# 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 Collaborative Intelligence for Human-Robot Teams |
| Job Reference | 79553 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$89,923 to AU$98,504 pa + up to 15.4% superannuation |
| Location(s) | Pullenvale, Brisbane |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * All Candidates * Be able to commence in the role by May 2022 |
| Position reports to the | Senior Research Scientist |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | David Howard via email at david.howard@csiro.au or phone +61 7 3327 4714 |
| 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 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) 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.**

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. There is growingacknowledgement that the best results ensue when humans work *collaboratively* with machines in both physical and virtual/digital worlds. 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.

The **CINTEL** **FSP** is about exploring “collaborative intelligence” and developing the science required to achieve it, leading to greater adoption and effective use of technology, enhanced productivity, and safety. It 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 Postdoctoral Fellow 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 with a multidisciplinary research team across CSIRO and Monash University to develop advanced types of Situational Awareness (SA) for CSIRO’s prizewinning DARPA SubT human-robot team (<https://www.csiro.au/en/research/technology-space/robotics/darpa-challenge>). The successful applicant will be given the opportunity to work with our SubT team, who recently beat an array of world-renowned robotics groups and took home second place, and a $1M prize, at the DARPA SubT challenge finals.

The project focuses on situational awareness, which is a key requirement for successful human-machine collaborations. It allows human operators to use their skills and cognition effectively. This project deals with methods to provide *dynamic situational awareness*, allowing operators to optimally deploy their ‘human’ skills (including intuition, adaptivity, expert knowledge, strategy, goal setting, and big picture thinking) to improve mission outcomes in human-robot team scenarios. Specifically, the Fellow will create a user modelling capability to continually assess a user’s state, and devise novel user interfaces that adaptively respond to changes in user state to balance cognitive loading with richness of incoming data. The novel solutions developed in this project will provide next-generation situational awareness capability to the existing SubT human-robot team and will be deployed in real-world scenarios. The successful candidate will be fully supported by our excellent engineers and operators.

### 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 solve research challenges associated with providing dynamic situational awareness in the context of human-robot teams.
* 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, working with the DARPA SubT project team to develop and deploy algorithmic frameworks for dynamic situational awareness.
* 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 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(s). 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 Computer Science, User Modelling, Human-Robot Teaming, Human-Computer Interaction, Data Science, or Cognitive Science.

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

1. Demonstrated experience with a modern programming language (C++ or Python preferred).
2. Demonstrated research experience in one or more areas related to the project, e.g., human-computer interaction, user modelling, cognitive modelling, human-robot teaming.
3. 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 top national and international conferences.
4. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
5. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.
6. **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.**

## **Desirable:**

1. Hands-on experience with robots is not required but is a bonus.
2. Experience with the Robotic Operating System (ROS).
3. Proven ability to plan, execute, and analyse experiments involving human participants.
4. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.

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 ($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.

Include if relevant:

* 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/)!

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 CSIRO [Data61](https://www.csiro.au/en/about/people/business-units/Data61)