POSITION DESCRIPTION

THE UNIVERSITY OF MELBOURNE

School of Chemical and Biomedical Engineering jointly with the School of Computing and Information Systems
Faculty of Engineering and Information Technology

Postdoctoral Research Fellow - Pharma and Food Manufacturing (5 positions available)

POSITION NO	0053516
CLASSIFICATION	Level A
SALARY	$75,289 - $102,163 p.a. (PhD entry Level A.6 - $95,179 pa)
SUPERANNUATION	Employer contribution of 10%
WORKING HOURS	Full-time / part-time opportunities
BASIS OF EMPLOYMENT	Fixed term positions available for up to 18 months 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	https://about.unimelb.edu.au/careers/staff-benefits
HOW TO APPLY	Online applications are preferred. Go to http://about.unimelb.edu.au/careers, select the relevant option ('Current Opportunities' or 'Jobs available to current staff'), then find the position by title or number.
CONTACT FOR ENQUIRIES ONLY	Professor Sally Gras (Chemical Engineering) email sgras@unimelb.edu.au Professor Uwe Aickelin (Computing and Information Systems) email uwe.aickelin@unimelb.edu.au *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

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

Position Summary

Digitisation and AI will transform the manufacture of medicine and food. Victoria needs to develop skills and tools to realise the benefits of this transformation.
The University of Melbourne has partnered with industry to develop a program to transform food and pharma manufacturing, with new tools and platforms, custom education and a more digitally skilled workforce. Engineers, scientists and computing specialists will work with the pharma and food industries to build Australian advanced manufacturing capabilities. The lead industry partner is CSL and positions will be co-located at the University's Parkville campus as well as the CSL Parkville premises.

The research will examine process modelling, simulation, optimisation and the best use of process data.

The multiple positions that are available through this program are as follows:

- Research Fellow (RF1) - Cell Culture in Pharmaceutical Production (up to 18-month appointment):
The Research Fellow will establish mammalian cell culture production systems and ensure operation is consistent with standards within the pharma industry. They will review the relevant literature and identify/confirm key operational challenges and engineering/digital opportunities relevant to Victorian pharma. The position will examine existing state of the art solutions for digital bioprocessing from potential partners (including internationally) and identify shortcomings, while collaborating within a team to analyze initial proof of concept data, to apply machine learning and other digital tools and review opportunities for translation of cell culture growth models to cells grown in other Victorian industries such as food (e.g. yeast growth, bacterial growth) or biotech.

- **Research Fellow (RF2) - Scaling Bioreactors in Cell Culture (up to 18-month appointment)***:*
The Research Fellow will investigate state of the art cell culture practices relevant to the Victorian pharma industry with initial placement at CSL. The position will review the relevant literature on the use of digital modelling for scale-up and -down in production and identify/confirm key operational challenges and engineering/digital opportunities relevant to Victorian pharma. The Research Fellow will examine datasets associated with process scaling and will work with within a team setting to examine digital tools in this context. Opportunities for translation to cells grown in other Victorian industries such as food (e.g. yeast growth, bacterial growth) or biotech will be identified.

- Research Fellow (RF3) - Membrane Operations in Pharmaceutical Production (9-month appointment or up to 18-month appointment, part-time (0.5 FTE)):
The Research Fellow will review relevant literature on the use of membranes, including novel membrane types for use in pharmaceutical and food manufacturing and identify/confirm key operational challenges and engineering/digital opportunities. The role will examine existing state of the art solutions from partners and internationally and identify shortcomings. The Research Fellow will work with key stakeholders to extend the work to consider the use of these membranes to other systems of relevance to the Victorian food or biotech manufacturing industry. The Research Fellow will initially be placed at the CSL Parkville premises.

- **Research Fellow (RF4) - Machine Learning for Optimization in Bioreactor Fermentation (up to 18-month appointment**):
The Research Fellow will initially be placed at the CSL Parkville premises to observe state of the art cell culture practices and generation, use, analysis and storage of data. They position will examine existing data and create data analysis tools to allow process optimisation which will then extend to other process datasets. They will work with colleagues to provide digital skills into these three projects and evaluate the potential to extend these tools to other processes of relevance to the Victorian food or biotech manufacturing industry.

- **Research Fellow (RF5) - Reducing the Uncertainty Found in Bioprocessing and Medical data (0.5 FTE) bioprocessing and (0.5 FTE) on medical data – up to 18 month appointment)**
The Research Fellow will review the extent to which data is missing, low resolution and/or contains measurement error in current datasets and data collection processes inherent to current industry practices and techniques. They will develop potential new data imputation methods and examine new potential ways that missing values may be hypothesised. The advantages and disadvantages of possible approaches will be assessed.
For the bioprocessing side, this will enable an estimate of the extent of uncertainty and error in current data as well as in the model outputs. The Research Fellow will work in a team to provide digital skills into these three projects and evaluate the potential to extend these tools to other processes of relevance to the Victorian food or biotech manufacturing industry.
For the medical side, the Research Fellow will work on the Fertility After Cancer Predictor (FoRECAsT) study. The study has collated 21 datasets (>30,000 individual records) from nine countries globally. This is the largest databank of fertility predictors in breast cancer worldwide. Breast cancer is the most common type of cancer in women, and its treatment can cause infertility in around 78% of women. The aim of the study is to build a predicate calculator. The challenge is a large number of missing and uncertain data and how to overcome this with suitable machine learning techniques such as heterogenous transfer learning.

1. Selection Criteria

1.1 ESSENTIAL

- A postgraduate research degree at PhD level (or near completion) or Higher Education qualification in a field relevant to the position described above. Specifically:
    - Research Fellow (RF1) - Cell Culture in Pharmaceutical Production – mammalian cell culture, biotechnology, biochemical or chemical engineering.
    - Research Fellow (RF2) - Scaling Bioreactors in Cell Culture – mammalian cell culture, biotechnology, biochemical or chemical engineering.
    - Research Fellow (RF3) - Membrane Operations in Pharmaceutical Production – biotechnology, protein chemistry, biochemical or chemical engineering.
    - Research Fellow (RF4) - Machine Learning for Optimization in Bioreactor Fermentation – machine learning or computer science.
    - Research Fellow (RF5) - Reducing the Uncertainty Found in Bioprocessing and Medical data – data science, statistics, bioinformatics/biostatistics or computer science.
- A record of high-quality research as evidenced by publications in leading journals and at conferences commensurate with opportunity.

- Ability to perform independent research with a commitment to interdisciplinary research.
- Demonstrated ability to lead and contribute in a cross-functional, multi-disciplinary team environment.
- Detail oriented, self-motivated and committed to the profession.
- 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.
- Demonstrated capacity to communicate research concepts to technical and non-technical audiences.
- Excellent written and verbal communication skills, demonstrated by presentation of research results at conferences, internal forums and manuscript submissions.
- Excellent interpersonal skills, including an ability to interact with internal and external stakeholders (academic, administrative and support staff) in a courteous and effective manner.
- Demonstrated ability to develop, administer and see through to completion appropriately designed research projects with limited supervision.

1.2 DESIRABLE

- For lab based positions experience in the relevant techniques is desirable (e.g. cell culture and bioreactor operation, protein purification).
- For digital positions experience in the relevant digital techniques is desirable.
- Experience in supervision of students or other researchers.
- A record of applying for and attracting research grant funding.
- Experience interacting with industry partners.
- Demonstrated capacity to build collaborations with a range of other researchers.

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, travel, etc.

2. Key Responsibilities

- Independently plan and carry out research on the proposed research project and work towards completion of the aims of the project.
- Develop effective timelines and milestones based on goals of the research program.
- Liaise effectively with collaborators and a variety of internal and external stakeholders to foster collaborative partnerships.
- Assist other researchers in carrying out research activities in order to work as a team and further the department’s research output.

- Prepare 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 participate in research seminars and conferences to disseminate research findings as opportunities arise.
- Conduct presentations to a broad audience, including key industry and/or clinical partners, and in public forums.
- Provide strong mentorship through the co-supervision of PhD students.
- Attend and actively participate in departmental seminars, meetings and committees as required by your supervisor.
- Undertake 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 SCHOOL OF COMPUTING AND INFORMATION SYSTEMS

https://cis.unimelb.edu.au/#about

The School of Computing and Information Systems (CIS) at the University of Melbourne is an international leader in information technology research and teaching.
CIS is one of the highest-profile schools in the country, regularly ranked top in Australia for Computer Science (2020 THE and QS). It is one of only two Australian divisions to be ranked "5 – Well above world standard" in both Information and Computing Sciences (FOR 08) and Information Systems (FOR 0806). CIS is at the forefront of computing research in Australia and overseas, with close links to major initiatives such as Melbourne Bioinformatics, IBM Research and CSIRO/DATA61 (formerly NICTA).
The School is committed to attracting and retaining the highest-quality staff available in order to produce outstanding and impactful research. CIS has highly successful research teams in the key areas of Computer Science (CS), Artificial Intelligence (AI), Human-Computer Interaction (HCI) and Information Systems (IS).
CIS provides majors in the three-year undergraduate ‘Melbourne Model’ degrees and has a range of specialist graduate programs in CS (including software engineering), AI, HCI and IS. It also has a large cohort of active graduate research students, both domestic and international, who are regularly publishing in top venues and engaging with the community.

5.4 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

5.5 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

5.6 CSL

CSL Limited is a company that fosters a work culture emphasising Superior Performance, Innovation, Integrity, Collaboration and Customer 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.