



UNIVERSITY OF LEEDS

# Access to Research

Research Internship Programme



## Candidate brief:

Bio-inspired nano/micro-structured materials for water harvesting applications (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.

## Bio-inspired nano/micro-structured materials for water harvesting applications

**Project supervisor:** Dr Sepideh Khodaparast

**Department:** Leeds Institute for Fluid Dynamics (Centre for Doctoral Training in Fluid Dynamics)

**Role type:** Full-time

**Duration:** 6 weeks

**Start date:** June/July 2024 (flexible)

**Salary:** £2,709 (£12.90/hr)

**Location:** This project requires two days of lab work per week 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, please contact [pgrdiversity@leeds.ac.uk](mailto:pgrdiversity@leeds.ac.uk)

### Project summary

Micro/nano-patterned surfaces have found increasing applications in various emerging technologies, thanks to their interesting functionalities related to wetting, adhesion, acoustic and bactericidal effects. However, the task of developing practical techniques to fabricate large area of such surfaces in a well-controlled and cost-effective manner remains challenging.

In this project we aim to investigate the efficacy of micro/nano-patterned surfaces for water harvesting applications. To overcome the water shortage crisis, it is becoming more important to extract water from all available alternative resources in an efficient and environmentally friendly manner. Recent research has shown that the fog in nature can be used for this purpose. Plant-based waxes will be used in this research as a sustainable raw material, employing crystallisation as an energy-efficient scalable route for the fabrication of patterns onto the surface. The crystallisation approach is inspired by approach used for the generation of intricate patterns on plant leaves.

A series of nano-patterned surfaces will be generated in this project using porous metallic and cellulose-based substrates. Waxes derived from rice bran, candelilla, carnauba and rape seed plants will be used. We will start the project by characterising the structure of the surface using optical and electron microscopy. We will then investigate the water collecting capacity of the fabricated in environments of various humidity. This project allows access to technical (micro-fabrication, optical and electron microscopy, and microfluidics) and scientific (fluid mechanics and material science) trainings and thus is appropriate for students with either physical science and engineering background.

Initial training for practical work, introduction to literature survey and data processing will be conducted in-person by the project supervisor. At least 2 days per week will be spent with the project supervisor during practical laboratory work and project discussion sessions. You will also join weekly group meetings and closely follow the research of one of the centre's current postgraduate researchers each week.

## **Developmental benefits**

This project will provide the successful applicant with the opportunity to develop:

- General research skills: independent learning, literature survey, presentation, scientific writing
- Technical skills: Advanced microscopy, High-speed imaging, scientific data analysis
- Professional skills: teamwork, time management, resource management

## **Essential criteria**

Applicants to this project should have:

- High level of curiosity and inclination to explore, learn, and innovate
- Strong written and verbal communication skills
- Strong attention to detail
- Ability to work well in a team environment
- Ability to think critically

## **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](mailto: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](mailto:pgrdiversity@leeds.ac.uk)