



Examples of new *Discovery Projects* in 2010

Mathematics, Information and Communication Sciences

The University of Western Australia (Contact: 08 6488 2806)

Person Identification from Multiple Non-Invasive Iris and Face Biometrics in Video
(DP1096801)

Summary: This project will undertake research to develop a prototype system for personal identification that can be used by law enforcement and security agencies to enrol people at points of entry at public places. The system will non-invasively acquire face and iris biometrics and match them against a database of known persons. The proposed system can be used in sensitive buildings for access control, eliminating the need to carry access cards or remember passwords. This research contributes to the national research priority of Safeguarding Australia. We will develop new techniques in computer vision and train new researchers in this area.

Chief Investigator: Professor Robyn Owens

ARC funding: \$390,000 over 3 years

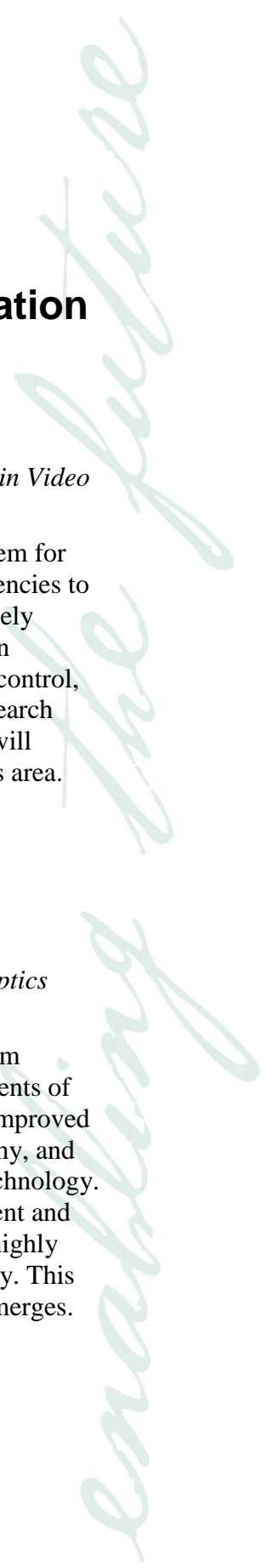
The University of New South Wales (Contact: 02 9385 2864)

New Quantum and Robust Control Theory with Applications to Quantum Optics
(DP1094650)

Summary: The application of quantum mechanics to the creation of quantum technology promises to be one of the most exciting technological developments of this century. Possible applications of quantum technologies include vastly improved sensors to search for minerals or gravity waves, secure quantum cryptography, and quantum computing. Quantum feedback control is a key tool in quantum technology. This project will lay the foundations of systematic theories of robust, coherent and nonlinear quantum feedback control and lead to advances in the control of highly resonant systems which underlie experimental quantum and nano technology. This will enable Australia to reap great benefits as this new technological area emerges.

Chief Investigator: Professor Ian Petersen

ARC funding: \$1,005,000 over 5 years





The University of Sydney (Contact: 02 9114 0748)

Cost-effective autonomous systems for large scale monitoring of marine protected areas (DP1093448)

Summary: This project seeks to develop autonomous technologies that will enable Australia's expanding system of marine protected areas (MPAs) to more effectively preserve marine biodiversity and long term ecosystem function through scalable, cost-effective monitoring. Monitoring will enable MPA managers to assess whether preservation and sustainability goals are being met and to adapt zoning policies in response. Australia will benefit from informed sustainable use policies that preserve the marine environment for future generations without unnecessarily restricting recreational and commercial access today.

Chief Investigator: Dr Oscar Pizarro

ARC funding: \$798,000 over 5 years

The University of Melbourne (Contact: 03 8344 4123)

Robotic gait assistive strategy for people with paraplegia: Generating balanced and human-like gait on a bipedal system (DP1093476)

Summary: The outcomes of the project will contribute significantly to the fundamental understanding of bipedal mechanisms, robotics, and the dynamics of human gait. This research is unique in Australia and it will strengthen Australia's research standing in robotics and health-sciences. The immediate application of the outcomes will contribute significantly to the musculoskeletal and psychological health of people with spinal cord injury, as well as the basic locomotion capability around the house to carry out their daily tasks more independently and conveniently. Hence it will directly contribute to improving their quality of life and substantially reducing health-care costs and carer responsibilities in the community.

Chief Investigator: Dr Denny Oetomo

ARC funding: \$352,000 over 3 years

Macquarie University (Contact: 02 9850 7456)

Natural Language Generation for Aboriginal Languages (DP1095443)

Summary: Australian Aboriginal languages have a number of interesting characteristics that make them a challenge for language technology applications; as yet, there are none, unlike for the indigenous Inuit peoples of Canada and Maori of New Zealand. We will carry out a large-scale computational linguistic investigation of an Aboriginal language to create a data-to-text natural language generation system. The system will use data from Australian Rules Football to automatically construct articles based on the data. This study of computational linguistics will have further national benefits through engagement of the owners of the language in the language survey, as well as generating articles that will encourage literacy and language maintenance.

Chief Investigator: Dr Mark Dras

ARC funding: \$425,000 over 3 years