# Position Details

## CSIRO Early Research Career (CERC) Postdoctoral Fellowship– CSOF4

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| The following information is for applicants | |
| Advertised Job Title | CSIRO Postdoctoral Fellowship in Soil Moisture Dynamic Modelling |
| Job Reference | 98592 |
| Tenure | Specified Term of 3 years  Full-time or Part-time |
| Salary Range | AU$99,990 to AU$109,527 pa (pro-rata for part-time)  plus 15.4% superannuation |
| Location(s) | Canberra, ACT or Perth, WA (Brisbane, QLD considered) |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Team Leader – Soil Monitoring and Information |
| Client Focus – Internal | 0% |
| Client Focus – External | 100% |
| Number of Direct Reports | 0 |
| Enquire about this job | Brendan Malone (brendan.malone@csiro.au)  Tom Van Niel (tom.vanniel@csiro.au) |
| How to apply | Apply online at <https://jobs.csiro.au/>  Internal applicants please apply via **Jobs Central**  If you experience difficulties when applying, please email [careers.online@csiro.au](mailto:careers.online@csiro.au) or call 1300 984 220. |

**Acknowledgement of Country**

CSIRO acknowledges the Traditional Owners of the land, sea and waters, of the areas that we live and work on across Australia. We acknowledge their continuing connection to their culture and pay our respects to their Elders past and present. View our [vision towards reconciliation](https://www.csiro.au/en/about/Indigenous-engagement/Reconciliation-Action-Plan).

**Child Safety**

CSIRO is committed to the safety and wellbeing of all children and young people involved in our activities and programs. View our [Child Safe Policy](https://www.csiro.au/en/about/policies/child-safe-policy).

### Role Overview

**CSIRO Early Research Career (CERC) Postdoctoral Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years of relevant postdoctoral work experience. These fellowships aim to develop the next generation of future leaders of the innovation system through:

* A differentiated career development program to deliver capability excellence and breadth across all facets of the national innovation system;
* Research training via strategic research and development projects with a clear focus that will deliver real impact through science and engineering excellence;
* An innovative culture supporting the development and demonstration of original thinking and expertise leading to peer-recognition; and
* Opportunities to develop skills and experience in collaborative research teams to effectively work within national and global multi/transdisciplinary and multi-stakeholder environments.

CERC Postdoctoral Fellows **are appointed for three years full-time or equivalent.**

Soil moisture is a vital land surface parameter that influences a broad range of processes with significant economic and environmental impact. It plays a key role in agricultural monitoring, weather prediction, and drought and flood forecasting, underscoring the indispensable value of accurate soil moisture metrics.

The CERC Fellow will lead efforts to advance new processes and parameterizations for modelling soil moisture dynamics. This work will primarily focus on enhancing the National Soil Moisture Inference Prediction System, an initiative supported by the Terrestrial Ecosystem Research Network (TERN), an Australian Government NCRIS-enabled program.

This role offers opportunities to contribute to the establishment of a national reference soil moisture measurement and monitoring network currently being deployed across Australia. Data from this network, combined with other ground-based and earth observations and soil moisture sensor arrays, will play a crucial role in validating and refining modelling approaches throughout the project.

The position is part of the CSIRO Agriculture and Food Sustainability Program and includes collaboration with national and international partners.

**Duties and Key Result Areas**

Under the guidance of research scientists and engineers, the CERC Postdoctoral Fellow will:

* **Advance the integration of actual evaporation (ETa) and soil moisture dynamics in modelling systems**, including:
  + Developing and refining coupled models to better capture interactions between ETa and soil moisture across various temporal and spatial scales.
  + Analyzing the complementary relationship (CR) between energy-driven and water-driven processes to enhance model accuracy.
  + Utilizing advanced remote sensing datasets and ground-based observations for model calibration and validation.
  + Applying spatio-temporal analysis and environmental modelling techniques to assess how environmental variables—such as vegetation, land use, and climate—affect ETa and soil moisture dynamics.
* **Contribute to interdisciplinary applications** in areas such as water resource management, drought monitoring, and ecosystem modelling.
* **Support the rollout of the national soil moisture sensor monitoring network** by participating or leading in soil survey fieldwork and laboratory activities.
* **Collaborate on a national strategy** for the development, deployment, expansion, and maintenance of soil moisture monitoring networks.
* **Produce high-impact research outputs**, including at least three scientific or engineering papers suitable for publication in leading journals, as well as contributions to client reports and patent applications.
* **Collaborate effectively within a multidisciplinary, international, and regionally dispersed research team** while independently conducting scientific investigations under broad guidance.
* Undertake **innovative and impactful research** aligned with CSIRO’s strategic objectives, delivering novel and significant scientific outcomes.
* **Leverage creativity and originality to explore opportunities** for new theoretical frameworks and to develop or expand innovative research directions.
* **Manage and analyze data** using advanced domain-specific data science techniques, ensuring accuracy and integrity in all outputs.
* **Actively pursue professional development** to enhance research capabilities and support long-term career goals.
* **Commit to CSIRO values and policies**, including adherence to the Code of Conduct, Health, Safety, and Environment procedures, Diversity and Inclusion initiatives, and Making Safety Personal goals.
* Perform other duties as required.

[**The CERC Postdoctoral Fellow learning and development program**](http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships)is developed between the CERC Postdoctoral Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellows' capabilities to the level expected of an independent researcher and will include on-the-job and course-based development encompassing:

* Discipline-specific techniques and protocols
* Professional growth
* Project management
* Communication and influencing skills
* Working and collaborating with others

## **Required Competencies**

* **Teamwork and Collaboration:** Cooperates with others to achieve organisational objectives and may share team resources in order to do this. Collaborates with other teams as well as industry colleagues.
* **Influence and Communication:** Uses knowledge of other party's priorities and adapts presentations or discussions to appeal to the interests and level of the audience. Anticipates and prepares for others reactions.
* **Resource Management/Leadership:** Allocates activities, directs tasks and manages resources to meet objectives. Provides coaching and on the job training, recognises and supports staff achievements and fosters open communication in the team.
* **Judgement and Problem Solving:** Investigates underlying issues of complex and ill-defined problems and develops appropriate response by adapting/creating and testing alternative solutions.
* **Independence:** Recognise and makes immediate changes to improve performance (faster, better, lower cost, more efficiently, better quality, improved client satisfaction).
* **Adaptability:**Copes with ambiguity or situations that lack clarity. Adapts readily to changing circumstances and new responsibilities (which may include activities outside own preferences) in the interests of achieving team objectives. Recognises the need for and undertakes personal development as a result of changes.

## **Selection Criteria**

Written responses for each of the section criteria are required to be included at the end of the cover letter.

#### Essential

*Under CSIRO policy only those who meet all essential criteria can be appointed.*

1. **Qualifications:**
   * A PhD (or near completion) in a relevant field, such as soil physics, hydrology, pedology, land surface modelling, agriculture, or environmental science.
   * Eligibility requires no more than three years (full-time equivalent) of postdoctoral research experience.
2. **Technical Expertise:**
   * Proven theoretical understanding of the water balance, the energy balance and/or soil science
   * Practical experience with soil water dynamics models, soil moisture measurement, and relevant instrumentation.
   * Demonstrated experience processing remote sensing data, especially related to integration of ground-based data with remote sensing data for modelling and analysis.
   * Strong skills in modern data science, including statistical and machine learning analysis, with proficiency in programming languages such as R or Python.
   * Knowledge of best practices in data management, ensuring reproducibility, traceability, and the use of version control systems.
3. **Research Output:**
   * A demonstrated history of publishing in peer-reviewed journals, along with experience in preparing scientific papers, reports, grant applications, or patents.
4. **Communication Skills:**
   * Excellent written and oral communication skills, with the ability to represent the research team effectively in diverse forums, including national and international conferences.
5. **Collaboration & Innovation:**
   * Ability to work collaboratively within multidisciplinary, regionally dispersed teams while maintaining independence in research.
   * A proven track record of innovation and creativity in scientific investigations, with a willingness to explore and incorporate novel approaches.
6. **Additional Requirements:**
   * A current driver’s license or the ability to obtain one in Australia.

## **Desirable**

1. Ability to remain productive, positive, and resilient in complex, ambiguous, and uncertain environments.
2. Experience in scientific domains related to national-scale digital soil mapping and assessment, like water balance, energy balance and actual evapotranspiration measurement and/or modelling.
3. Expertise in soil physical measurements, particularly those related to soil water retention.
4. Experience with the application of proximal soil sensing techniques.
5. Experience processing large remote sensing datasets.
6. Advanced understanding of modelling concepts.

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates are required to have **submitted** their PhD at the time of commencement, as a minimum requirement, if PhD conferment has not been obtained. If a candidate has submitted, but their PhD has not yet been formally attained, the starting salary will be CSOF4-1 (AU$96,811). Upon CSIRO receiving written confirmation that the PhD has been awarded (within a six-month period from the commencement date), the salary will be increased to the negotiated level, and the difference will be back-paid to the Officer's start date.

Special Requirements

Appointment to this role may be subject to conditions including provision of a national police check as well as other security/medical/character clearance requirements.

* The successful candidate will be asked to obtain and provide evidence of a National Police Check or equivalent. Please note that people with criminal records are not automatically deemed ineligible. Each application will be considered on its merits.
* The successful candidate may be required to undertake a pre-employment medical examination prior to commencement.
* If the successful candidate is not an Australian Citizen or Permanent Resident, they may be required to undergo additional security clearances, which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test).- https://ielts.com.au/

**Our Value Proposition**

We want CERC Postdoc Fellows to join our world class science, engineering and digital teams to solve big, complex problems that make a real difference to the future of Australia and the world.

You'll get to work with some of the most talented minds in their fields, not just in Australia, but in the world. At CSIRO, we spark off each other, learn from each other, trust each other and collaborate closely to achieve more than we could individually.

CSIRO Early Research Career (CERC) Postdoctoral Fellow Experience Employee Value Proposition (EVP). Find out more [here](https://www.csiro.au/en/careers/postdoctoral-fellowships)!

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](http://www.csiro.au/)!

CSIRO is a values-based organisation.  In your application and at interview you will need to demonstrate behaviours aligned to our values of:

* 1. People First
  2. Further Together
  3. Making it Real
  4. Trusted

Find out more about CSIRO [Agriculture and Food](https://www.csiro.au/en/Research/AF)