



Research Fellow - Nanochannel Biosensors

Department/Unit	Drug Delivery, Disposition and Dynamics
Faculty/Division	Faculty of Pharmacy and Pharmaceutical Sciences
Classification	Level A
Work location	Clayton campus / Parkville campus
Date document created or updated	May 2018

Organisational Context

Everyone needs a platform to launch a satisfying career. At Monash, we give you the space and support to take your career in all kinds of exciting new directions. You'll have access to quality research, infrastructure and learning facilities, opportunities to collaborate internationally, as well as the grants you'll need to publish your work. We're a university full of energetic and enthusiastic minds, driven to challenge what's expected, expand what we know, and learn from other inspiring, empowering thinkers. Discover more at www.monash.edu.

The **Faculty of Pharmacy and Pharmaceutical Sciences** is dynamic, innovative and ambitious, engaging in world-class research and being a leading education provider for over 130 years. We have two key research initiatives: the Monash Institute of Pharmaceutical Sciences and the Centre for Medicine Use and Safety, in which we engage some of the best equipped and most experienced pharmaceutical scientists in Australia. From a teaching perspective, our education curriculum - comprised of undergraduate, postgraduate and higher degrees by research programs - is purpose designed for the study of pharmacy and pharmaceutical science and taught by discipline experts. Our premises are located in 'the Parkville Strip', Australia's premier health and biomedical precinct, and offer world-class teaching facilities and research laboratories to our students and staff. To learn more about the Faculty, please visit our website: www.monash.edu/pharm/.

The Drug Delivery, Disposition and Dynamics (D4) research teams within the Monash Institute of Pharmaceutical Sciences (MIPS) are designing and developing the next generation of drug delivery systems and anti-infective agents to enhance medicine effectiveness and patient treatment.

The Melbourne Centre for Nanofabrication (MCN) is a purpose-built facility, designed to fill the gap in Australia for open access, multi-scale fabrication infrastructure, spanning a range of fabrication environments and materials. It provides the means to produce complex micro and nano-science based demonstration devices using an array of tools. The MCN comprises biological and non-biological fabrication techniques; e.g. electron beam lithography, focussed ion beam lithography, photolithography, embossing, deposition (self-assembly) as well as systems integration capabilities; e.g. bonding, biological spotting, microfluidics.

Probing Biosystems Future Science Platform. The goal of this FSP is to develop innovative platforms capable of interrogating living systems (e.g. human, animal, plant, synthetic tissue or organoid), 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. To help achieve this goal, two target areas of research have been identified: (i) the development of innovative implantable or wearable biosensors for improved health surveillance and (ii) the generation of novel microfluidic organoid-on-a-chip technology to fast track drug and disease biomarker discovery. The advancement in micro-battery design, microelectronics, secure telemetry and improved data analytics are integral to the development of the implantable biosensor platform.

Position Purpose

A Level A research-only academic is expected to contribute towards the research effort of the university and to develop their research expertise through the pursuit of defined projects relevant to the particular field of research.

The successful applicant will work on a Monash-CSIRO-joint funded project within the Probing Biosystems Future Science Platform and will be an important member of a multidisciplinary research team in a cutting-edge area of cell-materials interaction research. Several animal viral diseases, such as bovine ephemeral fever, bovine viral diarrhoea and caprine arthritis encephalitis, are endemic in certain parts of Australia, causing economic impact on livestock industry due to production losses, i.e. reduced reproductive performance, death and ill thrift. There are also emerging animal viral diseases, such as Japanese encephalitis, which are of special concern due to the potential capacity of migratory birds or newly introduced mosquito vectors to spread the disease all around Australia. Diagnosis is often made on the basis of the clinical symptoms of disease, plus blood tests to confirm the presence of antibodies. Fast and direct virus detection in the early stages of the disease is a more effective way to put in place eradication schemes based on prompt diagnostic to reduce the risks of disease spread by enabling rapid identification, isolation and treatment of infected animals. None of the traditional methods to detect viruses meet the requirements of portable and onsite sensor devices, which include high sensitivity, selectivity, cost-effectiveness and real-time detection without complex sample pre-treatments. Biosensors are designed to meet these requirements.

The aim of the project is to create the next generation of animal viral biosensors to provide producers with a biosecurity measure to control animal virus diseases. Universal platforms based on arrays of nanochannels will be fabricated using different synthetic materials to act as switchable electrochemical sensing platforms with size-selective filter capabilities.

Reporting Line: The position reports to Director of the Melbourne Centre for Nanofabrication, and CSIRO Science Leader

Supervisory Responsibilities: Co-supervision of Research Associate, PhD, master and Honours students

Financial Delegation: Not applicable

Budget Responsibilities: Not applicable

Key Responsibilities

Specific duties required of a Level A research-only academic may include:

1. The conduct of research under limited supervision either as a member of a team or, where appropriate, independently and the production or contribution to the production of conference and seminar papers and publications from that research
2. Supervision of research-support staff involved in the staff member's research
3. Guidance in the research effort of junior members of research-only Academic staff in her/his research area
4. Contribution to the preparation or, where appropriate, individual preparation of research proposal submissions to external funding bodies
5. Involvement in professional activities including, subject to availability of funds, attendance at conferences and seminars in the field of expertise
6. Administrative functions primarily connected with her/his area of research
7. Occasional contributions to the teaching program within the field of the staff member's research
8. Co-supervision or, where appropriate, supervision of major honours or postgraduate research projects within the field of the staff member's area of research
9. Attendance at meetings associated with research or the work of the organisational unit to which the research is connected and/or at departmental, school and/or faculty meetings and/or membership of a limited number of committees

Key Selection Criteria

Education/Qualifications

1. The appointee will have:
 - A Ph.D. degree or equivalent qualifications/experience in materials science, bionanotechnology or analytical chemistry or a related discipline from a recognised university or equivalent qualifications and research experience

Knowledge and Skills

2. Demonstrated experience in nanofabrication;
3. Demonstrated experience in assays such as immunoassays and aptamer-based assays; and
4. Demonstrated experience in electrochemical biosensing;
5. Evidence of an emerging track record of publications and presentations;
6. The ability to work under pressure and to prioritise tasks to meet deadlines;
7. High levels of initiative and flexibility;
8. Well-developed interpersonal and written communication skills;
9. Ability to work both independently and collaboratively as a member of a team;
10. Ability to work efficiently, meet project timelines, and excellent organisational skills

Other Job-Related Information

- Travel may be required between campuses.
- Travel to CSIRO Manufacturing (Clayton) and CSIRO Australian Animal Health Laboratory (Geelong) may be required
- There may be peak periods of work during which the taking of leave may be restricted

Legal Compliance

Ensure you are aware of and adhere to legislation and university policy relevant to the duties undertaken, including: Equal Employment Opportunity, supporting equity and fairness; Occupational Health and Safety, supporting a safe workplace; Conflict of Interest (including Conflict of Interest in Research); Paid Outside Work; Privacy; Research Conduct; and Staff/Student Relationships.