# Position Details

## Research Projects- CSOF4

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| The following information is for applicants |
| Advertised Job Title | CSIRO Postdoctoral Fellowship in 2D Materials for Quantum Emitters |
| Job Reference | 96226 |
| Tenure | Specified Term of 3 years Full-time |
| Salary Range | AU$96,329 to AU$105,517 pa + up to 15.4% superannuation |
| Location(s) | Lindfield, Sydney, NSW 2070 |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Tim van der Laan (Team Leader) |
| Client Focus – Internal | 90% |
| Client Focus – External | 10% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Andrew Squires via email at Andrew.Squires@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 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).

**Child Safety**

CSIRO is committed to the safety and wellbeing of all children and young people involved in our activities and programs. View our [Child Safe Policy](https://www.csiro.au/en/about/policies/child-safe-policy).

### 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.
* 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.**

The Functional Nanosystems team consists of physicists and engineers using novel materials, in particular 2D materials and superconductors, to solve global challenges. This work spans membranes, biotechnology, electronics, 6G+ telecommunications and quantum systems. The team's patented processes for the synthesis and fabrication of 2D materials and superconductors has led to large- and small-scale projects with customers spanning local SMEs to large multi-nationals. The team's niche is exploring fundamental academic innovations and seeing how they can be translated for environmental, economic and social impact.

The Project will be vital in developing new quantum technologies in CSIRO. The Postdoctoral Fellow will work with 2D materials to produce new and innovative quantum emitters. The Fellow will develop 2D materials stacks (van der Waals Heterostructures) from 2D materials including graphene, black phosphorus, hexagonal-boron nitride and transition metal dichalcogenides. The fellow will develop nanofabrication techniques to produce and investigate electrically driven quantum emission from 2D material stacks. The Fellow will design, fabricate, and optically characterise quantum emitters for applications in quantum communications. This role will partner with the [Quantum Technologies Future Science Platform](https://research.csiro.au/qt/).

[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 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 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.

### Duties and Key Result Areas

* Extend and optimise CSIRO’s 2D material transfer and stacking processes to produce quantum emitters.
* In a cleanroom environment, fabricate electrically triggered quantum emitters in 2D materials.
* Develop nanofabrication processes to deterministically engineer optically active sites in 2D materials.
* Characterise optical emission from 2D materials and their stacks to validate single photon emission.
* Work closely with other scientists and engineers in the development of quantum communications projects and infrastructure at CSIRO.
* Collaborate with research partners (academia and industry) to develop novel quantum solutions to emerging problems.
* Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
* Communicate openly, effectively, and respectfully with all staff, clients and suppliers in the interests of good business practice, collaboration and enhancement of CSIRO’s reputation.
* Work collaboratively as part of a multi-disciplinary, regionally dispersed research team to carry out tasks in support of CSIRO’s scientific objectives.
* Adhere to the spirit and practice of CSIRO’s Values, Code of Conduct, Health, Safety and Environment procedures and policy and diversity initiatives.
* Other duties as directed.

## **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 Physics, Quantum Engineering or Nanotechnology. Please note: To be eligible for this role you must have **no more than 3 years** (full-time or equivalent) of relevant research experience.
2. Demonstrated ability to optically characterise Single Photon Emitters.
3. Experience in nanofabrication techniques e.g. thermal evaporation, photo/thermal lithography, plasma etching and spin coating.
4. The ability to work effectively as part of a multi-disciplinary, regionally dispersed, and multi-institution research team.
5. 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.
6. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
7. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. Demonstrated ability of working with 2D materials and their heterostructures.
2. Experience in defect engineering in 2D material systems.
3. Experience working in a clean room environment.
4. Knowledge of Single Photon Emitters in Quantum Communications.
5. Experience in electrical characterisation of solid-state devices.

## **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.

To be appointed as a CERC 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 ($93,267). 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 is subject to provision of a pre-employment background check and may be subject to other security/medical/character clearance requirements.

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. Visit [CSIRO Online](http://www.csiro.au/).

Find out more about CSIRO [Manufacturing](https://www.csiro.au/en/Research/MF)

CSIRO is a values-based organisation.  In your application and at interview you will need to demonstrate behaviours aligned to our values of:

* People First
* Further Together
* Making it Real
* Trusted