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Introduction to Research at Victoria University
Message from the Vice-Chancellor

The achievements described in this Research Report demonstrate how far and how fast the University's research activities have developed since the institution was designated as a University in 1992. Research funding, activities and outputs have all grown strongly since that time. Victoria University is committed to nurturing its research culture and expanding its research activities. However, the climate for research has changed in recent years with declining availability of research funding from traditional Commonwealth sources and increased competition from other universities for the reduced research funding pool.

The University has responded to the challenge posed by these changes by the development of new ideas and new initiatives in the management of our research and research training activities. The philosophy of continual improvement is firmly ingrained in our research processes.

The driver for these improvements has been the new University Research and Research Training Management Plan that was implemented in 2000. The Plan defines the long term objectives of the University's research and its strategies for achieving these.

In research training the University continued to demonstrate excellent performance. Our research degree graduates are increasing in number and are well placed in industry, the academy and the community to continue to make contributions to the expansion of knowledge and the uptake of research. While our numbers of postgraduate researchers has remained stable, we are pleased by the quality outputs and the increase in the rate of research completions.

All these developments play a part in enabling the University to meet the needs of our region, the nation and society in general. Some of the achievements of our researchers are described in the following pages.

Professor Jarlath Ronayne,
Vice-Chancellor and President
Fermentation is one of the oldest biotechnological processes. It has traditionally been used to produce alcoholic beverages but recently has been applied to fuel alcohol, a renewable, environment friendly fuel with great future possibilities. Ethanologenic microorganisms utilize the sugars in the fermentation medium to generate energy for cell maintenance and growth, and produce ethanol as a by-product. Although ethanol is produced by microbial metabolism, its accumulation in the culture is associated with a reduction in fermentation productivity and eventual cessation of fermentation altogether. These effects arise due to the sensitivity of the microorganisms to the toxic nature of ethanol. For example, brewing yeasts cannot ferment all of the sugars during fermentation in cultures of very high carbohydrate content (ie. high gravity brewing) because the accumulation of ethanol becomes inhibitory to cellular processes. Exposure of microbial cells to stressful ethanol concentrations decreases their metabolic rate, induces changes in the metabolic pathways used and leads to a decline in cell vitality. Such effects have a substantial impact on fermentation productivity by slowing fermentation rates, reducing final ethanol yields, escalating fermentation turnover periods and limiting the microbial lifespan.

This problem in the fermentation industry is now being tackled head-on by Dr Paul Chambers and Dr Grant Stanley from the School of Life Sciences and Technology and industry partner, Dr Peter Rogers, from Carlton & United Breweries. Their approach is to study, at the molecular level, the built-in protective mechanisms used by various microorganisms to counteract the disruptive effects of non-lethal concentrations of ethanol. Although yeast make use of this molecular stress response to effectively combat cell stress at low ethanol concentrations, its effectiveness is limited at high ethanol levels. The key to ameliorating the damaging effects caused by ethanol stress may lie in identifying and characterising the genes that have a role in the molecular stress response, and then improving their effectiveness during exposure to high ethanol concentrations.

Using yeast as a model cell and the latest molecular biology techniques, this project is focussed on identifying novel key genetic elements of the yeast response to ethanol stress. These stress response genes will then be used to design molecular probes for identifying cells with inherently high stress-response gene expression and to develop programs aimed at increasing microbial tolerance to ethanol stress.

This research will contribute to our understanding of cell stress and how to reduce its damaging effects, paving the way for increased fermentation productivity and higher ethanol yields, increasing the market competitiveness of not only the brewing industry, but also fuel alcohol production. External funding of $201,800 has been obtained for this program via two ARC SPIRT grants in collaboration with Carlton & United Breweries.

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Export sales of over $3.0 billion per annum for a production of around 11 million tonnes make the wheat industry one of the largest export earners in Australia. Wheat is used for a wide range of applications including the manufacture of different bread products in Australia and for export to a large number of countries including Japan, Korea, Thailand, Indonesia and China for the manufacture of noodles. There are a number of factors that influence the selection of the appropriate wheat variety for noodle or bread manufacture; these factors include, in particular, the ratio of amylopectin: amylose in starch, the major component of wheat flour. It is known that amylopectin and amylose consist of long chains of glucose molecules that are linked in different ways. Amylopectin consists of both straight and branched chains of large numbers of glucose molecules, whereas amylose is a simpler structure containing shorter straight chains of glucose molecules. Although these two forms of starch are made of the same basic unit they have completely different properties that affect the final wheat product. For those wheat varieties that contain a high ratio of amylopectin: amylose, noodles are the product of choice, whereas those wheat varieties that contain a low ratio of amylopectin: amylose, bread is the product of choice.

In order to study the factors that affect the amylopectin: amylose ratio, a research team in the biotechnology group at the Werribee campus of Victoria University has been analyzing wheat starches and studying the genetic factors responsible for the starch qualities. One of the important outcomes from the research was the development of a new and rapid electrophoretic test for determining the ratio of amylopectin: amylose in different wheat varieties. This test could be used as a field test to assist farmers determine the right time to harvest and to determine the appropriate end use for the particular variety of wheat. Seasonal factors have been shown from previous studies to affect the ratio of amylopectin: amylose in wheat starch.

The team also investigated a key enzyme, the granule bound starch synthase (also called the waxy protein), which plays an important role in amylose synthesis in wheat. Research work by the group has indicated that the three waxy genes in wheat can be distinguished from one another due to differences in their DNA sequence. These results would be useful in rapid identification of appropriate wheat cultivars for noodle manufacture as well as in development of improved wheat cultivars for this purpose. The group also obtained important new data on the evolution of wheat by comparing the sequences of the waxy genes in common wheat, durum wheat and wild relatives of wheat. This work has been supported by an Overseas Postgraduate Research Scholarship and a Return to Study Postgraduate Research Scholarship.

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Noodles, Bread and Starch Synthetase
Research Team: Associate Professor Mrinal Bhave, Professor Bob Fairclough and PhD students Hema Jegasothy and Liuling Yan.
Tenderness of beef and lamb meat can be highly variable and unpredictable, yet it is well-known that tenderness and juiciness is a key quality attribute. A five year project by the research team headed by Dr Robyn Warner is investigating how exercise stress of meat animals (cattle and sheep) pre-slaughter affects the eating quality of the final product.

The effect of acute stress applied to lambs immediately prior to slaughter on the subsequent meat quality was not previously known. Lambs typically undergo exercise stress when they are mustered and herded prior to slaughter and this was found to have an effect on important meat quality traits. Lambs which underwent exercise pre-slaughter had a much faster pH fall and produced more tender meat which was related to an increase in muscle protein degradation. Unfortunately, exercise pre-slaughter also decreased the water-holding content of the muscle such that the meat lost more fluid during storage and cooking and was less juicy. The most recent experiment showed that the loss in water-holding capacity in the muscle post-slaughter due to pre-slaughter exercise can be blocked by injecting the beta-antagonist propanol. This suggests that the effect of exercise on the water-holding capacity was predominantly being mediated through the action of adrenaline.

A number of structural proteins of the muscle myofibril are gaining increasing attention in relation to meat tenderness, including the very large muscle protein, titin. Titin is a large multidomain protein that spans half the length of the sarcomere in association with myosin (thick filaments). Ionic strength of the fluid held in the muscle cells changes with the onset of rigor. Changes in ionic strength affects titins’ stiffness and may effect its conformation. We found that exercise pre-slaughter resulted in faster breakdown of titin, and in addition resulted in lower ionic activity in the drip from the meat, suggesting that more ions were retained in the meat. These conditions may affect the elastic nature of titin and may contribute to the overall toughness and water holding capacity of meat postmortem.

The role of nitric oxide (NO) in animal physiology in relation to meat quality has also been investigated. NO has long been known to be a toxic gas and its key physiological role has made it one of the hottest areas of international research, being named as the Science Molecule of the Year in 1992. The potential role of NO in meat quality is unknown because the role of NO in muscle physiology and meat quality is only just beginning to be researched. Recent results in the project show that inhibition of NO synthase (NOs) in non-stressed sedentary animals changes glucose uptake and lactate production in the ovine hindlimb. As NO is known to be synthesised during exercise, this may have implications for managing pre-slaughter stress in meat animals. As NO appears to also be involved in regulating calcium release, it may have a role in the development of meat tenderness through activating the calcium-dependent proteases in the muscle cell.

The project is funded by Meat and Livestock Australia and is a collaboration between the NRE’s Victorian Institute of Animal Science at Werribee and the School of Engineering and Science at VUT’s Werribee campus.

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What were the factors that led to the people of East Timor being able to shake off the Indonesian military occupation of their country after 24 years, and move towards an independence recognized by the international community with the historic ballot of August 1999? The answer to this question can give us the key to enable the East Timorese people to unleash their creativity, determination, commitment and ability to work together, which this victory illustrated. These capacities will be vital if Timor Loro Sa’e, the first new country to come to independence this millennium, is to make a success of its development strategy.

Many years later, following the replacement of President Suharto by President Habibie, Dr Hill, now a Senior Lecturer in Asian and Pacific Sociology at Victoria University, received a message saying that Xanana Gusmao wanted to read her thesis. Some one took him a copy in Cipinang jail and some weeks later a group of Indonesian students who were supportive of the East Timorese struggle for independence wrote asking if they could translate it into Indonesian.

When Dr Hill arrived in Dili on a research visit in August 2000 after an absence of 25 years, she found her Masters thesis in Indonesian was being used in the schools for the newly introduced subject of Timorese History. “That thesis”, she said, “was originally intended to be a study of the decolonization process of Portuguese Timor. When I went back to East Timor last year I almost picked up where I left off. My new book is a study of the process of decolonization as it is now being conducted under the auspices of UNTAET (the United Nations Transitional Authority in East Timor).”

I was also astounded to see how much similarity there was between the structures which the Portuguese had envisaged for Timor and what UNTAET has put in place.

The research focuses on the process whereby the United Nations, World Bank, and International Monetary Fund are putting in place institutions for the future governance of the new nation of Timor Loro Sa’e. It examines the policies being implemented in the new state and role of Timorese civil society in influencing policy-making before the election of a democratic government. This research has implications for the aid system in all small countries, not only East Timor. The research also covers reconciliation, gender issues, the economy, human resource development and the policy making process. Dr Hill was on the planning committee for the CNRT Melbourne Conference on Strategic Development Planning for East Timor co-hosted by Victoria University in April 1999. Her research is of importance to the University which has a number of East Timorese students, most of whom will be returning to their country to engage in its reconstruction. Dr Hill also established links with the National University of Timor Loro Sa’e, UNTIL, and it is hoped to teach some joint courses and to assist Timorese Non-governmental organizations with action-research projects.

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A two-stage research project to investigate intergenerational attitudes to the ageing process is being conducted by studying interactions between school-age children and adults. The project measured children’s perceptions of ageing and combined that information with the views of their teachers and older people working with them. One result of the project is the development of sustainable curriculum initiatives to strengthen intergenerational relations. The study involved eight primary schools, two of which were control schools.

Pre- and post-tests were given to children in Grade 4 (N=288) using the survey instrument “Children’s Views on Aging” developed by authors Dr. Sally Newman and Dr. Ronald Marks (1980: Pittsburgh, USA). The pre-test was followed by an intervention and the children were then post-tested to determine if their attitudes toward older people or ageing had changed. Qualitative evaluations from the adults (55+) involved in the interventions (N=18) and the teachers (N=19). The curriculum initiatives were developed within a partnership program between Victoria University’s teacher training and one of the experimental schools.

Data analyses generated two main themes: first, children value their relationship with older people; and second, while they value this relationship, they have a negative view of the physical, social and emotional effects of ageing. The children’s attitudes toward older people and their own ageing selves were not altered by the intervention. The older adults and teachers felt the interventions had been beneficial to themselves and the children. The children valued older people, however they did not view the ageing process favourably. Teachers and older adults acknowledged the value of older people being involved in children’s learning activities.

Sustainability of this intergenerational initiative was found to be dependent upon a centralised infrastructure. This research was funded by grants both from the Department of Human Services Positive Ageing Unit, Victorian Health Promotion Foundation and two philanthropic organisations.

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Research from quite different directions converged in the form of two contrasting books about media globalisation which were published in the year 2000 by the same researcher at Victoria University. A fine evening in March saw the launch at Readings Bookshop in Carlton of Floating Lives: The Media and Asian Diasporas - Negotiating Cultural Identity Through Media, edited by Stuart Cunningham and John Sinclair, and published by the University of Queensland Press. This was the major outcome of research funded by an ARC Large Grant carried out by Professor Sinclair at Victoria University’s former Centre for Asia-Pacific Studies (CAPS) over 1996-1998, in conjunction with Professor Cunningham’s work at QUT, and that of other interstate collaborators. Co-researchers at CAPS were Professor Kee Pookong, Dr Josephine Fox and Dr Audrey Yue.

With its title inspired by Clara Law’s film, Floating Lives examines how some of Australia’s principal communities of Asian origin make use of media and communication technologies to adapt their way of living to the experience of diasporic migration, and in the process, to negotiate new hybrid identities and cultures for themselves. It provides a series of case studies about how flows of media relate to flows of people in a globalizing world.

Looking at the media habits of the various Asian-Australian communities studied (Chinese, Indian, Thai and Vietnamese) provides a lot of insight into their diversity and cosmopolitanism, as well as the complex motives, purposes and passions involved in their media use. The book tries to reflect all of this, and provides a new perspective on adaptation to displacement and settlement, one which questions conventional understandings of migranthood and culture. At the same time, it has interesting policy implications for government’s role in the provision of broadcasting services like SBS.

At Easter, the Barcelona publisher Gedisa brought out Television: Globalización y Regionalización in Spain. This was based on the series of lectures which John Sinclair had presented in courses for graduate students during his stay the previous year as UNESCO Visiting Professor of Communication at the Universidad Autónoma de Barcelona. The lectures, which he had given in Spanish, covered his research on the historical development of communications media and their internationalization, and showed how media and communication had become a force and an issue in international relations, globalization processes, and postmodern cultural identities. In particular, the book incorporates much of Professor Sinclair’s internationally acknowledged studies of the television industries of the Spanish-speaking world as a ‘geolinguistic region’ second only to that of English.

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Increasing economic liberalisation in China and moves away from a purely command economy have lead to some reappraisal of information requirements to service the new commercial environment. This has been hastened by the increasing likelihood of China’s admittance to the World Trade Organisation and the expected impact of this on the structure of the Chinese economy.

In this context, the Centre for Strategic Economic Studies (CSES) through its TradeData division, has been involved in a major capacity building program with the China State Information Centre (SIC), a division within one of the China “super departments”, the State Development Planning Commission.

The SIC houses vast data resources relating to most aspects of Chinese economic and demographic life. Its priority is to design information products and delivery systems to disseminate real economic intelligence from this mass of data to other government departments and to the broader commercial community.

The central focus of the joint CSES/SIC multi-phase program was to develop a prototype e-commerce information service for use in China and to provide an ongoing capacity within SIC for advanced data management and design of commercial database products. The program was based on TradeData trade information and existing range of products as case study material.

The outcome of the development project greatly exceeded expectations, producing five separate prototype products, rather than the single prototype planned. The project culminated in an agreement with SIC to pursue a joint venture to develop and market a suite of trade related information services in China.

Prototype products developed included a range of statistical leading indicators, designed to anticipate turning points in Chinese GDP, total exports, and exports in a range of major trade sectors. This involved intensive research of trend data for a much wider range of economic variables, both for China and for a number of its major trading partners and identification of those which showed the strongest relationship with trend movements in the selected Chinese economic activity.

In addition to the development of statistical indicators, the program’s development work provided the ability to create, and transmit via the Chinese Internet, customised files of trade data with a Chinese language interface. This, in turn, required the development of a sophisticated data retrieval system, and the creation of a separate, secure data server at TradeData (which could provide Chinese access to TradeData’s multiple country trade data sets via the Internet). It also required very extensive research and development work to convert the Chinese import and export data sets, providing a suitable base for development of further products.

This China Capacity Building Program was funded by AusAid.

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What issues face public sector managers in South Africa? What are the difficulties in managing the transformation and reconstruction of South Africa? How can emerging public sector managers from previously disadvantaged backgrounds be developed to move into more senior management roles?

Early in 2000 the Public Sector Research Unit at Victoria University, together with Technikon Pretoria, the University of Venda, University of Zimbabwe and the South African Management Development Institute embarked on a project to find answers to these questions. The aim of the project was to develop management and administrative skills for public managers so they could contribute to the social and economic development objectives of South Africa and Zimbabwe through a more effective and efficient approach to service delivery. The Australia-South Africa Institutional Links program, which supported the project, is part of the Australian Government’s overseas aid program through the Australian Agency for International Development (AusAid).

A needs analysis of middle level managers of central government departments of the Republic of South Africa was undertaken. This group was targeted because of their potential to influence future practices, in their departments, on policy and planning decisions. Further information and data was drawn from the findings of a study conducted by the Human Sciences Research Council, for the Department of Public Service and Administration, regarding the status of training within the public service in South Africa. The research served to identify the major issues facing the South African public service, and ways in which these policy issues had been addressed in other countries. Skills, knowledge and understanding of middle level public sector managers were evaluated to identify skill deficiencies that needed to be addressed by training and education. The needs analysis provided the focus on management fundamentals, and exposed the need for curriculum development in culture and change, public sector structures and systems, resource management, performance management, planning, customer care and personal effectiveness – all in the context of local requirements.

The findings from this and other investigations were incorporated within the eventual training programs. Course curriculum and materials were developed by a team of academic staff from Victoria University, Technikon Pretoria, the University of Venda and the University of Zimbabwe, as well as staff from the South African Management Development Institute.

The Public Sector Research Unit co-ordinates and manages this project. The funding for the program was approximately $150,000. Continuing research projects, extending from the initial program, relate to South African public sector reform directions, enhancing public sector service delivery in South Africa and further identification of training needs.

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Debate abounds in the corporate world about the trade-offs between ethical governance principles and shareholder returns. Some see the only responsibility of business as that of supplying goods and services to society at a profit for their shareholders. Others see business operating for the welfare of society as a whole and support the view that its social responsibilities encompass every aspect of business operations from the products companies make and the services they deliver to the relationships they have with employees, customers, suppliers and the communities in which they operate. External stakeholder groups who have stimulated concern for public issues such as human rights, sustainable development, health and safety, consumer concerns, the rights of animals and the environment, are also demanding that businesses meet their corporate social responsibilities.

Meeting such responsibilities demands communication with the stakeholders. All publicly listed companies are required to produce an Annual Report for their shareholders. In Australia, the Annual Report must contain financial information, corporate governance information and a company’s policy on the establishment and maintenance of appropriate ethical standards.

A study by a research team in the Business Ethics Research Unit evaluated how banks as businesses reported their social, cultural and environmental responsibilities as well as economic and financial responsibilities to their stakeholders. Annual Reports and other financial reports contain information on the social and environmental aspects of a business, the Triple Bottom Line (TBL), providing information that is of interest, not only to shareholders, but to other stakeholders. The research team examined Annual Reports using criteria such as human rights, employee rights, environmental reporting, community involvement and stakeholder rights, as a means of evaluating corporate responsibility.

Associate Professor Anona Armstrong, one of the researchers, said that “while Australian banks appear to acknowledge that they have these responsibilities, evidence of transparent and ethical reporting practices was scarce”. The study found that Regional banks were rated more highly than the big four, with Victoria’s Bendigo Bank – ranked first overall – providing a model for others to follow. Of the big four, ANZ bank topped the list, mainly due to its focus on employees and willingness to reveal both favourable and unfavourable benchmarks. Westpac was ahead of other banks in its initiatives to set up ethical investment funds, but was poor in reporting employee information. However, there was room for improvement in all the banks.

This study, funded by a Seeding Grant from Victoria University, aroused considerable public interest. The research team is extending the research by applying the criteria used in the first study to a sample of international banks with the objective of developing an international standard for best practice reporting.

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Chronic heart failure (CHF) is a life threatening condition in which the pumping capacity of the heart is severely impaired. A serious consequence for patients with this problem is that they have a dramatically reduced capacity to perform exercise and in some cases normal daily tasks. In the past it was believed that this diminished capacity for work was due to the reduced delivery of nutrients and oxygen to the muscles via the blood supply.

Patients with this disease have severe muscle wasting and their muscles fatigue easily. It is now recognised that their exercise intolerance is not explained by the reduced cardiac performance, but is due to impaired muscle function. Improving the strength and endurance of the muscles of CHF patients considerably improves their quality of life and chance of survival. The group is investigating the muscle abnormalities in CHF patients with research funding from the National Health & Medical Research Council.

Using a comparison with healthy controls their research has identified several major defects in muscle which contribute to the exercise intolerance in CHF. For example, capillaries, the small blood vessels which directly supply oxygen and nutrients to working muscles, are much less numerous around the muscle fibres in CHF patients. In addition the oxidative muscle fibres are smaller in the patient group and these are the fibres that are primarily involved in endurance activities. Finally the group has identified that CHF patients have a much higher proportion of highly fatigable muscle fibres. All of these abnormalities in the muscle will contribute to a reduced exercise capacity and the more rapid onset of fatigue which these patients experience in all activities. Regular exercise may help restore muscle strength and endurance and improve the patient’s quality of life.

Aerobic exercise has been tried in the past to assist CHF patients. This form of exercise improves muscle endurance but does not restore wasted muscle. Consequently the group is now researching the application of a modified resistance exercise training protocol which will lead to an improvement in muscle strength and reduce the susceptibility of muscles to early fatigue. The program employs hydraulic exercise equipment because the CHF patients easily tolerate this type of exercise. To date 45 CHF patients have completed this training program without any adverse outcomes. Significantly, however, in a small subset of these patients muscle samples were obtained before and after the training regime. Early indications are that this form of training has produced beneficial results. The capillary blood supply to the muscle fibres was shown to be markedly improved and there is an indication of an increase in muscle fibre size. In addition, muscle aerobic capacity, that is, endurance, is also improved by this form of training.

This research is to be presented at The American Heart Association conference in California in November.

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Physical Activity and Healthy Bone development in Children

The role that weight bearing physical activity plays in the healthy development of the skeleton has been the focus of a series of research studies conducted in the Centre for Rehabilitation, Exercise & Sport Science (CRESS). Professor John Carlson, Dr. Geraldine Naughton and Doctoral students Sandy Iuliano-Bums and Sara Mulkearns have been working in collaboration with colleagues from Melbourne and Deakin Universities conducting studies which have examined the effects of exercise and nutrition on the developing bones of young children. There is increasing research concerning the laying down of bone mineral during the growing years. Factors such as genetics, nutritional sufficiency, hormonal status, lifestyle factors (eg., smoking and alcohol), and mechanical loading through physical activity have been recognised as some of the potential determinants of bone development during childhood and adolescence. Weight bearing physical activity has been advocated to be a major means of promoting the development and maintenance of bone health. The encouragement of activity which may optimise the development of a dense skeleton in the growing years may have future beneficial ramifications in the incidence of Osteoporosis and cardiovascular health in adulthood. Although osteoporotic fractures manifest in old age, the potential for osteoporosis may have its origins in youth. Bone mass and subsequent fracture risk in the elderly results from the amount of bone accrued by skeletal maturity, and the rate of bone loss in later life. Commencing adulthood with more bone mass may mean that for a given rate of bone loss in later life, more time would be needed before bone mass would be reduced to the point where skeletal integrity may be compromised and fractures may ensue. Based on these research premises our research group have conducted a series of studies which have exposed young boys and girls at local primary schools to increased levels of weight bearing physical activity with a view to examining the effect on their bone development. The programs utilised weight bearing physical activity based on existing physical education curriculum. An underlying theme of all the programs was an inherent enjoyment and an educationally challenging nature of the activities. The exercise program included a variety of vigorous, high impact aerobic sessions including step and normal aerobics, ball games, modified sports, various forms of dance, circuits and weight training circuit unit. PhD Student Sandy Iuliano-Bums conducted a dietary intervention (calcium supplementation) which was also combined with high and low impact physical activity programs. The general results of all of these programs is indicating a positive but moderate effect of exercise and nutrition on healthy bone development in the young. Positive increases in bone health have been seen in the weight bearing measured sites and preliminary result of nutritional intervention suggests a positive interactive effect of exercise and nutritional supplementation. Work is continuing to determine the nature of the positive exercise and the mechanisms within the bone which are stimulated by weight bearing physical activity.
Female authority in sport was the subject of a recent PhD research thesis which examined sports philosophy from the perspective of feminist theory. 'Authority' is understood as the capacity to have your explanations of your actions and beliefs treated as credible by the community of which you aspire to be a part. The study therefore aimed to highlight the mechanisms for such authority that selected feminist theories offer women in the production of spaces in sport.

Firstly the study revealed the lack of dialogue that has taken place between feminist social theory and philosophy of sport, as a way of redressing this deficiency. The thesis explored feminist views of society, and endeavoured to use these views to gain an increased understanding of female participation and authority in sport. Conversely, the thesis also suggested that political/mainstream feminism has ignored the situation of the female athlete and their sporting body, as the practice of sport is one of the most overt sites of male dominance.

A second goal of the research was to extend feminist theories of sport. It seems that difference in performance, and hence authority, between male and female athletes is related to both different corporeal socialisation patterns and different bodily structures. Whilst there is much that feminists can purportedly do about the former, with regards to the latter the best that females can do is invent new sports. Why not invent new bodies? Poststructural and Foucauldian understandings of the body will be used to denaturalise female sporting bodies so that the sex and constituents of the body are not fixed. As an example, the drug laws were re-viewed from the position of the poststructural feminist, as an intervention that refuses the opportunity for women to change their bodies.

How a male-defined way of sport becomes legitimated as 'the' authoritative way of sport (both playing and commentating) involves questions of power, knowledge and domination, and the control of language and rational space. The third goal of the thesis was to move beyond deconstruction of existing sporting discourses to produce a different rational space so that opportunities for the authoritative female voice are increased. Not many women have enjoyed such opportunities in the past.

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PACKAGING, TRANSPORTATION AND STORAGE
A device, code named AVATAR, has been developed recently to measure, store and analyse the impact forces between glass bottles during mechanised handling operations such as filling lines. The project was undertaken by the Engineering Research and Consultancy Centre at Victoria University of Technology and Satellite Telemetry Pty. Ltd. with the sponsorship of ACI Glass Packaging. The device will be used to assist in optimising the design and manufacture of glass bottles, optimising the configuration and operation of the handling lines as well as packaging designs and configurations.

When products are handled or packaged in loose bulk much of the damage results from inter-product impacts during the handling, packaging and transport processes. When glass bottles, in particular, are handled in large numbers by mechanised systems the nature of impacts can be quite complex and cannot be reliably detected with the use of accelerometers, but require the direct measurement of impact force. Although the impact resistance of packages or products can be easily established, the handling processes cannot be optimised unless the environmental impact levels are accurately and reliably measured and analysed. Recent developments in modern sensor and electronics technology have been employed to develop the device, which should assist in minimising waste and improving packaging line productivity.

The device is a manifestation of any specific glass bottle and can be thought of as an electronic replica. Inside the sealed enclosure are a fully configurable miniaturised data acquisition system and a high-frequency response bi-axial piezoelectric impact force sensor. The first prototype was designed such that its geometrical and inertial properties match those of a typical mid-neck bottle. Of course, the enclosure can be manufactured to emulate any glass container type or size.

The force sensor is mounted on one of two impact rings, made of magnesium alloy and case-hardened steel. The two impact rings are located at the heel and shoulder levels of the bottle. The diameters of the impact rings are slightly larger than the nominal bottle diameter to ensure that all impacts are transferred to the bi-axial force sensor.

Once activated, the device is armed and waits for an event (impact) of sufficient amplitude to trigger the data converter. Once triggered, the converter samples data on both channels of the force sensor at the prescribed rate and for the prescribed duration. The system then immediately tests the validity of the measured pulse and rejects noise signals based on the characteristic pulse width. The magnitude of the resulting vector is directly computed and the indicator lights are energised accordingly. Depending on the logging mode, the CPU then stores the pulse amplitude or the pulse record and direction onto the memory together with a timestamp. The recorded data is downloaded by connecting the device to a PC via the infrared port. The analysis software is then used to compute the resulting impact levels, their basic statistical properties and display them graphically.

Initial field trials have confirmed that AVATAR, can reliably and accurately detect impacts between bottles on a mechanised handling line. Further development will be aimed at transferring the technology to different applications where non-intrusive environmental impact forces need to be recorded without interference.

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FIRE SAFETY AND RISK ENGINEERING

VICTORIA UNIVERSITY OF TECHNOLOGY RESEARCH REPORT 2000

6
CESARE’s Fire Risk Model the Most Advanced in the World

Research Team: Staff of the Centre for Environmental Safety and Risk Engineering, (CESARE); Centre Director, Professor Ian Thomas.

A number of substantial contributions to the practice of fire safety engineering have been made in support of the development of a core fire safety model. Examples include fire spread and growth modelling and human behaviour studies. In addition, research has been undertaken in the areas of analyses of fire statistics, flame spread and fire endurance calculations, large-scale fire behaviour and smoke detector performance and reliability.

One project completed by the CESARE team in 2000 was the development of a Fire Risk/Cost Model (known as CESARE-Risk), and its application to Occupancy Classes 2 through 4 of the Building Code of Australia-1996 (BCA). CESARE-Risk is used to characterise building fire safety performance in terms of the expected risk-to-life and the fire-cost expectation. It comprises a Risk Assessment Model and a number of Fire Safety System Sub-Models that are combined to estimate the effectiveness of building fire safety systems. The theoretical research is supported by investigative and experimental programs. Of particular note is the collection of data on occupant behaviour in fires based on an examination of coroner’s records, fire statistics (both areas that have been very poorly addressed in the past) and on real case histories. In addition, the results of large-scale experimental work, for use in the development and validation of fire models, have been important.

As part of The Second International Review of the Fire Code Reform Centre’s Project 4 CESARE-Risk was evaluated by an international Review Team. The Review Team determined that major changes leading to significant progress have been made in the development of the Fire Risk Model. The sensitivity analyses of Class 2-4 occupancy using the present version of the Fire Risk Model, yielded good correspondence with fire statistics and represented results of acceptable accuracy for assessing the effects of fire safety measures.

The Review Team concluded that the Project 4 research team has produced an impressive body of work at the leading edge of fire risk modelling, and that it is the most advanced risk/cost fire model in the world. The outputs now being produced specifically address the needs of the ABCB in assessing regulatory reform.

The result of the Project 4 work provides a regulatory tool for the Australian Building Codes Board (ABCB) to identify and evaluate possible cost-effective alternative Deemed To Satisfy (DTS) provisions for the BCA. These alternative designs provide equal or lower risk and equal or lower cost when compared with the DTS provisions for Class 2 - 4 Occupancies of the current BCA.

The development of CESARE-Risk has been supported by the Fire Code Reform Centre Ltd (FCRC) and an ARC Collaborative Grant.

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Holiday Business. Tourism in Australia since 1870, is a lavishly-produced volume published by Melbourne University Press in November 2000. Funded largely by an ARC Large Grant, it was co-authored by Associate Professor Jim Davidson, an historian in the Department of Asian and International Studies, and Professor Peter Spearritt of Monash University.

'The most interesting thing about tourism', says Jim Davidson, 'is that it reflects social trends more clearly than people imagine. In 1910, when Australia still largely thought of itself as another Britain under another sky, Tasmania was the most popular long-range tourist destination. Because it had cooler summers, was green, and even had one or two ruins, Tasmania functioned as a kind of substitute England.'

'On the other hand, it wasn’t until 1957 that Ayers Rock /Uluru attracted more than 100 people. It was difficult to get to, of course, but even when the numbers began to increase people were more attracted to it as a natural wonder rather than anything else. It wasn’t till the 1970s that Aboriginality became trendy and some tourists began to respond to the place’s spiritual significance'.

He also points out how quickly tourism picks up on the latest trends. Hotels often pioneer features which don’t get into houses for a decade or two – whether it be electricity or en-suite bathrooms. But because it is so much a developmentalist industry, tourism runs the risk of gagging on its own hype. If a place becomes too crowded, then many people will start looking somewhere else. Moreover, apart from fashions changing, there can always be the interventions like the airline pilots’ strike of 1989, which isolated North Queensland, or the Asian financial crisis of the mid-1990s, which reduced Australian tourist numbers. So while tourism is now a steady earner for Australia, there is much about the industry which is, and will remain, volatile.

Also in November 2000, Associate Professor Jim Davidson was awarded another ARC Large Grant for 2001-3. This is for a biography, following his prizewinning Lyrebird Rising: Louise Hanson-Dyer of Oiseau-Lyre (1994) of the historian W.K. Hancock. Although less well-known now than he was a generation ago, Hancock is considered by a good many to be Australia’s finest historian. (He remains the one with the greatest international reputation.) The project will involve considerable work in South Africa and England as well as Australia.

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Major Skills Shortage in Electrical and Associated Industry
Research Team: Dr Jamie Doughney, Professor David Worland and Cheryl Wragg of Victoria University, and Jenny Howes of Access Training and Employment Centre.

Victoria is experiencing a major shortage of electrical tradespersons, slipping further behind the national ratio of electrical apprentices to tradespersons. This finding has come to light in a report produced by the Workplace Studies Centre. The report, “Apprentices and Ongoing Training Needs in the Electrical and Allied Industries”, was commissioned jointly by the Electrical Trades Union and the employer organisation, the National Electrical and Communications Association. According to the study, an additional 700-750 apprentices are needed each year to repair the decline in training of apprentices in the 1990s. The research attributes effects of corporatisation and privatisation of government enterprises, such as rail and power, as the main determinant of the drop in training of electrical apprentices.

Based on comprehensive interviews with employers, apprentices and training experts, the report found that smaller employers are continuing to employ and train apprentices, while some larger private and public entities, including Local, State and Federal governments, have significantly reduced their participation in apprenticeship training in Victoria. The study also revealed that labour hire companies are not participating adequately in apprenticeship training. The number of female electrical apprentices has significantly declined since 1991, and there has been little improvement in the employment of people from Aboriginal and Torres Strait Islander backgrounds.

Although many young people still valued a trade qualification as a career choice, the research found that there was a shortage of trade teachers amongst Registered Training Organisations. In addition, the quality of apprenticeship training may also be declining. One in five apprentices surveyed indicated disappointment and dissatisfaction with their apprenticeship. Issues identified included inadequate time and opportunity to practice skills at work, employer’s preference to use qualified electricians, and the perception of being used as cheap labour.

The report made a number of recommendations to the State government that included the establishing of a range of incentives for employers to take on new apprentices, and a targeted ratio of one apprentice to every three electricians employed across the electrical and associated industries. Other recommendations included the implementation of additional programs designed to increase and retain women and other marginalised groups in apprenticeship training; improved counselling, apprenticeship marketing and individual training plans for every apprentice; and improved links between workplace trade trainers and registered training organisations. The report also recommended a major evaluation of the resources, professional development opportunities and employment status of trade teachers, to ensure their retention and on-going employment, and an injection of additional resources to the VET system to co-ordinate and monitor the quality of electrical apprenticeship training.

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Wireless LANs provide high data rate connectivity and true mobility for users of laptop computers and personal digital assistant (PDA) anywhere, anytime. The effective use of such devices places stringent requirements on power consumption and increased battery life. Most of the terminal electronics needs to be combined on a single chip to cut manufacturing costs, increase the level of miniaturisation, improve hardware performance and reduce power drain.

With this goal in mind, a collaborative Mobile Radio Consortium was established, consisting of three Swedish universities (Royal Institute of Technology, Lund and Linkoping Universities) and the Telecommunications and Microelectronics (tµe) Centre at Victoria University. These research groups were involved in the design and implementation of various parts of an Orthogonal Frequency Division Multiplex (OFDM) transceiver as shown in the diagram below. The tµe Centre was involved in three of the thirteen PhD research projects as highlighted in the diagram. Students were required to research and implement various circuit blocks and then combine them on a single chip. Victoria University students were, therefore, required to spend time in Sweden to get their chip implemented as part of the collaboration amongst the research groups. The three projects undertaken by the centre were:

The IQ Correction Circuit was the first of three projects. Lack of exact balance between the I and Q arms of the modulator / demodulator cause problems, in particular, gain errors, phase errors and carrier leakage cause loss of image suppression and dc offsets can jam the incoming signal. The research involved DSP, analog and fuzzy techniques to correct these errors.

The second project was the study of the Diversity Circuit. Space diversity is being considered for future wireless terminals requiring high data rates. It involves multiple antennas on one unit. This is feasible for today’s laptop computers and PDAs.

The Peak-to-Average Power Circuit comprises the third project. Reducing the peak transmission power from a mobile terminal is an important requirement of future mobile systems (third generation and beyond). High peak power must be avoided because they reduce talk time and increase the cost of the radio frequency components. The research aims to reduce the envelope of the transmit signal without increasing the Bit Error Rate.

The work so far has resulted in one provisional patent. Ericsson Sweden and Ericsson Australia supported this project.

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MEDICAL BIOTECHNOLOGY
A survey of the scientific literature concerned with skeletal muscle indicates that cell physiologists were the first to respond to the challenge posed by the structural and functional complexity of the muscle tissue by developing single muscle fibre preparations and designing/refining methods for determining functional parameters in such preparations. In contrast, muscle biochemists, who until recently have concentrated their efforts towards the purification and analysis of muscle proteins, maintained largely a ‘whole muscle’ approach in their studies. This has lead to a significant cognitive gap in the field of muscle research.

Since its beginnings in May 1995, the Muscle Cell Biochemistry Laboratory has aimed at reducing the aforementioned gap by developing microanalytical methods, to be used with single muscle fibre preparations, that enable myologists to broaden the range of issues related to the function and dysfunction of skeletal muscle that can be explored in the research laboratory. For example, one of the current projects carried out in the lab, which involves several members of the group and is supported by a large NHMRC grant, addresses a number of novel questions regarding the role of glycogen (the main form of carbohydrate storage in the muscle cell) and of phosphorylated sugars in muscle contractility and the cellular mechanisms underlying these roles. The knowledge produced by this project will generate valuable insights into complex physiological (e.g. muscle fatigue, aging) and pathological (e.g. diabetes) conditions associated with glycogen depletion or sugar excess.

At present, the research team, led by Associate Professor Gabriela Stephenson, comprises two postdoctoral fellows, three PhD students, one Honours student and one research assistant. The Muscle Cell Biochemistry Laboratory at Victoria University has collaborative links with Australian and overseas muscle researchers and is funded primarily by external bodies, National Health and Medical Research Council, Australian Research Council and Clive & Vera Ramaciotti Foundations. Small seeding grants for this work have been obtained also from Victoria University.

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Oxytocin and Reproduction in Sheep and Humans: A New Role for an Old Hormone

Research Team: Professor Bob Fairclough, A/Professor Mrinal Bhave and Dr Sarah Fraser of the School of Life Sciences and external members: A/Professor Graham Jenkin and Dr Ross Young from Monash University and Dr Jeff Downing from CSIRO. Several PhD students have also been involved in this study including Tseng Lau, Susan Meier, Cheryl Cann, Hisham Al-Matushi and Helen Feng.

Disorders of the menstrual cycle, including menstrual cramps, amenorrhea and endometriosis, are a major health problem in women. However the underlying causes are still not completely understood. To investigate these underlying causes a major research project has been undertaken at the Victorian Department of Agriculture, Victoria University and Monash University using sheep as the experimental model. This work over the last 10 years has provided important new information on the hormonal control of the oestrous cycle in sheep.

One of the important early findings of the group was the serendipity discovery that oxytocin was released as a series of spikes into the bloodstream over the time which coincided with the regression of the corpus luteum within the ovary. It has been shown that oxytocin can bind to specific oxytocin receptors in the uterus which in turn leads to the release of prostaglandins from the uterus. Prostaglandins are responsible for the regression of the corpus luteum during the latter stages of oestrous cycle in sheep and in the menstrual cycle in women and are thought to be one of the causes of menstrual cramps. Further work from overseas laboratories revealed that the source of oxytocin was the ovary, which was a very surprising finding as it was previously thought that oxytocin was secreted by the pituitary gland to stimulate uterine contractions at labour and milk let down at the time of suckling. The researchers at Victoria University then showed that the specific oxytocin receptors in the uterus were regulated by the steroid hormones, estrogen and progesterone. Further work indicated that high levels of estrogen in the blood initially inhibited uterine oxytocin receptor levels and then acted as a stimulus. On the other hand, high levels of progesterone were found to initially suppress the uterine oxytocin receptor levels but after around 10 days of exposure to high progesterone levels this ability to inhibit was lost.

In another study it was shown that oxytocin and Rab, a molecule associated with the packaging of oxytocin, were co-located in secretory granules in the corpus luteum of the ovary and that these secretory granules contained differing levels of oxytocin during the oestrous cycle. The study indicated that the levels of oxytocin in these densely staining granules increased from low levels early in the oestrous cycle to a maximum during mid cycle and then declined sharply over the time of luteral regression at the end of the cycle. More recently it was shown by the group at Victoria University that oxytocin receptors in the uterus are synthesized by three genes and were able to determine the DNA sequence of some of these genes. The work described in this project has been very successful with over 21 papers published in international recognized journals over the last 10 years.

These results have provided important new information on the role of oxytocin in the hormonal control of the oestrous cycle in sheep, and are also providing important clues on the roles played by prostaglandins and oxytocin in the disorders of the menstrual cycle in women. The studies were supported by the Australian Wool Corporation ($266,000), the Australian Meat and Livestock Corporation ($485,000) and the Australian Research Council ($161,000).

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The Austin Research Institute (ARI) undertakes research in four main areas of immunity and biotechnology: Cancer - diagnosis and therapy; Transplantation - engineering animal organs and the development of new anti-rejection therapies; Inflammation/Autoimmune diseases - the development of new drugs; Infectious Diseases – new vaccine strategies.

Through the ARI's affiliation and collaboration with Victoria University the Bio-organic and Medicinal Chemistry Laboratory at the ARI is focussing on the application of organic chemistry in new approaches to the development of novel drugs and vaccines to treat disease.

The revolution in biotechnology has been accompanied by a revolution in organic chemistry that has brought together computing power for the rational design of drugs and new organic chemical entities that have made the development of new drugs possible at a rate, and of a type, not previously imagined. The ARI has a long standing interest in combining biology and chemistry and has previously reported its success in developing magic bullets in the treatment of cancer and chemical modifications for the targeting to and the selective stimulation of specialised immune cells that leads to the successful eradication of cancer in animals and which is presently in clinical trials.

1) Drugs for the treatment of inflammation
The laboratory is using new approaches to develop drugs for the treatment of inflammation caused by antibodies in autoimmune diseases such as rheumatoid arthritis, lupus and also in allergies. Dr Geoffrey Pietersz and Dr Gerard Moloney together with colleagues at Victoria University have designed over 80 new compounds for the treatment of inflammation.

These compounds have been designed on the basis of the three dimensional structure of human Fc receptors which are major triggers of inflammation in several autoimmune diseases. The 3D structure has revealed several ideal sites including a groove in the binding site, for the design of possible receptor antagonists. Using computational and other methods compounds have been designed to fit the shape and chemistry of the groove and the other sites. Working with the Helen M Schutt Trust Inflammatory Disease Laboratory at the ARI, several compounds have been tested and have shown surprisingly good activity, and indeed can prevent FcR activation of cells.

2) Developing a vaccine for breast cancer
This laboratory is also involved in the development of novel therapeutic and diagnostic approaches for cancer. With this in mind we have developed cell membrane permeable synthetic peptides which can penetrate specialised cells in the bodies immune system and present them to the immune system to trigger strong immune responses. Using a model system in mice we can show that these peptides can protect mice from tumours. We are now utilising membrane permeable peptides that are specific for breast cancer and investigating their activity in mice.

Previously we developed a breast cancer vaccine that is currently in clinical trial. From information about the mechanism of action of the latter vaccine we are trying to mimic this with more chemically well designed analogs of this vaccine using chemical synthesis.

In the area of "magic bullets" where potent drugs are targeted selectively to cancers using antibodies we are investigating a drug named Irenotecan. This drug is currently used in bowel cancer and we hope its activity could be further increased conjugating to antitumour antibodies without any side effects.

Medical research is a long-term quest for answers to problems that affect the health and well being of the human race. The National Health and Medical Research Council lend financial assistance to our research, however it is the non-government support from community-spirited individuals, corporations, service clubs, philanthropic trusts and foundations all of whom have a vital interest in medical research that provide a substantial portion of the ARI’s research funding.

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It has been stated that in the not too distant future we may be able to communicate verbally with our computer or, to take another example, simply to give a verbal instruction to our heating system to turn itself on at a certain time of the evening before we arrive home from a hard day at the office. Hence on the subject of speech analysis there have been many studies dealing with automatic speaker recognition. While it may not be important who gives the instruction to your heating system to turn itself on, in other cases verifying a person's verbal identity prior to admission to a secure facility or to a delicate transaction of national importance over the telephone may be vital.

Many models, based on some measures of speaker variability, have been developed to deal with automatic speaker recognition. One of the most popular models, often used in text-independent speaker identification, is the Gaussian Mixture Model (G.M.M.). This technique involves first a speech analysis process whose role is to extract from the initial input speech signal a set of feature vectors, which reflect a person’s vocal tract structure. These vectors are used in a second step, during the training phase to evaluate a particular model, characterizing each speaker. Generally, each individual Gaussian component is interpreted to represent some broad acoustic classes.

Because the whole utterance is used during the training and identification process, it is difficult to identify which set of acoustic classes representing some broad phonetic events, such as vowels, nasals or fricatives, contribute or do not contribute to identify a speaker. Since speaker recognition, especially in text-independent cases, depends primarily on accurate model estimation, special attention must be directed toward efficient modeling of each speaker. There exist various divergence measures, including Jensen’s, Kullback-Leibler, Csiszár and others automatically to extract from the input speech signal the part that best contributes to identify a speaker.

In any mathematical procedure of numerical type there are bound to be errors in the calculation of these various divergence measures. Prof. Dragomir and his team have begun exciting new research, which endeavours to evaluate and predict the relative error estimates between these various divergence measures. In turn knowing, a priori, which divergence measure has less error associated with it will help to identify, with more certainty, which part of the speech signal best contributes to identify a particular speaker. The project is entitled p-Logarithmic and Power Divergence Measures in Information Theory and their relationships with some particular instances of Csiszár – Divergence.

Divergence measures are equally important in other fields of science such as anthropology, genetics and biology. In cardiovascular systems, for example, divergence measures are important in identifying which particular crucial features are associated with physiological states such as exercise, wakefulness and sleep.

A prediction or knowledge of different physiological states may have an enormous impact on preventative medicine and the well being of a person.

Funding was from an ARC Small Grant for one year of $18,292.

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Resurrection ecology is the name of a new branch of ecology that combines palaeontology, ecology, and molecular biology, to analyse the evolution of populations over long periods of time. Daphnia are small planktonic crustaceans that live in lakes, reservoirs, ponds and farm dams. They normally produce live offspring, but when stressed, produce long-lived resting eggs that remain quiescent until better environmental conditions prevail. These resting eggs, called ephippia, normally hatch the following season, but many are buried in the sediments and never receive suitable hatching signals. Over time the eggs become buried deeper in the sediments as new material is added from above. These eggs form the resting egg bank. The resting egg bank is akin to a library that records changes in the genetic history of a population over time. This is a very powerful tool which can be used to reconstruct evolutionary changes in a population in relation to anthropogenic and natural environmental impacts.

We have studied the resting egg bank at Main Lake Tower Hill, a Maar lake near Warrnambool in Western Victoria. With financial support from a small ARC grant, we collected cores from the lake in April 2000 and returned them to the laboratory for analysis. The resting eggs of Daphnia were isolated from the cores and induced to hatch. We successfully hatched eggs that were up to 50 years old. The genetic make-up of these animals was determined using cellulose acetate electrophoresis, and their tolerance to increasing salinity levels was also measured. We also wanted to know what the water conditions were like at the time these eggs were produced. Dr John Tibby, of the Centre for Palynology and Palaeoecology at Monash University used the remains of diatoms found in the cores to estimate changes in the salinity of the lake over time. Diatoms are a group algae with silaceous skeletons. There are many different species of diatom, each with its own salinity optima. By relating the range of species present in each slice to their optima, he can infer the salinity of the lake at a particular depth in the core. Samples of the cores were also sent to ANSTO (Australian Nuclear Scientific and Technological Organisation) to determine the age of the sediments using lead-210 dating.

We were able to demonstrate that the salinity of the Main Lake at Tower Hill has increased significantly in recent years and that the Daphnia population have evolved to cope with increasing salt concentrations. The genetic analysis suggested that this was through elimination of genotypes that were not able to deal with increasing salinity stress.

This study has demonstrated an important new technique for measuring the long-term impact of environmental change of animal populations. In the future we plan to use molecular genetic techniques to analyse older eggs which have lost their ability to hatch.
Research Awards 2000

The principal University Research Awards are the Vice-Chancellor’s Medals for Excellence in Research. Each year one medal is awarded to a staff member and one to a research degree graduate. To assist in furthering the work of the recipient, a cheque of $5,000 accompanies the medal. In addition, eight Citations for Excellence can be awarded, two for each faculty for their pre-eminent staff and research degree graduate members. A $1,000 cheque accompanies each Citation.

Vice-Chancellor’s Medal for Excellence in Research

1. Research Staff Category:
   Associate Professor Mike Xie,
   Winner of the Research Staff Medal and Citation Awardee for the Faculty of Engineering and Science
   Research in the area of structural optimisation.
   School of the Built Environment

2. Research Degree Graduate Category:
   Dr Donald Feaver,
   Winner of the Postgraduate Research Degree Medal and Citation Awardee for the Faculty of Business and Law

Professor Ronayne and Professor Beck congratulate Associate Professor Mike Xie and Dr Donald Feaver on receiving the Vice-Chancellor’s Medal for Excellence in Research

Citations

1. Category for Research Staff:
   Associate Professor Mike Xie, Winner of the Vice-Chancellor’s Medal, Faculty of Engineering and Science
   Associate Professor Dorothy Bruck, Faculty of Arts
   Associate Professor Louise Kloot, Faculty of Business and Law

2. Category for Research Degree Graduates:
   Dr Donald Feaver, Winner of the Vice-Chancellor’s Medal, Faculty of Business and Law
   Supervisor: Professor Ken Wilson through the School of Applied Economics in the Faculty of Business and Law

Dr Robert Salter, Faculty of Arts
   Supervisor: Associate Professor Michael Hamel-Green through the Department of Social Inquiry and Community Studies in the Faculty of Arts
   Thesis Title: “Swaraj and Sweepers: The J P Movement and the Future of Transformational Politics”

Mr Trevor Patrick, Faculty of Human Development
   Supervisor: Dr Mark Minchin, through the School of Human Movement, Recreation and Performance in the Faculty of Human Development.

Dr Paul Clancy, Faculty of Engineering and Science
   Supervisor: Professor Vaughan Beck through the Centre for Environmental Safety and Risk Engineering.
   Thesis Title: “Time and Probability of Failure of Timber Framed Walls in Fire”

Certificates for Success in Attracting Significant New Grants or Other Research Income in 2000

Dr Fu-Chun Zheng, School of Communications and Informatics
   Project Title: Implementation of Smart Antenna Technology in Wideband CDMA Cellular Network
   Funds Source: Telstra
   Funding: $120,000 over two years

Dr Stephen Collins, Dr Greg Baxter and Associate Professor Peter Farrell, School of Communications and Informatics
   Project Title: Temperature and Strain Measurement using Fluorescence from Rare-earth-doped Optical Fibres
   Funds Source: Australian Research Council (ARC) Large Grant
   Funding: $186,920 over three years

Associate Professor Jim Davidson,
   Department of Asian and International Studies
   Project Title: The Life and Work of the Historian WK Hancock (1898-1988)
   Funds Source: Australian Research Council (ARC) Large Grant
   Funding: $101,000 over three years
Associate Professor Kees Sonneveld, 
Centre for Packaging, Transportation and Storage 
Project Title: Life Cycle Assessment of Polystyrene Packaging System 
Funds Source: Polystyrene Australia Pty Ltd 
Funding: $142,000 for one year

Ms Santina Bertone, Workplace Studies Centre 
Project Title: How Important are Change Agents? Studying the Take-up of Productive Diversity Policies in Business and Industry 
Funds Source: Australian Research Council (ARC) Strategic Partnerships with Industry - Research and Training (SPIRT) Grant 
Funding: $82,860 over two years 
Industry Partners: Department of Employment, Education and Training (Victoria), National Australia Bank, City of Maribyrnong, Access Training and Employment Centre (ATEC)

Project Title: Productive Diversity: What Kinds of Businesses are Active and Why? 
Funds Source: Australian Research Council (ARC) Strategic Partnerships with Industry - Research and Training (SPIRT) Grant 
Funding: $44,584 over two years 
Industry Partners: Mobil Oil Australia, Australian Multicultural Foundation

Ms Elsa Underhill, Workplace Studies Centre 
Project Title: Review of the Effectiveness of OHS Management Systems in Securing Healthy and Safe Workplaces 
Funding: $28,400 for one year 
Industry Partner: National Occupational Health and Safety Commission

Dr Paul Chambers and Dr Grant Stanley, 
School of Life Sciences and Technology 
Project Title: Improving Brewing Yeast Resilience and Productive Life: Analysis and Management of the Yeast Molecular Response to Brewing Stress 
Funds Source: Australian Research Council (ARC) Strategic Partnerships with Industry - Research and Training (SPIRT) Grant 
Funding: $66,876 over three years 
Industry Partner: Carlton & United Breweries Ltd

Associate Professor Nagendra Shah, 
School of Life Sciences and Technology 
Project Title: Improving Functional Characteristics of Low Fat Mozzarella Cheeses by using Fat Replacers and Proteolytic and Capsular Starter Culture Systems 
Funds Source: Australian Research Council (ARC) Strategic Partnerships with Industry - Research and Training (SPIRT) Grant 
Funding: $66,876 over three years 
Industry Partner: Dairy Farmers

Professor Helen Baker, School of Nursing 
Project Title: Development of Best Practice Guidelines for Nurses’ Rational Use of Benzodiazepines in Australian Aged Care Facilities 
Funds Source: Department of Health and Aged Care 
Funding: $20,000 for one year

Dr Suku Bhaskaran, Australian Food Marketing Centre 
Project Title: Licensing Arrangement - M3 Pty Ltd Project 
Funds Source: M3 Pty Ltd 
Funding: $480,000 over three years 
Project Title: Outcomes and Market Development Strategies, Processed Asian Food Projects 
Funds Source: Rural Industries Research and Development Corporation (RIRDC) 
Funding: $43,020 over one year and a half

Associate Professor Graham Thorpe, 
School of the Built Environment 
Project Title: An Innovative Grain Conditioning and Integrated Silo System 
Funds Source: Australian Research Council (ARC) Strategic Partnerships with Industry - Research and Training (SPIRT) Grant 
Funding: $90,000 for one year 
Industry Partners: A F Gason Pty Ltd, Lindsay F Nelson Manufacturing Pty Ltd

Project Title: The Commercialisation of a Novel Solar-assisted Grain Conditioning System 
Funds Source: Australian Greenhouse Office 
Funding: $60,000 over three years 
Industry Partners: Lindsay F Nelson Manufacturing Pty Ltd, A F Gason Pty Ltd

Associate Professor Lily Stojarovska, Ms Suzy Honisett, School of Life Sciences and Technology and Faculty of Engineering and Science and Associate Professor Paul Komesoroff (Baker Research Institute) 
Project Title: The Effects of Troglitazone and Hormonal Therapy on Cardiovascular Risk Factors, Bone Parameters and Glucose Metabolism in Postmenopausal Women with Type 2 Diabetes Mellitus 
Funds Source: Australian Menopause Society 
Funding: $20,000 for one year

Ms Susan Feldman and Dr Anne Binkley, 
Alma Unit for Research on Ageing, Faculty of Human Development 
Project Title: Australian Component of Bloomington, USA, Ageing Well Study 
Funds Source: Perpetual Trustees 
Funding: $42,000 for one year
The University focuses its research activities, and strives for research excellence, in a number of areas where the University’s research strengths match the needs and interests of existing and potential external stakeholders. These areas, defined as strategic research areas, have been further refined to represent those programs associated with current University Research Centres, Faculty Centres, Key Research Areas (KRAs) and other major collaborations with Cooperative Research Centres (CRCs) and the Austin Research Institute.

Research contacts in the Strategic Research Areas are:

**Food Value Chain, Bioprocessing and Food Technology**  
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**Social Diversity and Community Wellbeing**  
KRA - Social Diversity and Community Wellbeing  
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**Europe Australia Institute**  
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**Asia Australia Pacific Institute**  
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**Institute for Youth, Education and Community**  
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**Alma Unit for Research on Ageing (AURA)**  
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**Strategic Economic Studies**  
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**Rehabilitation, Exercise and Sports Science**  
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**Packaging, Transportation and Storage**  
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CRC - International Food Manufacture and Packaging Science  
Contact Person: Associate Professor Kees Sonneveld

**Fire Safety and Risk Engineering**  
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**Telecommunications**  
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**Medical Biotechnology**  
Austin Research Institute  
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Dairy Farmers
National Occupational Health and Safety Commission
Mobil Oil Australia
Australian Multicultural Foundation
Department of Employment, Education and Training (Victoria)
National Australia Bank
City of Maribyrnong
Access Training and Employment Centre (ATEC)
Polystyrene Australia Pty Ltd
Telstra
The Brotherhood of St Lawrence
Department of Natural Resources and Environment
Australian Council for the Arts
Committee for Economic Development of Australia
Department of Immigration and Multicultural Affairs
Electrical Trades Union of Australia (Victorian Branch)
The National Electrical Contractors Association (Victoria)
City of Maribyrnong
Department of State & Regional Affairs (Victoria)
Huile Trading Co
Menwan's Confectioners and Bakers Pty Ltd
Newman's Chocolates
Department of State and Regional Development (Victoria)
Rural Industry Research and Development Corporation
AusIndustry
Ericsson Australia
Meat and Livestock Australia
Polychip Pharmaceuticals
Grains Research and Development Corporation
Environment Australia
Department of Education, Training and Youth Affairs
Australian Research Council
Department of Human Services
Western Region
Brimbank City Council
Hobsons Bay City Council
The City of Melbourne Council
City of Moonee Valley
Wyndham City Council
Catholic Education Office in Victoria
The Sydney Myer Foundation
VicHealth

Besen Family Foundation
Gandel Charitable Trust
The Australian and New Zealand Fund for Osteopathic Research
Cowbel International Inc.
Australian Cystic Fibrosis Research Trust
Vision Systems
Fire Code Reform Centre Ltd
BHP Australia
AusAid
Strategic Industry Research Foundation
Australian Vice-Chancellors Committee
IDP Education Australia
Business Victoria
Department of Industry Science Resources
Delft University of Technology
Henderson Foundation
Dried Fruits Research & Development Council
Building Control Commission
Carlton and United Breweries
Primary Industries and Resources (South Australia)
National Health and Medical Research Council
Australian National Training Authority
EcoRecycle Victoria