# 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 Additive Manufacturing of Hybrid Composites |
| Job Reference | 67662 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$86,434 to AU$94,679 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Clayton, VIC |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * Australian/New Zealand Citizens and Australian Permanent Residents * Australian temporary residents currently residing in Australia (visa sponsorship may be provided to eligible candidates) |
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| Position reports to the | Project Leader and Team Leader |
| Client Focus – Internal | 90% |
| Client Focus – External | 10% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Dr Antonella Sola via email: Antonella.Sola@csiro.au or phone: +61 3 9545 2158 or Dr Adrian Trinchi via email: Adrian.Trinchi@csiro.au or phone: +61 3 9545 2747 *Please do not email your application directly to either of the above contact individuals. Applications received via this method will not be considered by the selection panel.* |
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| 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.  In your application please include 2 documents only – a CV and a cover letter. The cover letter should highlight your interest in the role and include a succinct address to each of the essential selection criteria and, wherever applicable, to the desirable criteria described below in this position description. Applications that do not address the selection criterion will not be considered. You will also be required to respond to some screening questions. |
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### 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 Postdoctoral fellow will actively contribute to the Additive Manufacturing (AM) of new functional materials. CSIRO is seeking to establish new capabilities to develop and process organic-inorganic hybrid composites by AM, with a focus on the Fused Filament Fabrication (FFF) technique (aka Fused Deposition Modeling, FDM).

In this role, new organic-inorganic feedstock filaments, such as those consisting of combinations of metal, ceramic, polymer or other relevant materials, will be developed and 3D printed by FFF techniques, with a goal of fabricating/preparing both organic-inorganic composite parts, as well as fully inorganic parts. A comprehensive characterisation will be conducted to underpin the effects of introducing the inorganic filler on the rheological, mechanical and functional properties of the polymer matrix. A focused investigation will be dedicated to understanding the filler-matrix interaction. Post-processing treatments will be considered in order to meet surface quality specifications and to embed additional functionality in the printed part.

It is expected the successful candidate contributes to the development of intellectual property in the area in terms of patents and know-how, and will publish aspects of the research in high quality peer reviewed journals.

### Duties and Key Result Areas:

In this role, the successful candidate will:

* Develop new customised inorganic-organic hybrid composite filaments that might be consistently fed in standard FFF printers;
* Explore the effect of the inorganic filler on the properties and printability of the polymer matrix;
* Understand and optimise the bonding mechanisms at the filler-matrix interface before and after printing;
* 3D print samples by FFF and characterise the new hybrid composites;
* Evaluate the effectiveness of post-processing treatments to control the surface topology and to add new functionalities;
* Manually operate chemical reactors and high temperature equipment;
* Independently carry out scientific activities involving production and testing of new polymer-matrix hybrid composites;
* Undertake characterisation of feedstock materials and printed parts using appropriate analytical techniques (including but not limited to optical microscopy, electron microscopy, mechanical testing, rheological measurements, X-ray diffraction -XRD-, differential scanning calorimetry -DSC- and thermo-gravimetric analysis -TGA-);
* Develop/construct custom experimental setups and systems;
* Carry out chemical handling and processing operation (under controlled atmosphere, where required);
* Maintain and develop safe operation of key laboratory equipment in the polymers, ceramics and light metals areas, including ultra-low-oxygen glove box systems;
* Assist with general technical aspects, including maintenance of laboratory and working environment;
* Prepare SWIs and preventive maintenance schedules for safe operation of laboratory equipment;

Under the direction of senior research scientists and engineers, CERC Postdoctoral Fellows:

* + Carry out original, innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Adhere to the spirit and practice of CSIRO’s Code of Conduct, Health, Safety and Environment procedures and policy, Diversity initiatives and Making Safety Personal goals.
* Complete other duties as directed.

[**The CERC Postdoctoral Fellow learning and development program**](http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships)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

## **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.

## **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 a relevant discipline area, such as materials science, materials engineering, chemical engineering, metallurgy etc.

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. Track record in the development of inorganic-organic composite materials, with a focus on the bonding mechanisms at the material-matrix interface.
2. Experience in Additive Manufacturing, especially with FFF techniques and developing filaments.
3. Detailed materials characterisation experience, including but not limited to optical and electron microscopy, DSC, DMA, TGA, rheology, XRD, mechanical testing.
4. Demonstrated ability to operate key equipment and, where necessary, develop custom processes, as well as maintaining the healthy operation of the laboratory environment in a multi-material process setting.
5. High level written and oral communication skills and a sound history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.

## **Desirable:**

1. Practical knowledge of producing customised filaments for FFF.
2. Ability to handle both ceramic and metallic fillers.
3. Experience in powder handling and working with reactive metal powders (e.g. Ti, Mg, Al etc).

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates will be expected to commence employment by December 2020/January 2021. Candidates are also 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

* The successful candidate will be asked to obtain and provide evidence of a National Police Check or equivalent. Please note that people 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 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 [here](https://www.csiro.au/en/careers/postdoctoral-fellowships)!

## **About CSIRO:**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](http://www.csiro.au/)!

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