

Position Title:	Research Associate/Research Fellow
Position Classification:	Level A/B
Position Number:	
Faculty:	Engineering and Mathematical Sciences
Department:	Mathematics and Statistics
Centre/Section:	Applied Mathematics
Supervisor Title:	CSIRO-UWA Chair in Complex Engineering Systems
Supervisor Position Number:	

Your work area

Complex Systems research at UWA has been recognised as strategic focus and part of the Faculty of Engineering and Mathematical Sciences initiative, Engineering for Remote Operations (ERO). ERO research in Complex Systems is lead by the CSIRO-UWA Chair in Complex Engineering Systems, Prof. Michael Small. Prof. Small's appointment is a joint initiative funded by UWA and CSIRO's Mineral Resources flagship. The group includes eight academic staff and post-doctoral fellows based either in UWA's Department of Mathematics and Statistics, or CSIRO's Mineral Resources. There are currently 12 post-doctoral research students, and annually 2-4 undergraduate students within the group. Funding for the current position comes from the successful ARC Discovery Programme grant application, "Navigating tipping points in complex dynamical systems" – a collaboration between Prof. Small, a medical oncologist (Dr. Lesterhuis), a bioinformatician (Dr. Bosco), and CSIRO's Mineral Resources (Dr. Zaitouny). This appointee will be based in the Department of Mathematics and Statistics and work closely with various members of the team based at UWA (in both Mathematics and Statistics and in Medicine), Telethon Kids Institute and CSIRO.

The Department of Mathematics and Statistics has an established and dedicated team of teaching and research staff who engage in a multidisciplinary approach to provide pathways to incorporate mathematics and statistics into undergraduate and postgraduate studies and research. Our program of teaching and research covers the broad fields of applied mathematics, pure mathematics and statistics.

Reporting Structure

Reports to: CSIRO-UWA Chair in Complex Engineering Systems

If a leadership/ supervisory role:

Direct Reports:

Teams:

Your role

You will take responsibility for the research program "Navigating tipping points in complex dynamical systems", as described in the funded ARC project proposal. This project expects to generate innovative techniques from complex systems theory and dynamical systems theory to identify tipping points and apply these techniques to understand real world systems. Working with clinicians and practicing engineers the project aims to contribute to the development of new treatment regimes for dynamical diseases and develop improved management strategies for resource-focused engineering industries. This should provide significant benefit to many areas including the personalised treatment of disease.

You will join the complex system research group in the Department of Mathematics and Statistics and work with academics and fellow researchers within that group. You may also be required to supervise honours students and postgraduate research students on projects related to this research. You will report to directly to Prof. Small and interact closely with Drs. Lesterhuis, Bosco and Zaitouny. As a full-time post-doctoral research fellow you will conduct original mathematical research related on topics determined in consultation with Prof. Small.

Key responsibilities

1. Work as a full-time researcher in the Department of Mathematics and Statistics, under the supervision of Prof. Michael Small.
2. Contribute in a major way to research connected to the ARC project entitled "Navigating tipping points in complex dynamical systems". This project aims to develop mathematical techniques to

detect and characterise tipping points (i.e. regime changes) in complex dynamical systems. In particular the focus is on dynamical systems for which the deterministic dynamics of the system can be characterised as a network – either from gene expression profiles and bioinformatics measurements or complex engineering processes (such as utility networks). The principal applications will be cancer immunotherapy and engineered systems.

3. Participate in other research projects undertaken within the research group as appropriate and as agreed with Prof. Small.
4. Design and develop mathematical algorithms to characterise and predict tipping points in dynamical systems from experimental data.
5. Assist in acquiring experimental results and participate in trans-disciplinary research meetings in both a laboratory and hospital setting.
6. Conduct high-quality, high-impact research in dynamical systems and complex systems and publish results in peer-reviewed journals and present the results at conferences and elsewhere as appropriate.
7. Present research activities and results in reports, research publications, and to visitors, potential sponsors and peers.
8. Contribute to grant writing.
9. Assist in the supervision of undergraduate students and Masters and PhD students. Work in collaboration with other post-doctoral researchers and academic staff within the complex systems research group.
10. Perform other duties as directed.

Your specific work capabilities (selection criteria)

1. PhD in mathematics, physics, computer science, engineering, physiology, biology, or similar.
2. Strong ability in at least one of: complex systems, dynamical systems, bioinformatics techniques for cancer immunotherapy, nonlinear time series analysis.
3. Experience with relevant computational toolkits (MATLAB, python, etc.)
4. Experience in working as a team player, preferably within a cross-disciplinary team. Track record of research publication relative to opportunity.
5. Highly developed written and verbal communication skills in the preparation of high-quality reports, presentations and publications.
6. An ability and willingness to direct and supervise final year undergraduate students and PhD students, if appropriate, in the areas of biomedical optics, biophotonics and biomedical engineering.
7. Highly developed organisational skills and demonstrated ability to set priorities and to meet deadlines.

Special Requirements

There are no special requirements

Compliance

Workplace Health and Safety

All supervising staff are required to undertake effective measures to ensure compliance with the Occupational Safety and Health Act 1984 and related University requirements (including Safety, Health and Wellbeing Objectives and Targets).

All staff must comply with requirements of the Occupational Safety and Health Act and all reasonable directives given in relation to health and safety at work, to ensure compliance with University and Legislative health and safety requirements.

Details of the safety obligations can be accessed at <http://www.safety.uwa.edu.au>

Equity and Diversity

All staff members are required to comply with the University's Code of Ethics and Code of Conduct and Equity and Diversity principles. Details of the University policies on these can be accessed at http://www.hr.uwa.edu.au/publications/code_of_ethics, <http://www.equity.uwa.edu.au>