# 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 ML/AI FSP: Finding the Unknown in Radio Astronomy Data Sets. |
| Job Reference | 66845 |
| Tenure | Specified Term of 3 years Full-time  |
| Salary Range | AU$83,687 to AU$94,679 pa + up to 15.4% superannuation |
| Location(s) | Marsfield, Sydney |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Team Leader |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact George Hobbs via email at george.hobbs@csiro.au or phone +61 2 9372 4652, Lars Petersson lars.petersson@csiro.au ORVivien Rolland vivien.rolland@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 or call 1300 984 220. |

### 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 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.**

**The Machine Learning and Artificial Intelligence Future Science Platform** (ML/AI FSP) will bring together a large number of World-leading experts to explore scientific questions using machine learning techniques. As a member of this Platform you will work with CSIRO scientists and engineers as well as have an opportunity to collaborate with 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 modern-day astronomy: identifying rare and currently unknown classes of astrophysical objects. You will also have the opportunity to work with other members of the Platform on projects ranging across multiple science research areas.

Finding the unknown has always been an extremely rewarding challenge, often serendipitous and defying traditional search methodologies. Such serendipitous discoveries have included pulsars and fast radio bursts. We now have a new game changer - dealing with massive data volumes. The Evolutionary Map of the Universe (EMU) survey on CSIRO’s Australian Square Kilometre Array Pathfinder (ASKAP) will be the largest radio survey yet attempted and increase the number of known radio sources from millions to tens of millions. The new receiver systems on Parkes are undertaking new deep and wideband surveys for pulsars, which lead to copious data volumes.

The role of this Postdoctoral Fellow is to develop machine learning algorithms that can be applied to these very large data structures and can identify unusual and unexpected sources in the ASKAP and Parkes data sets.

The postdoc position will be based within CSIRO Astronomy and Space Science (CASS). CASS operates a number of world-class radio astronomy observatories that are collectively known as the Australia Telescope National Facility (ATNF). These include the Parkes 64m diameter radio telescope, the Australia Telescope Compact Array at Narrabri and the Australian Square Kilometre Array Pathfinder.

### Duties and Key Result Areas:

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

* + 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.
	+ Develop general methods for searching for "known unknowns” (pulsars, fast radio bursts, galaxies, etc.) and “unknown unknowns” (the unexpected) in data sets from the Parkes and ASKAP telescopes.
	+ Implement these methods efficiently on high performance computing systems.
	+ 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.
	+ Publish results in relevant international scientific venues (high-level journals and conferences).
	+ Interpret and present research findings in computer vision 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 computing, astrophysics or 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. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
2. Solid knowledge of machine learning techniques and proven ability to develop and apply such techniques to complex data sets.
3. 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.
4. Knowledge of Python, Julia, C, C++ or equivalent.
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 record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Knowledge relating to the application of machine learning methodology to large data sets.
2. Experience using high-performance computing systems.
3. Experience in pulsar, transient or synthesis imaging astronomy.

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$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

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 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/)!

Find out more about CSIRO [Astronomy and Space](https://www.csiro.au/en/Research/Astronomy)