# 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 Bushfire risk monitoring with Earth observation using Synthetic Aperture Radar |
| Job Reference | 79944 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$89,926 to AU$98,504 pa + up to 15.4% superannuation |
| Location(s) | Perth, WA (however other sites may be considered) |
| 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 candidates) |
| Position reports to the | Director, Centre for Earth Observation |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Amy Parker via email at Amy.Parker@csiro.au or phone +61 4 3684 8314 |
| 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.**

The Bushfire Earth Observation Taskforce, launched by the Australian Space Agency as part of the Royal Commission into Natural Disaster Arrangements, reports that: “*Australia has increasing access to data from several [Synthetic Aperture Radar] SAR satellites... but their capability to see through clouds and smoke for bushfire support is still to be developed*” and that “*it would be useful for Australian research agencies and fire services to develop the use of... SAR... for this purpose*”.

The CERC Fellow’s research will improve Australia’s ability to plan for and respond to bushfires by developing new capability in the use of satellite-based synthetic aperture radar (SAR) imagery. Synthetic Aperture Radar (SAR) has advantages when compared to passive optical satellite sensors because the microwave signal can penetrate smoke and, in some cases, the vegetation canopy to capture under-story burns. The SAR signal is also sensitive to the vertical structure of vegetation, providing observables that are critical to estimating fuel load, fuel connectivity, and post-burn vegetation recovery, and that are different to those obtainable from more widely used optical satellites.

Despite advances in SAR data availability for Australia, information derived from SAR is not routinely used for quantifying bushfire risks and recovery. Realising this aim requires fundamental remote sensing research to develop/advance credible SAR methodologies for the estimation of biophysical parameters and implement the results as quantitative land-cover monitoring technologies for bushfire management.

The CERC Fellow will explore: new SAR datasets that operate across the electromagnetic spectrum, from X- (9.65 GHz), C- (5.405 GHz), S- (3.2 GHz) to L- (1.2 GHz) and soon, P- (435 MHz) bands; polarimetric SAR Interferometry (PolInSAR); validation with robust 3D structural measurements from LiDAR; machine learning based classification; and implementation of these methodologies on the Open Data Cube.

Key outcomes of the CERC Fellow’s research will be SAR-based methodologies for retrieval of vegetation structure information to improve pre-fire risk and post-fire recovery assessments, and the implementation of strategies for acquiring and analysing imagery from new commercial datasets to derive near-real-time fire extent maps through smoke.

The CERC Fellow will join a cross-disciplinary team with expertise in SAR data analysis, bushfire ecology, satellite operations and the use of Earth observation to address disasters. Their research will be of high impact and interest across CSIRO, Australia and beyond, with opportunities to join national and international collaborative efforts to develop better ways of responding to bushfires with Earth observation data.

### Duties and Key Result Areas:

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

* + Carry out innovative, impactful research in the use of Synthetic Aperture Radar for bushfire planning and response.
  + Test and implement novel datasets and methods to map active fires through smoke and deliver vegetation structure information for risk and recovery assessments.
  + Lead the use of CSIRO’s NovaSAR-1 satellite capacity share for bushfire response activities.
  + Proactively seek opportunities to integrate research outcomes into bushfire research across CSIRO and other agencies.
  + Represent CSIRO in international fora such at the Committee on Earth Observation Satellites Working Group Disasters Wildfire Pilot.
  + Undertake development to grow effective researcher capabilities to support career goals.
  + Adhere to the spirit and practice of CSIRO’s Code of Conduct, 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 ecological remote sensing, environmental 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 and demonstrated ability to work across a range of programming and data analysis languages (e.g. Python, C or Matlab) and software environments.
2. Experience in Earth observation data processing, particularly Synthetic Aperture Radar.
3. An understanding of basic electromagnetic wave propagation and the principles of radar remote sensing.
4. The ability to work independently and use initiative.
5. 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.
6. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
7. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Experience in the use of Synthetic Aperture Radar for bushfire risk and recovery assessments.
2. Experience in the application of Interferometric Synthetic Aperture Radar Polarimetry.
3. Experience in Synthetic Aperture Radar applications with Artificial Intelligence/Machine Learning.
4. Experience in Open Data Cubes and the use of data analytics techniques for handling large datasets
5. Experience in stakeholder engagement, expert elicitation and/or knowledge co-production
6. Experience in undertaking cross-disciplinary research, knowledge generation or learning
7. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
8. **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 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.
* 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 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

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Find out more about CSIRO [Data61](https://www.csiro.au/en/about/people/business-units/Data61)

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