

# RESEARCH OVERVIEW



BE WHAT YOU WANT TO BE



*Professor Jennelle Kyd is the Deputy Vice-Chancellor (Academic and Research) responsible for leadership in Research, Scholarship and Industry, and the development and implementation of the Research Strategic Plan.*

*Professor Kyd has research interests in middle ear and respiratory infections and currently holds NHMRC and ARC grants that support her research at CQUniversity. Professor Kyd is a leader in an international group that is working with the pharmaceutical industry and key international researchers to achieve a vaccine for the prevention of bacterial middle ear infection in children.*

*She is an inventor of commercially valuable intellectual property of vaccine components for *Haemophilus influenzae*, *Moraxella catarrhalis* and *Pseudomonas aeruginosa*.*

## INTRODUCTION

CQUniversity is one of the most engaged, supportive and responsive universities in Australia. We're focused on making higher education and research more accessible and relevant to all people, especially those who live and work in our region and beyond. Academics and student researchers undertake world-class research at CQUniversity in the areas of health, natural resources and education. Our personalised learning support and collaborative partnerships provide pathways for people from all walks of life and different learning styles to achieve, thrive, and succeed.

As well as being a leading provider of distance education, CQUniversity has campuses in Rockhampton, Bundaberg, Emerald, Gladstone and Mackay plus a delivery site on the Sunshine Coast. The University also operates international campuses in Brisbane, the Gold Coast, Melbourne and Sydney.

Our graduates have one of the highest employment rates in the country, with students ranking 10% higher than the national average for employment. Over 90% of CQUniversity graduates with a bachelor degree find full-time work within four months of finishing university – a rate almost 10% higher than the national average (Graduate Careers Australia).

The Good Universities Guide 2010 gives CQUniversity a top rating (5 stars) for graduate starting salaries, cultural diversity, international enrolments and access by equity groups. CQUniversity has also been recognised for its outstanding export achievement in the field of education services, facilities, expertise, and curriculum at both state and national levels.

## Message from Professor Jennelle Kyd, Deputy Vice-Chancellor (Academic and Research)

CQUniversity has a commitment to excellence in research and innovation with a particular emphasis on issues that affect the region. We strive to achieve relevance in our research goals through linkages with industry, business, government and the community and through collaboration with national and international researchers and research networks.

The long-term Research and Innovation vision is for CQUniversity to be Australia's leading University for research achievements and industry partnerships in our priority areas of research. The University will be known for its expertise in and contribution to innovations for and solutions to the issues that confront the Resources Industries; Community Health and Social Viability; and Education.

To achieve this vision and our goals, the University is focusing its researchers and research efforts and increasing the scale of research through two institutes: the Institute for Resource Industries and Sustainability and the Institute for Health and Social Science Research, and two new research centres in the area of education: the International Education Research Centre and the Learning and Teaching Education Research Centre.

CQUniversity also provides a range of exciting and relevant research opportunities for Masters and PhD candidates and is committed to excellence and quality in the research training experience of its candidates.

# CQUniversity Research structure

CQUniversity focuses its research in the three priority areas that directly contribute to the support and revitalisation of our Community Health, Sustainability and Education. The Office of Research facilitates research activity through the provision of effective and efficient support services. These priority areas are hosted within two Institutes and constituent Research Centres and groups:

**The Institute for Resource Industries and Sustainability (IRIS) includes the following centres and groups:**

- Centre for Environmental Management
- Centre for Railway Engineering
- Centre for Plant and Water Sciences
- Process Engineering and Light Metals Centre
- Centre for Intelligent and Networked Systems
- Power Engineering Research Group

**The following groups and centres comprise the Institute for Health and Social Science Research (IHSSR):**

- Population Research Laboratory
- Centre for Longitudinal and Preventative Health Research
- Centre for Mental Health and Wellbeing
- Centre for Physical Activity Studies
- Queensland Centre for Domestic and Family Violence Research
- International Program of Psycho-Social Health Research
- Capricornia Centre for Mucosal Immunology

**Two new research centres support Educational Research:**

- International Education Research Centre
- Learning and Teaching Education Research Centre





## IRIS GROUPS AND CENTRES

**Centre for Environmental Management** strives to achieve environmentally sustainable development in the dry tropics. It has six main fields of endeavour – marine, coastal, terrestrial and freshwater ecology, environmental resource economics, ecotoxicology and some associated social studies. The focus is on issues associated with sustainable regional development, accounting for the costs of environmental impact, biodiversity management, rehabilitation success, ecosystem functional indicators of environmental performance and integrated regional monitoring. It is one of the largest research centres at CQUniversity, with approximately 30 research and technical staff.

**Centre for Railway Engineering (CRE)** concentrates several engineering disciplines as applied to rail research and is a leading participant in the CRC for Rail Innovation. The CRE has a strong customer focus and endeavours to build a strong partnership between its researchers and the rail industry through high quality generic and commercial research, continuing professional education and consultancy services. CRE has expertise in train and wagon dynamics, simulation, structural fatigue, failure analysis, erosion control, driver advisory systems, condition monitoring and train control and brake systems. Research projects are carried out by research academics, professional research staff, project engineers and postgraduate students with support from technicians and software developers.

**Centre for Plant and Water Sciences** aims to undertake research, undergraduate teaching and postgraduate training in the water and plant sciences. To do this effectively the Centre draws upon a number of full-time academic and research only staff, higher degree students, an enthusiastic complement of technical and administrative staff, and many volunteers. The Centre focuses on the tropical environment suited to the University's geographic locations, and undertakes research that includes the development of biofuels, plant production/conservation and innovations in horticulture.

**Process Engineering and Light Metals Centre (PELM)** is an advanced Research and Development facility servicing the needs of the processing industries in the Central Queensland Region. PELM particularly focuses its research in three areas: industrial materials failure analysis and sustainability, industrial processes with particular emphasis on optimisation of fluid flow parameters, and industrial asset management. PELM offers a variety of partnership models to clients and researchers such as consultancy, contract research or ongoing collaboration with industry and national organisations. PELM has developed one of the leading metallurgical evaluation facilities in Queensland, through providing a wide range of services and being committed to solving complex issues for its clients.

**Centre for Intelligent and Networked Systems** was established in 2008 to provide a focus for university research in the general area of intelligent and networked systems and to establish strong and sustainable research relationships with both regional industry and external research organisations. As such, it has four key research programs: agent-based systems, computational intelligence, data mining and networked systems.

**Power Engineering Research Group** is looking to the future of electricity generation, transmission and distribution in its many forms. The group's research currently includes areas such as Smart Grid, renewable energy systems, power quality, electrical asset management, as well as traditional generation, transmission and distribution systems. The group is working collaboratively with industry to conduct research for innovative solutions to challenges in these areas using multidisciplinary research expertise; facilitating interchange of ideas and collaboration among academia, industry and government on critical industry issues and; educating the next generation of power industry engineers.

## IHSSR GROUPS AND CENTRES

**Population Research Laboratory (PRL)** is the central hub of the research infrastructure of the Institute for Health and Social Science Research (IHSSR) at CQUniversity. The PRL conducts high quality social surveys using advanced social research methods and computer assisted telephone interviewing (CATI) technology which inform its three flagship projects: the Australian Health and Social Science Project (online panel study), the annual Central Queensland Social Survey (regional CATI survey) and the annual Queensland Social Survey (state wide CATI survey). Along with these, the PRL has a diversified portfolio of research projects that it has undertaken for university and non-university based researchers to enable decision making in the public and private sectors, specialising in survey design, testing and evaluation, large scale population based CATI surveys, online surveys, focus groups and combined methodology research.

**Centre for Longitudinal and Preventative Health Research** focuses on two major streams of research: Longitudinal Programs, and Prevention, Intervention and Evaluation Programs. The Centre aims to provide an evidence-based platform for long term health intervention research through the development of prospective studies that monitor health needs and outcomes at the individual, group and community level. The Centre is focused on the identification of risk and protective factors that promote health, resilience, and positive adjustment in regional, state and national contexts.

**Centre for Mental Health and Wellbeing** evaluates clinical and behavioural health issues, through the research and promotion of positive change as well as understanding the psycho-social, cultural and geographical contexts of health and health-related behaviours. This work is vital to improve understanding of the implications of clinical and mental health services in relation to mental and psycho-social health needs.





**Centre for Physical Activity Studies (CPAS)** primarily aims to advance the science of physical activity research. Specifically, research within CPAS focuses on increasing the knowledge of individual, social and environmental correlates of physical activity. It further seeks to develop, implement and evaluate new and innovative intervention strategies to increase physical activity at an individual and population level, both in healthy and unhealthy populations (e.g. diabetes and cardiovascular disease). More broadly, CPAS also engages in research related to physical activity and health, such as health promotion, nutritional and obesity research, and exercise and biomedical research. CPAS currently hosts several ongoing and developing projects, one of which is the nationally and internationally recognised 10,000 Steps. Funded by Queensland Health, the ongoing 10,000 Steps project was Australia's first 'whole of community' health promotion physical activity project. The project has been successful in motivating local communities, workplaces and individuals to increase their physical activity (PA) levels. As a result of its initial local success in Rockhampton, the project was 'rolled out' as a sustainable state-wide and beyond initiative in 2004/2005. Other recent developing health promotion projects include ManUp Gladstone and Walk 2.0.

**Queensland Centre for Domestic and Family Violence Research (CDFVR)** is based in Mackay and contributes to the prevention of domestic and family violence by informing, promoting and supporting the actions of individuals, communities, services and governments through state-wide leadership in research, professional development, education and community engagement. The Centre's research function is to initiate, undertake and collaborate on innovative and interdisciplinary research and publications to reduce deficits in domestic and family violence knowledge and literature. CDFVR is also committed to undertaking applied research that supports the development of policy and practice in the field of domestic and family violence prevention with a particular, though not exclusive, focus on issues for Aboriginal and Torres Strait Islander peoples, and rural and regional communities.

**International Program of Psycho-Social Health Research (IPP-SHR)** undertakes research that examines and documents the human experience of serious illness (both physical and mental). IPP-SHR addresses a wide range of topic areas including haematology/oncology, mental health, palliative care, rural and remote health, Indigenous health and paediatrics. In essence the program is concerned with contributing to the development of psycho-social services that assist people to deal with the many challenges associated with serious physical and/or mental illness.

**Capricornia Centre for Mucosal Immunology** investigates immunity to infections in the respiratory tract and middle ear. This program investigates complex host-pathogen interactions to better understand disease processes to enable the development of more effective therapies, including the development of vaccines. The Centre undertakes fundamental research as well as research consultancy services.

## EDUCATION RESEARCH CENTRES

**International Education Research Centre** aims to develop for CQUniversity a leadership position in applied research into international education issues, enhancing the University's capacity and reputation as a provider of high quality interculturally-informed education and service to all its students, domestic and international. Current themes include international student security; internationalisation of the curriculum; student support mechanisms and public policy aspects.

**Learning and Teaching Education Research Centre** is concerned with identifying the underpinning research required to drive teaching and learning at CQUniversity. The kind and direction of the underpinning research is determined largely by the contextual conditions that characterise CQUniversity, namely: cultural diversity, multiple sites and multi-modal delivery techniques.





## Research Higher Degree Scholarships

### Australian Postgraduate Award (APA)

Eligibility	<ul style="list-style-type: none"> <li>• Australian citizens</li> <li>• New Zealand citizens</li> <li>• Australian Permanent Residents</li> </ul>
Entry Requirements	<ul style="list-style-type: none"> <li>• Honours 1 or equivalent</li> </ul>
Stipend	<ul style="list-style-type: none"> <li>• \$22 500 (2010 Base Rate)</li> </ul>
Allowances	<ul style="list-style-type: none"> <li>• Relocation allowance</li> <li>• Research Support Grant</li> <li>• Thesis allowance</li> </ul>
Tuition Fees	<ul style="list-style-type: none"> <li>• RTS Place</li> </ul>
Tenure	<ul style="list-style-type: none"> <li>• 2 years for Masters Candidates</li> <li>• 3 years for Doctoral Candidates</li> </ul>

### Australian Postgraduate Award – Industry (APA (I))

Eligibility	<ul style="list-style-type: none"> <li>• International or domestic applicants</li> </ul>
Entry Requirements	<ul style="list-style-type: none"> <li>• Honours 1 or 2A, or equivalent</li> </ul>
Stipend	<ul style="list-style-type: none"> <li>• \$27 222 indexed annually</li> </ul>
Allowances	<ul style="list-style-type: none"> <li>• Relocation allowance</li> <li>• Thesis allowance</li> </ul>
Tuition Fees	<ul style="list-style-type: none"> <li>• RTS Place for domestic recipients</li> <li>• Full-fee paying for international candidates</li> </ul>
Tenure	<ul style="list-style-type: none"> <li>• 2 years for Masters Candidates</li> <li>• 3 years for Doctoral Candidates</li> </ul>

### Strategic Research Scholarships (SRS)

Eligibility	<ul style="list-style-type: none"> <li>• International or domestic applicants</li> </ul>
Entry Requirements	<ul style="list-style-type: none"> <li>• Honours 1 or equivalent</li> </ul>
Stipend	<ul style="list-style-type: none"> <li>• \$45 000 indexed annually</li> </ul>
Allowances	<ul style="list-style-type: none"> <li>• Nil</li> </ul>
Tuition Fees	<ul style="list-style-type: none"> <li>• RTS Place for Domestic Candidates</li> <li>• Full-fee Paying for International Candidates</li> </ul>
Tenure	<ul style="list-style-type: none"> <li>• 2 years for Masters Candidates</li> <li>• 3 years for Doctoral Candidates</li> </ul>

### **CQUniversity Postgraduate Research Award (UPRA)**

Eligibility	<ul style="list-style-type: none"><li>• Australian citizens</li><li>• Australian Permanent Residents</li><li>• New Zealand citizens</li></ul>
Entry Requirements	<ul style="list-style-type: none"><li>• Honours 1 or equivalent</li></ul>
Stipend	<ul style="list-style-type: none"><li>• Ranges between \$22 500 to \$24 000 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Relocation allowance</li><li>• Research Support Grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• RTS Place</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>

### **CQUniversity Women's Equal Opportunity Postgraduate Research Award (WEOPRA)**

Eligibility	<p>This scholarship is offered to enable women to undertake full-time postgraduate research towards a doctoral or masters degree after experiencing a break in study.</p> <p>Applicants must be female and be either an Australian citizen, permanent resident of Australia or New Zealand citizen.</p>
Entry Requirements	<ul style="list-style-type: none"><li>• Academic achievement relative to life circumstances</li><li>• A high level of motivation</li><li>• Ways in which this award will enhance future professional goals</li><li>• Potential for successful completion of a research higher degree</li><li>• Capacity to contribute to the University's research culture</li></ul>
Stipend	<ul style="list-style-type: none"><li>• \$22 500 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Relocation allowance</li><li>• Research support grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• RTS Place</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>

### **International Postgraduate Research Award (IPRA)**

Eligibility	<ul style="list-style-type: none"><li>• International applicants from any country, except New Zealand</li></ul>
Entry Requirements	<ul style="list-style-type: none"><li>• Honours 1 or equivalent</li></ul>
Stipend	<ul style="list-style-type: none"><li>• \$22 500 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Research Support Grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• Scholarship covers tuition fees</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>



### **CQUniversity Indigenous Australian Postgraduate Research Award (IAPRA)**

Eligibility	<ul style="list-style-type: none"><li>• Australian citizens of Indigenous descent</li></ul>
Entry Requirements	<ul style="list-style-type: none"><li>• Academic achievement relative to life circumstances</li><li>• A high level of motivation</li><li>• Ways in which this award will enhance future professional goals</li><li>• Potential for successful completion of a research higher degree</li><li>• Capacity to contribute to the University's research culture</li><li>• Capacity to contribute to the University's established Indigenous knowledge base</li></ul>
Stipend	<ul style="list-style-type: none"><li>• \$22 500 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Relocation allowance</li><li>• Research Support Grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• RTS Place</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>

### **International Postgraduate Research Scholarship (IPRS)**

Eligibility	<ul style="list-style-type: none"><li>• International applicants from any country, except New Zealand</li><li>• This scholarship is available to commencing candidates only</li></ul>
Entry Requirements	<ul style="list-style-type: none"><li>• Honours 1 or equivalent</li></ul>
Stipend	<ul style="list-style-type: none"><li>• \$22 500 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Overseas Health Cover</li><li>• Research Support Grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• Scholarship covers tuition fees</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>
IPRS Website	<ul style="list-style-type: none"><li>• DEEWR IPRS website: <a href="http://www.innovation.gov.au/Section/AboutDIISR/FactSheets/Pages/InternationalPostgraduateResearchScholarships(IPRS)FactSheet.aspx">http://www.innovation.gov.au/Section/AboutDIISR/FactSheets/Pages/InternationalPostgraduateResearchScholarships(IPRS)FactSheet.aspx</a></li></ul>

### **Postgraduate Research International Scholarship (PRIS)**

Eligibility	<ul style="list-style-type: none"><li>• International applicants for any country, except New Zealand</li></ul>
Entry Requirements	<ul style="list-style-type: none"><li>• Honours 1 or equivalent</li></ul>
Stipend	<ul style="list-style-type: none"><li>• \$22 500 indexed annually</li></ul>
Allowances	<ul style="list-style-type: none"><li>• Research Support Grant</li><li>• Thesis allowance</li></ul>
Tuition Fees	<ul style="list-style-type: none"><li>• Scholarship does not pay tuition fees</li></ul>
Tenure	<ul style="list-style-type: none"><li>• 2 years for Masters Candidates</li><li>• 3 years for Doctoral Candidates</li></ul>

## AREAS OF RESEARCH AND EXPERTISE

### Meet the Forensic Investigator

Professor Richard Clegg has a very unusual job, working as a forensic engineer. While a forensic scientist carefully analyses a dead body at a crime scene, Clegg examines large-scale broken industrial equipment, conducting meticulous detective work to determine the cause of the failure. Clegg, who is also a metallurgist, founded and equipped the Industrial Materials Science laboratory at the Process Engineering and Light Metals (PELM) Centre at CQUniversity. He procured state-of-the-art equipment so researchers can analyse corrosion, fatigue, fracture and wear-and-tear of material used in industrial equipment.

‘Basically my job is to understand how and why mechanical equipment breaks down and to prevent it happening in future by looking at the cause of cracks and fractures,’ Clegg says. ‘Sometimes there is a fault in the equipment’s manufacture or it’s been abused.’

As the director of the PELM Centre, Clegg and his team of postgraduate and doctoral students are now involved in many diverse mining and mineral processing projects across Queensland. One of these projects involves examining corrosion of equipment in alumina refineries which use very hot caustic soda with steel equipment. Alumina is the precursor of aluminium and Gladstone has the world’s largest and second largest refineries of this kind.

‘One of the main reasons companies want us to do this research is to prevent industrial accidents,’ Clegg says. He has investigated machinery after a double fatal accident at the Watson Oil Fields, a bucket wheel excavator failure at Moranbah and slurry pump failures at alumina refineries.

One of Clegg’s other projects is with the CAST Cooperative Research Centre in conjunction with the University of Queensland, and Monash and Swinburne Universities, looking at magnesium alloys joining behaviour. ‘This research has the potential to create material to build lightweight cars,’ Clegg says.

In addition to his work at CQUniversity, Clegg has a specialist consultancy which investigates the engineering reasons for medical device failures. In recent years he has been an expert witness in a series of cases for Queensland Health which involved a failed female sterilisation device.

Clegg first discovered that his metal engineering expertise had a medical application while at University College London. It was there that he worked with a team of experts designing and developing a titanium skin penetrating electrical connector which was part of a Digital Signal Processor for a cochlear implant system.



## More Than Remote Possibilities

Stemming the diabetes epidemic is a global issue. More than 220 million people worldwide now have the disease, with that figure set to double by 2030, reports the World Health Organisation. In Australia, 900 000 people are estimated to be affected, 90 per cent of them with type II diabetes which is commonly linked to lifestyle factors such as obesity.

The costs to both government and the individual are substantial. For the first, it means a spiralling health budget; for the second, potential long-term damage to nerves, eyes, kidneys and other organs as well as an increased risk of cardiovascular disease. Now researchers hope that finding new ways to decrease the amount of sugar in the average Western diet and easier ways to manage the condition itself will lead to reduced healthcare costs and an improvement in the health of global populations.

Agricultural consultant and CQUniversity Honorary Research Fellow Andrew Rank, colleague Professor David Midmore and their associates are fast becoming the go-to experts on a natural, kilojoule-free sugar substitute, Stevia. Commercial use of the plant, they say, could assist in reducing kilojoule loads and weight gain and help sufferers, who are unable to automatically regulate blood glucose levels to better manage their diet. Midmore, the director of the Centre for Plant and Water Science, was asked to give a presentation in Shanghai about the biological qualities of Stevia and its potential as a cash crop for growers and retailers worldwide. 'Stevia is estimated to eventually provide 15 to 20 per cent of the world's sweeteners,' he says. 'This would be valued at US\$7–10 billion out of the current US\$50 billion sugar market.'

In Australia, the potential consumption is 800 tonnes a year, valued at up to \$40 million, of which growers would get up to 25 per cent. Adds Midmore 'Australia could aspire to supply a significant part of this demand.'

At the Centre for Plant and Water Science researcher Ria Reyes has also been working on the physiological significance of steviol glycosides (why plants actually produce them) and on simple ways to quantify the sweetener concentrations in plants so that growers can be paid on quality of their produce. She reveals that a non-invasive method for estimating leaf sweetness before delivery to the market has been developed using Near Infrared Spectroscopy (NIRs).

While the method was developed using lab-based instruments, work is now underway to explore the application of the method in handheld NIR equipment that would be practical for use in the field. 'We have also entered into discussions with a number of commercial agencies interested in the use of NIR for non-invasive assessment of quality (SG concentration) of dry stevia leaves,' says Reyes.

On the disease management front, research is underway into improved monitoring of the health of those who have diabetes by taking advantage of electronic and mobile devices. This area of health, also known as e-health or m-health is tipped to explode in Australia and internationally as a viable and cost-effective means of medical consultation and record keeping, particularly for people living in remote areas.

For young people with type I diabetes, CQUniversity postgraduate Morwenna Kirwan hopes to develop an electronic self-management tool that will enable them to record glucose readings, insulin injections, lab results, food intake and physical activity. 'Young people are very comfortable using technology,' says Kirwan. 'To be able to monitor their health through software applications that could be linked to mobile phones or other devices would be a practical way for them to manage the disease.'

Elsewhere, at CQUniversity's Learning and Teaching Education Research Centre, Dr Tabassum (Neeta) Ferdous is exploring how individuals of culturally and linguistically diverse (CALD) backgrounds manage their diabetes and how different health educational resources impact on their ability to self-manage their disease. According to Dr Ferdous there is increased incidence, complication and mortality rate from diabetes among the overseas born population in Australia than the Australian born population.





## Strength in Diversity

Oral history offers a vital window on our past that with the passing of a generation becomes the stuff of history books. With that in mind, 55-year-old Wayne Ah-Wong, whose family includes Aboriginals, Torres Strait Islanders and South Sea Islanders, drew on his relatives' accounts in unique research that revealed how these ethnic groups have interrelated from the 1930s to the present day.

Ah-Wong says these ethnic groups are often lumped together. 'We often hear Aborigines called 'blackfellas' when there are different groups all around the country, or people from Torres Strait and the South Seas just called 'islanders'.'

Ah-Wong grew up in Mackay, a region that has historically had a large population of Islanders and Aboriginal people. In Mackay, Ah-Wong approached three respected elders from each ethnic group – all men were in their seventies and were related to him either through marriage or extended family.

'These were men who had taken leadership roles in politics or in their workplace and spoken up for their people in the past,' says Ah-Wong.

During a series of interviews, Ah-Wong asked them to recall and reflect not only on their personal histories, childhood, education, employment and war service but their perspective on what was going on in their wider communities. In doing so, he wanted to find out how the lives of Aboriginals, South Sea Islanders and Torres Strait Islanders interacted and how their experiences of life differed adapting to a white colonial system.

The elders spoke about the changing social, cultural and economic status of each group such as when South Sea Islanders were brought to Queensland as indentured labour during the 1800s to service the sugar industry. Although they were allowed greater freedom of movement to find work than Aboriginal people who were routinely moved onto reserves, South Sea Islanders weren't entitled to the same social services as the other two indigenous groups. Aboriginal people, on the other hand, suffered greater oppression having their language suppressed, unlike Torres Strait Islanders.

In the case of South Sea Islanders, many appeared to voluntarily suspend their own language on arrival in Australia. What emerges beyond the colonial rule and oppression is a multi-layered story of intermarriage and absorption of aspects of each other's culture, particularly in the case of Aborigines for whom it wasn't beneficial to be identified as such. 'Most Aborigines became invisible by marrying South Sea Islanders. Now they're starting to reintroduce and reinvigorate their culture through language and dance,' he says.

The Torres Strait Islanders retained some of their traditions such as tombstone openings, and while the South Sea Islanders lost a lot of their culture some things have not been forgotten. Ah-Wong was told that 'when one lady went back to her island, she was identified by the song she sang'.

## People and the Pouch Factor

Not too many similarities jump out at you when you compare a kangaroo and a human, but new marsupial research by CQUniversity's Dr Lauren Young may soon lead to greater understanding of the human immune system and how we fight infectious disease.

Marsupials are mammals whose young are born immaturely but crawl into their mother's pouch and latch themselves onto one of her teats until they are more developed.

Now on the brink of a cutting-edge discovery, Young has taken a circuitous route to arrive at her current role as a CQUniversity senior lecturer in the Faculty of Science, Engineering and Health. She began her career about 20 years ago as a food industry chemist and then became a Research and Development manager.

After a decade in that field, Young decided to change careers. She returned to study and received a Bachelor of Applied Science with Honours from the University of Western Sydney in 1997. She completed her doctorate on marsupial immunology in 2003.

For her research, Young relies on her contacts with veterinarians who have injured or sick animals which need to be euthanised. The animals she has experimented on have included endangered Tammar wallabies, long-footed potoroos, echidnas, platypus and koalas. 'It makes it more challenging to do research when I don't just have a colony of lab-rats to work on!' she says.

Young's major research breakthrough came just a few years ago when she decided that to create an immunological testing system specific to marsupials, she needed to analyse their gene sequence. In the process, she and her team of researchers discovered a specific gene in marsupials that they hadn't expected to find.

'Sequencing these genes gave us a real picture of how complex marsupials are, when previously researchers had believed they had much more primitive immune systems,' she says. It's also demonstrated their closer genetic similarity to humans.

Marsupials and 'eutherian' mammals; animals born with placentas such as dogs, cats and cows, as well as humans, last shared a common ancestor over 180 million years ago. Using traditional laboratory techniques it's understandable that scientists hadn't found a link. But with state-of-the-art technology and predictive gene software, Young and her team cracked the code and they are currently writing up their research findings.

'It is very exciting,' Young says. 'This discovery is not just about helping us understand marsupial immunology, but we hope it will inform us about other species such as Tasmanian Devils. We're working with Tasmanian researchers right now.'

Currently a Devil Facial Tumour Disease, characterised by fatal facial cancers, is sweeping through Tasmania's devil population and 60 per cent of the state has been affected.

The gene sequencing of marsupials will not only help animals, it will also assist human immunology. 'By developing a good model system we may, for example, be able to fight tuberculosis better, which is currently on the increase worldwide,' Young says.



