# 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 Environmental Modelling - Direct Air Capture |
| Job Reference | 93682 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$92,624 to AU$101,459 pa (pro-rata for part-time)  plus up to 15.4% superannuation |
| Location(s) | Melbourne, VIC |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Team leader, Aerosol & Chemical Modelling |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Kathryn Emmerson via email: kathryn.emmerson@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](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).

**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; 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.**

Future Science Platforms (FSPs) represent an investment in science that underpins innovation and can help reinvent and create new industries for Australia.

Nationally and internationally, reaching net-zero emissions and beyond will require new methods of permanently removing significant amounts of carbon from the atmosphere that are fast, scalable, and responsible. CarbonLock, CSIRO’s Permanent Carbon Locking Future Science Platform (FSP) will address this challenge by driving radical innovation at the nexus of biology, chemistry and engineering in negative emissions technology and their integration to permanently remove atmospheric carbon dioxide in novel and unconventional ways.

**Project title: Impact of changing atmospheric conditions on the design and deployment of carbon dioxide removal**

Direct air capture (DAC) technologies remove carbon dioxide from ambient air and are showing promise in reducing greenhouse gas concentrations in the atmosphere and thus help in achieving climate change mitigation goals. DAC plants currently operate on a small scale and as commercial and demonstration projects.

The CERC Fellow will join a team of internationally recognised scientists in conducting research on developing a novel, modelling based, optimal design and deployment methodology for DAC systems in Australia that takes into account air quality and other environmental considerations. The research will also look at how DAC design and siting considerations might change in response to environmental changes in a future climate. The large physical structures, significant land area requirements and huge air throughput of direct air capture systems result in significant and diverse interactions with its surrounding environment that need be considered carefully.

The role sits within the Atmospheric Composition and Chemistry Group in CSIRO’s Environment Business Unit (BU) and will have strong links with other BUs working in the CarbonLock FSP. The CERC Fellow will work in a multi-disciplinary team, has keen interest in long-lasting carbon removal solutions and a strong drive to deliver science aimed at minimising environmental impact.

### Duties and Key Result Areas

Under the direction of senior research scientists, the CERC Postdoctoral Fellow will:

* Use computational fluid dynamics (CFD) and turbulent dispersion principles to test the configuration and position of the DAC units to optimise the performance (for example, in terms of atmospheric temperature and humidity).
* Consider how the DAC units might be scaled up, with a view to maximise CO2 sequestration.
* Run and use output from the CSIRO chemical transport model to assess the likelihood of air quality problems (for example, dust storms and bushfires) in future in Australia on climate scale with regards to optimal DAC siting. This will also consider options for permanent carbon locking, such as underground storage, or location of mineral deposits suitable for CO2 binding.
* Study whether the position of DAC plants could have co-benefits for air quality, such as a distributed DAC system within urban areas or as part of tunnel ventilation system.
* Evaluate the potential impacts of the DAC on the immediate surroundings in terms of noise, emissions and other undesirable effects.
* Undertake regular reviews of relevant literature.
* Contribute to the aims of the CarbonLock FSP and attend the annual meetings.
* Produce high-quality scientific papers suitable for publication in quality journals.
* Prepare appropriate conference papers and present those at conferences as agreed with your supervisor.
* Work collaboratively with colleagues within your team, the business unit and across CSIRO.
* Contribute to the development of innovative concepts and ideas for further research.
* Proactively undertake development to grow effective researcher capabilities to support career goals.
* Draw on professional expertise, knowledge of other disciplines and research experience, recognise opportunities for innovation and generate new theoretical perspectives by pursuing new ideas/approaches and networking with scientific colleagues across a range of disciplines.
  + 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) in mathematics, atmospheric physics, environmental engineering or fluid mechanics.

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

1. Strong mathematical modelling background, preferably in computational fluid dynamics.
2. Demonstrated experience in one or more of the following areas: Air pollution transport processes; Optimisation methods; Data analysis and visualisation
3. Strong programming skills for both modelling and visualisation of results, e.g. Fortran and Python, and familiarity with command-language scripting in Unix or Linux environments.
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 publication record in peer reviewed journals and/or authorship of scientific papers and reports
6. **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.**

## **Desirable**

1. Experience with high-performance computing (i.e., supercomputing).
2. Experience in processing large datasets with formats such as netCDF.
3. Experience with Geographical Information Systems or other visual presentation techniques.
4. Understanding of meteorology, climate and air quality interactions.
5. Good understanding of how DAC works, net-zero and negative emissions, and carbon capture and storage.
6. Remain productive, positive and resilient in complex, ambiguous and/or uncertain environments.
7. **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 [CarbonLock FSP – CSIRO's CarbonLock FSP](https://research.csiro.au/carbonlock/) 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