POSITION DESCRIPTION

WESTERN SYDNEY UNIVERSITY

Postdoctoral Research Fellow in Data Science for Smart Horticulture

POSITION DETAILS

Position Title	**Postdoctoral Research Fellow in Data Science for Smart Horticulture (ARC TC-SaSH)**
Classification	**Academic Level A**
Position Number	**7016368**
School/Office	**Hawkesbury Institute for the Environment**
Division	**Provost**

POSITION PURPOSE

The Industrial Training Centre for Smart and Sustainable Horticulture (SaSH) aims to generate and adapt new high-value crops to thrive in protected settings. The project will ultimately develop and commercialise novel germplasm that is of high value to the industry and provide new knowledge to enable rapid transition of selected germplasm into protected settings and improve profitability of horticultural enterprises. The Postdoctoral Research Fellow will integrate across the four research and training programs within SaSH to focus on horticultural crops to be productive in high- and medium-tech growth facilities. The Postdoctoral Research Fellow will utilise latest physiology and phenotyping platforms to build a recognised program of research and deep collaborations with industry partners. Overall, the project will provide deep insight into production of tomato and snacking capsicums in protected facilities that will ultimately be deployed to growers.

The Postdoctoral Research Fellow will join an international project team of researchers and commercial partners. The Postdoctoral Research Fellow will communicate findings at scientific meetings and publish research in high-impact international journals and will closely interact with industry partners.

Subject to the University's operational requirements, the incumbent may have an opportunity to express interest in working overseas, either with a strategic partner or at an overseas campus for a fixed period of time.

KEY ACCOUNTABILITIES

1. Design experiments and data acquisition schemes across multiple programs to maximise statistical power, interpretability, and downstream modelling value; work closely with researchers to align sampling protocols, metadata standards, and measurement schedules.
2. Conduct original research to develop and validate advanced modelling approaches for smart horticulture, including statistical learning, mechanistic modelling, hybrid physics-informed ML, and stochastic modelling (e.g., stochastic differential equations) to capture biological variability and uncertainty.
3. Develop scalable data integration workflows that combine heterogeneous datasets (imaging, sensor, environmental, management, and socio-economic/operational data where relevant) and support cross-program inference and discovery.
4. Create predictive and explanatory models for crop growth dynamics, stress detection, yield and quality forecasting, and system optimisation under variable greenhouse and environmental conditions.
5. Contribute to the day-to-day execution of research-related tasks as part of an interdisciplinary and multi-institutional team, including preparation of reports and manuscripts for publication in referred journals and preparing and presenting research findings at national and international seminars, conferences and industry workshops.
6. Support translation of research outcomes into reusable tools (e.g., code repositories, reproducible pipelines, dashboards, model APIs) and contribute to best-practice adoption with industry partners.
7. Ensure that project research data management conforms to the Australian Code for the Responsible Conduct of Research, and University policies, including documentation, version control, reproducibility, and secure handling of partner datasets.
8. Mentor and support students and junior researchers in data science methods, experimental design, modelling practices, and reproducible research workflows as required.
9. Participate in administration and attend meetings associated with research or the work of the organisational unit to which research is connected.
10. Occasionally contribute to teaching related to the research project, which may include the development, design and delivery of innovative and engaging teaching (conduct of lectures, tutorials, demonstrations, workshops and other classes).
11. Provide advice/mentoring to Undergraduate student Summer Projects, Masters Research students, and/or Higher Degree Research students where appropriate.

QUALIFICATIONS, EXPERIENCE AND SKILLS

1. A PhD degree in relevant discipline or equivalent qualifications or research experience (e.g. progress towards the formal completion of or recently submitted PhD thesis for examination) in data science, applied mathematics, statistics, computational sciences, engineering, bioinformatics, or a related quantitative discipline relevant to modelling complex biological and environmental systems.
2. Demonstrated research experience in advanced data science and statistical modelling, including multivariate analysis, time-series modelling, uncertainty quantification, and inference from noisy and incomplete data. Demonstrated ability to apply these methods to real-world, complex datasets.
3. Demonstrated expertise in mathematical modelling of dynamic systems, including experience with digital twins, mechanistic models and/or stochastic processes (e.g., stochastic differential equations, state-space models, Bayesian hierarchical models, or related approaches) relevant to crop growth, stress response, or controlled environment systems.
4. Strong experience integrating and modelling multiple sources of data, including sensor

networks and/or imaging-derived phenotyping data (e.g., RGB, depth, thermal, hyperspectral), environmental control variables, and operational/management datasets. Proven ability to develop robust data fusion approaches and derive interpretable insights.

5. High-level programming and computational skills, including proficiency in Python and scientific computing workflows (e.g., NumPy/SciPy, pandas, PyTorch/TensorFlow/JAX, probabilistic programming tools, and high-performance computing, e.g. SLURM). Demonstrated commitment to reproducible research practices (version control, documentation, testing, experiment tracking).
6. Strong track record of high-quality research outputs, including publications in internationally recognised scientific journals and evidence of delivering impactful results. Ability to translate research outcomes into reusable artefacts such as open-source software, data products, or decision-support tools is highly desirable.
7. Demonstrated organisational skills and excellent verbal communication and interpersonal skills, including the ability to be self-directed, manage multiple concurrent tasks, meet deadlines, and communicate effectively with both technical and non-technical stakeholders (including industry partners).
8. Demonstrated ability to work effectively in a multi-disciplinary team environment, contributing to cross-program integration and meeting strict timelines and deliverable requirements, including providing advice to and/or mentoring of graduate and undergraduate students to achieve project goals.

KEY RELATIONSHIPS

- **This position reports to**: Professor (7004288)
- **This position supervises**: N/A
- **Key internal relationships**:
    - Institute Director
    - Institute Manager
    - Academic Staff within HIE
    - HDR students who are embedded with the new training centre
    - Colleagues in the theme, HIE and across the University
- **Key external relationships**:
    - Industry Partners
    - Named project team members

CHALLENGES

- Balancing research independence and collaborative expectations.
- Managing funding and resource constraints.
- Adapting to diverse institutional cultures.

UNIVERSITY EXPECTATIONS

The University expects that all employees are aware of, and comply with legislation and Western's policies and procedures relevant to the position, including but not limited to:

→ Code of Conduct
→ Work Health and Safety and Wellbeing Management System
→ Enterprise Agreement or Award
→ Anti-discrimination principles, Equal Employment Opportunity and staff and student equity

Approved by: Lead People and Culture Partner (Provost)
Date: 25/05/2026