

**THE UNIVERSITY OF MANCHESTER**  
**PARTICULARS OF APPOINTMENT**  
**FACULTY OF SCIENCE & ENGINEERING**  
**SCHOOL OF ENGINEERING**  
**DEPARTMENT OF CIVIL ENGINEERING AND MANAGEMENT**  
**RESEARCH ASSOCIATE (REMOTE SENSING OF IRRIGATED CROPLANDS)**  
**VACANCY REF: SAE-029882**

**Salary:** Grade 6 £37,694 to £42,254 per annum, depending on relevant experience

**Hours:** Full Time

**Duration:** Fixed Term from 1 January for 24 months (in the first instance)

**Location:** Oxford Road, Manchester

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**Enquiries about the vacancy, shortlisting and interviews:**

Name: Dr Tim Foster, Reader in Water-Food Security and Director of Manchester Environmental Research Institute (MERI)

Email: [timothy.foster@manchester.ac.uk](mailto:timothy.foster@manchester.ac.uk)

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**About the Role**

We are seeking to appoint a talented and enthusiastic Postdoctoral Research Associate (PDRA) to play a key role in delivering two major international projects (TRANSCEND and IrrEO) that are supporting sustainable development of irrigated agriculture in Latin America and Sub-Saharan Africa. The IrrEO and TRANSCEND projects are led by Dr Tim Foster, PI of the Agriculture, Water and Climate Research Group and Director of the Manchester Environmental Research Institute (MERI).

Expanding irrigation is critical for climate adaptation, improving food security, and supporting economic development. However, the ability to design and implement effective irrigation investments is greatly limited by a lack of data on the current extent of irrigation and how irrigated areas have responded to past investments. Lack of information about the changing dynamics of irrigated agriculture also poses risks to water resource sustainability, in particular in small-scale farming systems.

The PDRA will develop satellite-based mapping tools to improve data for governments, financing and development actors about the changing extent of irrigated agriculture, and use these data to

support targeting, assessment, and monitoring of irrigation projects and investments. The PDRA will contribute to two projects:

1. IrrEO – a Gates Foundation funded project that is developing national-scale irrigated area and agricultural field mapping algorithms for governments in Sub-Saharan Africa. The PDRA will contribute to development of machine and deep learning mapping algorithms in one of the IrrEO's case study countries (Nigeria, Ethiopia, Kenya) to evaluate the dynamics of small-scale irrigated agriculture and support the development of an interactive irrigation mapping toolbox for government and end users.
2. TRANSCEND – a UKRI and EU funded project that is developing transformational adaptation policies to improve allocation and management of scarce water resources. The PDRA will support the development of an EO-based mapping tool to assess historical changes in cropland areas and water use in the Altiplano region of South America using Landsat imagery and Random Forest models. Working with other organisations in TRANSCEND consortium (IMDEA Water, Spain, Stockholm Environment Institute, Latin America), you will apply these data to support evaluation and design of demand- and supply-side policies to address inter-sectoral and transboundary water competition and conflict in the region.

The PDRA will be an integral part of the UoM team working on both the IrrEO and TRANSCEND projects, including co-investigators and a large team of PDRA's and PhD researchers. The PDRA will also collaborate closely with non-academic partners for both projects, including national governments, river basin agencies, international agencies and development donors.

Due to the nature of the funding, this post is available for an initial fixed term of 24 months with a start date in late 2025 or early January 2025. Due to funding it is expected that the role will be split between the TRANSCEND and IrrEO projects in the first year, with time then fully devoted to the IrrEO project.

### **Key Responsibilities, Accountabilities or Duties**

The PDRA's range of duties will include:

- Develop and validate satellite-based machine learning algorithms to map the spatial and temporal locations and dynamics of irrigated croplands in TRANSCEND's Latin America living lab (Lake Titicaca-Desaguadero-Poopo system) and one of IrrEO's case study countries (Nigeria, Ethiopia, or Kenya).
- Apply mapping algorithms to quantify contemporary and historic changes in irrigated areas and evaluate performance of past water policies, climate and socio-economic changes.
- Co-develop training materials, including user-friendly code workflows (e.g. Jupyter notebooks), to support uptake of irrigated mapping algorithms and datasets by government agencies, river basin organisations, and donors.
- Design and lead training activities for academic and government partners in TRANSCEND and IrrEO's case study countries to build in-country capacity to apply irrigation mapping tools and datasets for water and irrigation planning.
- Lead the writing and preparation of original research papers for publication in international excellent peer-reviewed journals.
- Disseminate research findings and methodologies to scientific and practitioner audiences through a range of media.
- Attend and present research at project meetings, conferences, workshops, and other events
- Pursue independent and original research ideas in related subject areas, including contributing to the development of funding proposals in collaboration with colleagues.

## **PERSON SPECIFICATION**

### **Essential**

- Hold a PhD or equivalent (or be close to completion) in remote sensing, agriculture, land use science, physical geography, environmental sciences, or a related discipline including candidates with a background in computer science or data sciences.
- Experience of analysing EO imagery (optical and/or radar) and developing classification models based on EO and other geospatial data.
- Strong quantitative skills including experience of developing and applying machine learning and/or artificial intelligence algorithms, preferably in Python or R.
- An emerging track record, relative to career stage, of publications in internationally excellent peer-reviewed journals.
- Excellent written and verbal communication skills, including the ability to present research to both scientific and non-technical audiences.
- Ability to build and maintain constructive working relationships with a wide diversity of actors, including transdisciplinary and/or international working relationships
- Good time management and organisational skills, including the ability to coordinate project activities and reliably meet deadlines for deliverables.
- Willingness to travel and participate in events, meetings, and capacity development activities related to the project internationally.

### **Desirable**

- Experience of working in any of the TRANSCEND (Peru, Bolivia, Chile) and/or IrrEO case study countries (Nigeria, Kenya, Ethiopia), or in Sub-Saharan Africa or Latin America more broadly.
- Experience of using high performance computing or cloud computing facilities (e.g., Amazon Web Services, Google Earth Engine)
- Experience of developing open-source software tools and/or data products, and commitment to open science principles
- Experience of developing and/or conducting training or teaching on Earth Observation techniques.
- Experience of working with non-academic organizations to co-develop research methods, tools, and/or outputs
- Conversant in Spanish (CEFR B1 or higher)