## Job Description & Person Specification

### Section 1
Role Overview

| Job title: | Research Assistant or Research Fellow in Network Analysis for Off-Grid Sanitation |
| Vacancy reference: | 3375 |
| School/Professional Service Unit: | School of Water, Energy and Environment Cranfield Water Science Institute |
| Job type: | Full time Fixed Term Contract for 17 months |
| Hours of work: | 37 hours per week, normally worked Monday to Friday Flexible working will be considered |
| Salary details: | **Research Assistant** (if PhD near to completion) £30,600 per annum |
| | **Research Fellow** (if PhD obtained) £33,309 per annum |
| Line Manager: | Dr Alison Parker, Senior Lecturer in International Water and Sanitation |
| Start date: | As soon as possible |
| Closing date for applications: | 16 August 2020 |
Section 2
About Cranfield University

As the UK’s only exclusively postgraduate university, Cranfield’s world-class expertise, large-scale facilities and unrivalled industry partnerships is creating leaders in technology and management globally. Cranfield’s distinctive expertise is in our deep understanding of technology and management and how these work together to benefit the world.

Find out more about us, our history, and our rankings and awards by visiting https://www.cranfield.ac.uk/about/about

Corporate Plan (415i)

Our corporate plan is designed to raise the ambition and enhance the distinctiveness of our University through our people (staff, students and alumni), the industry partners we work with and our unrivalled research facilities. To strengthen our distinctive position in higher education and to grow our University, we have raised our ambition through our 415i goals:

- 400 fully research-active staff
- 1 - deliver a UK top 10 learning experience
- 5 - achieve a 5% operating surplus
- 1 - impact, influence, international
What we value

We value ambition, impact, respect and community. These values inform how we work together and our relationships with our partners and students. We believe that success is not only about what we achieve, but how we achieve it. Our values help to define who we are, guide the way we work together and help to shape our decisions. Our shared values were developed with the active engagement of colleagues across the University:

**Ambition** – We aim high. We do all we can to achieve excellence.

**Impact** – We change people’s lives. We make the world a better place.

**Respect** – We value everyone’s expertise. We support each other.

**Community** – We build and cherish our Cranfield community. We embrace diversity.

Our shared, stated values help to define who we are and underpin everything we do. To find out more, visit: [https://www.cranfield.ac.uk/about](https://www.cranfield.ac.uk/about)

Section 3

About School of Water, Energy and Environment

Cranfield’s excellence in Water, Energy and Environment is recognised internationally. Industrial-scale facilities underpin our research and development in energy technologies, including biofuels, biomass for energy, carbon capture and offshore oil and gas. Our environment activities include internationally recognised centres of excellence in Environmental Risk and Futures, and Water Science. Agrifood has been a core area since taking over the National College of Agricultural Engineering in the 1970s and we own the soil map for England and Wales.

Visit the Cranfield website to learn more about the School’s current research activities, taught programmes and impact:

*Learn more about Water*

*Learn more about Energy and Power*

*Learn more about Environment and Agrifood*

About the Cranfield Water Science Institute

The Water Science Institute has an international reputation for its transformational research and teaching in the science, engineering and management of water in the municipal, industrial and natural environments.

We have been working in water for over 40 years. Our academic and research staff, including scientists, engineers, technologists, policy specialists and social scientists, are engaged in delivering postgraduate teaching, research, consultancy and training in an international arena.
We deliver a number of MSc programmes and support a large cohort of PhD and EngD research students. We work closely with a range of clients across industry and government helping them to address their water challenges and make a progressive contribution to the green economy.

Organisational Chart

School of Water, Energy & Environment

Chief Operating Officer – School SAM/SWEE

Directors of Research & Education

PVC-School of Water, Energy and Environment

Themes

Water

Energy and Power

Environment and Agrifood

Centres and Institutes

Centre for Competitive, Creative Design

Cranfield Water Science Institute

Centre for Energy Systems and Strategy

Centre for Thermal Energy Systems and Materials

Centre for Renewable Energy Systems

Centre for Climate and Environmental Protection

AgriEpi

CHAPS

Cranfield Soil and Agrifood Institute

Centre for Environmental and Agricultural Informatics

BSSS

IAGrE

Section 4

Job Details

Job Purpose

To protect human and ecosystem wellbeing, sanitation systems must separate users from their excreta and treat it so that it does not pose a risk to public health or the environment. This involves a complex system of technology, behaviours, economics and policies. Sewers and wastewater treatment plants can assist in providing safe sanitation, but they are expensive and challenging to build, particularly in dense urban areas or where land tenure is insecure. In fact, only 47% of the world’s urban population have safely managed sanitation; that is where human waste is treated before disposal (UNICEF and WHO, 2019). Many of these people are instead using off-grid options for sanitation, such as pit latrines and septic tanks. These are physically difficult to empty, especially in areas of high population density, on steep slopes or with a high water table, and pose significant health hazards. The collected waste is often dumped illegally, frequently into water sources. Off grid solutions can only manage waste safely if the entire service chain, including collection, transport, treatment and safe end use or disposal, is adequately provided. Failures occur
because the associated system of technology, behaviours, economics and policies are not sufficiently developed along the full service chain.

The ESRC GRCF-funded Scaling-up Off-grid Sanitation (SOS) project aims to address that failure by unlocking trajectories towards the development of sustainable off-grid sanitation systems that adequately deliver safe services along the full service chain. The research will focus on an emerging off-grid sanitation paradigm in the form of container-based sanitation (CBS) across four country contexts – Haiti, Peru, Kenya and South Africa – but will locate this within efforts to deliver city-wide sanitation services more broadly. It will also interrogate more generalizable questions on how the provision of ‘off-grid’ services, such as sanitation, water and energy, create new opportunities and risks for achieving universal service provision in developing cities. CBS is an attractive entry point into this area as it is a service model which aims to reduce inequalities around sanitation through inclusive designs. At its heart, CBS relies on a relatively simple technology, at least from the user’s perspective, in the form of specially designed toilets which collect human excreta in sealable, removable containers (sometimes called cartridges) which are then transported to treatment facilities for safe processing.

As CBS is scaled up, changes will cascade back and forth across other service grids (e.g. water, sanitation, energy and transport). Some initial grid interlinkages are:

- **Water**: CBS reduces water demand in comparison with flushing toilets and reduces groundwater pollution caused by pit latrines use by providing an above-ground containment system.
- **Solid waste**: Households often throw waste into pit latrines which means pits can only be emptied using unsafe practices. A switch to CBS presents both challenges and opportunities for solid waste management.
- **Energy**: CBS uses ‘active’ collection methods of trucks and transport. CBS also provides a more homogenised product that can be utilised for off-grid energy production (Riungu et al., 2019).
- **Transport**: CBS is interlinked with transport networks as it relies on regular emptying which will become increasingly intensive as services scale up to whole urban areas. Off-grid treatment such as local disposal pits and production of resources will reduce transport burdens for resources and waste in urban areas.

Research has previously demonstrated the connection of impacts of increasing sanitation access to various other areas of development, yet there is very little research quantifying the impact of such work and what off-grid modalities would mean for cities. This project will therefore look to quantify and model the impact of scaling up CBS on the grids of water, sanitation, energy and transport.

You will perform a system network analysis to visualise and quantify the links between CBS and other grid impacts. You will use novel and innovative open-data resources to assess how the scaling up of CBS impacts the other grids of services and use appropriate software to spatially model these interactions (e.g. ArcGIS). You will collect data for models from CBSA partners and open sources to build a holistic overview of service grids in marginalised areas. You will produce results and insights to inform CBS policy and practice, and write up these results in high impact journals and other appropriate project outputs.

### Key Deliverables

<table>
<thead>
<tr>
<th>Description of Deliverables</th>
<th>% of time</th>
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<tbody>
<tr>
<td><strong>Research</strong></td>
<td>80</td>
</tr>
<tr>
<td>Develop a system network analysis to visualise and quantify the links between container based sanitation and other grid impacts</td>
<td></td>
</tr>
<tr>
<td>Authoring and submission of academic journal articles to high quality journals for publication and dissemination.</td>
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</table>
Please be advised that the percentages allocated for the key deliverables may be adapted to take into account the needs of the School and / or University.

### Planning and organising

You must adhere to delivering the research work within the time-scales set by your line manager and demanded by the Scaling-Up Off-Grid Sanitation contract which requires monthly review meetings and summary presentations and planning for the next month’s schedule.

You will be self-directed and well organised. You should be able to develop a forward research plan for yourself over both short and extended timescales. You should have excellent project and time management skills, ensuring that milestones and deliverables are achieved to time and to high quality.

The role will involve short-term responsibilities such as day-to-day project management, interaction with the wider project team and organising project meetings. As different tasks will require different time periods for planning, flexibility and good coordination skills will be important.

Work will need to be clearly documented on a day-to-day basis, showing a clear development path for the project. On an ad-hoc basis you may be required to assist with other related projects where your skills may be relevant.

You will need to travel to study sites in Haiti, Peru, Kenya and South Africa, to meet local partners, often without colleagues from Cranfield so will need to be able to plan and organise your travel arrangements with administrative support.
**Communicating and influencing**

You will collaborate with the other research institutions and implementing partners on the Scaling-Up Off-Grid Sanitation project who are located in the UK, North and South America and Africa. You will need to be able to demonstrate excellent inter-personal skills to communicate with staff from all organisations across a wide range of disciplines to discuss project methodologies and to interpret results.

You will be expected to be able to articulate information about your work in a clear and concise manner and to discuss problems constructively with your line manager and colleagues.

You will also need to be confident in engaging with stakeholders and key informants from the sanitation and interlinked sectors. An active and collegiate team mentality is the expected norm at Cranfield.

You will be expected to communicate scientific results effectively through reports and presentations at national and international meetings/conferences, and to prepare articles suitable for publication in high-impact peer-reviewed journals. There is an expectation that at least two peer reviewed journal papers will be published from this project.

There will be opportunities to present project outputs at industry and science conferences through oral presentation and a need to be able to actively contribute to workshops, technical meetings and seminars.

**Problem solving**

You are expected to already be a confident and independent researcher. You will be expected to be able to work independently for most of the time, with reference to the line manager and other project colleagues for points of clarification.

You will be expected to think through and solve problems which may be encountered in terms of methodology, the analyses, and development of spatial models and interpretation of results. This includes being able to use software to programme and run appropriate models.

Most problems will be solved through experience and through the guidance and mentoring available. You will be expected to discuss problems constructively with the line manager or other colleagues.

You will be responsible for ensuring that appropriate risk assessments are carried out for any new procedures to meet the University specification.

**Decision making**

1) **Decisions you will take without reference to others**
   - Day-to-day management and planning of on-going research within the overall specifications provided by the project terms of reference / proposal.
   - Draft delivery of high quality research and reports to deadline and quality.
   - Writing draft journal and conference papers.
   - Preparing material for jointly authored papers and conference presentations.

[www.cranfield.ac.uk](http://www.cranfield.ac.uk)
- Active participation in the implementation of health and safety procedures in the areas in which you work.
- Drafting reports, minutes, actions and papers.
- Identifying, collating and communicating associated research papers and reports

II) Decisions you will refer to your manager/colleagues
- Developing new research ideas, proposals, consultancy work and identifying sources of funding.
- Balancing ongoing research commitments, project management and publication/proposal-related activities.
- Activities to enable the dissemination and exploitation of research results.
- Aspects potentially affecting the operation of the project or the outcome of the results, such that they will have influence on the success of the project meeting the goals.
- Budgetary issues related to research contracts.
- Decisions that involve modifications to contracted deliverables.
- Writing journal and conference papers – final submission.
- Research support for PhD and MSc students.

Guiding framework

The guiding framework for this role is the University’s Corporate plan – 415i.

The School of Water, Energy and Environment’s Academic Plan is the principal reference point for all our activity and sets out our School ambitions, operating strategy and tone of delivery. It supports the University’s Corporate Plan which is focused on the application of scientific excellence in a financially viable operating environment.

There are established working practices, processes, systems and procedures that you will learn and must be used. Alterations to any of these must be agreed with the line manager. You can expect close support from the line manager in research, career development, mentoring, project management and publications/proposals.

Our performance and development review scheme provides a set of objectives agreed with the line manager for the year ahead and expected SMART targets.

Duties and responsibilities should be carried out with due regard and compliance with the General Data Protection Regulations, Health and Safety and the Equality Act 2010. All staff must conform to the requirements of the Financial Manual. The role will be subject to normal school and university systems and procedures. A very high emphasis is placed in particular on conformity with health and safety, environmental and ethical policies of the university.

There may be occasions when existing procedures may not cover new circumstances and where you need to work collaboratively with the Head of Department, academic staff and the Department administrators to develop new processes for the future.

You must respect the fundamental code of conduct for academic and scientific work. You may be privy to confidential information relating to staff and students and it is imperative that absolute discretion and confidentiality is shown at all times.
For specific projects, there will likely be documentation which will outline the tasks, milestones and deliverables related to the project. If applicable, the specific responsibilities of each of the participants in the consortium would also be outlined in a consortium agreement / grant agreement.

**Impact**

The role will be focused on meeting the aims and objectives of the Scaling-Up Off-Grid Sanitation project.

It is very important to conduct high quality research to maintain and enhance the reputation and performance of the project, institute and School. This will have impact on colleagues in related areas of research and could facilitate further internal and external collaborations.

No direct responsibility for budget or other staff / students is associated with this role. However, opportunities to co-supervise PhD / MSc students will be provided, and we expect all our post-doctoral researchers to take an active role within the Institute and more widely within the School to both inform others of their on-going work and to make best use of existing knowledge and expertise. There will also be scope to develop linked project bids and to work with colleagues in responding to research calls, as appropriate.

You will be expected to present work at national and international meetings/conferences and to write peer reviewed journal papers.

**Facts and Figures**

- Cranfield is ranked second in the UK for employment of our graduates.
- Of the 5,097 students at the University, 54% were from the UK, 17% from EU countries and 29% from the rest of the world.
- Around half (47.9%) of our students and learners are over 30 years old.
- More than half of our students and learners study part-time.
- Cranfield awards around 2,500 degrees each year.
- Cranfield welcomes over 5,000 postgraduate students from more than 100 countries each year.
- Our worldwide community is a powerful professional network with students and learners from 169 countries.
- We are one of the biggest employers in the region (Central Bedfordshire) with around 1,200 staff based at the Cranfield campus.
- 81% of our research is classed as world-leading or internationally excelent.
- We are number 54 in the UK for research power.
- In the English higher education sector, Cranfield University had the highest average contract research income with business per academic (2015-2018).
- Cranfield University is in the top five English higher education providers for consultancy income per academic (2015-2018).
- We are on track to meet the challenging target we set ourselves to re-duce our carbon footprint by 50% by 2020.
- Cranfield is one of only eight institutions to have won the Queen's Anniversary Prize on five or more separate occasions, including for water and sanitation in 2015.
- Over £100 million of investment in new facilities over the past four years.
- Cranfield Unviersity os a partner in the EPSRC CDT in Water and Wastewater Infrastruvvre Emegineered for resilieence, providing 50 PhD studnetshoips in WASH between for 5 years form 2019.
## Section 5
### Am I suited to this role?

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<th>Criteria</th>
<th>Essential</th>
<th>Desirable</th>
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<tr>
<td><strong>Education / Qualifications</strong></td>
<td>PhD (obtained or near completion) in systems thinking or related discipline, or the equivalent in professional qualifications and experience</td>
<td>MSc in Water Management or International Development</td>
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<tr>
<td><strong>Experience</strong></td>
<td>Fluent in GIS software. Extensive research experience in systems thinking. High level analytical capability Track record of winning and delivering research projects sponsored by both the public and private sectors. Preparing, editing and submitting high quality research outputs. Peer-reviewed publication track record</td>
<td>Experience of research with a container-based sanitation enterprise. Fluency in spatially modelling decision-making (e.g. Netlogo and understanding of Agent-Based Modelling) Experience using the DELPHI method Experience of teaching at graduate or postgraduate level. Experience of supporting students, e.g. through research supervision, lecturing, tutorials Experience of managing projects Presentation at major national or international conferences Experience in delivery of training seminars, workshops, technical meetings</td>
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<td>Knowledge</td>
<td>Knowledge of at least one of following service sectors in a low or middle income country: water, energy, transport, sanitation, solid waste</td>
<td>Knowledge of an additional service service sectors in a low or middle income country: water, energy, transport, solid waste</td>
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<td>Knowledge of on-site/off-grid sanitation systems like pit latrines and septic tanks</td>
<td>Knowledge of Health and Safety Legislation as it relates to the role</td>
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<td>Understanding of and contribution to broader university management processes</td>
<td>Knowledge of academic standards in UK higher education sector</td>
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<td>Skills / Aptitudes</td>
<td>High quality lecturing skills</td>
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<td>Ability to empathize with the challenges faced by urban residents in low and middle income settings, including poverty and intersectionality.</td>
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<td>Ability to communicate complex information clearly, and to encourage commitment to learn in others</td>
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<td>Proven ability to develop business opportunities and attract research income from multiple types of client.</td>
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<td>Excellent project and time management skills, ensuring that milestones and deliverables are achieved to time and to high quality</td>
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<tr>
<td>Excellent oral and written communication skills and presentation skills, and good technical writing skills in English</td>
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<td>Excellent team-working and interpersonal skills</td>
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<td>Proven ability to undertake original research</td>
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<td>Ability and “drive” to produce high quality manuscripts, with others.</td>
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<td>Ability to find appropriate solutions to academic and technical problems</td>
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<tr>
<td>Values</td>
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<td>Ability to demonstrate our values: Ambition, Impact, Respect and Community.</td>
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<td>Other</td>
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<td>Due to the requirement to travel internationally you should have no travel restrictions on passport that would restrict travel to Kenya, South Africa, Peru or Haiti.</td>
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<td>The willingness and ability to travel and work overseas with national and international partners</td>
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