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# 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 Distributed Sensing Systems |
| Job Reference | 91450 |
| Tenure | Specified Term of 2 years  Full-time |
| Salary Range | AU$92,624 to AU$101,459 pa + up to 15.4% superannuation |
| Location(s) | Brisbane, QLD |
| Relocation Assistance | Will be provided to the successful candidate if applicable |
| Applications are open to | All candidates |
| Position reports to the | Team Leader |
| Number of Direct Reports | 0 |
| Enquire about this job | Jaijun Liu, [ryan.liu@data61.csiro.au](mailto:ryan.liu@data61.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. |

**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 and have less than four 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.

We are seeking a talented and motivated CERC Fellow to join our **Distributed Sensing Systems (DSS)** group, which is a world-leading research group specialised on large-scale, decentralized, and intelligent sensing technologies. The group is based in Pullenvale, Queensland, Australia and is part of the Cyber-Physical Systems research program within the CSIRO’s Data61 business unit. With over 60 staff and students, our group is comprised of Research Scientists, CERC Fellows, Engineers, PhD & Masters Students, and Industrial Trainees.

The research focus of this role is on the development and deployment of AI algorithms and workflows for underwater ocean sensing. The CERC Fellow with work with CSIRO mobile surveillance platforms for oceans that collect image/video data streams, location and motion information, and environmental parameters from under water. The goal of the project will be to enhance the efficiency and quality of data/knowledge acquisition on large scales through employing artificial intelligence (AI) algorithms that run on sensing devices, at edge, or in the cloud. We work directly with external users of the technology and translate scientific research to improvements in productivity and sustainability of various industries. Technologies developed by the DSS group have been deployed at continental scales in Australia and around the world in a broad range of environmental, agricultural, and industrial applications.

The position is funded through CSIRO’s *Reinvent Science Program*, which combines the expertise and imaginations of scientists, engineers and designers to build next-generation methodologies and tools that accelerate scientific discovery.  The program brings together deep digital science and engineering knowledge, new technology capabilities and domain science experts to revolutionise the way we do science at CSIRO.

The main research area of the CERC Fellow will be machine learning (ML)/AI for on-device processing/edge computing. They will develop new concepts, algorithms, and software tools to speed up the development of on-device analytics for ocean survey sensor platforms. The main objectives include analytics for multi-modal data streams, such as video, motion, and location:

* Automation of the data annotation using ML models, weakly/semi-supervised training of ML algorithms, and active learning based on human input
* Incorporation of position and location time-series data to improve vision-based ML models, for example, through reconstruction of metric dimensions of objects.
* The CERC Fellow will be exposed to a range of datasets from real-life ocean surveys collected for different scientific and industrial purposes.

The successful candidate will be part of CSIRO CERC Fellowship program which offers opportunities for 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

The CERC Fellow **will be appointed for two years** and is expected to commence in the first half of 2023**.**

### Duties and Key Result Areas:

Under the direction of the senior DSS group members, the successful candidate will:

* + Obtain an overview of the group’s research and engineering landscape and understand the key underlying scientific challenges.
  + Develop ML/AI solutions that help tackle these scientific challenges and are suitable for on-device processing or edge computing.
  + Implement and evaluate the developed algorithms and methods efficiently using Python libraries such as scikit-learn, TensorFlow, and PyTorch.
  + Liaise with the engineers to execute the validated algorithms and tools on the appropriate embedded systems or edge computing platforms.
  + Publish results in relevant reputable journals and conferences and prepare patent applications.
  + Recognise and exploit opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for further development or creation of new lines of research.
  + Collaborate with members of diverse project teams 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.

## **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, engineering, mathematics, or similar discipline.

*Please note*: To be eligible for this role you must have at least one year of relevant research experience, but no more than six full-time equivalent years of relevant experience since confirmation of your doctorate at the end of this postdoctoral term.

1. Solid understanding of machine learning principles and ability to conceive and develop theoretically-sound machine learning algorithms and evaluate them using Python libraries such as scikit-learn, TensorFlow, or PyTorch.
2. Strong experience in performing visual recognition in multimodal sensory data including 2D images and 3D pointclouds (or depth images).
3. Demonstrated experience in developing machine learning models for real-world applications.
4. Record of publication in reputable peer-reviewed journals/conferences or authorship of scientific reports, grant applications, or patents.
5. Proficiency in Python and C/C++.
6. Ability to work effectively as part of a multi-disciplinary, regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.
7. High level of written and oral communication skills with ability to effectively represent the research team internally or externally, including the presentation of research outcomes at international conferences.

## **Desirable:**

1. Experience or interest in one or more of the following: computational geometry, 3D pointcloud processing, multimodal fusion or cross-modal learning with 2D/3D.
2. Experience with developing machine learning algorithms for and implementing them on embedded systems or edge devices.
3. Knowledge of software engineering principles and experience with source code version-control systems such as Git.

To be appointed as a Postdoctoral Fellow within CSIRO, the successful candidate will be expected 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 ($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 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 CSIRO 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 Fellows 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/)!

**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/).