# 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 CO2 Capture and Mineralisation |
| Job Reference | 86472 |
| 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) | CSIRO Newcastle Energy Centre, with the possibility of working in CSIRO Clayton, Melbourne for up to 12 months |
| 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) |
| Position reports to the | Team leader |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Hai Yu via email at hai.yu@csiro.au or phone +61 2 4960 6201 |
| 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 full time equivalent.**

The unsustainable use of natural resources has led to excessive emissions of different pollutants including carbon dioxide and alkaline solid wastes (coal ash, red mud, steel and iron slag, mine tailings, etc.). Carbon dioxide emissions contribute to global warming and most alkaline residue waste ends up in landfill, where it contaminates soil, water and air.

We have recently proposed and validated a new concept - Integrated CO2 Absorption and Mineralization (IAM). The IAM technology can potentially combine carbon capture from industries and the ambient air with mineralisation into one short, efficient, thus low-cost process, turning CO2 and solid wastes to carbonates, valuable construction materials and locking away CO2 permanently. This project represents outstanding opportunities for the CERC Fellow to gain a fundamental understanding of the new process and through science and engineering innovation and further to advance the new technology which has the potential to contribute significantly to a circular economy nationally and internationally.

The CERC Fellow will lead innovation on high-impact research in a large, multidisciplinary team with well-established collaborations. The CERC Fellow will access major, state-of-the-art industrial and research facilities, including CSIRO’s three capture pilot plants, Intelligent Leaching Column facilities and the Australian Synchrotron. These will provide the best opportunities for the Fellow to achieve research and technical excellence with focus on innovation and impact, as well as contribute to other major research activities in CSIRO, such as emerging direct air capture and heavy industry decarbonation. The CERC Fellow’s research strongly aligns with a range of strategic priorities for CSIRO Energy, the Permanent Carbon Locking Future Science Platform and the Towards Net Zero Mission. These include industrial decarbonisation, environmental performance, and technologies supporting a circular economy. The CERC Fellow will lead the project, explore research opportunities, apply for additional funding, engage customers and supervise students. This will help establish the Fellow as a highly independent leader. The CERC Fellow will build global scientific and business network by working in CSIRO Newcastle and Clayton, researching with other partners, participating in HILT CRC activities (>50 partners), and travelling overseas for international conferences.

### Duties and Key Result Areas

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

* + Design, set up and operate a CO2 absorption and mineralisation rig to assess and identify effective CO2 absorbents for selected alkaline solid wastes.
  + Use the facilities at CSIRO and its research partners to determine and characterise the reaction mechanisms involved in CO2 mineralisation reactions.
  + Improve process efficiency through innovation and intensification, including heat integration, reactor design and process optimisation.
  + Assess the technical, economic and environmental factors associated with the use of carbonated materials.
  + 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.
  + 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 chemical engineering, civil engineering, mineral processing, hydrometallurgy, environmental engineering, or materials science and engineering.

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

1. Solid background in a relevant research area, such as mineral carbonation, carbon capture, carbon storage, or alkaline leaching.
2. Excellent experimental skills including design, set up and operation of bench-scale facilities.
3. Practical experience with solid materials characterisation.
4. 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.
5. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
6. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. A good understanding of liquid absorbent-based carbon capture.
2. Research experience on reactor design and process intensification.
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.**

## **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 31 January 2023. Candidates are also 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 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.

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).

**Diversity and Inclusion** (provide some statements on diversity and inclusion).

We are working hard to recruit diverse people and ensure that all our people feel supported to do their best work and feel empowered to let their ideas flourish.  [Strategy](https://www.csiro.au/en/about/Policies/Diversity-strategy)https://www.csiro.au/en/about/policies/diversity-strategy

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. Visit [CSIRO Online](http://www.csiro.au/) and

[Energy](https://www.csiro.au/en/Research/EF" \o "Energy- CSIRO Website)

[Manufacturing](https://www.csiro.au/en/Research/MF)

[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