# 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 – Lightweight Models for Edge AI |
| Job Reference | 70855 |
| Tenure | Specified Term of 3 years (Full-time) |
| Salary Range | AU$86,434 to AU$94,679 + up to 15.4% superannuation |
| Location(s) | Pullenvale, QLD |
| 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 candidates) |
| Position reports to the | Science Leader |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Dr Jiajun Liu via email at: [jiajun.liu@csiro.au](mailto:jiajun.liu@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](mailto: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 Distributed Sensing Systems (DSS)** Group is one of the leading large-scale sensing groups in the world, based in Brisbane, Queensland, Australia. We are part of the Cyber-Physical Research Program at CSIRO’s Data61 Business Unit.

The group’s research focuses on creating integrated sensing, AI/ML, and telemetry technologies that will radically improve the cost and quality of data gathering on a large scale to enhance the understanding of our natural and built environments. We translate research technologies to commercial outcomes to help improve productivity across Industries and provide the ability to protect and manage Australia’s sociological and environmental sustainability. Technologies developed by the DSS Group have been deployed at continental scale in Australia, and across 6 continents on a broad range of environmental, agricultural, and industrial applications.

The DSS pursues the scientific vision that consists of three closely interrelated perspectives:

1. **Scalable Sensing for Sustainability**: Designing intelligent and scalable sensing systems to help Australia and the world tackle sustainability challenges, in a sustainable way.
2. **Ubiquitous AI for the Real World**: Building embedded and edge AI capabilities that bridge the gap between the physical world and the digital world in a distributed/edge environment, enabling their transition from the lab into the real world.
3. **NextGen IoT/Sensor Networks with Responsibility**: Encoding trust, confidentiality, and security into software and hardware design of IoT/Sensor Networks to promote responsible data collection and analytics.

With over 60 people spread across QLD, NSW, VIC, TAS, and ACT; our team is comprised of Research Scientists, Post-Doctoral Fellows, Engineers, PhD & Masters Students, and Industrial Trainees.

The position sits within the DSS group as part of a strategic and integrated research effort on machine learning/AI models for the aforementioned distributed/edge environments, through techniques that include but are not limited to: model design, model distillation, model quantization, distributed training, etc. In particular, the candidate will investigate new models and algorithms for multi-modal learning that harness the power of a variety of sensory signals including videos, accelerations, kinetic energy harvesting etc.

This will be done within national and international settings, and as part of a diverse multidisciplinary team. The role will also be exposed to and applied in a wide range of real-life applications that cover a set of different domains and are of national/global significance.

### Duties and Key Result Areas:

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

* + Obtaining an overview of the group’s research and engineering landscape and understanding the key underlying scientific challenges.
  + Developing graph-based learning algorithms that help solve these scientific challenges and potentially fit into the distributed/edge computational environment.
  + Carrying out evaluation of the developed software to demonstrate its competitiveness and fitness for purpose, taking responsibility for functionality, performance and robustness.
  + Publishing results in relevant international scientific venues (high-ranking journals and conferences).
  + Actively work with the group’s engineering capabilities to transfer research outcomes into engineering results.
  + Interpreting and presenting research findings in artificial intelligence and machine learning to research scientists and practitioners from a wide range of other scientific areas.
  + Identifying opportunities that could potentially generate intellectual properties through research.
  + Recognising and exploiting opportunities for innovation and the generation of new theoretical perspectives, and progressing opportunities for the further development or creation of new lines of research.
  + Collaborate with members of a diverse project team and external partners to ensure research directions can lead to lasting impact in application domains.
  + 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 machine learning, artificial intelligence, computer vision, computer science, statistics, data analytics, applied mathematics or applied 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. Solid knowledge of machine learning (preferably in lightweight deep learning models) and statistics, and the ability to implement (lightweight) models with machine learning toolkits such as TensorFlow/TensorFlow Lite, on edge AI devices.
2. Demonstrated experience in models simplification using techniques such as model/knowledge distillation, binarization, etc.
3. A sound history of publication in high-rank peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents, in machine learning or systems areas.
4. 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.
5. Proficient in Python, C++ or equivalent.
6. 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.
7. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Experience or interest in one or more of the following: designing and implementing neural networks; implementing deep neural networks on edge AI devices.
2. Good experience with high-dimensional, multimodal data.
3. Good understanding of the underlying differences between the two phases of model training (development) and inference (deployment), and demonstrated skills of taking advantage with such knowledge in research.
4. Good experience using GPU-assisted model acceleration and source code versioning systems such as Git.
5. Experience working in object/event detection, or activity classification*.*

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/

## **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

**About Data61:**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](https://www.data61.csiro.au/)!

**About DSS Group:**

Find out more about [the Distributed Sensing Systems (DSS) group](https://research.csiro.au/dss/).