POSITION DESCRIPTION

Position Title: Research Associate in X-ray Tomography of Soil
Organisation Unit: School of Agriculture and Food Sciences
Position Number: TBA
Type of Employment: Full time, fixed term for 3 years
Classification: Academic Level A

THE UNIVERSITY OF QUEENSLAND

The University of Queensland (UQ) contributes positively to society by engaging in the creation, preservation, transfer and application of knowledge. UQ helps shape the future by bringing together and developing leaders in their fields to inspire the next generation and to advance ideas that benefit the world. UQ strives for the personal and professional success of its students, staff and alumni. For more than a century, we have educated and worked with outstanding people to deliver knowledge leadership for a better world.

UQ ranks in the world’s top universities, as measured by several key independent ranking, including the CWTS Leiden Ranking (32), the Performance Ranking of Scientific Papers for World Universities (40), the US News Best Global Universities Rankings (42), QS World University Rankings (47), Academic Ranking of World Universities (54), and the Times Higher Education World University Rankings (66). Excluding the award component, UQ is now ranked 45th in the world in the ARWU, and is one of the only two Australian universities to be included in the global top 50.

UQ has an outstanding reputation for the quality of its teachers, its educational programs and employment outcomes for its students. Our students remain at the heart of what we do. The UQ experience – the UQ Advantage – is distinguished by a research enriched curriculum, international collaborations, industry engagement and opportunities that nurture and develop future leaders. UQ has a strong focus on teaching excellence, winning more national teaching excellence awards than any other in the country and attracting the majority of Queensland’s highest academic achievers, as well as top interstate and overseas students.

UQ is one of Australia’s Group of Eight, a charter member of edX and a founding member of Universitas 21, an international consortium of leading research-intensive universities.

Our 53,000-plus strong student community includes more than 16,400 postgraduate scholars and more than 17,000 international students from 135 countries, adding to its proud 260,000-plus alumni. The University has more than 6,600 academic and professional staff (full-time equivalent) and a $2.15 billion annual operating budget. Its major campuses are at St Lucia, Gatton and Herston, in addition to teaching and research sites around Queensland and Brisbane city. The University has six Faculties and four University-level Institutes. The Institutes, funded by government and industry grants, philanthropy and commercialisation activities, have built scale and focus in research areas in neuroscience, biomolecular and
biomedical sciences, sustainable minerals, bioengineering and nanotechnology, as well as social science research.

UQ has an outstanding track-record in commercialisation of our innovation with major technologies employed across the globe and integral to gross product sales of $11billion+.

UQ has a rapidly growing record of attracting philanthropic support for its activities and this will be a strategic focus going forward.

Organisational Environment

The School of Agriculture and Food Sciences is one of the largest schools of this type in Australia, comprising research and teaching experts in plant and soil science, animal science, agricultural business, environmental science, and food, nutrition and technology. With a diverse group of internationally regarded scientists, our experts deliver knowledge, skills and research that provide solutions to world issues in climate change, feeding the world, managing the environment, replacing fossil fuels with biofuels, maintaining biodiversity, and supporting economic and community development.

Located at St Lucia and Gatton, the School is a large and dynamic multidisciplinary hub focused on applied research and teaching within the Faculty of Science committed to finding innovative and technology focused solutions to global challenges. The School offers a range of undergraduate and postgraduate coursework and research degrees encompassing agriculture and related disciplines ranging from Bachelor Degree to Doctorate. Quality laboratories and facilities and strong partnerships with industry, community and government bodies, provide an environment that enables world class research and research training, in a collaborative and cooperative spirit for postgraduate students and researchers.

Soil Science, within the School of Agriculture and Food Sciences, is a highly productive research group with a strong track record of research funding spanning the agriculture / environment spectrum.

Information about the Faculty and the School may be accessed on the Faculty’s web site at http://www.agriculture.uq.edu.au. Faculty of Science information covering 6 Schools and 19 Centres is available at http://www.uq.edu.au/science.

Information for Prospective Staff

Information about life at UQ including staff benefits, relocation and UQ campuses is available online.

The University of Queensland Enterprise Agreement outlines the position classification standards for Levels A to E.

DUTY STATEMENT

Primary Purpose of Position

The present position will focus upon developing an approach to allow for the routine analyses of root distribution in soil cores using synchrotron-based X-ray tomography. This research will primarily utilise the IMBL beamline at the Australian Synchrotron to conduct these analyses. Specifically, this position will be required to (i) conduct a series of experiments to determine the experimental conditions suitable for these analyses (for example, maximum diameter of core that can be scanned), (ii) develop a data pipeline in
conjunction with the computing group at the synchrotron to allow routine processing of data for analysis of root distribution, (iii) perform segmentation of the collected data (iv) undertake analyses on a range of soil cores for the purposes of experimental validation, (v) work with a wide range of researchers from other groups from across Australia to co-ordinate the collection of large soil cores from the field for their analyses at the synchrotron.

More information about the Australian Synchrotron and the IMBL beamline can be found at: https://www.ansto.gov.au/research/facilities/australian-synchrotron/overview

This position is one of several that are being funded as part of a collaboration between GRDC, The University of Queensland, the University of South Australia, Murdoch University, and the Australian Synchrotron (ANSTO). Overall, this large research program aims to develop synchrotron-based techniques as an approach for improving our understanding of plant-soil interactions in Australian grain-producing systems. The Australian Synchrotron is one of Australia’s most significant pieces of scientific infrastructure. Developments in recent years at the Australian Synchrotron have enabled new approaches that can investigate issues that impact upon Australian grain production. This present position will also collaborate closely with the other postdoctoral positions being funded through this GRDC project. These other positions include one that is seeking to analyses changes in organic carbon in soils as well as a position that is seeking to develop synchrotron-based approaches for imaging nutrient distribution in soils.

This position will be employed through both The University of Queensland (Associate Professor Peter Kopittke) and the University of South Australia (Professor Enzo Lombi) but will be based primarily at the Australian Synchrotron at Clayton (Melbourne).

This research is conducted as part of a collaboration between The University of Queensland, the University of South Australia, ANSTO, and the Grains Research and Development Corporation (GRDC).

Duties

Duties and responsibilities include, but are not limited to:

Research

- Undertake innovative research using synchrotron-based X-ray tomography to examine root distribution in soils.
- Develop a user-friendly data pipeline in conjunction with the computing group to allow routine data processing for determining root distribution within soil following analysis using X-ray tomography.
- Develop procedures for the segmentation of processed data.
- Maintain clear and accurate records of work performed.
- Assist in the preparation of reports to The University of Queensland, the University of South Australia, and the funding body (GRDC)
- Prepare high quality, peer-reviewed publications for international journals.
- Work with a wide range of researchers from other groups from across Australia to co-ordinate the collection of large soil cores from the field for their analyses at the synchrotron.
- Under guidance of Chief Investigator/s, conduct a series of experiments to determine the experimental conditions suitable for these analyses.
Service and Engagement
- Perform a range of administrative functions
- Contribute to the processes that enable the academic team to manage the work of the School, including participate in School decision-making and serve on School committees
- Foster the School’s relations with industry, government departments, professional bodies and the wider community.
- Any other duties as reasonably directed by your supervisor

Other
- Ensure you are aware of and comply with legislation and University policy relevant to the duties undertaken, including but not exclusive to:
  o the University’s Code of Conduct
  o requirements of the Queensland occupational health and safety (OH&S) legislation and related OH&S responsibilities and procedures developed by the University or Institute/School
  o the adoption of sustainable practices in all work activities and compliance with associated legislation and related University sustainability responsibilities and procedures
  o requirements of the Education Services for Overseas Students Act 2000, the National Code 2007 and associated legislation, and related responsibilities and procedures developed by the University

Organisational Relationships

The position reports to Associate Professor Peter Kopittke (UQ) and Professor Enzo Lombi (UniSA).
SELECTION CRITERIA

- PhD in the area of X-ray tomography or a closely related imaging approach.
- Demonstrated expertise in the use of X-ray tomography specifically for imaging of roots within soil would be highly advantageous.
- Experience in the development of pipelines for processing data from X-ray tomography, especially for the analyses of root distribution in soil.
- Experience in tomography data segmentation.
- A willingness to be involved in research in remote locations, and to travel regularly (both domestically and internationally) to conduct specific analyses.
- Organisational and problem solving skills.
- Experience in the production of scientific reports, journal publications, and standard operating procedures.
- Well-developed interpersonal skills, including the ability to work and communicate well – both written and verbally – in a multidisciplinary team.
- Commitment to upholding the University’s values, and with the outstanding personal qualities of openness, respectfulness and integrity.

Qualification Verification

An appointment to this position is subject to the verification of the highest academic qualification from the conferring institution.

The University of Queensland values diversity and inclusion and actively encourages applications from those who bring diversity to the University. Please refer to the University’s Diversity and Inclusion webpage for further information and points of contact if you require additional support.

Accessibility requirements and/or adjustments can be directed to recruitment@uq.edu.au.