



## POSITION DESCRIPTION

School of Chemical and Biomedical Engineering

Faculty of Engineering and Information Technology

### Postdoctoral Research Fellow - Downstream BioProcessing

### The ARC Digital Bioprocess Development Hub

Position No	0053518
Classification	Level A
Salary	\$83,468 - \$113,262 pa (PhD entry Level A.6 - \$105,518 pa) up to 3 years
Superannuation	Employer contribution of 17%
WORKING HOURS	Full-time / part-time opportunities
BASIS OF EMPLOYMENT	Fixed term position available for up to three years Applications for part-time or other flexible working arrangements will be welcomed and will be fully considered subject to meeting the inherent requirements of the position
Other Benefits	<a href="https://about.unimelb.edu.au/careers/staff-benefits">https://about.unimelb.edu.au/careers/staff-benefits</a>
How to Apply	Online applications are preferred. Go to <a href="http://about.unimelb.edu.au/careers">http://about.unimelb.edu.au/careers</a> , select the relevant option ('Current Opportunities' or 'Jobs available to current staff'), then find the position by title or number.
Contact for enquiries only	Department of Chemical Engineering Professor Sandra Kentish Email <a href="mailto:sandraek@unimelb.edu.au">sandraek@unimelb.edu.au</a>

*Please do not send your application to this contact.*

For information about working for the University of Melbourne, visit our website:  
[about.unimelb.edu.au/careers](https://about.unimelb.edu.au/careers)

## Acknowledgement of Country

The University of Melbourne acknowledges the Traditional Owners of country throughout Australia. The University recognises the unique place held by Aboriginal and Torres Strait Islander peoples as the original custodians of country and their continued connection to the land, waterways, songlines and culture. The University respects all Aboriginal and Torres Strait Islander People and warmly embrace those students, staff, Elders and collaborators who identify as First Nations.

## Commitment to Diversity and Inclusion

The Faculty of Engineering and Information Technology (FEIT) is committed to creating a diverse and inclusive environment that welcomes and values all people. We recognise that diversity is essential in contributing to the success of FEIT. Women, Aboriginal and Torres Strait Islanders, the LGBTIQ+ community, people living with disability and those from a culturally and linguistically diverse background, are strongly encouraged to apply. Those seeking support in submitting an application are welcome to contact the Faculty HR team at [feit-hr@unimelb.edu.au](mailto:feit-hr@unimelb.edu.au)

## Position Summary

The ARC Hub for Digital Bioprocess Development is part of the Industrial Transformation Research Hub grant scheme (ITRH Scheme) and aims to assist the Biopharma industry by increasing digital innovation, productivity and competitiveness. The Hub engages an interdisciplinary team of engineers, scientists and computing specialists to develop digitally integrated advanced manufacturing processes and a platform for industry adoption. The program addresses key bioprocessing research challenges and develop new process and digital models that can predict and optimise manufacturing processes, resulting in greater yields, faster and more flexible processes and enhanced product stability. The Hub will transform biopharmaceutical manufacturing and unlock growth opportunities to forge an internationally competitive Australian Biopharma sector.

The ARC Hub for Digital Bioprocess Development is a collaborative program of significant scope and scale. It draws together expertise from The University of Melbourne, University of Technology Sydney and RMIT University, together with CSL Innovation, Patheon and Cytiva and three leading international universities, forming a substantial team. The Hub has a critical mass of researchers and expertise needed to address key biopharma research challenges, contributing to industry outcomes and positioning Australian Biopharma manufacturing to benefit from Industry 4.0.

The focus of work for the Research Fellow will be on downstream processing operations for pharmaceutical protein production. These operations consist of a number of operations including depth filtration, affinity (Protein A) chromatography, orthogonal processes for virus removal (low pH incubation and virus filtration), anion exchange (AEX) and cation exchange (CEX) chromatography and a ultrafiltration/diafiltration for buffer exchange and concentration. While these processes are effective, they are time consuming when conducted at scale. Further, the Protein A affinity step is highly costly, with each column fill costing many thousands of dollars. Disruptor technologies such as membrane chromatography can potentially replace these packed bed operations with advantages in speed and quality. As the field is still emerging, digital models for optimization or performance are limited so research in this space is needed.

The Research Fellow will consider membrane adsorbers and other devices to replace process steps that currently use packed bed systems, with the specific objective maintaining recovery and quality whilst reducing processing times and decreasing cost of goods. They will select suitable devices for evaluation and characterization through designed experiments. They will develop and validate mechanistic models of device performance, integrated into software programs such as GoSilico and CADET. Finally, they will perform cost of goods analysis to confirm the economic viability of the device.

While most models will be mechanistic in nature and built in python code, the Research Fellow may also use machine learning and data-driven computational modelling to enhance their models, as well as computational fluid dynamics to characterise fluid dynamics within devices.

## 1. Selection Criteria

### 1.1 ESSENTIAL

- ▶ A postgraduate research degree at PhD level (or near completion) in chemical or biochemical engineering, mathematical process modelling or biotechnology.
- ▶ A sound understanding of the fundamentals of engineering including mass transfer, packed bed operations, process control and mathematical model development.
- ▶ A high proficiency in mathematics, preferably related to mechanistic models.
- ▶ A record of high-quality research as evidenced by publications in leading journals and at conferences commensurate with opportunity.
- ▶ Ability to work with industry partners to achieve applied outcomes and to work with others across the sector to achieve industry impact and sector transformation.
- ▶ Experience in working with minimal supervision and ability to prioritise tasks to achieve project objectives within timelines, demonstrating flexibility to flourish in a fast-paced environment.
- ▶ Excellent written and verbal communication skills, demonstrated by presentation of research results at conferences, internal forums and manuscript submissions.
- ▶ The ability to prepare and manage data including data collation, assessment, cleaning storage, and maintenance of confidentiality.

### 1.2 DESIRABLE

Desirable skills include:

- ▶ An understanding of bioprocessing and cell culture.
  - ▶ Experience in supervision of students or other researchers.
  - ▶ Experience in relevant techniques (e.g. chromatography, membrane filtration, protein analysis).
- Experience working with Python to assess data and/or to construct mechanistic models

### 1.3 OTHER JOB-RELATED INFORMATION

- ▶ Flexibility in job location (CSL & University of Melbourne) and the ability to work across multiple worksites will be required.
- ▶ This position requires the incumbent to hold a current and valid Working with Children Check.
- ▶ Occasional work out of ordinary hours.

## 2. Key Responsibilities

- ▶ Independently planning and carrying out research on the research project and working towards completion of the aims of the project. This will include both mathematical modelling work and experimental work
- ▶ Developing effective timelines and milestones based on goals of the research program.

- ▶ Liaising effectively with collaborators and a variety of internal and external stakeholders to foster collaborative partnerships and working with teams to achieve joint outputs and outcomes. This will include working with partnership organisations to translate research findings and to provide recommendations.
- ▶ Managing and maintain the confidentiality of research data and results.
- ▶ Participating in Hub meetings and workshops and contributions to the broader Hub program, including activities to benefit the sector and reporting as required by the Hub program. This includes outreach and translation activities, mentoring programs, supervision of Masters students and industry placement programs and participation in or contribution towards microcertification programs and best-practice case studies.
- ▶ Assisting other researchers in carrying out research activities, as described in the Digital Bioprocess Development Hub program in order to work as a team and further both the DBD Hub and department's research output.
- ▶ Preparing and publish research outcomes in conferences and journals and other scholarly outputs to a high academic standard in accordance with the research expectations of the University of Melbourne.
- ▶ Actively participating in research seminars and conferences to disseminate research findings as opportunities arise.
- ▶ Giving presentations to a broad audience, including key industry and/or clinical partners, and in public forums.
- ▶ Providing strong mentorship through the co-supervision of PhD students.
- ▶ Attending and actively participating in departmental seminars, meetings and committees as required by your supervisor.
- ▶ Undertaking administrative functions and obligations primarily connected with the staff member's area of research.

### ***3. Equal Opportunity, Diversity and Inclusion***

The University is committed to all aspects of equal opportunity, diversity and inclusion in the workplace and to providing all staff, students, contractors, honorary appointees, volunteers and visitors with a safe, respectful and rewarding environment free from all forms of unlawful discrimination, harassment, vilification and victimisation. This commitment is set out in the University's People Strategy and policies that address diversity and inclusion, equal employment opportunity, discrimination, sexual harassment, bullying and appropriate workplace behaviour. All staff are required to comply with all University policies.

All FEIT employees are required to behave in a manner that creates; supports and encourages an inclusive and safe work environment for all.

<https://eng.unimelb.edu.au/diversity>

### ***4. Occupational Health and Safety (OHS)***

All staff are required to take reasonable care for their own health and safety and that of other personnel who may be affected by their conduct.

OHS responsibilities applicable to positions are published at:

<http://safety.unimelb.edu.au/topics/responsibilities/>

These include general staff responsibilities and those additional responsibilities that apply for Managers and Supervisors and other Personnel.

## **5. Other Information**

### **5.1 SCHOOL OF CHEMICAL AND BIOMEDICAL ENGINEERING**

<https://eng.unimelb.edu.au/about/departments/school-of-chemical-and-biomedical-engineering>

The School of Chemical and Biomedical Engineering encompasses both the Department of Chemical Engineering and the Department of Biomedical Engineering. This fusion of engineering disciplines provides a dynamic and interdisciplinary environment that is world leading in both research and teaching.

### **5.2 DEPARTMENT OF CHEMICAL ENGINEERING**

<http://www.chemeng.unimelb.edu.au>

The Department of Chemical Engineering hosts several Research Centres including the Peter Cook Centre for Carbon Capture and Research, the ARC Dairy Innovation Research Hub, the Particulate Fluids Processing Centre and the ARC Centre of Excellence in Convergent Bio-Nano Science and Technology.

Our laboratories are housed across four locations including a substantially renovated main building, a second building devoted exclusively to research, two floors within the nearby Chemistry building and a presence within the Bio21 Institute. Our academics have been elected as Fellows of the Royal Society, the world's oldest scientific society, the Australian Academy of Science, and the Australian Academy of Technological Sciences and Engineering.

Strong collaborations with industry, government and community partners inform teaching and research programs with real-world requirements. Industry Engagement is a key focus area for the Department. We carry out research projects based on deep collaborations with government and business and we also work with organisations that provide internship project opportunities for students.

We offer four Masters of Engineering degrees (Chemical, Chemical with Business, Biochemical, and Materials) with over 250 students, as well as undergraduate majors within the Bachelor of Science and Bachelor of Commerce.

### **5.3 FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY**

The Faculty of Engineering and Information Technology (FEIT) has been the leading Australian provider of engineering and IT education and research for over 150 years. We are a multidisciplinary School organised into three key areas; Computing and Information Systems (CIS), Chemical and Biomedical Engineering (CBE) and Electrical, Mechanical and Infrastructure Engineering (EMI). FEIT continues to attract top staff and students with a global reputation and has a commitment to knowledge for the betterment of society.

FEIT has never been better positioned as a global leader, anchored in the dynamic Asia Pacific region, creating and curating knowledge to address some of the world's biggest challenges. Through our students and our relationships with communities, we can not only respond to society's needs but anticipate and create engineering and IT solutions for the future.

<https://eng.unimelb.edu.au/>

<https://eng.unimelb.edu.au/about/join-mse>

Our ten-year strategy, FEIT 2025, is our School's commitment to bring to life the University-wide strategy Advancing Melbourne and reinforce the University of Melbourne's position as one of the best in the world.

To achieve our ambitions, we will continue to build new infrastructure to enable our teaching, research and engagement; we continue to recruit outstanding people from around the world; and we continue to attract high-quality students from across the globe who are at the heart of our enterprise.

<https://eng.unimelb.edu.au/about/mse-2025>

#### 5.4 THE UNIVERSITY OF MELBOURNE

Established in 1853, the University of Melbourne is a public-spirited institution that makes distinctive contributions to society in **research, learning and teaching** and **engagement**. It's consistently ranked among the leading universities in the world, with international rankings of world universities placing it as number 1 in Australia and number 32 in the world (Times Higher Education World University Rankings 2017-2018).

The University's 10-year strategy, Advancing Melbourne will enable the University to contribute to advancing the state and national interest and make vital contributions to Australia's standing on the world stage. We seek to be a leading force in advancing Australia as an ambitious, forward-thinking country while increasing its reputation and influence globally.  
**<https://about.unimelb.edu.au/strategy/advancing-melbourne>**

Further information about working at The University of Melbourne is available at <http://about.unimelb.edu.au/careers>

#### 5.5 CSL

CSL Limited is a company that fosters a work culture emphasising Superior Performance, Innovation, Integrity, Collaboration and Patient Focus with a commitment to support, train and grow its people. As a genuine leader in the biopharmaceutical industry, CSL is a multinational ASX Listed Company that is actively growing its Australian based manufacturing operations to support global growth. CSL develops, manufactures and markets products to treat and prevent serious human medical conditions and is globally one of the largest manufacturers of plasma-derived therapies.

Further information about CSL is available at <https://www.csl.com/>

