# Position Details

## CSIRO Early Research Career (CERC) Engineering Fellowship– CSOF4

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| The following information is for applicants |
| Advertised Job Title | CSIRO Engineering Fellowship in Astronomy Data Processing Pipelines |
| Job Reference | 79891 |
| 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) | Marsfield (Sydney) NSW or Kensington (Perth) 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 | Calibration and Imaging (CALIM) Team Leader |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Stephen Ord via email at Stephen.Ord@csiro.au or phone +61 2 9372 4186 |
| 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. |

**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 or masters 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.**

**Help us develop a faster, robust, and more flexible data processing pipeline for the ASKAP telescope**

The Australian Square Kilometre Array Pathfinder (ASKAP), CSIRO’s newest and largest radio telescope, is a cutting-edge instrument built by CSIRO to produce ground-breaking surveys of the sky. High Performance Computing is vital for the processing and analysis of data from the telescope and the Software and Computing group provides and maintains the data processing pipelines that take the raw output from the telescope and generate high quality data products for the astronomy community. ASKAP generates large amounts of data (nearly 10TB/hr) that requires substantial and near real-time processing before it is ready for scientific use. This is a unique challenge compared to other large-scale scientific computing problems such as simulations, as the data processing needs to be much faster than the data acquisition to avoid data being overflown and thus impacting the subsequent experiments. The science teams seeking to use ASKAP comprise hundreds of radio astronomers from Australia and around the world, and they rely on the outcomes of our high-performance processing pipelines to get the data required for their science.

**What does this fellowship aim to achieve**

Creating and maintaining an efficient and flexible near real-time scientific data processing workflow pipeline running in High-Performance Computing (HPC) environments is challenging. The fellow will explore novel solutions to this problem for radio astronomy data processing and contribute to the development of future data processing pipelines.

In addition to the current challenges, there will be a new Supercomputer at Pawsey, named Setonix that brings new technologies and opportunities to improve the scientific data throughput of ASKAP. This project aims to achieve a factor of two or more improvement in the performance execution of the data processing pipelines for the ASKAP telescope. An investigation into scientific software workflow best practices and subsequent innovation and development of new solutions will provide a valuable addition to current knowledge in this area which will be applicable not only for astronomy applications, but also other “big data” science.

Approximately 50% of the position will be the extension and maintenance of the current pipeline, with the remainder expected to be devoted to the research and development of new pipeline technologies that will supersede the current implementation.

**What qualifications and experience are required**

This fellowship is targeted at early career engineers, a PhD is not required, but a Masters level qualification and an interest in developing data processing workflows on high performance computing platforms is expected.

The skills and experience required to manage and improve our data processing pipelines may come from areas outside the physical sciences and we encourage engineers and scientists of all backgrounds interested in the application of HPC to complex workflows to apply.

CSIRO also has a priority to improve how we recruit and empower diverse talented people.

CSIRO is a member of [Pride in Diversity](http://www.prideinclusionprograms.com.au/about-pid/) the [Australian Network on Disability](https://www.and.org.au/) the [Champions of Change Coalition (CCC)](https://championsofchangecoalition.org/) and [Science in Australia Gender Equity](http://www.sciencegenderequity.org.au/) (SAGE) pilot program.

Also Space and Astronomy at CSIRO is currently a recipient of a Bronze Pleiades Award from Inclusion, Diversity and Equity in Astronomy (IDEA), which recognises organisations in Australian Astronomy that are attempting to achieve an environment that is welcoming and supportive of all academic staff, professional staff and students, regardless of gender and sexual identity, ethnic and cultural background, disability, age, family/carer responsibilities, political affiliation, and religious belief.

### Duties and Key Result Areas:

* Work together with ASKAP Scientists, Software Engineers and Pawsey Technical Staff to manage, maintain and develop the ASKAP Astronomy Data Processing Pipelines.
* Research and develop novel processing workflows to improve the efficiency and reliability of ASKAP Science Data Processing.
* Communicate openly, effectively and respectfully with all staff, clients and suppliers, and form quality interpersonal relationships that reflect CSIRO’s values and reputation.
* 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 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 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) OR hold an engineering degree plus a Master of Science (MSc) or Master of Engineering (MEng) qualifications (or will shortly satisfy the requirements of a masters) plus equivalent levels of original and significant contributions to research and development to that expected of someone of a new PhD graduate. The doctorate or masters must be in a discipline area, relevant to High Performance Computing. We do appreciate that this research area is broad, and it is expected that applicants outside the traditional areas of astronomy and computer science could well have the skills and experience required for the role.

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

1. Experience in the research, development or application of data processing workflows in cloud computing or data centre environments.
2. 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.
3. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Experience with modern Agile software development practices:
	* SCRUM/KANBAN
	* Git and Git workflows
	* Continuous Integration
2. Experience with:
	* Unix/Linux OS and Bash scripting
	* Python package development
	* High performance computing (HPC) systems and supporting services (e.g. slurm, Lustre file systems, networking)
	* Containerisation technologies (Docker, Singularity) especially in a HPC context.
3. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
4. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
5. **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 or master thesis at the time of commencement, as a minimum requirement, if PhD or masters conferment has not been obtained. If a candidate has submitted, but their PhD or masters has not yet been formally attained, the starting salary will be CSOF4-1 ($87,068). Upon CSIRO receiving written confirmation that the PhD or masters 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.

**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.

CSIRO Early Research Career (CERC) 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/)!

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 [Space and Astronomy](https://www.csiro.au/en/about/people/business-units/Space-and-Astronomy)