



JOB TITLE Research Associate in Urban Flood Risk Modelling: Sediment Transport & Debris

SCHOOL OF BUILT ENVIRONMENT

Applicant Information – Reference No. 135/12

The School of the Built Environment is one of the UK's leading institutions for multidisciplinary research and teaching in the built environment. We aim to attain excellence in teaching of the core disciplines that contribute to a sustainable, resource and energy efficient built environment and are committed to undertaking high value, high impact research and knowledge transfer in topics of high societal relevance.

Job Description

This post will be based in our Institute of Infrastructure & Environment, which is part of the Edinburgh Research Partnership in Engineering & Mathematics (ERPem www.erp.ac.uk) and is a collaborative research venture with the University of Edinburgh. The Institute aims to be world leading in civil engineering research by delivering excellence in specialist areas of high value, high impact research across a wide range of fields within the professional discipline and we boast a strong reputation in leading research projects in water engineering and water resources.

Due to our continued success in securing external research funding, we are seeking to appoint an enthusiastic, dynamic and well-qualified individual to join the Water Research group. The successful candidate will contribute to the delivery of research specific to the modelling of sediment and debris dynamics associated with flood risk in the urban environment. This will focus upon modelling urban drainage, SuDS, green building components and watercourses to enhance their design for effective transfer of sediment and debris during multiple runoff events and without compromising flood conveyance and or infrastructure scour. Embedded within this will be development of novel field-based research into the tagging and mapping of debris movements through catchment systems. These are research areas where we are on the verge of some significant scientific breakthroughs, having a strong track record of both improving flood inundation modelling via the Flood Risk Management Research Consortium and novel physical modelling of sediment transport and debris blockage. This 30 month RA position is intended to capitalize upon and augment our existing knowledge. The research is part of the EPSRC-funded research programme on *"Delivering and Evaluating Multiple Flood Risk Benefits in Blue-Green Cities"*, which involves 8 universities across the UK. An ability to contribute to external collaborative research activities associated wider research programme is therefore essential, as is a commitment to strategic research output/dissemination.

You will be expected to have a good knowledge of topics across hydraulics, sediment transport and flood risk modelling.

Key Duties and Responsibilities

The post holder will:

- Collate and analyse literature-based quantitative field data on urban sediment and debris source, pathway and receptor;

- Undertake field-based experiments, including the use of innovative radio frequency identification (RFID) tags, to monitor debris movement and location in urban watercourses ;
- Design a strategic numerical modelling programme aligned with the scientific objectives of the job description;
- Execute simulations of hydraulic, sediment and debris dynamics for a range of urban infrastructure & fabrics and analyse these data sets for flood risk;
- Develop and apply methodology associated with assessing the related risk to flood defence assets;
- Work collaboratively with other members of the Blue-Green Cities research team to exchange and analyse complementary data sets;
- Write high-profile publications for peer reviewed journals and disseminate findings at international conferences, workshops and other networking events;
- Support colleagues and informally supervise less experienced members of the research group e.g. to assist PhD students with their professional development;
- Pursue research funding opportunities to expand the portfolio of the research group;
- Undertake administrative, representative and associated tasks as required.

Please note that this job description is not exhaustive, and the role holder may be required to undertake other relevant duties commensurate with the grading of the post. Activities may be subject to amendment over time as the role develops and/or priorities and requirements evolve.

Contractual Information

Job Title: Research Associate in Urban Flood Risk Modelling: Sediment Transport & Debris

School/Section: School of Built Environment

Reporting to: Dr. Heather Haynes, Dr. Scott Arthur & Prof. Gareth Pender

Duration of Post: 30 months

Working Hours: As required to fulfil the role

Disclosure Scotland Requirement: No

Grade/Salary Range: Grade 7 £29,249-£35,938)

Pension Scheme: USS

Annual leave: 30 days plus “buildings closed days”

Sickness benefits: 6 months full pay, 6 months half pay

Start Date: as soon as possible

Person Specification

This section details the attributes e.g. skills, knowledge/qualifications and competencies which are required in order to undertake the full remit of the role.

Attributes	Essential	Desirable	Means of Assessment
Education & Qualifications (<i>technical, professional, academic qualifications and training required</i>)	Completed or writing-up a PhD or equivalent in discipline relevant to the job description: e.g. modelling of hydraulics, sediment transport, debris transport/blockage, flood risk.		Certificate

Experience	<p>Experience of appropriate 1D computational software packages for hydraulic and sediment/debris transport modelling, specifically including ISIS and ISIS-Sediment. A developing track record of publishing research outcomes in high quality academic journals <i>and</i> international conferences.</p> <p>Computer literacy using Microsoft Office and MATLAB software.</p>	<p>Experience of calculating and modelling sediment supply in river catchments (e.g. SWAT).</p> <p>Evidence of undertaking field-work related to sediment transport and/or debris monitoring.</p> <p>Experience of 2D computational software packages for hydraulic and sediment transport modelling (e.g. CAESAR, TUFLOW, MIKE 21).</p> <p>Evidence of undertaking cross-disciplinary collaborative research with one or more of the following disciplines: built environment; sustainable environment; urban planning; socio-economics.</p> <p>Track record of applying for and securing small research grants.</p>	Application form and interview
Competencies, Skills & Knowledge (e.g. effective communication skills, initiative, flexibility, leadership etc)	<p>Demonstrated knowledge of the FRMRC Toolbox for sediment transport modelling.</p> <p>Established knowledge of the scientific theory and mathematical solvers underpinning 1D computer software for hydraulic and sediment transport modelling.</p> <p>Demonstrated ability to robustly apply and defend the parameterization used in 1D hydraulic-sediment/debris model set-up.</p> <p>Proven ability to generate research ideas and implement them independently with a disciplined and methodological approach.</p> <p>Demonstrated track record of</p>	<p>Demonstrated ability to learn new numerical modelling software.</p> <p>Proven ability to show innovative thinking to advance research or resolve a problem.</p> <p>Proven ability to undertake risk assessments for fieldwork.</p>	Application form and interview

	successfully participating in collaborative research.		
	Proven excellent communications skills, both verbal and written (including presentations).		

Essential Criteria – these are attributes without which a candidate would not be able to undertake the full remit of the role. Applicants who do not clearly demonstrate in their application that they possess the essential requirements will normally be eliminated at the short listing stage.

Desirable Criteria – these are attributes which would be useful for the candidate to hold. When short listing, these criteria will be considered when more than one applicant meets the essential criteria.

Other Relevant Information

The research is part of the EPSRC-funded research programme on “*Delivering and Evaluating Multiple Flood Risk Benefits in Blue-Green Cities*”, which involves 8 universities across the UK. As such, applicants must be prepared to travel to progress meetings hosted by collaborators at institutions around the UK. Of particular note is that this research work-package is collaborative with Cranfield University and the successful applicant will be expected to spend short periods of time at this institution through the research programme. The start date for this post is “as soon as possible” and applicants should clearly state their availability on their application.

Application Details

Informal enquiries are strongly encouraged and may be made to Dr. Heather Haynes h.haynes@hw.ac.uk, copied to Dr. Scott Arthur s.arthur@hw.ac.uk or Professor Gareth Pender g.pender@hw.ac.uk

Application Process

Applications should be completed on our application form, available here <http://www.hw.ac.uk/hr/htm/vacancies/HR-Standard-Appl-form-2009.doc> or if you are unable to access this please call 0131-451-3022 for a paper application form.

Forms should be returned to Human Resources no later than 10 September. Applications can be submitted by email to hr@hw.ac.uk or by post to Human Resources, Lord Balerno Building, Heriot-Watt University, Edinburgh EH14 4AS.

For all applications and correspondence about your application, please quote 135/12

The University is committed to equality of opportunity.

Heriot-Watt University and Values

With a history dating back to 1821, Heriot-Watt University has established a reputation for world-class teaching and practical, leading-edge research, which has made us one of the top UK universities for business and industry.

We're a vibrant, forward-looking university, well known for the quality of our degrees with employers actively seeking out our graduates.

Heriot-Watt is also Scotland's most international university with an unsurpassed international in-country presence. We deliver degree programmes to 11,800 students in 150 countries around the world, have a campus in Dubai and boast the largest international student cohort in Scotland.

At Heriot-Watt we've created an environment that nurtures innovation and leadership - where our researchers, staff and students can realise their potential and develop their ambitions.

We're proud of our collegiate atmosphere and integrated teaching and research approach which has helped to build a community of committed academics and highly motivated students. Our focus on careers delivers results and we've an excellent reputation for graduate employability.

We have campuses in Edinburgh, the Borders, Orkney and Dubai where we aim to provide stimulating, supportive environments conducive to effective learning and research, and where staff and students can excel.

At Heriot-Watt, we have an established set of values that help us to nurture innovation and leadership, and show our commitment to continuous improvement and development in all our activities.

Our values describe our deeply held beliefs and our community spirit. They characterise not only how we are as a higher education institution but also frame how we want to be.

Our values are:

- Valuing and respecting everyone
- Pursuing excellence
- Pride and belonging
- Shaping the future
- Outward looking

As a learning, living and working institution, we use our values as the building blocks of how we go about doing our work and how we conduct ourselves as part of Heriot-Watt University. They represent what binds us together as a University community and help us to become the best at what we do.

It's key that all our staff feel part of our achievements, and our values provide your link to our success.

For full details on our University please view our website, www.hw.ac.uk

Heriot-Watt University is a charity registered in Scotland (SC000278).