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Future Fluid Dynamics

Research Internship Programme

Candidate brief

Micro-splashes: Unravelling particle-droplet interactions

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Micro-splashes: Unravelling particle-droplet interactions

Project supervisors: Professor Andrew Bayly
Department: School of Chemical & Process Engineering

Duration: 6 weeks FT (or PT equivalent)
Start date: June 2025
Stipend: £3,517
Location: University of Leeds campus

Project summary

Collisions between particles and droplets is important to numerous natural and industrial systems, from atmospheric flows, to particle formation in process equipment and pollution control. Think removal of dust by rain droplets, which is important for pollution, or the manufacturing of food products, such as milks, where particle agglomerates are made due to particle-droplet collisions and the resulting structure controls the product performance. Being able to predict and understand the outcomes of these collisions, is important for scientists and engineers to predict the behaviour of these systems. This project will look at the fundamentals of binary particle-droplet collisions and build on successful work on binary droplet-droplet and particle-droplet collisions.

The project will focus on systems where the particle is smaller than the droplet as there is limited data for these systems and many important applications and will explore the influence of size, density and surface properties on collision outcomes. An existing rig and image analysis tools will be used as the basis of the work. With the support of the supervisor, the intern will need to optimize this experimental set-up for the new particles, plan their experimental work in the context of the existing literature, execute their plan with agility to respond to unexpected results, analyse and report their data to the research group.

Developmental benefits

The successful applicant will develop an understanding of what it is like to work in engineering research and whether a potential career in the area is something they would like to pursue via a PhD or otherwise. Additionally, the successful applicant will develop technical, research and professional skills and build their network. In particular:

- Knowledge and expertise in dispersed multi-phase flows – particle and droplet Dynamics
- Experimental skills including droplet generation, high-speed imaging
- Image processing and analysis
- Coding and Matlab
- Independent research and analysis skills
- Experimental skills – rig design, optimization,
- Experimental design
- Data analysis and data communication
- Teamworking
- Project management
- Communication skills

Essential criteria

Applicants to this project should have:

- Practical aptitude for experimentation and attention to detail
- Familiarity with Matlab, or demonstrated ability to pick this up fast
- Pragmatic, problem solver who works well in unstructured environment
- Curiosity and perseverance to further knowledge and understanding
- Great verbal and written communication skills

Who should apply

On order to be considered for this opportunity, applicants must be eligible for the **Home (UK) rate of postgraduate academic fees**, must **not** have previously undertaken a research internship with the Leeds Centre for Doctoral Training in Future Fluid Dynamics **and meet one or more** of the below criteria:

- First in family to go to university
- From a Black, Asian or other minoritised ethnic group
- Neurodivergent (e.g. ASD, ADHD) and/or Disability (e.g. physical impairments, mental health condition, learning difficulties, chronic illness)
- Identify as female
- Have caring responsibilities
- Have been outside of education for 5 or more years
- Studying/studied at a university that is not a member of the Russell Group*

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

How to apply

Before making an application, you should review the essential and eligibility criteria above. Please note that if you do not meet the stated eligibility criteria your application will not be shared with the shortlisting panel for review.

You can submit your application by completing the form below:

Future Fluid Dynamics Internship Programme (2025): Application form

Applications close at 23:59 on Friday 31 January 2025.

If you have any questions about your application, please contact Emily Bryan-Kinns by email at e.bryan-kinns@leeds.ac.uk.

If you require information for disabled applicants, or would like to request alternative formats, please contact the PGR Diversity Team by email at pgrdiversity@leeds.ac.uk.