# Position Details

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

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| The following information is for applicants |
| Advertised Job Title | CSIRO Engineering Fellowship in R&D on Scale Mitigation using Ultrasound Technology |
| Job Reference | 90710 |
| Tenure | Specified Term of 3 years Full-time |
| Salary Range | AU$92,624 to AU$101,459 pa + up to 15.4% superannuation |
| Location(s) | Clayton, Victoria |
| 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 onshore candidates)
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| Position reports to | Mr Greg Short, Team Leader Fluids Engineering |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Greg Short: Greg.Short@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).

### 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.**

**Project Description**

### Scale deposition on slurry tank walls, in pipes, valves, impellers and on flow instruments is an on-going problem in many hydrometallurgical processes in the minerals industry. Traditionally, flow equipment is shut down regularly for time consuming chemical cleaning or manual hydro blasting de-scaling. The de-scaling operations typically incur production downtime, increased plant operating costs, and on-going occupational health and safety (OHS) risks. To solve these scale problems, CSIRO Minerals Resources has established an active research program on adapting industrial ultrasound cavitation cleaning technology for scale mitigation applications.

### The role of this Engineering Fellow (EF), a CSIRO Early Research Career Fellowship, is to explore and implement piezoelectrical ultrasound technology in-situ in slurry transport and mixing equipment to minimise or avoid de-scaling operations by keeping equipment surfaces clean. The EF will work in close collaboration with the Fluids Engineering Team, located in Clayton, Melbourne.

### Duties and Key Result Areas

The Engineering Fellow (EF) program planned for 3 years will be undertaken in parallel with the existing scale strategic research program at CSIRO. The EF will learn from recent fundamental developments and take full advantage of the breadth of skillsets in the Fluids Engineering Team. The team colleagues will provide technical support and mentoring.

A comprehensive training program will be provided to the EF on the background knowledge of the scale problems commonly experienced in the minerals industry, scale science basics, the fluid dynamics of cavitation, and ultrasound science. The EF will review the relevant literature and the results of the on-going experimental research on scale mitigation and will be encouraged to provide their input into the next stage of project design and testing.

The CERC fellow will:

* Establish the current understanding of scale/fluid flow/cavitation interactions.
* Investigate existing ultrasound technology, either commercially available or at R&D stage.
* In close collaboration with the technicians and scientists in the Fluids Engineering Team, develop prototype designs of piezoelectrical-based surface self-cleaning test units.
* Undertake flow laboratory scale physical tests.
* Design and conduct experiments to investigate the performance of the test units for design optimisation.
* Collaborate with the team in techno-economic work to assess concept viability.
* Participate in commercialization activities associated with technology development.
* Publish lead-author papers in high impact journals and present scientific findings at national and international conferences.

This project provides an exciting opportunity for the EF to become a leader in cutting-edge research with broad applicability across the mineral processing domain. It will leverage strong collaboration between the CSIRO Fluids Engineering Team, industry partners, experts at RMIT University and other CMR specialists in flow modelling, scale chemistry and analysis, and oxide precipitation.

Under the direction of senior research scientists and engineers, this CERC Fellow will:

* + 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
	+ 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 Zero Harm goals.
* Conduct 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) OR hold an engineering degree plus a Master of Science (MSc) or Master of Engineering (MEng) qualifications (or will shortly satisfy the requirements of a masters) plus equivalent levels of original and significant contributions to research and development to that expected of someone of a new PhD graduate. The doctorate or masters must be in relevant discipline areas such as Mechanical Engineering, Electrical Engineering, or Mechatronics Engineering.
Please note: To be eligible for this role you must have **no more than 3 years** (full time equivalent) of relevant research experience.
2. 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.
3. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
4. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. Relevant experience in laboratory or industry in ultrasound technology or ultrasound industrial cleaning.
2. Technical experience with or understanding of piezoelectrical materials and/or their application in industrial processes.
3. Exposure to research and industrial applications of anti-fouling and/or scale mitigation.
4. Competence or understanding of fluid dynamics, cavitation, multiphase flow systems.
5. **The ability to work effectively as part of a multi-disciplinary research team, plus the motivation and discipline to carry out autonomous research.**

## **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 to this CERC Fellowship role within CSIRO, candidates will be expected to commence employment **by 30 June 2023.** Candidates are also required to have **submitted** their doctoral or master thesis at the time of commencement, as a minimum requirement, if PhD or masters conferment has not been obtained. If a candidate has submitted, but their PhD or masters has not yet been formally attained, the starting salary will be CSOF4-1 ($89,680). Upon CSIRO receiving written confirmation that the PhD or masters 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 Clearance or equivalent. Please note that individuals 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.

CSIRO Early Research Career (CERC) 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. Visit [CSIRO Online](http://www.csiro.au/) and [Mineral Resources](https://www.csiro.au/en/Research/MRF%22%20%5Co%20%22Mineral%20Resources-%20CSIRO%20Website) 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