# 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 Exploration of Nanomaterials for a Reverse Electrodialysis Battery  |
| Job Reference | 92469 |
| 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 | All Candidates (incl. Internationals) |
| Position reports to the | Applied Porous Materials Team Leader, CSIRO Manufacturing |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Matthew Hill via email Matthew.hill@csiro.au or 03 9545 2841 |
| 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.**

Whilst batteries typically store energy through a chemical potential difference, it is possible to achieve storage of energy by a difference across a cell in the concentration of metal ions, commonly known as an osmotic pressure.

Reverse electrodialysis (RED) is a process that generates electrical energy from the salinity difference between two solutions. It involves the use of a series of alternating cation and anion exchange membranes to create a gradient of ion concentration, which can then be used to drive an electric current. The process typically involves the use of seawater and freshwater, with the seawater being separated into two streams of different salinity. As the two streams pass through the membranes, ions flow from the higher concentration to the lower concentration, generating a voltage.

This project seeks to find out if it is possible to revolutionise these ion exchange membranes by developing new nanomaterials capable of extremely efficient separation of these ions. Within the desalination and lithium extraction research community, there has been great progress in developing new wonder materials that can transport the metal ions like never before. We would love to explore whether these breakthroughs are a basis for energy storage, possibly making RED a means to cheap, large scale energy storage. Current RED systems typically utilise a salty and freshwater stream on either side of the membrane to develop the osmotic pressure difference. Consequently, RED systems are mainly anchored to coastal usage, and would compete for scarce freshwater resources. As a result, there is not presently widespread support for their viability. Were a membrane with sufficient rapid ion transport and selectivity discovered in this project, it might be possible to remove the requirement for a freshwater stream altogether. This would open a plethora of opportunities in Australia and globally where dams, ponds and reservoirs are currently storing saline solutions (for instance from mining) with no use case and costing businesses money to maintain.

### Duties and Key Result Areas

* Preparation of candidate membrane materials
* Development of membrane coating methods
* Conduct test campaign, designing new testing modules as required
* Preparation of high quality publications
* Preparation of patents
* Engagement with industry partners
* Presentation in public settings.

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.
	+ 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 Values, Code of Conduct, Health, Safety and Environment procedures and policy and diversity initiatives.
* 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 chemistry, chemical engineering or materials science.

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

1. Experience with membrane science.
2. Familiarity with energy storage.
3. Demonstrated ability to synthesise and characterise nanomaterials.
4. Ability to construct prototype devices.
5. Ability to work in diverse teams in an inclusive manner.
6. 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.
7. A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
8. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable**

1. Device design experience.
2. Track record of engagement with industry.
3. Electrochemistry expertise.
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.**

## **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 ($89,680). 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.

* The successful candidate will undertake a pre-employment background check. 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).

## **About CSIRO**

We solve the greatest challenges through innovative science and technology. Visit [CSIRO Online](http://www.csiro.au/) and [Manufacturing](https://www.csiro.au/en/about/people/business-units/manufacturing) 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