# Position Details

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

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| The following information is for applicants | |
| Advertised Job Title | CSIRO Winanga-y Postdoctoral Fellowship Biomaterial Science Platform for Extrusion Optimisation and Scale-up |
| Job Reference | 84511 |
| Tenure | Specified Term of 3 years full-time |
| Salary Range | AU$89,926 to AU$98,504 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Werribee, Victoria |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | All Candidates |
| Position reports to the | Fellowship supervisory team, and Team Leader, Food Engineering |
| Client Focus – Internal | 90% |
| Client Focus – External | 10% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Danyang Ying via email at danyang.ying@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).

### 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.**

We are thrilled to be able to deliver on the commitment we made in our strategy to invest in frontier science with the CSIRO Agriculture & Food Winanga-y Postdoctoral Fellowship scheme. The word Winanga-y (pronounced win-na-gnay) is a cultural asset gifted by the Gomeroi Nation in Myall Vale to CSIRO's Agriculture and Food Business Unit to name the new Postdoctoral Fellowship Scheme. Winanga-y means to understand, know, remember, and think.

This position provides an exciting opportunity to take a leading role in the development of fundamental understanding of food extrusion systems. The CERC Fellow will develop predictive platforms that encompass flow properties and the physicochemical changes occurring during extrusion, complemented with mechanistic understanding from development and use of advanced computational models of extrusion, within an expert system for new product development, process optimisation and commercial scale up.

Extrusion is one of the most versatile technologies for the manufacture of food and feed products due to its efficiency (combining multiple unit operations of mixing, heating, pressurised cooking, mechanical shearing, expansion and shaping into one continuous process) and versatility (easy control of the heating and shearing through the control of temperature, moisture and screw speed and screw configurations). Nevertheless, extrusion is nearly always performed through an empirical approach rather than a theoretical or knowledge-based one. This necessitates the adoption of a trial-and-error method. Due to its empiricism, translation (e.g. scale-up, optimisation, transfer to other extruders) is often an issue for production of extruded food and feed products and currently heavily relies on the experience of individual personnel, which leads to the extruder being regarded as a ‘black box’. There is an urgent need to create mechanistic understanding, linking material properties, feed material structure and processing aspects to the final product attributes; to understand how all those complex thermo-physico-chemical reactions happen inside the extruder; and make the extrusion process less of a “black box”.

During their Fellowship, the CERC Fellow will develop an in-depth fundamental understanding of the food and feed material transformations during extrusion (e.g. the flow properties and the physical and chemical changes of the materials), build computational models able to predict complex flow, rheological and thermodynamic behaviours and an expert system (a collection of the extrusion engineering and industrial experiences and expertise with a user friendly human machine interface) to guide new product development, process optimisation and commercial scale up.

The CERC Postdoctoral Fellow will be jointly supervised by Dr Danyang Ying and a multi-disciplinary team of co-supervisors/mentors from CSIRO Agriculture and Food (Dr Artur Rombenso), Data61 (Dr Paul Cleary), and University of Melbourne, RMIT University and other universities. In addition to the Fellowships supervisory team, the Fellow will have the opportunity to interact with other researchers in CSIRO and industries to broaden their scientific skills, engineering experiences and networks.

### Duties and Key Result Areas

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

* Survey of the current state-of-the-art of food and feed extrusion science and technology, computational modelling and expert system.
* Design a research and development plan to build the biomaterials science platform for extrusion optimisation and scale up.
* Develop and build the platform and complete the verification using industrial case studies.
* 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 Making Safety Personal 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**

CSIRO is an Equal Opportunity employer working hard to recruit world-class talent that represents the diversity across our society. As part of our commitment to Aboriginal and Torres Strait Islander employment outcomes, preference will be given to Aboriginal and Torres Strait Islander candidates who meet the role 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 material science, chemical engineering, mechanical engineering, materials and process engineering.

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. Experience in food manufacturing, extrusion and physico-chemical characterisation of materials.
2. Design, execution, and analysis of experiments with the purpose of gaining new understanding of a physical system.
3. Experience in use of computational modelling and simulation to create novel understanding of physical processes.
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 and/or patents.
6. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.
7. A demonstrated “can-do” mindset that facilitate respect, collaboration, support, inclusiveness and accountability in the workplace.

## **Desirable**

1. Experience in the development and processing of protein- and vegetable-based food systems. Demonstrated interest in food and feed extrusion.
2. Experience in database, expert system, human-machine interface building, and web-based and mobile app programming.
3. **Scientific programming skills with expertise in F90 and/or C++ (or similar languages).**
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 ($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).

## **About CSIRO**

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

Find out more about CSIRO [Agriculture and Food](https://www.csiro.au/en/Research/AF)

Find out more about CSIRO [Data61](https://www.csiro.au/en/about/people/business-units/Data61)

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