UNIVERSITY OF LEEDS

# CANDIDATE BRIEF

## Summer Research Internship – Future Fluid Dynamics CDT

## Faculty of Engineering and Physical Sciences


**Salary: Grade 4 (£26,707 - £28,778 p.a.)**

**Reporting to: Dr Declan Finney, School of Earth and Environment**

**Reference: EPSMA1136**

**Closing date: Monday 01 June 2026**

**Fixed term (between 6-12 weeks, available from 01 June 2026 - to complete specific time limited work)**

**Location: Leeds Main Campus**

**We are open to discussing flexible working arrangements**

# Summer Research Internship - Future Fluid Dynamics CDT, Faculty of Engineering and Physical Sciences.

**Are you interested in gaining first-hand experience of the research environment in fluid dynamics at the University of Leeds? Would you like to explore this opportunity to help you make an informed decision about progressing to postgraduate research? Would you like to develop knowledge, skills and experience to strengthen your application for research degree opportunities?**

The EPSRC Centre for Doctoral Training (CDT) in Future Fluid Dynamics, hosts an annual internship programme throughout summer. This opportunity is designed to enhance access to postgraduate research for individuals from underrepresented groups, supporting a more diverse and inclusive research community.

The programme allows prospective postgraduate researchers to gain first-hand experience of the research environment in fluid dynamics at the University of Leeds. This experience will assist them to help informed decisions around progression to PGR and to develop relevant knowledge, skills and experience that can strengthen their applications to research degree opportunities. The centre provides advanced training and research opportunities in the field of fluid dynamics, with the aim of equipping future academics and industry practitioners with the interdisciplinary skills required to tackle complex fluid-related challenges across a range of industrial and scientific sectors. Research areas are Engineering and Physical Sciences, Environment, Biological Sciences, or Medicine and Health.

## Widening participation

**Applications are open to those who have *not* undertaken a research internship previously, and meet one or more of the following criteria**:

- The first in their family to go to university;
- From Black, Asian or other minoritised ethnic groups;
- Neurodivergent (e.g. ASD, ADHD) and/or Disability (e.g. physical impairments, mental health condition, learning difficulties, chronic illness);
- Are 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.

### About the project

Title: Hydrogen pre-ignition induced by lubricant droplet

This project addresses a critical challenge in the transition to zero-carbon transport: hydrogen pre-ignition (PI) in heavy goods vehicle engines. Hydrogen's low ignition energy makes engines highly susceptible to damaging premature combustion, often triggered by interactions with lubricant oil droplets. This research aims to develop a novel fast-screening experimental method to evaluate and rank the pre-ignition propensity of next-generation lubricants, directly supporting the development of cleaner, more reliable hydrogen combustion engines.

You will conduct fundamental experiments using specialised combustion equipment (e.g., a Rapid Compression Machine) to introduce a single lubricant droplet into a controlled hydrogen-air environment. The project will systematically investigate how key parameters including compression temperature, pressure, hydrogen-air mixture ratio, and droplet size influence ignition behaviour. The goal is to establish a reliable protocol that can differentiate between lubricant formulations, providing vital data for our industrial partner, BP, to design advanced lubricants with minimal pre-ignition risk.

This internship offers unique hands-on experience in advanced thermofluids experimentation, training in LabVIEW and SolidWorks, and direct exposure to industry-linked research. You will become an integral part of the Leeds Combustion research team, contributing to a project with tangible impact on the UK's 2050 net-zero transport strategy.

## Overview of the role

To undertake independent research project supervised by an academic at the University of Leeds. This project will take place over 210 hours worked over a period of 6 weeks to 3 months during summer.

### Main Duties and responsibilities

- Undertake experimental research tasks within the Thermofluids Laboratory;
- Set up optical systems for experimentation;

- Execute experiments using the Rapid Compression Machine (RCM);
- Record and analyse pressure data and high-speed images;
- Compile findings and write a comprehensive technical report;
- Create a comprehensive technical report covering the experimental methodology, data collected, analysis performed, results, and conclusions regarding the impact of test parameters on pre-ignition propensity. Raw and post-processed pressure data and high-speed images.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

## Developmental benefits

- The intern will learn about hydrogen combustion dynamics, lubricant tribology, and the thermofluidic challenges specific to decarbonising heavy-duty transport;
- Learn to plan and execute a structured experimental matrix, manage time effectively and adapt to research challenges;
- Practice documenting methods, analysing data, and synthesising findings into clear written reports and verbal presentations for both academic and industry audiences;
- Experience working as part of an active research team, contributing to group discussions, and learning from PGR and PDRA researchers;
- Gain direct insight into industrially-driven R&D through collaboration with engineers from BP;
- Achieve the tangible satisfaction of contributing to a project with direct relevance to the UK's 2050 net-zero transport strategy, enhancing the purpose and impact of the work.

# Qualifications and skills

### Qualifications

- Open to graduates or current second- or third-year undergraduates eligible for the Home (UK) fee-rate at postgraduate research (PGR).


**Essential**

- Curiosity and willingness to learn skills and techniques;
- Critical thinking;
- Good verbal and written communication skills;
- Ability to work both independently and as part of a team;
- Project specific:
    - Knowledge of thermofluids, combustion, or sustainable energy systems;
    - Practical aptitude for hands-on experimental work in a laboratory environment;
    - Strong analytical and problem-solving skills for troubleshooting experiments and interpreting complex data.

**Desirable**

- Project specific:
    - Prior hands-on experience in a mechanical, chemical, or fluids laboratory setting;
    - Familiarity with data acquisition or instrumentation software such as LabVIEW;
    - Basic proficiency with CAD software, such as SolidWorks, for simple component design;
    - Coding experience in MATLAB Image Processing Toolbox.

## How to apply

You can apply for this role online; more guidance can be found on our How to Apply information page. Applications should be submitted by **23:59** (UK time) on the advertised closing date.

Please upload a supporting statement (Word or PDF) with the following details:

- An **introduction** to yourself and a **brief overview** of why you are applying for your chosen project and the internship;
- An outline demonstrating how you meet all **essential** and **desirable criteria** in the job description. Please address each criterion separately, clearly referencing the specific criterion;
- A description of which **widening participation criteria** mentioned in the job description you satisfy.

## Contact information

To explore the post further or for any queries you may have, please contact:

**Dr Junfeng Yang, Associate Professor**
Email: J.Yang@leeds.ac.uk

OR

**Patricia Grant, Centre Manager**
Email: P.Grant@leeds.ac.uk

## Additional information

**Faculty and School Information**
Further information is available on the research and teaching activities of the Faculty of Engineering & Physical Sciences, and the School of Mathematics.

**Working at Leeds**
We are a campus-based community and regular interaction with campus is an expectation of all roles in line with academic and service needs and the requirements of the role. We are also open to discussing flexible working arrangements. To find out more about the benefits of working at the University and what it is like to live and work in the Leeds area visit our Working at Leeds information page.

**A diverse workforce**
As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Engineering and Physical Sciences we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

We have identified that women are currently underrepresented in this role and particularly welcome applications. Candidates will always be selected based on merit and ability.

The Faculty of Engineering and Physical Sciences are proud to have been awarded the Athena SWAN Silver Award from the Equality Challenge Unit, the national body that promotes equality in the higher education sector. Our equality and inclusion webpage provides more information.

**Information for disabled candidates**
Information for disabled candidates, impairments or health conditions, including requesting alternative formats, can be found under the 'Accessibility' heading on our How to Apply information page or by getting in touch by emailing HR via hr@leeds.ac.uk.

**Criminal Record Information**
**Rehabilitation of Offenders Act 1974**
A criminal record check is not required for this position. However, all applicants will be required to declare if they have any 'unspent' criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our Criminal Records information page.