

## Research Associate in *Nonlinear Waves in Stratified Fluids*

Job Ref: REQ260041

**As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.**

### Project Description

Loughborough University invites applications for a Postdoctoral Research Associate position in Nonlinear Waves, for a duration of **two and half years**. The successful candidate will join the Department of Mathematical Sciences to work with Dr. Ricardo Barros on the research project "Internal Solitary Waves of Mode-2: Theory, Models and Experiments", funded by the Leverhulme Trust. The position includes a generous allowance for travel, training, and dissemination activities.

The project spans the interface between experimental fluid dynamics and applied mathematics and will make significant contributions to both areas. Its goal is to develop a comprehensive mathematical and physical description of mode-2 internal solitary waves (ISWs), thereby enhancing our understanding of these phenomena in the oceans and other stably stratified fluids. For the first time, the research will provide an integrated mathematical, computational, and experimental study of mode-2 ISWs, building on recent results from the research team, who were the first to discover solutions of the governing fluid dynamic equations describing these waves and to generate them in the laboratory under realistic oceanic density profiles. The project will employ a range of techniques, including mathematical modelling, asymptotic analysis, numerical analysis, and scientific computing, and will involve collaboration with colleagues at Newcastle University, the University of Bath, Penn State University (USA), and the New Jersey Institute of Technology (USA).

We are looking for candidates with a strong research background in applied mathematics, fluid dynamics, nonlinear waves, or closely related areas. Applicants should have expertise in numerical methods for dispersive nonlinear partial differential equations. Familiarity with numerical solutions for the fully nonlinear Euler equations for homogeneous or stratified fluids would be advantageous, although not essential.

Informal enquiries are encouraged and can be directed to Dr. Ricardo Barros (R.Barros@lboro.ac.uk).

### Job Description

**Job Grade:** Specialist and Supporting Academic Grade 6

#### Job Purpose

*To conduct research in the area of nonlinear waves in stratified fluids. To develop the numerical and analytical tools to understand the generation and stability of single- and multi-humped mode-2 waves in stratified fluids*

#### Job Duties

- *To become familiar with the current state of the art in the area of nonlinear waves in stratified fluids.*
- *To develop conduct research on novel and existing models for waves in stratified fluids.*
- *To write research papers suitable for publication in high quality academic journals.*
- *To attend and contribute to conferences.*
- *To support the research team by enhancing relationships with existing collaborators and by assisting the establishment of relationships with new collaborators.*

- *Travel to attend meetings and make presentations both within the project partners working group and to external stakeholders.*
- *Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.*
- *Undertake other duties as may be reasonably requested and that are commensurate with the nature and grade of the post.*

## Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility entailed.

## Special Conditions

All staff have a statutory responsibility to take reasonable care of themselves, others and the environment and to prevent harm by their acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Policy & Procedures.

All staff should hold a duty and commitment to observing the University's Equity & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equity & Diversity legislation and University policies/procedures.

Successful completion of probation will be dependent on attendance at the University's mandatory courses which include Respecting Diversity and, where appropriate, Recruitment and Selection.

## Organisational Responsibility

Reports to the Principal Investigator.

## Person Specification

Your application will be reviewed with respect to meeting the essential and desirable criteria listed below. Your application will be reviewed against the essential and desirable criteria listed below. Applicants are strongly advised to explicitly state and evidence how they meet each of the essential (and desirable) criteria in their application. Stages of assessment are as follows:

- 1 – Application
- 2 – Test/Assessment Centre/Presentation
- 3 – Interview

## Essential Criteria

| Area                 | Criteria  | Stage |
|----------------------|---|-------|
| Experience           | Research experience in nonlinear waves in fluids                    | 1,3   |
|                      | Expertise in numerical methods for PDEs                             | 1,3   |
|                      | Expertise in mathematical modelling in fluid dynamics               | 1,3   |
|                      | Authoring original work for academic journal papers                 | 1     |
|                      | Experience delivering presentations at conferences and/or workshops | 1     |
| Skills and abilities | Proficiency in MATLAB   | 1,3   |

|                |   |     |
|----------------|---|-----|
|                | Excellent written and oral communication skills                                   | 1,3 |
|                | Self-motivated with ability to meet deadlines                                     | 1,3 |
|                | Excellent interpersonal, and organisational skills                                | 3   |
|                | Working knowledge of specific analytical and numerical methods in the area        | 1,3 |
| Qualifications | PhD (or near completion)  | 1   |
| Other          | Commitment to observing the University's Equal Opportunities policy at all times. | 3   |

### Desirable Criteria

| Area                 | Criteria   | Stage |
|----------------------|--|-------|
| Experience           | Prior experience in the area of density stratified fluids                  | 1,3   |
|                      | Working knowledge of the boundary integral method for PDEs                 | 1,3   |
|                      | Developing proposals for funding from external agencies                    | 1,3   |
|                      | Working in a high-quality academic research environment                    | 1     |
|                      | Teaching and / or supervision of students                                  | 1     |
| Skills and abilities | Authoring original work, in the highest quality refereed academic journals | 1     |
|                      | A strong publication track record  | 1     |

### Conditions of Service

The position is full time and fixed term for 30 months. Salary will be on Specialist and Supporting Academic Grade 6, (£35,608- £46,049 per annum), at a starting salary to be confirmed on offer of appointment. The appointment will be subject to the University's Terms and Conditions of Employment for staff grades 6 and above, details of which can be found [here](#).

The University is committed to enabling staff to maintain a healthy work-home balance and has a number of family-friendly policies which can be found [here](#).

The University offers a wide range of employee benefits which can be found [here](#).

We also offer an on-campus nursery with subsidised places, subsidised places at local holiday clubs and a childcare voucher scheme (further details are available at: <http://www.lboro.ac.uk/services/hr/a-z/childcare-information---page.html>)

In addition, the University is supportive, wherever possible, of flexible working arrangements. We also strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a Bronze Athena SWAN award which recognises the importance of support for women at all stages of their academic career. For further information on Athena SWAN see <http://www.lboro.ac.uk/services/hr/athena-swan/>