# Position Details

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

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| The following information is for applicants | |
| Advertised Job Title | Postdoctoral Fellow – Non-Linear Electromagnetic Sensing |
| Job Reference | 84756 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$87,068 to AU$98,504 pa + up to 15.4% superannuation |
| Location(s) | Lucas Heights, 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 – Magnetic Resonance Development |
| Client Focus – Internal | 100% |
| Client Focus – External | 0% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Richard Yong via email at richard.yong@csiro.au or phone +61 2 9710 6702 |
| 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

**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 or part time equivalent.**

We are looking to appoint a postdoctoral researcher within the Autonomous Sensors Future Science Platform. CSIROs Future Science Platforms (FSPs) represent an investment in science that underpins innovation and has the potential to help reinvent and create new industries for Australia. The Autonomous Sensors FSP will accelerate the generation of new tools to enable growth of digital decision making within domains; combining fundamental sensor research with autonomous engineering solutions to provide new advanced sensing and platform technologies for the environmental monitoring, health monitoring, mining, agriculture, and manufacturing domains.

The Fellow will join the CSIRO Mineral Resources’ Magnetic Resonance Development Team, at our excellently equipped Lucas Heights laboratory located in southern Sydney. We are a team of physicists and engineers who develop novel nuclear magnetic resonance and radio-frequency on-line instruments to solve a range of challenging, real-world measurement problems in the mining and security industry. Applicants will require Ph.D. in physics, or other physical sciences or engineering disciplines with a strong focus on experimental science.

The Magnetic Resonance Development Team performs ongoing research in radio frequency related fields such as low-field NMR, NQR and large surface coil magnetic resonance sensing. Building on this activity, the Fellow will undertake research in non-linear methods for the detection of materials, exploiting physical effects such as saturation, harmonic generation and wave mixing to provide new measurement capability. The work will have two aspects: (i) the experimental development of measurement systems that exploit non-linearity within materials and (ii) the exploration of non-linear detectors that may provide advantages over linear detectors. The role will suit a person with strong experimental skills, interested in progressing ideas from the laboratory to industry applications.

The Fellow will be required to interact with other CERC Fellows and researchers within the Autonomous Sensors FSP and across CSIRO. Communication of key results will be required through publication in international scientific journals and presentation at conferences, workshops, and internal meetings. Opportunities will allow researchers to expand professional networks, learn the latest methods and provide an experience leading to high-impact scientific discovery.

### Duties and Key Result Areas

* Under the supervision of more senior researchers, assist in the planning and preparation of research proposals and carry out research investigations, requiring originality, creativity and innovation.
* Use knowledge of solid-state and experimental physics to prototype and develop novel analysers and detectors
* Develop experimental programs operating CSIRO custom-built prototypes for non-linear detection.
* Collect data, analysis and interpretation of data and report writing.
* Publish the results of scientific work in recognised journals.
* Use computer modelling to validate experimental results.
* Use and understand electromagnetic and solid-state physics models to explain experimental data.
* Maintain confidentiality when dealing with commercially sensitive information.
* 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, Diversity initiatives and Making Safety Personal goals.

Under the direction of senior research scientists and engineers, CERC Fellows:

* + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Recognise and exploit opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research
  + 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
  + 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.
* Other duties as directed.

The CERC Fellow learning, development and training programis developed between the CERC Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellow’s 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

## **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 physics, physical sciences or engineering.

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

1. Demonstrated excellent experimental skills, preferably in spectroscopic or electromagnetic techniques.
2. Sound theoretical understanding of physics concepts particularly in the areas or electromagnetism and solid-state physics.
3. Interest in applying scientific problem solving and research to solve practical industrial measurement challenges.
4. Competency with scientific computing packages or other programming languages.
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. Experience in radio-frequency spectroscopies or measurement techniques.
2. Knowledge of non-linear response in materials or aspects of non-linear detectors.
3. General electronics knowledge.

## **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 ($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.
* The successful candidate will be required to obtain and maintain a security clearance at the ANSTO site.
* 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. Visit [CSIRO Online](http://www.csiro.au/) and [Mineral Resources](https://www.csiro.au/en/Research/MRF) for more information.

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