# Position Details

## Research Scientist/Engineer- CSOF5

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| The following information is for applicants | |
| Advertised Job Title | Research Scientist - Efficient machine learning for time-series data |
| Job Reference | 88767 |
| Tenure | Indefinite (Full-time) |
| Salary Range | AU$ 102,724 to $AU 111,165 + 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 | Team Leader |
| Client Focus – Internal | 50% |
| Client Focus – External | 50% |
| 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. |

**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

The **Distributed Sensing Systems (DSS)** group is one of the leading large-scale sensing and analytics 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 to ramp up ML/AI capabilities in aforementioned distributed/edge environment, with a focus on building multi-modal edge AI models and platforms to acommendate requirements from real-life applications across multiple domains including Agri-food, environmental sensing, etc.

### Duties and Key Result Areas:

This is a research scientist position, expected to conduct research on efficient machine learning algorithms for time-series data on edge devices and implement such algorithms on edge hardware, for projects in digital agriculture – eGrazor, digital manufacturing – FDMF/Maven, and smart building/digital twin domains. Specifically, the position will develop lightweight ML models to analyse multi-modal time-series data from multiple edge devices and sensors such as temperature/humidity, or accelerometer, to understand/classify context in which a sensor device operates, or identify activities of the target object. The fellow will utilise the edge ML technology in real-world use-cases and industry deployments while helping build crucial capabilities and opening new avenues for growth in DSS, CPS, and Data61.

Key duties include:

* Develop multi-variate/multi-modal algorithmic solutions that are suitable for distributed and in-network 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 domain scientists/experts to validate 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.

**Required Skills and Experience:**

* Technology: Proficiency in machine learning frameworks such as PyTorch or TensorFlow, strong research background in time-series data analysis/mining
* Science: alignment with priority publication venues for the DSS group, including venues focusing on machine learning, embedded networked systems, mobile, wearable, and pervasive computing; demonstrated ability to publish in a top-rank conference and journal venues
* Impact: ability and drive to work with engineers and domain scientists towards translation of R&D towards impact, including environmental and societal aspects

## **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 PhD (or an equivalent combination of qualifications and research experience) in a relevant field.
2. Solid knowledge of machine learning (preferably in statistical learning/deep learning).
3. Demonstrated experience in models simplification using techniques such as model/knowledge distillation, binarization, etc.
4. 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.
5. 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.
6. Proficient in Python, C++ or equivalent.
7. 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.
8. 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 time-series data analysis/mining algorithms with information theory, statistics or neural networks-based models.
2. Good experience with high-dimensional, multimodal time-series data streams.
3. Good experience using GPU-assisted model acceleration and source code versioning systems such as Git.
4. Experience working in object/event detection, or activity classification*.*

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/

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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/).