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| Last updated: | <date> |

**JOB DESCRIPTION**

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| Post title: | **Research Fellow** | | |
| Academic Unit/Service: | Geography and Environmental Science | | |
| Faculty: | FELS | | |
| Career Pathway: | Education, Research and Enterprise (ERE) | Level: | 4 |
| \*ERE category: | Research focused | | |
| Posts responsible to: | Professor Justin Sheffield, Dr. Julian Leyland | | |
| Posts responsible for: |  | | |
| Post base: | Office-based | | |

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| Job purpose |
| The post holder will contribute to research projects on hydroclimate variability and extremes under climate change, focused mainly (75%) on 1) A new European Space Agency (ESA) funded project, AFRI-SMART, to develop new approaches based on Earth Observation (EO) data, modelling and assimilation, for sustainable agriculture and water resources in Morocco; and (25%) on 2) ongoing GCRF and NERC funded work using EO data and GIS to assess impacts of sand-mining on bed-level changes and river bank erosion in the Mekong delta.  The ESA project is a collaboration between Politecnico de Milano (lead institution), the Centre d'Etudes Spatiales de la Biosphère, (CESBIO, France), the University of Southampton, UNESCO Intergovernmental Hydrology Programme and stakeholders in Morocco, including the Ministry of Water and regional water resource managers and end-users. The project overall objectives are to 1) co-develop and validate innovative EO-based solutions addressing sustainable water resources and agriculture at national scale. 2) involve end-user entities throughout the project and facilitate integration of the developed solutions into their operational working practices; 3) fully exploit the current observational capacity offered by ESA EO space missions in synergy with state-of-the-art advanced models and other non-EO data, and leverage on cutting edge information technology.  The role of Southampton is to develop a hydrological monitoring and forecasting capacity nationally using a scalable modelling approach to provide national, basin and local (field-scale) predictions. The post holder will work directly with the UK Principal investigator, Professor Justin Sheffield, to undertake research on characterising and understanding the variability and predictability of water resources and hydrological extremes across scales in Morocco, focusing on agricultural and water resource systems case studies. They will develop, test and implement a monitoring and forecasting system working closely with the other research partners to integrate this with EO products and local-scale models of irrigation needs, and with the stakeholders to ensure the system meets end-user needs and is integrated into operations. There will be opportunities to work closely with stakeholders and end-users in Morocco.  The post holder will have the opportunity to disseminate their research at national and international meetings or workshops. The post-holder will also have opportunities to develop knowledge and professional skill sets in: trans- and multi-disciplinary research projects; collaborative and partnership working; policy-influence; and international development issues.  In addition, the successful candidate will further utilise their EO and spatial analysis skills to support the processing and presentation of data which seeks to establish the impacts of sand mining activity on river beds and banks in the Vietnamese Mekong Delta. Working with Dr Julian Leyland, the candidate will synthesise existing data to deliver hazard maps and contribute to a research paper and potential policy documents. There will likely be an opportunity to accompany the team to Vietnam to participate in a locally organised workshop. |

| Key accountabilities/primary responsibilities | | % Time |
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|  | To use statistical and machine learning methods, along with GIS and large-datasets of climate, hydrological and geomorphological data from in-situ sources and satellite remote sensing, along with outputs from hydrological models, and short-term and seasonal climate forecasts, to estimate the variability and predictability of terrestrial water variables and map river related hazards. | 45% |
|  | To use this information and understanding to develop predictive tools and strategies to better manage water and improve crop production and productivity. | 20% |
|  | Collaboratively work with other researchers within the projects based in Southampton and overseas, and with stakeholders in Morocco and Vietnam. | 10% |
|  | Regularly disseminate findings by taking the lead in preparing publication materials for referred journals, presenting results at conferences and project meetings. | 10 % |
|  | Contribute to the writing of project reports and participate in project meetings. | 5% |
|  | Carry out occasional undergraduate supervision, demonstrating or lecturing duties within own area of expertise, under the direct guidance of a member of departmental academic staff. | 5% |
|  | Any other duties as allocated by the line manager following consultation with the post holder. | 5% |

| Internal and external relationships |
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| • Working closely with the Southampton lead Investigator(s)  • Actively engage with Co-Is and stakeholders. |

| Special Requirements |
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| To attend in person or remotely, national, international conferences and project meetings for the purpose of disseminating research results, as allowed under prevailing travel restrictions and personal circumstances of the postholder.  *Applications for Research Fellow positions will be considered from candidates who are working towards or nearing completion of a relevant PhD qualification. The title of Research Fellow will be applied upon successful completion of the PhD. Prior to the qualification being awarded the title of* ***Senior Research Assistant*** *will be given.* |

**PERSON SPECIFICATION**

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| Criteria | Essential | Desirable | How to be assessed |
| Qualifications, knowledge and experience | PhD (or equivalent professional qualifications) and experience in Geography, Engineering, Environmental Science, Mathematics, or Computing Science or a related discipline.  Experience of applying statistical and machine learning methods for prediction to address environmental problems.  Ability to manipulate large datasets in a Unix/Linux environment, and ability to program in a scientific language such as R, Python, C or Fortran.  Experience of Geographic Information Systems (GIS) | Knowledge of water resources and water security issues, agricultural management and food security issues, in particular in dryland environments.  Understanding and experience of working with climate and hydrological data, hydrological/crop models and hydrological forecasting techniques.  Experience of working with satellite remote sensing data of hydrological and crop variables.  Experience of data analysis and modelling in high-performance computing environments. | CV,  publications, references, interview |
| Planning and organising | Ability to conduct research both independently and in collaboration with peers  Able to organise own research activities to deadlines and quality standards |  | CV,  publications, references, interview |
| Problem solving and initiative | Able to develop understanding of complex problems and apply in-depth knowledge to address them  Able to develop original techniques/methods |  | CV,  publications, references, interview |
| Management and teamwork | Experience with collaborative work  Work effectively in a team, understanding the strengths and weaknesses of others to help teamwork development |  | CV,  publications, references, interview |
| Communicating and influencing | Able to present research results at group meetings and conferences  Able to write up research results for publication in leading peer-viewed journals  Work proactively with colleagues in other work areas/institutions, contributing specialist knowledge to achieve outcomes | Track record of writing research articles for publication in high quality journals | CV,  publications, references, interview |
| Other skills and behaviours | Understanding of relevant Health & Safety issues  Positive attitude to colleagues and students |  | references, interview |
| Special requirements | Able to attend national and international conferences to present research results |  | interview |

**JOB HAZARD ANALYSIS**

**Is this an office-based post?**

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| Yes | If this post is an office-based job with routine office hazards (eg: use of VDU), no further information needs to be supplied. Do not complete the section below. |
| No | If this post is not office-based or has some hazards other than routine office (eg: more than use of VDU) please complete the analysis below.  Hiring managers are asked to complete this section as accurately as possible to ensure the safety of the post-holder. |

## - HR will send a full PEHQ to all applicants for this position. Please note, if full health clearance is required for a role, this will apply to all individuals, including existing members of staff.

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| **ENVIRONMENTAL EXPOSURES** | **Occasionally**  (<30% of time) | **Frequently**  (30-60% of time) | **Constantly**  (> 60% of time) |
| Outside work |  |  |  |
| Extremes of temperature (eg: fridge/ furnace) |  |  |  |
| ## Potential for exposure to body fluids |  |  |  |
| ## Noise (greater than 80 dba - 8 hrs twa) |  |  |  |
| ## Exposure to hazardous substances (eg: solvents, liquids, dust, fumes, biohazards). Specify below: |  |  |  |
| Frequent hand washing |  |  |  |
| Ionising radiation |  |  |  |
| **EQUIPMENT/TOOLS/MACHINES USED** | | | |
| ## Food handling |  |  |  |
| ## Driving university vehicles(eg: car/van/LGV/PCV) |  |  |  |
| ## Use of latex gloves (prohibited unless specific clinical necessity) |  |  |  |
| ## Vibrating tools (eg: strimmers, hammer drill, lawnmowers) |  |  |  |
| **PHYSICAL ABILITIES** | | | |
| Load manual handling |  |  |  |
| Repetitive crouching/kneeling/stooping |  |  |  |
| Repetitive pulling/pushing |  |  |  |
| Repetitive lifting |  |  |  |
| Standing for prolonged periods |  |  |  |
| Repetitive climbing (ie: steps, stools, ladders, stairs) |  |  |  |
| Fine motor grips (eg: pipetting) |  |  |  |
| Gross motor grips |  |  |  |
| Repetitive reaching below shoulder height |  |  |  |
| Repetitive reaching at shoulder height |  |  |  |
| Repetitive reaching above shoulder height |  |  |  |
| **PSYCHOSOCIAL ISSUES** | | | |
| Face to face contact with public |  |  |  |
| Lone working |  |  |  |
| ## Shift work/night work/on call duties |  |  |  |