# Position Details

## CSIRO Early Research Career (CERC) Postdoctoral Fellowship– CSOF4

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| The following information is for applicants | |
| Advertised Job Title | Postdoctoral Fellowship – Privacy Preserving Technologies |
| Job Reference | 64469 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$83,687 to AU$94,679 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Sydney, NSW |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * All 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 Prof. Dali Kaafarvia email at [dali.kaafar@data61.csiro.au](mailto:thierry.rakotoarivelo@data61.csiro.au) or phone +61 2 9490 5699 |
| 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.**

### Privacy-preserving technologies are now critical as evermore volumes of data are being collected and shared between entities. Releasing and analysing data in a privacy-preserving manner means that any information specific to an individual remains hidden while characteristics common across individuals are learned. A series of results have shown that the pervasive techniques of de-identification (removing obvious identifiers of individuals from data) to sanitise datasets are prone to a host of attacks including inference and re-identification through use of background knowledge. A safer alternative is to use provably privacy-preserving algorithms to release and analyse data.

### We are seeking a Postdoctoral fellow to work on different aspects of Privacy Enhancing Technologies (PETs) as applied to problems arising in privacy preservation of real-world datasets. The Postdoctoral fellow will be involved in one or more projects in three focus areas:

### • Designing algorithms and protocols that allow private release and/or analysis of data for different application scenarios. These include online access to data through a secure interface, one-off release of synthetic data, real-time release of statistics from continuous streams of data, and data aggregation at the edge in an Internet-of-Things (IoT) setting.

### • Application and implementation of private algorithms for release and analysis of real-world industry and government datasets in ongoing and future data privacy projects. This will involve identification and development of suitable algorithms (in terms of computational efficiency and utility) targeted to a particular dataset and statistical insights.

### • Examining and introducing variants of provable privacy definitions that improve trade-off between privacy and utility.

### The outcome of this research will have both research and practical applications. The successful candidate will closely interact with both researchers and engineers within the Information Security and Privacy Group.

### Duties and Key Result Areas:

* Under the direction of senior research scientists, carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
* Work with CSIRO scientists and engineers within the Data Privacy team and across other research programs at Data61 to develop and analyse differentially private algorithms and techniques. This will involve:
  + Design and evaluation of privacy-preserving algorithms for different settings (online, offline, real-time, etc.) as required diverse application scenarios.
  + Engagement with other business units of CSIRO, industry and government clients of commercial projects to understand their privacy requirements, formalising the privacy problem and identifying suitable solutions.
  + Analyse and identify privacy attacks and vulnerabilities due to shortcomings or incorrect application of privacy techniques such as k-anonymity, de-identification methods and differential privacy.
  + Work with engineers within the team to ensure secure implementations of PETs algorithms.
  + Explore alternate provable privacy solutions, e.g. where differential privacy fails to give reasonable utility or where differentially private algorithms are computationally inefficient.
  + Investigate theoretical limits including impossibility results and the gaps between theory and practice, e.g., showing that it is impossible to devise an efficient algorithm under differential privacy for a given class of analysis and demonstrating what this means in practice.
* Undertake regular reviews of relevant literature and patents.
* Produce high quality scientific and/or engineering papers suitable for publication in quality journals, for client reports and granting of patents.
* Prepare appropriate conference papers and present those at conferences as agreed with your supervisor.
* Contribute to the development of innovative concepts and ideas for further research.
* Make a contribution to the effective functioning of the research team and help deliver CSIRO’s organisational objectives and plans.
* Work collaboratively with colleagues within your team, the business unit and across CSIRO.
* 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 Values, Health, Safety and Environment plans and policies, Diversity initiatives and Zero Harm goals.
* Undertake an appropriate training and development program developed by CSIRO.
* Other duties as directed.

***CSIRO’s postdoctoral training program***is developed between the Postdoctoral Fellow and a CSIRO scientist. 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
* <http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships>

[**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 asTheoretical Computer Science, Algorithms, Mathematics with a computing major, Cryptography, Information and Data Privacy.

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. Demonstrated knowledge and skills in one or more of the following areas: Design and analysis of algorithms, Differential Privacy framework, Applied Cryptography, Probabilistic and statistical framework, machine learning and Information theory.
2. Demonstrated experience in the collection and processing of large data sets, development of efficient algorithms on large datasets, and development of security or privacy-preserving algorithms or protocols for processing and sharing data.
3. The ability to work effectively as part of a research team, plus the motivation and discipline to carry out autonomous research.
4. A record of science innovation and creativity plus the ability and willingness to incorporate novel ideas and approaches into scientific investigations.
5. A record of publication in top peer reviewed journals and conferences (i.e. high impact factor, or selective acceptance rate).
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 sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
8. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Previous experience or research in measuring and quantifying privacy risks and developing and implementing Provable Privacy Preserving Algorithms
2. Familiarity with software development processes and a few mainstream programming languages such as C, Python and Java.
3. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
4. **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.**

***Data61 Values:***

**Great Impact**: We focus our valuable resources on areas where we can lead globally and have large impact for Australia, to aid our future prosperity and independence.

**Mastery**: We are fearless, curious and we improve every day. We strive to excel in research, technology and business, and to work with the best in the world.

**Co-Creation of Value**: Everything we do involves co-creation with our network: team, customers and partners. Generously empowering their success is central to our success.

**Ownership of Results**: We jointly hold ourselves accountable for our actions. We do this via trust and commitment.

**People and their Differences**: We embrace the creativity that comes from the diversity of our people.

**Agility and Flexibility**: We view the changing world as an opportunity. This requires agility and flexibility in everything we do; everything changes, except our constant desire to adapt.

**Tell it Straight, with Respect:**We say what we mean, mean what we say, and do not mislead, obfuscate or spin. We're direct and always respectful.

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.

**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/)!

**About DATA61**:  In today’s data-focused world, there’s no doubt that numbers count.  [Data61](http://www.data61.csiro.au/) are the largest data innovation group in Australia, a connector that brings together technology innovators, businesses and universities to transform Australian industry and to help solve our greatest challenges. A CSIRO business, we are creating our data-driven future.

Find out more! <http://www.data61.csiro.au/>