

Queensland

University of Southern Queensland

DP0774450 Dr J Li; Dr H Wang

Approved Project Title **Privacy preserving data sharing in data mining environments**

Project Title

2007 : \$60,000

2008 : \$55,000

2009 : \$50,000

Primary RFCD 2801 INFORMATION SYSTEMS

Administering Organisation University of Southern Queensland

Project Summary

Preserving privacy in data mining among various enterprises and organisations is essential for many real world applications in areas like health surveillance, business analysis, fraud detection and terror protection. Efficient and effective techniques are badly needed to protect privacy in data sharing and data mining. The developed cutting-edge techniques in this project will be implemented in freely available open source software tools, empowering Australian organisations to utilise the techniques to develop intelligent systems in data sharing environments. These techniques will ultimately lead to better utilisation of the information available in many enterprises and organisations.

DP0774601 Dr JA Lopez

Approved Project Title **RadioGenes2: Modelling complex biomolecular interactions in radiated tumours: Towards understanding the genesis of therapeutic radioresistance.**

2007 : \$60,000

2008 : \$55,000

2009 : \$55,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Organisation University of Southern Queensland

Project Summary

About 45% of bladder cancer patients require radiotherapy or surgery. Radiotherapy has a failure rate of ~50%. Surgery (bladder removal) diminishes quality of life considerably. Modelling complex gene interactions in radiated cancer cells will provide crucial knowledge on the molecular genesis of radiotherapy-resistance of tumours. Our findings will provide: (i) an accurate mathematical/computational model for diagnosing radiosensitivity; (ii) further insights to be applied in the pharmaceutical sector such as the discovery of novel molecular targets that have the potential to increase radiotherapy success ratios; (iii) a holistic modelling technique applicable to a larger diversity of tumours.

DP0774311 Prof AJ Roberts; Prof IG Kevrekidis

Approved Project Title **Modelling of multiscale systems in engineering and science supports large-scale equation-free simulations and analysis**

2007 : \$113,083

2008 : \$115,000

2009 : \$105,000

2010 : \$59,058

Primary RFCD 2918 INTERDISCIPLINARY ENGINEERING

Administering Organisation University of Southern Queensland

Project Summary

A persistent feature of complex systems in engineering and science is the emergence of macroscopic, coarse grained, coherent behaviour from the interactions of microscopic agents (molecules, cells) and with their environment. In current modeling, ranging from ecology to materials science, the underlying microscopic mechanisms are known, but the closures to translate microscale knowledge to a system level macroscopic description are rarely available in closed form. Our novel, equation free, computational methodologies will circumvent this stumbling block, and promises to radically change the modeling, exploration and understanding of complex system behavior. We continue to develop this powerful computational methodology.

Summary of Discovery Projects Proposals for Funding to Commence in 2007

DP0774440 Dr Kl Ziri-Castro

Approved Project Title **Modelling Human-Body Effects on Indoor Multiple-Input Multiple-Output Channels for Broadband Wireless Systems**

2007 : \$50,000

2008 : \$50,000

Primary RFCD 2917 COMMUNICATIONS TECHNOLOGIES

Administering Organisation University of Southern Queensland

Project Summary

Multiple-Input Multiple-Output (MIMO) technologies use a number of antennas to send multiple signals as a way to significantly increase the speed, range and reliability of a wireless network. The upcoming IEEE 802.11n standard, which includes MIMO in its specifications, will offer up to eight times the coverage and up to six times the speed of currently available IEEE 802.11 products. Through comprehensive measurement campaigns, this project will characterise the time-varying human body effect on indoor MIMO systems in populated environments, such as busy industrial and commercial buildings. Results will have a direct impact on future wireless applications, and are valuable from both scientific and economy-enhancement viewpoints.