# 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 Ecological Modelling and Prediction |
| Job Reference | 79896 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$89,926 to AU$98,504 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Darwin, NT |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | Australian/New Zealand Citizens, Australian Permanent Residents and Australian temporary residents currently residing in Australia (visa sponsorship may be provided to eligible onshore candidates) |
| Position reports to the | Senior Research scientist |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Anna Richards via email at Anna.Richards@csiro.au or phone +61 8 8944 8437 |
| 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 area 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).

### Role Overview

**CSIRO Early Research Career (CERC) Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years relevant research 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 Fellows **are appointed for three years full-time or equivalent.**

At present science is currently unable to make spatial projections of the future state and extent of Australia‘s ecosystems at resolutions suitable for local management. This is a major challenge as it limits our ability to quantify expected changes in structure, function and composition of ecosystems (i.e. their natural capital), which are needed to effectively mitigate future risks to ecosystem services (e.g. carbon sequestration, habitat for biodiversity persistence, provision of clean water). For example, there has been a long-term increase in dangerous fire weather and the length of the fire season across Australia because of climate change and this is very likely to increase in the future for many regions, resulting in higher frequency and intensity of bushfires. This presents an increasing risk to life and property in semi-urban and rural areas, but also to natural capital in ecosystems managed for nature conservation, and in production landscapes. Changes to ecosystem characteristics will also alter the extent of future ecosystem states, in turn influencing bushfire behaviour in yet unknown ways. This CERC Postdoctoral Fellowship will integrate cutting edge dynamic ecosystem models and data analytics with projections of fire regimes under future climate scenarios to better understand bushfire resilience.

Prediction of the future state and extent of ecosystems requires an understanding of their dynamics (i.e. variability) across space and time, and an ability to partition this into variation due to landscape-scale disturbance and recovery processes to which ecosystems have adapted (e.g. endogenous fire and drought regimes) and changes that alter ecosystem characteristics and degrade ecosystem health (e.g. invasive species, vegetation clearing). A recent partnership between the Department of Agriculture, Water and the Environment and CSIRO led to the development of the Australian Ecosystem Models (AusEcoModels) framework, which systematically integrated information about reference ecosystem dynamics (those in best condition for biodiversity persistence) into a set of 46 nationally-consistent templates, termed state and transition models (S&TMs). There is a significant research effort required now to bring this theoretical framework into a quantitative modelling system that can be used to capture ecosystem responses (transitions between ecosystem states, process-based understanding of plant growth) to specific stressors (e.g. weeds, drought, changed bushfire regimes) to enable future predictions of the state and extent of both reference and modified ecosystems under climate change.

The Postdoctoral Fellow will lead the development of a toolkit for quantitative and spatially explicit modelling of ecosystem states and transitions. They will leverage advances in data analytics, hybrid machine learning and cloud computing to develop digital methods to automate a set of conceptual dynamic ecosystem models (AusEcoModels), that will systematically capture information on disturbance-driven changes in ecosystems to describe bushfire fuel ecology.

The Postdoctoral Fellow will have access to a world-leading panel of supervisors, including US and Canadian-based experts in the development of state and transition simulation models, and experts in mechanistic models of plant growth and disturbance based at the Western Sydney University. This effort will focus on fire-prone ecosystems and link to projections of future fire behaviour under different climate and land use scenarios. The ST&Ms will be integrated with fire spread modelling, climate projections, and observational data streams from ecological surveys and satellites within the newly formed National Bushfire Intelligence Capability (a multi-agency collaboration between CSIRO, Geoscience Australia and the Australian Bureau of Meteorology, that the postdoctoral fellow will work closely with). This will enable a step change in ecological modelling and the way bushfire risks and trade-offs can be predicted and managed into the future.

### Duties and Key Result Areas:

Under the direction of senior research scientists and engineers, CERC Fellows:

* + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Recognise and utilise opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research in ecological modelling of bushfire risk.
  + Work with project stakeholders and collaborators to design research questions, implement research activities and evaluate outcomes
  + Produce high quality scientific papers suitable for publication in peer reviewed journals, and internal and external reports. Prepare appropriate conference papers and present those at national and international conferences as agreed with their supervisor.
  + Translate outcomes of research activities to partners and end-users, for instance, through participation in management meetings, field visits and presentations.
  + Carry out research investigations requiring originality, creativity and innovation
  + Record, manage, and analyse data/information using relevant domain data science techniques.
  + Proactively undertake development to grow effective researcher capabilities to support career goals.
* Adhere to the spirit and practice of CSIRO’s Code of Conduct, including ethical human research and privacy requirements, Health, Safety and Environment procedures and policy, Diversity initiatives and Making Safety Personal goals.
* Other duties as directed.

The CERC Fellow learning, development and training programis developed between the CERC Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellow’s 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**

#### Essential

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

1. A doctorate (or will shortly satisfy the requirements of a PhD). The doctorate must be in a relevant discipline area, such as environmental modelling, landscape ecology or ecological remote sensing.

Please note: To be eligible for this role you must have **no more than 3 years** (full-time equivalent) of relevant research experience.

1. Programming skills in Python or an equivalent high-level language.
2. Experience in the development and/or application of quantitative models for understanding environmental systems and processes.
3. High level written and oral communication skills with the ability to represent the research team effectively internally and externally, including the presentation of research outcomes at national and international conferences.
4. A history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
5. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific workflows.

**Desirable:**

1. Experience working across desktop, high performance and commercial cloud platforms.
2. An ability to apply data analytics techniques for handling large datasets and multi-model outputs.
3. An ability to work collaboratively using software version control systems.
4. Experience in applying remote sensing techniques to ecological questions.
5. Experience in stakeholder engagement, expert elicitation and/or knowledge co-production.
6. The ability to remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
7. **The ability to work effectively as part of a multi-disciplinary, potentially regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.**

To be appointed to this CERC Fellowship role within CSIRO, candidates will be expected to commence employment by 30 June 2022. To be appointed as a CERC Fellow within CSIRO, candidates are required to have **submitted** their doctoral thesis 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 ($87,068). Upon CSIRO receiving written confirmation that the PhD has been awarded (within a six month period from 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.
* 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 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.

Find out more about our CSIRO Early Research Career (CERC) Fellow Experience Employee Value Proposition (EVP) [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 [Land and Water](https://www.csiro.au/en/Research/LWF)