# 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 Detecting Dark Galaxies |
| Job Reference | 90751 |
| Tenure | Specified Term of 3 years  Full-time or Part-time, minimum 0.6 FTE |
| Salary Range | AU$92,624 to AU$101,459 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Kensington, WA |
| 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 | Team Leader, Space and Astronomy |
| Client Focus – Internal | 30% |
| Client Focus – External | 70% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Ivy Wong via email at [Ivy.wong@csiro.au](mailto:Ivy.wong@csiro.au) or phone at +61-8-6436-8602 |
| 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).

### 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 CERC Postdoctoral Fellow will work on the application of Deep Learning or Machine Learning methods to find dark galaxies in very noisy massive spectral line data cubes, within the research group led by Dr Ivy Wong. Dark galaxies are dark matter dominated massive galaxies with very few stars. The focus of this CERC Fellowship is aimed at improving upon the reliability of detecting gas-rich dark galaxies which typically have low signal-to-noise ratios (SNR) from the WALLABY survey using the Australian SKA Pathfinder (ASKAP). ASKAP is a correlated array of 36 12-m dishes, and it maps the sky via synthesis imaging – an indirect imaging technique similar to that used in medical imaging (e.g., CT scans or MRIs). The ASKAP data rate is ~2Gb per second, yielding ~75 Pb per year. WALLABY will survey a significant fraction of the Southern sky for Atomic Hydrogen (HI) further, deeper, and wider than ever before. The goal is to be able to detect low SNR dark galaxies in a reliable and automated manner.

The CERC Fellow will work in close collaborations with Dr Ivy Wong, Dr Karen Lee-Waddell at the Australian SKA Regional Centre and Dr Tobias Westmeier from the International Centre for Radio Astronomy Research (ICRAR) at the University of Western Australia to provide novel solutions to the scientific and technical challenges faced by the next-generation radio sky surveys.

### Duties and Key Result Areas

Under the direction of senior research scientists and engineers, this CERC Fellow will:

* + In collaboration with cross-institutional astronomers, develop and implement machine learning / deep learning solutions to the low signal-to-noise big data faced by the next-generation all-sky survey for atomic Hydrogen.
  + Effectively translate machine/deep learning techniques to synthesis radio astronomy problems using CSIRO HPC facilities.
  + Publish results and methods in relevant international journals (and conferences) and release solutions onto public repositories such as GitHub.
  + Collaborate with members of a diverse project team and external partners to ensure research leads to lasting application impact.
  + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + 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, Health, Safety and Environment procedures and policy, Diversity initiatives and Zero Harm 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

## **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 Astrophysics/Physics, Computer Science, Mathematics, Software Engineering or similar.

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

1. Demonstrated expertise in the application of machine/deep learning methods
2. Demonstrated understanding of interferometric spectral line observations (or hyperspectral data from indirect imaging).
3. Demonstrated ability to work effectively in large distributed scientific collaborations.
4. 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.
5. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
6. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. Experience with high-performance computing clusters.
2. Experience and interest in supervising students.
3. Ability to remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.

## **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.

To be appointed to this CERC Fellowship role within CSIRO, candidates will be expected to commence employment by 30 June 2023. Candidates are also 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 (AU$89,680). 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 Clearance or equivalent. Please note that individuals 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. Visit [CSIRO Online](http://www.csiro.au/) and [Space and Astronomy](https://www.csiro.au/en/about/people/business-units/Space-and-Astronomy) and [Data61](https://www.csiro.au/en/about/people/business-units/Data61) for more information.

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

* People First
* Further Together
* Making it Real
* Trusted