

Research Associate in Risk-based Flood Forecasting

REQ190818

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.

School/Department summary

Research and teaching in the School of Architecture Building and Civil Engineering (ABCE) is driven by 63 academic staff, 34 technical and clerical support staff, 40 contract researchers and over 120 doctoral students. The School benefits by having academic staff from a wide variety of backgrounds, with a resulting rich diversity of perspectives.

The undergraduate programmes include Civil Engineering, Construction Engineering Management, Commercial Management and Quantity Surveying, Architectural Engineering and Design Management, Air Transport Management, and Transport and Business Management.

At MRes level we train the next generation of multi-disciplinary researchers in energy demand. At MSc level, we offer programmes in Low Energy Building Services Engineering and Low Carbon Building Design as well as in Water and Waste Engineering, Construction Management, Transport Policy and Business Management. These programmes are all accredited by the Professional Institutions. The EPSRC Centre for Doctoral Training in Energy Demand will support over 50 PhD students.

In all courses the academic content is directly aligned to the needs of the industry and there is a high level of sponsorship in our portfolio of programmes. Our record of graduate employment is second to none and we have been ranked 1st or 2nd in the National Student Survey for the last 6 years. Further information may be found from - <http://www.lboro.ac.uk/departments/civil-building/>

In the 2014 Research Excellence Framework, the School was ranked fifth in the Architecture and Built Environment Unit of Assessment with 87% of the work judged as either "world leading" or "internationally excellent". Importantly, this was achieved whilst still returning 100% of staff; world class research pervades the School. The research environment was ranked first overall; Loughborough is the best place in which to build a career in energy research.

The international standing of our research is exemplified by our growing portfolio of collaborations with other leading universities and research institutes worldwide. These include: the UNSW Sydney, University of California at Berkeley, MIT, Chongqing, Hong Kong, Iowa State, Oklahoma State, RMIT, Georgia State and Penn State.

We are equally proud of our collaborations with industry where we count organisations such as Willmott Dixon, Electricite de France, The BRE, Honeywell, Anglia Water and Biffa. Built Environment research is increasingly informing government policy through, for example, the Department of Energy and Climate Change and The Committee on Climate Change. For more on our research go to:

<http://www.lboro.ac.uk/schools/cv/research/index.html>

Project Description

The current international collaborative project, entitled "Building a Flood Hazard Impact Model for India (FHIM-India)", is funded by the UK Met Office through the Newton Fund programme, "*Weather and Climate Science for Service Partnership - India*". FHIM-India aims to develop a novel and practical methodology to develop and integrate flood impact scenarios into a risk-based flood forecasting and warning framework. The newly developed approach will be demonstrated in a case study area in India. The resulting Flood Hazard Impact Model will be the first step towards operational deployment, bringing benefits to social welfare and economic development through the flood mitigation potential it affords. The application of the model to elsewhere will be also explored within the project.

The mentioned Flood Hazard Impact Model will be developed using the Hazard Impact Framework approach, or HIF, established under the Natural Hazards Partnership (NHP). The NHP is a partnership of UK government

agencies, including the Met Office, and has created innovative real-time Hazard Impact Models (HIMs) for Surface Water Flooding, Vehicle Over-Turning from wind and landslides. The HIF consolidates the learning from developing these HIMs and aims to document an overarching methodological approach applicable to building real-time HIMs for a range of natural hazards, such as floods and landslides, and at national scales. The consortium for this project brings together NHP leads on flooding (Centre for Ecology & Hydrology (CEH)) and impacts (Health and Safety Executive (HSE)) plus experts on high-resolution inundation modelling (Loughborough University (LU)). The UK team will work closely with relevant WCSSP-India in-country partners to gather user-requirements, experience and supporting data and information, and to ensure the project outputs are fit-for-purpose.

Job Description: Risk-based flood forecasting

Job Grade: Specialist and Supporting Academic (Research) 6

Job Purpose

The Postdoctoral Research Associate will further develop and apply the in-house flood modelling software HiPIMS for risk-based real-time flood forecasting.

Job Duties

Research

- To work with the project team to further develop the Loughborough in-house high-performance hydrodynamic flood model HiPIMS by coupling it with the Grid to Grid (G2G) hydrological model for large-scale flood forecasting.
- To work with the in-country partners and develop new tools to collect and process data from different sources to support high-resolution flood modelling.
- To work with the project team to co-design flood scenarios and perform scenario simulations to produce flood hazard maps that will be used for creating a library of flood impact scenarios.
- To work with the project team to integrate flood hazard and impact modelling for risk-based real-time flood forecasting.
- To write and publish high-quality journal papers to report novel research outputs.

General, technical

- To assist PI/Co-Is in project management and help prepare project delivery plan and progress reports.
- To write research papers suitable for publication in high-quality academic journals and for presentation at specialist scientific conferences and reports (if necessary) for dissemination of research outputs to non-technical audience.
- To report research progress and work efficiently with the wider FHIM-India team to ensure successful delivery of the proposed research.
- To attend and contribute to project meetings and other engagement events.

General and administrative

- To work effectively with relevant administrative, technical and academic staff in the School and across the University.
- To engage in training programmes in the University (e.g. through Staff Development) which are consistent with your needs and aspirations and those of the project team and the host School.
- To carry out other specific duties as may be reasonably requested by the project leaders 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 Equality & Diversity policy and procedures at all times. Duties must be carried out in accordance with relevant Equality & 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: Dr Xilin Xia

Person Specification

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	Background in engineering or science.	1,3
	Experience of developing and applying hydrological and hydrodynamic models for flood inundation modelling and impact/risk assessment.	1,3
	Experience of processing large datasets using Python, Matlab or other tools.	1,3
	Publication of academic articles or papers on engineering or science topics.	1
Skills and abilities	Ability to undertake the duties and responsibilities of the post.	1,3
	Proven programming skills in developing hydrodynamic flood inundation models and processing large datasets.	1,3
	Excellent written and oral communication skills in English.	1,2,3
	Ability to work independently and as part of a team.	3
Training	Willingness to undertake appropriate further training and to adopt new procedures as and when required.	1
Qualifications	A PhD in computational hydraulics/hydrology or other relevant areas	1
Other	Commitment to observing the University's Equal Opportunities policy at all times.	1,3
	Willingness to travel.	3

Desirable Criteria

Area	Criteria	Stage
Experience	Experience of using C++ and GPU high-performance computing languages (e.g. CUDA) and working on Linux-based HPC clusters.	1,3
	Teaching and / or supervising students in relevant areas.	1,3
	Writing research proposals for funding from internal/external sources.	1,2,3
Skills and abilities	Knowledge of uncertainty analysis and data assimilation in hydrological/hydraulic modelling.	
	Ability to efficiently work with datasets from different sources using GIS and other data management tools.	1,3
	Knowledge of pluvial and fluvial flood forecasting.	1,3

Qualifications	Academic degrees in hydraulics/hydrology, or related fields	1
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Conditions of Service

The position is **full-time** and **fixed-term** for up to 18 months (*term length to be reduced if candidate commences role post October 2019 due to funding restrictions*). Salary will be within Specialist and Supporting Academic Grade 6 (£30,942 - £38,017) per annum at a starting salary to be confirmed on offer of appointment.

The appointment will be subject to the University's normal Terms and Conditions of Employment for Grade 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 are available at <http://www.lboro.ac.uk/services/hr/a-z/family-leave-policy-and-procedure---page.html>.

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/>