# 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 MLAI FSP: Spatiotemporal Learning from Satellite Data |
| Job Reference | 68004 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$86,434 to AU$94,679 pa + up to 15.4% superannuation |
| Location(s) | Brisbane or Canberra |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * Australian/New Zealand Citizens and Australian Permanent Residents * Australian temporary residents currently residing in Australia (visa sponsorship may be provided to eligible candidates) |
| Position reports to the | Project Leader |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Peyman Moghadam, [peyman.moghadam@csiro.au](mailto:peyman.moghadam@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. |

### Role Overview

**The CSIRO Machine Learning and Artificial Intelligence Future Science Platform** (MLAI FSP) will bring together a large number of world-leading experts to explore scientific questions using machine learning techniques. As a member of the MLAI FSP you will work with CSIRO scientists, engineers and collaborate with national and international university partners, to develop new machine learning and artificial intelligence methods that have general applicability. The methods will be applied to an exciting challenge in the Land and Water Business Unit: harnessing deep learning to transform the role of satellite imagery in real-time monitoring of landscapes and ecosystems. This science field deals with large complex, multilayered datasets that have significant analytical challenges and will be used to analyse satellite data to provide intelligence on environmental systems using ML algorithms. You will also have the opportunity to work with other members of the MLAI FSP Platform on projects ranging across multiple science research areas.

The position sits within the Spatiotemporal MLAI Activity and will work closely with leading scientists in L&W, and Data61 machine learning and artificial intelligence experts, to develop fundamental and transformative spatiotemporal machine learning/artificial intelligence algorithms and workflows for complex environmental systems. Since manual annotation of large, multimodal, high-dimensional spatiotemporal data is challenging, approaches to use large collections of unlabelled data to learn generic representations are important. Your research will focus on spatiotemporal encoding to ensure generalisation and transferability and algorithms that combine multiple sources of data with domain knowledge and constraints. This will be done within national and international settings, and as part of a diverse multidisciplinary team.

**CSIRO Early Research Career (CERC) Postdoctoral Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years 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 or part time equivalent.**

### Duties and Key Result Areas:

Under the direction of senior research scientists and engineers in CSIRO, the successful candidate will:

* + Develop generalised methods for automating the analysis of spatiotemporal data, including remote sensed data, to address problems of complex data with many spectral bands, spatiotemporal dependencies, large data series, lack of labelled data, maintaining consistency beyond the training space, data sparsity, uncertainty and data integrations given the diversity of data types and scales.
  + Implement these methods efficiently using programming tools such as PyTorch, mxnet and TensorFlow on high performance computing systems.
  + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Recognise and exploit opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research.
  + Carry out evaluation of the developed software to demonstrate its competitiveness and fitness for purpose, taking responsibility for functionality, performance and robustness.
  + Collaborate with members of a diverse project team and external partners to ensure research directions can lead to lasting impact in application domains.
  + Demonstrate the capacity of these methods to advance landscape and ecological monitoring through at least two case-studies, in collaboration with other CSIRO scientists.
  + Publish results in relevant international scientific venues (high-level journals and conferences).
  + Interpret and present research findings in artificial intelligence and machine learning to research scientists and practitioners from a wide range of other scientific areas.
  + Communicate effectively and respectfully with all staff, clients and suppliers in the interests of good business practice, collaboration and enhancement of CSIRO’s reputation.
  + 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 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**

#### 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) in a relevant discipline area, such as machine learning, artificial intelligence, computer vision, computer science, statistics, data analytics, environmental modelling, applied mathematics or applied physics.

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

1. Solid knowledge of machine learning, artificial intelligence and statistics, and the ability to understand and develop mathematically-founded machine learning algorithms and their development in toolkits such as TensorFlow, mxnet or PyTorch.
2. Demonstrated experience in developing machine learning algorithms for spatiotemporal or remote sensing datasets.
3. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
4. The ability to work effectively as part of a multi-disciplinary, regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.
5. Knowledge of Python, C++ or equivalent.
6. 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.
7. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Demonstrated experience on deploying machine learning algorithms for large multiscale data sets.
2. Experience or interest in one or more of the following: deep neural networks including graph neural networks; Bayesian learning, cross-modal deep learning methods; weakly/self/semi-supervised learning.
3. Good experience with high-dimensional, multimodal spatiotemporal or remote sensing data.
4. Good experience using high-performance computing clusters and source code versioning systems such as Git.
5. Experience working in the multi-disciplinary domain of multilayered -omics, contaminants and / or whole organism responses.

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates will be expected to commence employment by December 2020/January 2021. Candidates are also 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 ($83,687). 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

* 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 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/)!

**About Data61:**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](https://www.data61.csiro.au/)!

**About Land and Water:**

We work with our partners to deliver innovative solutions to the complex challenges that arise from the demands and impacts of human activities on the environment. To find out more visit us [online](https://www.csiro.au/en/Research/LWF).

Find out more about [The Machine Learning and Artificial Intelligence Future Science Platform (MLAI FSP)](https://research.csiro.au/mlai-fsp/)