# 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 Deep Learning, Decision Support, and Underwater Acoustics in a Collaborative Intelligence Context |
| Job Reference | 87033 |
| 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) | Hobart, Tasmania |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * Australian/New Zealand Citizens; and
* Australian Permanent Residents.

NOTE: Candidates must be able to commence in the role by December 2022 |
| Position reports to the | Team Leader, Marine Data Analytics |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Pascal Craw via email at Pascal.craw@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. |

**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 or full time equivalent.**

This role will be embedded in CSIRO’s new Collaborative Intelligence (CINTEL) Future Science Platform (FSP). Future Science Platforms (FSPs) are an investment in science that underpins innovation and that has the potential to help reinvent and create new industries for Australia.

The **Collaborative Intelligence (CINTEL) FSP** will develop the science that enables human intelligence and technology to work harmoniously together across multiple domains, exceeding the performance of either alone. This is needed as there is growingacknowledgement that the best results ensue when humans work *collaboratively* with machines in both physical and virtual/digital worlds.

The **CINTEL** **FSP** is about exploring “collaborative intelligence” and developing the science required to integrate artificial and human intelligence and produce a general-purpose technology which could have a transformative impact across a wide range of industries and domains. This in turn will lead to greater adoption and effective use of technology, enhanced productivity, and safety. The FSP will also explore how people and machines work and learn together while ensuring meaningful and rewarding work for people, where machines augment rather than substitute human intellect. Achieving this will require **an interdisciplinary approach**, bringing together experts in social science, engineering, and computer science, with domain expertise in the areas in which collaborative intelligence is to be deployed.

The Postdoc will be part of a cohort of early career researchers working with top CSIRO scientists and engineers to re-think how to partner human and machine intelligence in symbiotic relationships. The emphasis will be on research at the cutting edge of an emerging field to explore how to work with machines to boost human capabilities, enhance human decision-making and performance, and build human trust in machines.

The Postdoctoral Fellow will work in a multidisciplinary team in CSIRO’s Oceans and Atmosphere Business Unit, focused on monitoring human activities and impacts in the marine environment. More information on the team and its research is available at <https://research.csiro.au/iuu>.

The Fellow will lead a project with two key goals:

1. The development of deep learning methods for identifying and classifying underwater acoustic signatures associated with surface and subsurface human activities. The methods developed are intended to operate on embedded systems in an underwater acoustic sensor developed by CSIRO.
2. Exploration of approaches to interpretable deep learning for deployed acoustic sensor systems in remote environments, particularly where communication bandwidth is constrained. This will include a significant focus on how the human and AI components can partner to provide effective, dynamic situational awareness of remote environments in near real-time when communications are limited.

The successful applicant will work within a team of more than 30 scientists and engineers who deliver projects across the marine research field with a focus on sensor and instrumentation development, supported by onboard machine learning and remote communications. Key activity areas across the team at present include the development of autonomous sensors for underwater acoustics, biosensing and sampling, and environmental pollutants.

### Duties and Key Result Areas:

Under the direction of senior research scientists, CERC Postdoctoral Fellows:

* Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes. In this project, the Fellow will be required to articulate and solve research challenges associated with understanding human trust in novel collaborative technologies.
* 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, including performing systematic literature surveys of research relevant to the field.
* Carry out research investigations within a multidisciplinary team, requiring originality, creativity and innovation, including the planning, design, conduct and quantitative analysis of data from empirical studies involving human participants. This position also requires an ability to conduct qualitative inquiry to gather relevant knowledge from a variety of stakeholders, and triangulate findings from both quantitative and qualitative research.
* Produce high quality research publications and publish in various high-profile venues.
* Represent CSIRO externally, including in public forums such as academic conferences, with industry or the research sector or with Government, including collaborating with stakeholders and academic partners as required.
* 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

## **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 computer science, engineering, physics, ecology, psychology, or other disciplines.

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

1. Knowledge of interpretable machine learning, including approaches to understanding inputs and activations in deep learning models. Knowledge of deep learning techniques, including experience with deep learning software libraries. High-level programming skills, particularly in languages common in machine learning environments.
2. Highly experienced with both applied quantitative and qualitative research methods.
3. Demonstrated research experience in a multidisciplinary team environment, in areas related to Trust in technology and/or Responsible Innovation. **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.**
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. Previous experience working in Human-Machine Interaction (HMI), working at the intersection of Computer Science and Social Science or Behavioural Science.
2. Experience with or knowledge of the development of embedded systems.
3. Experience with or knowledge of acoustics, sound propagation and attenuation, and related topics.
4. Experience with or knowledge of decision support systems.
5. 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 December 2022. 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 ($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 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 [Oceans and Atmosphere](https://www.csiro.au/en/about/people/business-units/Oceans-and-Atmosphere) 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