# 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 Hybrid Postquantum Cryptography |
| Job Reference | 83511 |
| Tenure | Specified Term of 3 years Full-time  |
| Salary Range | AU$89,926 to AU$98,504 pa + 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 | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Dongxi Liu via email at dongxi.liu@csiro.au or phone +61 2 9372 4152 |
| 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 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 three 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.

CERC Fellows **are appointed for three years full-time or equivalent.**

[Future Science Platforms](http://www.csiro.au/en/About/Future-Science-Platforms) (FSPs) are an investment in science that underpins innovation and has the potential to help reinvent and create new industries for Australia.  They are strategic investments for CSIRO, aimed at developing capacity in areas of identified future importance for Australia. FSPs are both impact and science-focused, developing innovative scientific solutions with industry, government, and university partners with a 5-to-10-year vision.

The [Quantum Technologies FSP](https://research.csiro.au/qt/) aims to establish and grow capacity in quantum technology research and development at CSIRO, and is part of a larger strategic investment in [Quantum at CSIRO](http://www.csiro.au/quantum). The QT-FSP launched in November 2021 and will become a portfolio of projects that build on CSIRO’s long-standing and deep domain expertise. The opportunity we are seizing leverages existing expertise while extending into new, uncharted areas of discovery in quantum science and technology. The CERC Postdoctoral Fellow is critical to each project team, bringing their quantum skills to bear on specific application domains. As such, the Postdoctoral Fellow will be working in a highly cross-disciplinary environment and be challenged to help create new capability inside CSIRO. Ideally, the Postdoctoral Fellow will have an interest in industrial application of quantum technologies, in solving problems that may have real commercial value, and in making an impact to better the lives of Australians. These areas of focus represent the biggest challenge facing the evolution of “quantum technologies” into a bona fide industry: identifying applications where quantum advantage can be achieved.

This position is with the PQC Hybrid project in [Quantum Technologies FSP](https://research.csiro.au/qt/). Quantum computing could impact cybersecurity negatively. To make networked systems quantum safe, there are mostly exclusive approaches: Post-Quantum Cryptography based on hard mathematical problems and Quantum Key Distribution/Quantum Cryptography based on physical principles. Each approach has its own advantage and limitation, which could cause security uncertainties. This project aims to investigate algorithms, protocols, and implementations to integrate different approaches together to benefit from the technical advantages of Post-Quantum Cryptography and Quantum Key Distribution.

**Duties and Key Result Areas:**

Under the supervision of senior research scientists and engineers, the postdoc fellow:

* + Carry out innovative, impactful research on post-quantum cryptography (PQC) technology that will, where possible, lead to novel and important scientific outcomes.
	+ Recognise and exploit opportunities of quantum cryptography (QC) for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research on hybrid PQC and QC
	+ Help to build strategic relationship with QT FSP, industry, and academic partners.
	+ Work collaboratively with colleagues within the team, QT FSP, and across CSIRO.
	+ Produce high quality scientific and/or engineering papers suitable for publication in quality journals, for client reports and granting of patents.
	+ Conduct technical presentations at conferences and relevant events.
	+ Develop research protypes and demonstrate at conferences or relevant events.
	+ Utilise design thinking methodology to plan and prepare research proposals, and apply non-academic impact methodology to research projects
	+ Carry out research investigations requiring originality, creativity and innovation
	+ Record, manage, and analyse data/information using relevant domain data science techniques.
	+ Proactively undertake development to grow effective researcher capabilities to support career goals.
	+ 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.
	+ Undertake an appropriate training and development program developed by CSIRO.
* 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). The doctorate must be in a relevant discipline area, such as post-quantum cryptography.

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

1. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports on post-quantum cryptography, cryptography, security analysis and proof.
2. Knowledge of network security protocols such as TLS and IPsec.
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 national and international conferences.
4. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Basic knowledge of quantum computing and quantum algorithms
2. Basic knowledge of quantum cryptography or quantum key distribution
3. Experience of implementing research protype relevant to post-quantum cryptography and/or network security protocols.
4. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
5. **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.**

To be appointed as a postdoc fellow within CSIRO, candidates are required to have **submitted** their doctoral thesis 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$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.

* 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 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.

Find out more about our CSIRO Early Research Career (CERC) Fellow Experience Employee Value Proposition (EVP) [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)