# Position Description

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

The following information is for applicants

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| Advertised job title**:** | CSIRO Postdoctoral Fellowship in Machine Learning, Materials Science and Robotics |
| Job reference: | 61695 |
| Relocation assistance**:** | Will be provided to the successful candidate if required. |
| Applications are open to: | [ ]  Australian Citizens Only[ ]  Australian/New Zealand Citizens and Australian Permanent Residents Only* [x]  All Candidates
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| Percentage of client focus - internal: | 90% |
| Percentage of client focus - external: | 10% |
| Reports to the: | Manager of the Rapid Automated Materials & Processing centre (RAMP) |
| Number of direct reports: | 0 |
| How to apply: | Please apply online at [jobs.csiro.au](https://jobs.csiro.au/) and enter the requisition number**.** Internal applicants please apply via ‘Jobs Central’ through the ‘People Hub’ icon  |
| Contact details to discuss this position: | Benjamin Muir via email Ben.Muir@csiro.au *Please do not email your application directly to Dr Muir. Applications received via this method may not be considered by the selection* |
| If you have difficulty applying please contact: | Call 1300 984 220 or email csiro.online@csiro.au between 8.30 am and 5 pm Australian east coast time. |

## Role Overview:

**CSIRO Early Research Career (CERC) Postdoctoral Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years relevant postdoctoral work 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 Postdoctoral Fellows **are appointed for three years or part time equivalent.**

The CSIRO Postdoctoral Fellowship in Machine Learning, Materials Science and Robotics role will help discover new ways to digitise the materials research laboratory and overcome inefficiencies that hinder the high throughput materials research community. The Fellow will explore the use of machine learning (ML) in optimising polymer design and synthesis processes. The Fellow will develop ML algorithms using new and existing polymer design experiments, and their related analytical data, to provide improved inputs to robotic synthesis platforms. The Fellow will explore ways to integrate ML algorithms with control systems and in-line analytics with the goal of closed-loop synthesis of bespoke polymers.

## Duties and Key Result Areas:

* Under the direction of senior research scientists and engineers, CERC Postdoctoral Fellows:
	+ Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
* Develop and implement machine learning algorithms using design of experiments (DoE) and experimentally determined data sets.
* Integrate new hardware for in-line and automated characterisation and analysis with robotic synthesis platforms (example: Gel Permeation Chromatography (GPC) and Nuclear Magnetic Resonance (NMR)).
* Develop standardised protocols for automated synthesis that can be applied to a range of chemical systems.
* Undertake experimental work on the design and synthesis of antimicrobial polymers in a robotic platform.
	+ Screen synthesised polymer libraries produced and undertake structure-property studies on the application of these biopolymers for antibacterial efficacy *in vitro.*
* Undertake regular reviews of relevant journal and patent literature.
* Produce high quality scientific and/or engineering papers suitable for publication in high-impact journals, for client reports and patents.
* Prepare appropriate conference papers and present those at conferences as agreed with your supervisor.
	+ 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 plans and policies, Diversity initiatives and Zero Harm goals
* Other duties as directed.

**The CERC Postdoctoral Fellow learning and development program**is developed between the CERC Postdoctoral Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellows’ 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

<http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships>

## CSIRO Competencies:

1. **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.**
2. **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.**
3. **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.**
4. **Judgement and Problem Solving:** Investigates underlying issues of complex and ill-defined problems and develops appropriate response by adapting/creating and testing alternative solutions.
5. **Independence: Recognise and makes immediate changes to improve performance (faster, better, lower cost, more efficiently, better quality, improved client satisfaction).**
6. **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.

## Essential Criteria:

*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 a relevant discipline area, such as Computer Science, Applied Mathematics, Chemical Engineering, Materials Engineering/Science, or other demonstrably relevant discipline.

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

1. A sound working knowledge and demonstrated familiarity with machine learning techniques as they may apply to materials science/materials informatics.
2. Familiarity and demonstrated skills in the use of programming tools and languages such as (but not limited to) Python™, C++, MATLAB, LabView.
3. **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.**
4. **A sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.**
5. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.
6. **A history of professional and respectful behaviours and attitudes in a collaborative environment.**

## Desirable Criteria:

1. Experience with Design of Experiments (DoE) and high-throughput materials discovery.
2. Demonstrated laboratory experience with material development and formulation.
3. An interest in developing antimicrobial compounds and/or bacterial assays.
4. Familiarity with and the ability to interpret and work with diverse ranges of spectral data that are applicable to material science (examples: NMR, IR, MS, Raman, UV, ELS, GPC, HPLC, GC).
5. Interest in laboratory automation.
6. Ability to 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.**

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates are required to have **submitted** their PhD 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 ($83,687)*.* 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 security/national police/medical/character clearance requirements. Applicants who are not Australian Citizens or Permanent Residents 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 Postdoc 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) Postdoctoral Fellow Experience Employee Value Proposition (EVP). Find out more! <https://www.csiro.au/en/careers/postdoctoral-fellowships>

## About CSIRO:

At CSIRO we solve the greatest challenges through innovative science and technology. See more [online](http://www.csiro.au/)!

Find out more about CSIRO [Manufacturing](https://www.csiro.au/en/Research/MF)