

## Position Details

<b>Advertised Job Title:</b>	Postdoctoral Fellowship – Probing Biosystems Human Gutome
<b>Reference Number:</b>	30302
<b>Classification:</b>	CSOF4
<b>Salary Range:</b>	AU \$78K to AU \$88K plus up to 15.4% superannuation
<b>Location:</b>	Adelaide, South Australia
<b>Tenure:</b>	Specified Term of 3 years
<b>Relocation assistance:</b>	Will be provided to the successful candidate if required.
<b>Applications are open to:</b>	<input type="checkbox"/> Australian Citizens Only <input type="checkbox"/> Australian Citizens and Permanent Residents Only <input checked="" type="checkbox"/> All Candidates

### Role Overview:

**Postdoctoral Fellowships** at CSIRO provide opportunities to scientists and engineers, who have completed their doctorate and have no more than three (3) years relevant postdoctoral work experience. These fellowships will help launch their careers, provide experience that will enhance their career prospects, and facilitate the recruitment and development of potential leaders for CSIRO.

Postdoctoral Fellows **are appointed for up to three years** and will work closely with a leading Research Scientist or Engineer in their respective field. They carry out innovative, impactful research of strategic importance to CSIRO with the possibility of novel and important scientific outcomes. They present the findings in appropriate publications and at conferences.

Future Science Platforms (FSPs) are a major new CSIRO initiative. FSPs are multi-year investments in frontier science that will reinvent and create new industries for Australia. The "Probing Biosystems FSP" aims to revolutionise healthcare and agriculture through devices and systems to obtain real-time information from living organisms about their health and well-being. This will lead to the ability to provide health and medical interventions that are timely, customised and highly specific.

The goal of the FSP is to develop innovative platforms capable of interrogating living systems, preferably in real time, to extract and interpret meaningful information about the health status of the subject associated with recommendations for treatment and/or automated intervention if required.

The Human Gutome: Gastrointestinal organoids as a high throughput screening platform for the diagnosis and prevention of gastrointestinal disease.

Organoids are three-dimensional organ "buds" that can be propagated from stem cells and isolated intestinal crypts derived from ex vivo biopsy from humans or animals. These organoids represent the epithelial architecture and the cellular diversity of the intestine and are therefore functional mimics of the intestinal tissue they were derived from, providing a biologically relevant system for in vitro research. This project establishes gut organoids from tissue derived from the normal gut and gastrointestinal disease of human subjects. This represents a novel ex vivo model system that can be used to understand interactions of drugs, food compounds and supplements with the gastrointestinal tract without the need for animal studies or the use of cell lines derived from cancer patients which have an abnormal karyotype.

This technology allows, for the first time, screening of normal and matched diseased tissue from the same individual. This ex vivo platform allows the advent of personalised healthcare and treatment regimens, and identification of preventative strategies to stop the development of intestinal disease. This will enable personalised dietary interventions, both of which will lead to improved health outcomes of individuals.

#### Duties and Key Result Areas:

- Under the direction of senior research scientists, carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
- Milestones
  - A. Establish gastrointestinal organoids from normal human gut epithelial tissue and from individuals with gastrointestinal disease for use as a high-throughput screening platform*
    - Development of our existing capability for propagating murine gastrointestinal organoids using biopsies provided by clinicians within the SA Health network and ALOA
    - Collaborations with clinical partners to establish a continuum representing gastrointestinal disease (normal and IBD, CRC from same individual)
    - Develop SOP for harvesting, storage, propagation and long term culturing of normal and disease colonic epithelial tissue, including assessment of karyotype stability during long term culture and after reviving from freeze.
    - Characterisation of gastrointestinal organoid using genomic and phenotypic techniques to confirm functionality of key in vivo processes, including measurement of differentiated cells to indicate normal development of colonoid crypts.
    - Establish reproducible and biologically relevant assays to be used end-points of high throughput screening (proliferation, apoptosis, cytotoxicity, gut barrier function, integrity).
    - Establish robust 3D confocal imaging of cultures
  - A. Proof-of-concept for high throughput screening.*
    - Testing of model system with SCFAs to leverage from our track record in SCFA and normal gut homeostasis and prevention of CRC which have been previously tested in cell lines to verify results
  - B. Determine utility of biomarkers for monitoring health and disease*
    - Testing of biomarkers in organoid culture buy using antibodies derived from ISC that appear differentially regulated in normal, IBD and colorectal cancer
    - Reconstitution of the immune system into the gut organoid model
    - Development of a business model canvas and investment strategy, with the aim of attracting external customers for the high-throughput screening platform and biobank.
    - Develop effective operational linkages with other research groups within and external to CSIRO to realise project goals
    - Assist in the management of laboratory and experimental activities, including supervision of undergraduate and postgraduate students and laboratory staff as appropriate.
    - Undertake regular reviews of relevant literature and patents
    - Produce high quality scientific and/or engineering papers suitable for publication in quality journals, for client reports and granting of patents.
    - Enhance operational linkages with other research groups such as the Australian Organoid Alliance within and external to CSIRO to realise project goals

**CSIRO's postdoctoral training program** is developed between the Postdoctoral Fellow and a CSIRO

scientist. 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>

### Selection Criteria:

*Please note: Under CSIRO policy only applicants who meet all the essential criteria can be appointed*

#### **Pre-Requisite**

1. **Education/Qualifications:** A doctorate and or equivalent research experience in a relevant discipline area, such as, molecular biology or immunology.
2. **Communication:** Strong written and oral communication skills including the ability to publish research results, prepare reports and present the results of scientific investigations at national and international conferences and stakeholder meetings.
3. **Publications:** A solid record of publication in quality, peer reviewed journals.
4. **Behaviours:** A history of professional and respectful behaviours and attitudes in a collaborative environment.

#### **Essential Criteria:**

1. Demonstrable knowledge of cell or molecular biology and/or immunology relevant to gastrointestinal disease
2. Cell and/or microscopy imaging, including fluorescent, confocal and 3D imaging
3. Commitment and interest in human gut health, including strategies to maintain a healthy gut and prevention of gut disorders.
4. The ability to work effectively as part of a multi-disciplinary, regionally dispersed research team, and carry out independent individual research, to achieve organisational objectives.
5. A record of science innovation and creativity plus the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

#### **Desirable Criteria:**

1. Knowledge of human intestinal biology, including the gut immune system.
2. Establishment of robust, reliable and biologically relevant assays for high throughput screening, e.g., proliferation, apoptosis, cytotoxicity, gut barrier function/integrity
3. Experience in the handling of human clinical samples, including human gastrointestinal tissue.

#### **CSIRO Values:**

As Australia's Innovation Catalyst, CSIRO has strategic actions underpinned by behaviours aligned to Excellent science, Inclusion, trust & respect, Health, safety & environment and Deliver on commitments. In your application and at interview you will need to demonstrate alignment with these

behaviours.

**Eligibility:**

To be appointed as a 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 (\$78,479). 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.

**Other special requirements:**

*Appointment to this role may be subject to conditions including security/medical/character clearance requirements. Applicants who are not Australian Citizens or Permanent Residents may be required to undergo additional security clearance processes; which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test).- <http://www.ielts.org/default.aspx>*

**Other Information:**

**How to Apply:** Please apply for this position online at [www.csiro.au/careers](http://www.csiro.au/careers). You may be asked to provide additional information (online) relevant to the selection criteria. If so, then responding will enhance your application so please take the time to provide relevant succinct answers. Applicants who do not provide the information when requested may not be considered.

If you experience difficulties applying online call 1300 984 220 and someone will be able to assist you. Outside business hours please email: [csiro-careers@csiro.au](mailto:csiro-careers@csiro.au). Please note only one document can be attached to your application. Please combine all documents into one Word document and upload it to the CV link.

**Referees:** If you do not already have the names and contact details of two previous supervisors or academic / professional referees included in your resume/CV please add these before uploading your CV.

**Contact:** If after reading the selection documentation you require further information please contact Leah Cosgrove at [leah.cosgrove@csiro.au](mailto:leah.cosgrove@csiro.au) or +61 8 8303 8833 or Dr Kim Fung at [kim.fung@csiro.au](mailto:kim.fung@csiro.au).

*Please do not email your application directly to Dr Cosgrove or Dr Fung. Applications received via this method will not be considered.*

**About CSIRO**

Australia is founding its future on science and innovation. Its national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.

Find out more! [www.csiro.au](http://www.csiro.au).

**About Future Science Platforms**

[Future Science Platforms](#) (FSPs) a multi-year, multi-disciplinary investment in our collective future - bringing CSIRO and our partners together to work on the big ideas. They are critical to turn Australia's future challenges into opportunities to invent a better future for us all. FSPs are an investment in science that underpins innovation and that has the potential to help reinvent and create new industries

for Australia. FSPs will see us grow the capability of new generation of researchers and allow Australia to attract the best students and experts to work with us on future science.

**Probing Biosystems**

A revolution in healthcare and agriculture through devices and systems to obtain real-time information from living organisms about their health and well-being. This will lead to the ability to provide health and medical interventions that are timely, customised and highly specific.