

## JOB DESCRIPTION

<b>Vacancy reference:</b>	SRF23092
<b>Post Title:</b>	Post-doctoral Research Assistant (PDRA) in Hydrological Modelling
<b>Grade:</b>	Grade 6
<b>School/Department:</b>	SAGES
<b>Reports to:</b>	Prof Anne Verhoef and Dr Joanna Clark
<b>Responsible for:</b>	n/a

### Purpose

The purpose of this post is for the PDRA to assess, through a range of modelling exercises, the effectiveness of Natural Flood Management measures that relate to land management, in the West Thames River Basin across a range of scales from field to small catchment to large river basin.

The PDRA will join a modelling team that includes groundwater modellers (BGS), catchment rainfall-runoff and river hydraulic modellers (JBA and Environment Agency) and land surface/hydrological modellers (UoR).

The researcher will work closely with other project team members developing NFM scenarios, and collecting and processing field and remote sensing data to support modelling work; and Institute of Environmental Analytics who will develop a web-based application to visualise the model outputs. The PDRA will work closely with our Project Partners to evaluate specifically land-based measures that will have the most realisable potential to reduce the integrated risk from pluvial, fluvial and groundwater flooding, e.g. crop choice, tillage practices, tree planting in lowland catchments.

The PDRA will also play an active role in knowledge exchange and the development of events and resources to help communicate this research to scientific, policy, practitioners and public stakeholders.

### Main duties and responsibilities

Research:

- Undertake research under the supervision of the Principle Investigator and Co-Investigators:
  - Conduct a survey on existing models that would allow catchment-wide interaction between vegetation, atmosphere, and the soil water, groundwater and surface water stores/flows to be simulated, in particular with regards to flooding and its alleviation via NFM measures
  - Collate existing datasets of model parameters, driving data and verification data based on in-situ surveys, and continuously monitored data that are required, in addition to data collated by other project PDRAs.
  - Conduct ensemble-type distributed hydrological modelling (including model verification, advanced sensitivity studies and uncertainty analyses) for a number of catchments in the West Thames River Basin across different scales and for different rainfall scenarios
- Contribute to the development and writing of research proposals and projects.

- Contribute to the writing of papers for publication in leading academic journals and other relevant media as lead author and co-author.
- Disseminate research findings and establish a national reputation through participation in national conferences, exhibitions etc.
- Participate in programme level collaborations with the modellers on the two other NERC-funded NFM projects (funding application pending)
- Provide specialist advice to other staff and students within the University
- Work with the field and remote sensing researchers to use land surface models to evaluate the effectiveness of different land-based measures at the field scale
- Work closely with the other researchers on the LANDWISE Modelling Work Package, and with the UoR land surface computational scientist, to streamline and integrate modelling efforts.

#### Enterprise & Outreach:

- Carry out consulting or specialist activities under the supervision of a project leader when required.
- Liaise with external partners in government, industry, NGO organisations and wider community to the University to help share findings of the research beyond academic audiences
- Work with partners to co-design and deliver knowledge exchange resources and activities to meet partner needs
- Attend relevant seminars, conferences, exhibitions and other events
- Contribute to writing and presenting reports for external partners and organisations.

#### Leadership & Management:

- May supervise the work of UG and PG project students
- Undertake project-related administration such as organising regular project or partner meetings, departmental presentations or seminars

### **Supervision received**

The post holder will be responsible to Prof Anne Verhoef (Department of Geography and Environmental Science) and will receive further supervision and guidance from Professor Hannah Cloke and Dr Joanna Clark who leads LANDWISE. It is the aim that the PDRA will spend time with JBA Consulting, working with Steve Rose and others.

### **Supervision given**

The researcher may be offered the opportunity to develop supervision skills by co-supervising UG and PG project students.

### **Contact**

The postholder will be expected to liaise with Academic staff, post-doctoral researchers, PhD students and technical/IT staff both in SAGES and across the University, especially the land surface & hydrological modelling and remote sensing specialists in the Departments of Geography and Environmental Science, and Meteorology. In addition, the postholder will be expected to liaise with the wider LANDWISE team of researchers and project partners.

### **Terms and conditions**

This is a fixed term post of 30 months in first instance, but with the scope of a further extension (application pending). There are no specific hours of work, but the appointee will be required to work such hours as are necessary to carry out the duties associated with the post.

This document outlines the duties required for the time being of the post to indicate the level of responsibility. It is not a comprehensive or exhaustive list and the line manager may vary duties from time to time which do not change the general character of the job or the level of responsibility entailed.

**Date assessed: 17/05/2018**

# PERSON SPECIFICATION

Job Title	School/Department
PDRA in Hydrological Modelling	SAGES/ GES

Criteria	Essential	Desirable
Skills Required	<ul style="list-style-type: none"> <li>• Excellent analytical and problem-solving skills</li> <li>• Ability to communicate effectively, both orally and in writing</li> <li>• Ability to work to deadlines</li> <li>• Ability to run models in a distributed fashion, including via GIS</li> <li>• Ability to handle/post-process/analyse large data sets</li> <li>• Ability to manipulate (including visualisation) large model output datasets</li> <li>• Ability to conduct model sensitivity and uncertainty analyses</li> <li>• Skills in scientific programming (ideally Fortran and/or Python) and data analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Skills relating to model inversion techniques (and/or data-assimilation)</li> <li>• Ability to manipulate large remote sensing datasets</li> <li>• Computing skills in packages for data analysis and visualisation</li> <li>• Skills relating to stakeholder engagement and/or participatory research approaches</li> <li>• Research and project-related administrative skills.</li> </ul>
Attainment	<ul style="list-style-type: none"> <li>• PhD (or soon to obtain PhD) in relevant subject or discipline (e.g. Hydrology or relevant Physical, Environmental Science or lowland catchment modelling)</li> <li>• A good honours degree in relevant subject</li> <li>• Appropriate publication record for career level</li> </ul>	
Knowledge	<ul style="list-style-type: none"> <li>• Catchment processes related to the water balance, as well as water flow pathways</li> <li>• Land surface processes and natural flood management</li> <li>• Tools relating to model sensitivity analyses and statistical analyses of model time-series</li> </ul>	<ul style="list-style-type: none"> <li>• Earth Observation</li> <li>• Agricultural practices/Agri-environment policy</li> <li>• Soil physics</li> <li>• Model inversion techniques</li> <li>•</li> </ul>

<p>Relevant Experience</p>	<ul style="list-style-type: none"> <li>• Experience of public speaking at events/exhibitions etc.</li> <li>• Experience of managing a project</li> <li>• Experience of building and maintaining external contacts/partners in order to drive mutual interests</li> <li>• Experience in working with distributed hydrological models and/or land surface or soil-vegetation-atmosphere-transfer models</li> <li>• Experience in working with numerical models (hydrological and/or those looking at land surface water, energy &amp; carbon exchange).</li> </ul>	<ul style="list-style-type: none"> <li>• Experience in numerical model development</li> <li>• Experience with data-assimilation procedures</li> <li>• Experience in working with lowland catchments</li> <li>• Experience of modelling NFM measures</li> <li>• Experience participating in knowledge exchange activities and working with stakeholders</li> <li>• Experience with coupling of models, e.g. via OpenMI</li> <li>• A track record of publishing research</li> <li>• Experience of providing research and project-related administrative support</li> <li>• Experience supervising students undertaking research projects</li> </ul>
<p>Disposition</p>	<ul style="list-style-type: none"> <li>• Self-motivated and driven to solve problems independently</li> <li>• Willingness to travel regularly to project partner institutions, stakeholder locations, project meetings, workshops, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Willingness to collaborate with scientists and wider partners towards common project goals</li> </ul>

<p>Completed by:</p>	<p>Date:</p>
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