate to contact pgrdiversity@leeds.ac.uk