MASSEY RESEARCH

How to give
Organisational psychology and aid work

Staying cool
The science of refrigeration

Shift worker
Translocating species

Research, Scholarship and Creativity

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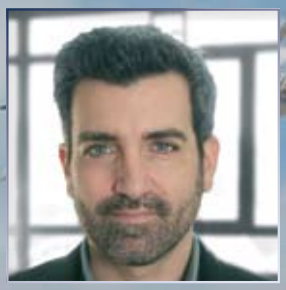











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Plus: Markets and human behaviour • Children and reading • Rereading the Victorians

Massey University

Thinking globally

AS17-148-22727 is its official designation, but most people know it as the blue marble. Taken on December 7 1972 by the astronauts on Apollo 17, the photograph has become an icon of the environmental movement and a part of our shared consciousness. There is our home, the planet Earth, revealed for what it is: small, fragile, precious and infinitely lonely. The blue marble redefined our sense of scale.

Go forward some 30-odd years, and I think you can say that a similarly epochal moment occurred with the release of Google Earth and other like applications. Now anyone with a home computer and a fast connection can traverse the surface of the planet, zooming in to identify their country, their region, their neighbourhood, their street, their very house.

What does this mean? Well, for Massey researcher Dr Phil Battley, who is tracking the flight of the godwit using radio transmitters, it means he can follow the paths of individual birds as they depart the beaches of New Zealand, fly across the expanses of the Pacific, take time out in the estuaries of Korea, and continue on to Alaska.

Google Earth also shows us man's impact: land reclamation diminishing the Korean estuaries favoured by godwits; climate change melting the ice of the Arctic; irrigation robbing the Aral Sea of its waters.

Google Earth makes the predicaments that can seem abstract inescapably real and insistent. Like the 'blue marble' before it, it is a goad for us to confront problems that are global in scale – and not just those we can see when we use it as a tool. Take peak oil, climate change, the loss of biodiversity or global poverty. These issues confront us all, and the world's universities are a part of a global enterprise explicating where the failures lie and exploring what can be done.

So what is Massey doing? In approaching the twin issues of peak oil and climate change, the University is hosting a range of initiatives. Massey researchers are working on battery technologies, on solar cells powered by cheaply-produced organic pigments, on ways of catalysing the production of hydrogen from water, and on turning biowastes into methane fuel. Professor Ralph Sims, one of New Zealand's most eminent alternative fuel researchers, is currently seconded to work with the International Energy Agency in Paris.

Addressing some of the issues surrounding biodiversity, Associate Professor Doug Armstrong is developing mathematical models that can be used to determine the factors that will decide whether a species survives or perishes within a given landscape.

Then there is the issue of poverty. In 2004, 980 million people worldwide lived on less than $US1 a day, a statistic that should be a reproach to us all. More aid for those countries whose populations are trapped in poverty is surely part of the answer, and the G8's 2005 commitment to double its aid to Africa by 2010 is very welcome, but the aid also has to be delivered in ways that ensure it will be used effectively – and history shows that this has not always been the case.

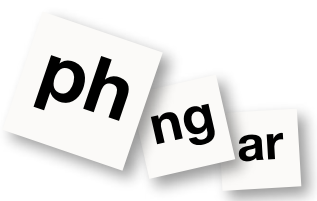
The mechanics of why aid does or does not work have most often been seen as the province of economists or geographers. Yet the effectiveness of aid is also very largely determined by all those personal transactions that take place every day between aid workers and those they are working with.

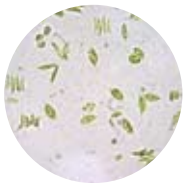
In this issue you will meet organisational psychologist Professor Stuart Carr, who is looking at the implications of what he calls the "elephant in the room", the pay disparities between expatriate aid workers and the host-country workers who toil alongside them. He is funded by two British organisations. His collaborators are based around the world, communicating by phone and e-mail.

The world has become a small place indeed.

Judith Kinnear
Vice-Chancellor

A photo taken by the crew of Apollo 17 on their way to the Moon. Antarctica, Africa, the Arabian Peninsula, Madagascar, and part of Asia are visible.





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Growing the economy

The statement in the OECD's review of New Zealand's innovation policy published in September of this year is carefully worded: "expectations surrounding New Zealand's economic development have so far not been fully met". It might as well have been the schoolmaster's fudge, "has potential, could do better".

To some, the assertion may seem curious. For hasn't New Zealand enjoyed a decade of sustained economic growth? It has, but then comes the follow-up question: where has that growth has come from?

The growth in per-capita gross domestic product can be attributed to two factors: greater labour utilisation – the hours we work – and increases in labour productivity – how much we produce per hour worked.

Largely the gains we have realised so far have come from working longer. Now, with a tight labour market, we need to work smarter, tailoring what we do to our circumstances.

New Zealand, the OECD report points out, has some economic strikes against it. Our small domestic economy does not lend itself to economies of scale. Our business sector spends only about a third of the OECD average on research and development. Our geographical isolation removes us from both the markets and global knowledge centres on which we rely.

But we have many countervailing strengths. One is that we are an extremely efficient agricultural producer. Partly this is because of accidents of geography and climate; partly because we have come to be good at what we do – our farmers and producers have proven themselves to be nimble innovators, and they have been ably assisted by our universities and Crown Research Institutes.

In the future our strength in agriculture should stand us in good stead. As populous developing nations become prosperous, the world appetite for meat and dairy products is likely to grow apace (witness what has happened with dairy pay-outs), and even as this is happening large tracts of land once given over to producing food are now being used to grow crops such as corn for biofuels.

And if you talk to professors Paul Moughan and Harjinder Singh of the Riddet Centre for fundamental food research, you will find them upbeat about the possibilities of playing to New Zealand's strengths as a food producer and exporter. Take functional foods, an area in which the centre is actively working. Foods scientifically tailored to provide particular benefits represent a market estimated at $45 billion annually and growing by 10 per cent a year. The potential, they say, is nearly unbounded.

I think the OECD team would regard the centre as a showpiece for what is possible. Here is a research enterprise that brings together an array of public and private sector partners and has already created a major commercial spin-off – a venture that is commercialising a method for encapsulating heart-friendly – but sometimes dismayingly fishy-tasting – Omega-3 oils in such a way that they can be incorporated in foods in high concentrations without being apparent to the consumer.

Recently the Riddet Centre was awarded the status of being a national Centre of Research Excellence and given an additional $24 million in funding over six years.

Similarly, I am sure the $17 million state-of-the-art Hopkirk Research Institute, a collaborative venture between AgResearch and Massey University which is pursuing animal health research, and the Manawatu Microscopy and Imaging Centre, which among its partners has the Hopkirk Institute, four Crown Research Institutes and two commercial enterprises, would win plaudits.

These are well-planned collaborative ventures which are making every scarce research dollar count to New Zealand's advantage.

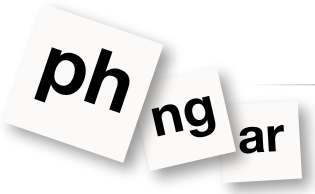
Nigel Long
Deputy Vice-Chancellor (Academic & Research)

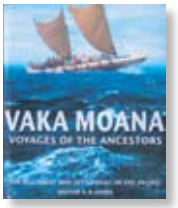
MASSEY RESEARCH

HERE & NOW

FEATURES



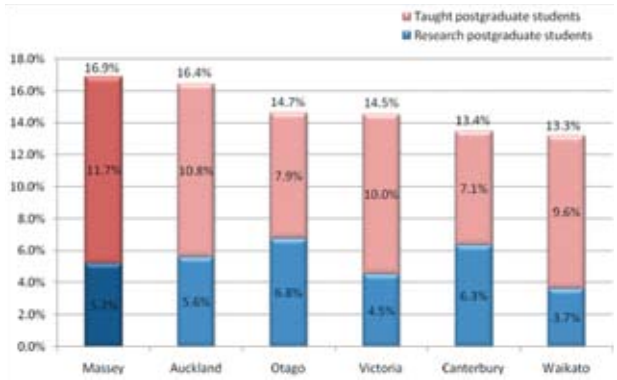


FINAL WORDS

To learn more about Massey research and to view earlier issues of this publication visit http://masseynews.massey.ac.nz

An exceptional postgraduate research experience

Postgraduate student numbers are burgeoning at Massey. In 2006 more than 16.9 per cent of Massey's student population were postgraduates, a proportion higher than that of any other New Zealand university.



Postgraduate students as a percentage of total students (EFTS) for 2006

A research powerhouse

Massey's lineage as an agricultural college can still be seen in the University's eminence in biosciences, but Massey has become much more.

Currently the University has more than 700 research-active staff. They include acknowledged world experts in fields as disparate as sleep/wake research, the 'handedness' of molecules, and the Bartók Viola Concerto.

The Performance-Based Research Funding exercise has identified Massey as having strengths in a number of domains:

- applied biological sciences
- veterinary and large-animal science
- accounting and finance
- communications, and journalism and media studies
- design
- management, human resources and industrial relations
- Māori knowledge and development
- social sciences, social policy and social work
- visual arts and crafts.

The University also hosts a span of human health research expertise, including nursing, rehabilitation therapies, public health, and burgeoning new areas such as sport and exercise science.

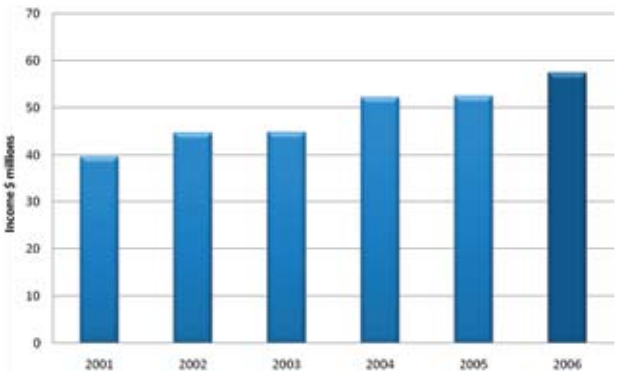
Massey is one of three New Zealand universities to make the Shanghai Jiao Tong University ranking of the top five-hundred universities worldwide and the top 100 in the Asia-Pacific region.

Building a research infrastructure

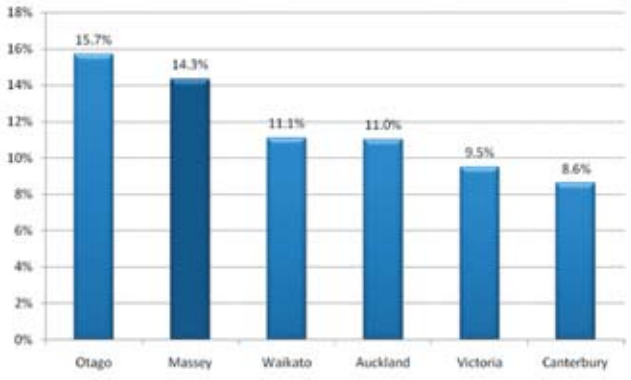
The University is committed to providing its researchers with an environment in which scholarship and creativity can flourish. This includes professional development programmes, generous leave provisions, a system of rewards and recognition, opportunities for promotion and, at the postgraduate level, a range of scholarships. It also includes investing in the equipment and infrastructure that make advanced scientific research possible. 2007 has been marked by the opening of the Hopkirk Institute and of the Manawatu Microscopy and Imaging Centre.

A magnet for research investment

The research funding attracted by medical research – an expensive and well-funded activity – skews the totals for research funding across the universities. If this funding is excluded, however, Massey can be seen to attract more research and contract income from external sources than any other New Zealand university. External sponsors invested more than $57 million in Massey's researchers in 2006.



Total research and contract income awarded for 2006



External research income as percentage of total turnover for 2006

The Graduate Research School

The Graduate Research School is responsible for doctoral degrees (in philosophy, business and administration, clinical psychology, and education), and scholarships, both undergraduate and postgraduate. It is also to assume responsibility for research masters degrees. The School provides information and administrative services for doctoral degrees and scholarships.

The Dean of Graduate Research, Professor Margaret Tennant, is the Chair of the Doctoral Research Committee, and the of Scholarships Committee, and has an advocacy role for graduate research within the University.

PBRF funding climbs

Massey's share of the PBRF funding pool has increased by $2 million from $32.7 million to $34.7 million. This is the third highest allocation in New Zealand, putting Massey in third place behind Otago and Auckland, both of which have medical schools with access to pools of research funds not available to other research institutions.

This strengthens Massey's position as a national leader in the core areas for which it is internationally recognised: sciences, creative arts, business and social sciences.

The Performance-Based Research Fund's 2006 Quality Evaluation determines the share of an annual allocation of funding (currently $137 million) received by each university and tertiary institution based on the performance of their academic researchers. This is the second Quality Evaluation; the first was in 2003.

Massey now has 13 subject areas ranked in the top three in New Zealand, compared with seven in 2003. It is ranked first in Design, Nursing and Veterinary Science; second in Agriculture and other Applied Biological Sciences, Public Health, Pure and Applied Mathematics, and Visual Arts and Crafts; and third in Clinical Medicine, Engineering and Technology, other Health Studies, Physics, Sport and Exercise Science, and Statistics. In 19 subject areas Massey achieved quality scores above the sector average.

The overall "quality score" of the University as an institution has improved from 2.11 in 2003 to 3.05, a 45 per cent increase.

Massey now has the third highest number of active researchers of any university. It has 874 researchers with rankings of A, B or C, compared with 689 in 2003, a 27 per cent increase. The number of A-ranked researchers increased by 52 per cent, B-ranked by 32 per cent; and C-ranked by 22 per cent.

Because it exceeded the targets it set for itself in the number of A and B-ranked researchers it now has slightly fewer C researchers than expected. The percentage of research-active staff has increased from 56 per cent to 78 per cent.

Each of the five colleges increased its overall quality score, with the College of Creative Arts and the College of Education improving dramatically.

Within the colleges, there were significant improvements in the rankings for Engineering and Technology, Nursing, Education, Visual Arts, Physics, Statistics, Mathematics, Chemistry and Veterinary Science.

Doug Hopcroft assists Prime Minister Helen Clark to view a weta egg with the electron

Zooming in

The Manawatu Microscopy and Imaging Centre has opened on the Palmerston North campus. Prime Minister Helen Clark officiated, citing the state-of-the-art centre as an example of industry and science coming together to boost knowledge and the economy.

Funded by the Tertiary Education Commission to the tune of $1.5 million the centre is a state-of-the-art facility that is being used not only by Massey staff and students but by many Crown Research Institutes and industry partners.

"Palmerston North's contribution is huge in biological science and research, so it is a very logical hub for a centre of this kind. The new Microscopy Centre enables the Manawatu to stay at the forefront of teaching and research in the biological sciences."

The centre, which houses a range of imaging equipment for use across the physical and biological sciences, represented an important linkage between town and gown, Miss Clark said. "As a country we haven't always been good at that … but a centre such as this makes it clear we should be."

Miss Clark also noted the support for New Zealand's primary industries provided by the University.

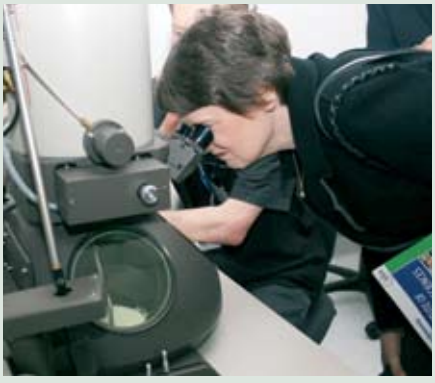
"What we know is that our primary sector would not be making the huge contribution they are making to the economy were they not relying on the research coming out – a good deal of it coming here from Massey."

Among other things, the centre will be used by veterinary pathologists working to identify disease-causing viruses; by Fonterra researchers studying milk proteins; by vulcanologists investigating the elemental composition of volcanic glass; and by researchers from Crop & Food conducting confocal analyses of nutrient release in food products.

The centre also supports areas of fundamental research such as studies in endophyte symbiosis, micro-rheological studies of bio-materials and human chromosome studies.

"The range of instruments and ancillary equipment – light, fluorescence and confocal microscopes and scanning and transmission electron microscopes – provides the tools to study biological and material structures, both the surfaces and interior features," said Vice-Chancellor Professor Judith Kinnear.

The centre is a key resource for a biological science hub which includes the Hopkirk Research Institute for animal health research, four Crown Research Institutes (HortResearch, Crop and Food, AgResearch, Landcare Research), Fonterra Innovation, and Leather and Shoe Research.



Hopkirk Research Institute opens

Massey Vice-Chancellor Professor Judith Kinnear inspects state-of-the-art laboratory facilities at the Hopkirk Institute with the Hon Steve Maharey and AgResearch chairman Rick Christie.

The opening in March of the $17 million state-of-the-art Hopkirk Research Institute, a collaborative venture between AgResearch and Massey University, initiates a new era in animal health research in New Zealand – particularly for sheep, cattle, goats and deer.

The building was officially opened by the Hon Steve Maharey, Minister for Crown Research Institutes and Research, Science and Technology and MP for Palmerston North.

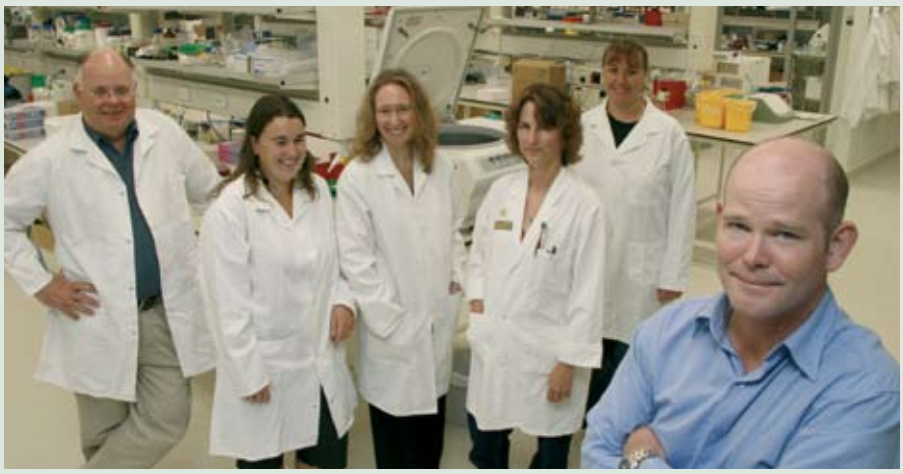
Situated on Massey's Palmerston North campus, adjacent to the Institute of Veterinary Animal and Biomedical Sciences (IVABS), the institute offers close to 4000 square metres of laboratory space and can house 90 to 100 research staff.

The Hopkirk Research Institute will focus on achieving and promoting scientific and technological excellence in areas relevant to the health and welfare of pastoral livestock, with an emphasis on infectious diseases endemic to New Zealand that threaten the livelihood of the pastoral sector.

Research and development will initially concentrate on three main areas. These are finding solutions for the control of parasitic diseases (primarily in sheep and cattle); developing more effective vaccines to combat infectious disease (chiefly tuberculosis, yet with a growing emphasis on Johne's disease); identifying and predicting food poisoning threats in New Zealand, and devising means to minimise their prevalence and impact.

The collaborative venture integrates the work of Massey's clinicians, epidemiologists, pathologists and scientists with that of AgResearch's microbiologists and parasitologists to anchor research in the practical reality of New Zealand's pastoral farming system.

AgResearch Animal Health Section Manager Dr Wayne Hein will be the inaugural director of the Hopkirk Research Institute.



Professor Nigel French in one of several state-of-the-art laboratories in the new Hopkirk Institute. Behind him, from left to right, are veterinary public health researchers Jim Learmonth, Rebecca Pattison, Dr Eve Pleydell, Dr Julie Collins-Emerson and Lynn Rogers.

Riddet Centre becomes second Massey-based Centre of Research Excellence

In June the Massey-hosted Riddet Centre Massey became the latest addition to New Zealand's national Centres for Research Excellence. The announcement means that the centre will share in $200 million of newly announced special Government research funding.

The Riddet Centre was formed in 2003, bringing together talent from Massey, Auckland, and Otago universities. The partnership is now extended and includes AgResearch and Crop and Food Research.

Since its creation the centre has been at the forefront of fundamental food industry research, bringing in more than $20 million in external funding. The centre is led by Massey's Professor Moughan and Fonterra chair in dairy science Professor Harjinder Singh, both Fellows of the Royal Society of New Zealand.

The Riddet Centre joins the Massey-hosted Allan Wilson Centre for Molecular Ecology and Evolution, which has had CoRE funding since 2002. The other partners in the Allan Wilson Centre are Auckland, Otago, Canterbury and Victoria universities.

The Allan Wilson Centre brings together ecologists, evolutionary biologists and mathematicians. Its fundamental research in evolutionary biology has drawn on the latest in DNA-sequencing technologies.

Together the two CoREs will receive just over $38 million in operating funding over the next six years and more than $3 million in capital funding.

Massey is also a partner in two other CoREs, the National Centre for Advanced Bio-Protection Technologies and the National Centre for Growth and Development. There are currently seven CoREs nationwide.

Health Research Council funding

The University is to receive $5.6 million in research funding from the Health Research Council of New Zealand's annual funding round.

Te Pūmanawa Hauora, the Māori health research programme, has been allocated $2.3 million; other Māori health programmes have been allocated $2 million; and further projects have been allocated $1.3 million.

At Te Pūmanawa Hauora the HRC funding supports the second half of a six-year programme. "The new funding will allow research to continue into particular programmes around child health, the health of older people and mental health, as well as contributing to building Māori research capacity," says Centre Director Chris Cunningham. "We intend to examine the relationship between physical activity and ageing … what makes for good health as you age as a Māori person?"

In a pilot study of about 400 children and young people in the Bay of Plenty, self-assessment questionnaires will be used to see how children and their families feel about their health.

"We know there is a relationship between your self-assessed health status and health outcomes," Dr Cunningham says. "We want to see how children rate their health and what things they consider important."

Other projects to receive funding are:

- The Whariki Research group receives $852,482 for work on the health implications of conferred privilege and structural advantage and $813,650 for research into media, mental health and well-being in New Zealand.
- The School of Sociology, Social Policy and Social Work receives $897,876 for a four-year longitudinal study of people with spinal cord injury.
- The Sleep/Wake Research Centre receives $149,962 for a 12-month feasibility study on sleep during pregnancy and postpartum and its relationship with maternal mental health.
- The Allan Wilson Centre for Molecular Ecology and Evolution, a Centre of Research Excellence hosted by the University, receives $132,000 to work on eukaryotic signature proteins.
- The Institute of Information and Mathematical Sciences receives $142,000 for a 12-month study of New Zealanders' attitudes to electronic health records.
- A School of Health Sciences project researching nursing and Māori patient outcomes receives $311,620 for a 15-month study.

FoRST funding

Five major Massey University projects have won $13.6 million in new funding from the Foundation for Research, Science and Technology. The annual funding round is intended to assist New Zealand develop its economy, manage resources sustainably and respond to climate change.

The projects to receive funding are:

PolyBatics researchers based in the Institute of Molecular Biosciences receive $500,000 per year for two years for work on biodegradable nanoparticles made to order by genetically-modified bacteria.

Economic Integration of Immigrants, a project led by Professor Paul Spoonley of the School of Social and Cultural Studies, receives $627,000 per year for five years to investigate how well or poorly immigrants are able to participate in sustainable and productive employment.

The Nanomaterials Research Centre receives $1.4 million over two years, for research into solar cells. Work on storage, generation and efficiency of solar energy has been undertaken by NRC for several years and has received ongoing funding from FoRST.

A longitudinal study of ageing led by Dr Fiona Alpass of the Department of Psychology receives $750,000 per year for five years. The work is focused on factors contributing to quality of life and independence in the elderly.

The Riddet Centre receives $4.275 million over five years for the future foods project, led by Centre co-directors Professor Harjinder Singh and Professor Paul Moughan. The project is a large programme to investigate the nanostructure of foods post-ingestion, with the aim of developing healthier foods.

In June 2007 the Riddet Centre was named by the Government as a Centre of Research Excellence, securing Government funding for six years and acknowledging its status as a world-class research institution.

From top: Researcher Margo van den Berg of the Sleep/Wake Research Centre, which is the recipient of Health Research Council grant to conduct a 12-month feasibility study on sleep during pregnancy and postpartum and its relationship with maternal mental health; Dr Chris Cunningham, Director of Te Pūmanawa Hauora, which has been funded by the HRC for the second half of a six-year programme; Professor Paul Spoonley who, funded by FoRST, is to lead a project addressing the economic integration of migrants; Professors Mike Hendy and David Penny are the directors of the Allan Wilson Centre, which is being funded by FoRST to conduct a study of eukaryotic signature proteins

Light work

Massey has been awarded $500,000 by the Tertiary Education Commission to host a New Zealand Synchrotron Support Programme.

Professor of Structural Chemistry and Biology Geoff Jameson says the successful application will facilitate New Zealand scientists' access to the A$220 million Australian Synchrotron facility, to be launched this year in Melbourne. Massey will act on behalf of Auckland, Waikato, Victoria, Canterbury, Lincoln and Otago universities.

The synchrotron is a football-field sized machine capable of creating beams of extremely intense light – a million times brighter than that of the sun – which are channelled into workstations and can be used simultaneously.

The synchrotron will feature 10 world-class beams that will benefit many areas of research across the University, including structural biology, nano-materials research, soil science, and medical imaging in the veterinary school. It will complement Massey's Nuclear Magnetic Resonance suite and X-ray crystallography facilities.

"It's a truly multi-use piece of equipment. It will transform basic science and applied science as well," says Professor Jameson. "It can be used not just for blue skies research but also in fields like engineering and technology. With any process which needs light – from hard X-ray light through to infrared – the synchrotron will do it better."

In 2004, Massey committed $450,000 as part of more than $10 million contributed by a consortium of New Zealand universities and several Crown Research Institutes, in partnership with the Ministry of Research Science and Technology.

Professor Jameson says the Synchrotron Support Programme will provide networking to help scientists access the facility, to negotiate research time at it, and to ensure that universities and institutes make the most of their investment in it. The programme will also provide seed money to projects that will use the Synchrotron and funding for scientists to travel to Melbourne.

The application to the Tertiary Education Commission (for the Innovation and Development Fund) by Massey's Research Management Services, under the direction of Michael Peters, is the first collective funding application made by universities and crown research institutes.

Professor Geoff Jameson

Cancer research wins US funding

An international study led by the University's Centre for Public Health Research has been awarded $140,000 by the United States National Institutes of Health to investigate risk factors of non-Hodgkin's lymphoma.

Non-Hodgkin's lymphoma (NHL), diagnosed in about 600 New Zealanders annually, is a group of cancers that may develop in the spleen, lymph nodes or tonsils or any other organ associated with the lymphatic system.

Study leader Dr Andrea 't Mannetje says although both the incidence of NHL and its associated mortality have been increasing worldwide for 20 years nobody knows why; the causes of NHL are poorly understood.

"This study will help us learn more about any links between occupational exposure and NHL, which may provide opportunities for the primary prevention of NHL in the future."

Previous studies focusing on occupational risk factors have suggested some exposure to pesticides and solvents may be a cause, but the findings have been inconsistent.

The new study will, over two years, analyse the association between occupational risk factors and NHL in nine separate NHL case-control studies from North America, Europe and Australia.

World-renowned cancer research institutes, such as the World Health Organisation's International Agency for Research on Cancer and the United States' National Cancer Institute, will be among the collaborators.

The Centre for Public Health Research is a multi-disciplinary team of researchers based at Massey's Wellington campus.

This time with feeling

A project focusing on tailoring products that people bond with emotionally has been awarded a $1 million grant over two years. Manufacturers Navman, Macpac, Gallagher Group and Tait Electronics are among the companies who will work alongside the Massey project members. The project is one of two funded under the Tertiary Education Commission's Growth and Innovation Pilot Initiative. The other, headed by Professor Bob Hodgson, has been granted $164,132 to develop well-qualified ICT professionals. The project will identify the knowledge and skills gaps of people who work in engineering and computer science-related roles but lack formal graduate qualifications, and design a qualification to raise their skills to graduate level.

The project team. From left: Dr Mark Goellner, Professor Tony Parker, Professor Duncan Joiner, Associate Professor Anders Warrell, Professor Claire Massey, Rodney Adank and Lyn Garrett.

Fellowships for IVF, diet researchers

Two of this year's 11 Foundation for Research, Science and Technology postdoctoral fellowships have been awarded to researchers based at the Palmerston North campus.

Dr Gabe Redding (at left) of the Institute of Technology and Engineering has been awarded a fellowship of $261,000 over three years to continue his work on in-vitro fertilisation, while Dr Abby Thompson of the Riddet Centre has been awarded $315,000 over three years for work on genomics.

Dr Redding's project is *Modelling the transport of substances in the ovarian follicle for the improvement of assisted conception in humans*. He conducted earlier research into this topic during his PhD on bioprocess engineering. Associate Professor John Bronlund was his PhD supervisor.

Reproductive biology and engineering are disciplines that are seldom paired, according to Dr Redding.

"The long-term goal is to fully explore the contribution engineering can make to improving the outcomes of assisted reproduction technologies such as IVF," he says.

The PhD work was undertaken as part of a wider programme contract awarded to AgResearch, also funded by the Foundation.

Dr Abby Thompson has received grant funding that will allow her to spend a further three years investigating the impact of food on individuals. Dr Thompson will travel to Reading University in England for her project, *Impact of dietary lipids and genotype on cardiovascular risk through effects of insulin signalling and endothelial function*. Her work will investigate the health consequences of eating diets containing different types of fats for individuals with specific genes.

"The new work will allow us to have a better understanding of how our genetics can impact the way our food can affect our health. Ultimately, this area of research will enable dietary recommendations that are person-specific, rather than guidelines that are applied to a whole population," Dr Thompson says.

"Sometimes only some individuals will show a link between eating a certain food and a change in their health. For example, saturated fats are often seen as having a negative effect on our health through their association with heart disease and clogging of the arteries, but there are some people who can eat as much saturated fat as they like and it does not appear to have any negative effect on them at all."

Dr Thompson completed her BTech at the Institute of Food, Nutrition and Human Health. Riddet Centre co-director Professor Harjinder Singh supervised her PhD.

Todd Foundation Scholarship for energy PhD student

Massey science technician Sheinach Dunn (Ngāti Maniapoto and Ngāti Raukawa) has been awarded the inaugural Todd Foundation Scholarship in Energy Research, worth up to $78,000.

Ms Dunn has a BSc (Hons), majoring in zoology, and is currently a technician in the Institute of Food, Nutrition and Human Health in the College of Sciences at the Wellington campus. She now intends to complete a PhD in the field of sustainable renewable energy. Her doctoral research will focus on hydrogen as a clean-burning fuel that does not produce either carbon dioxide or toxic emissions.

She will investigate electro-catalysts for the efficient conversion of electricity and hydrogen to electricity. Her work will contribute to research under way by Massey and Norwegian researchers on the development of more cost-effective and efficient hydrogen energy technologies, such as portable fuel cells for cars.

Dr Richard Haverkamp in the Institute of Technology and Engineering (Palmerston North) will supervise her PhD.

Ms Dunn began university study after a career in the Royal New Zealand Air Force as an avionic technician. The Todd Foundation scholarship is worth $25,000 a year for up to three years, with a one-off payment of up to $3000 to assist with conference attendance. The selection panel, chaired by John Todd, said they were impressed with Ms Dunn's work ethic and clear determination to succeed.

Building the hydrogen economy

As the first signs of end of the age of oil come into view, many people are pinning their hopes on the hydrogen economy. Hydrogen is a clean fuel that can be generated from no more than electricity and water.

But turning electricity into hydrogen is an inefficient process. Among the energy losses, some of the energy will be expended in heating the water rather than breaking the chemical bonds between hydrogen and oxygen.

Dr Aaron Marshall (pictured) is developing nano-materials that can be used to catalyse the electrolysis of water into hydrogen and water, thereby lifting the efficiency.

His work has led to Dr Marshall being declared an inaugural recipient of the Elizabeth Ellen Dalton Award. The award of $10,000 will enable more fundamental investigation of electrolytic nano-particles and water electrolysis systems. The electrolysers being developed will compete in supplying hydrogen gas for industry and automotive fuel applications. If the hydrogen is produced using electricity from renewable sources, the gas is a completely clean and renewable energy carrier with the potential to replace oil as a major fuel source.

"Natural gas is the most common source of hydrogen used in fuel cells," Dr Marshall says, "but of course it is not sustainable. Water electrolysis is a clean and simple way to produce hydrogen gas from electricity."

In January, Dr Marshall was awarded a $260,000 Foundation for Research, Science and Technology postdoctoral fellowship to enable the three-year nanomaterials study. Dr Marshall developed chemical processes to produce nano-sized particles while completing his PhD at the Norwegian University of Science and Technology. He is now part of Associate Professor Richard Haverkamp's Nanotechnology Group.

An EE Dalton Award is also being made to Dr Matthew Barnett of AgResearch as part of Nutrigenomics New Zealand, and to Dr Ishwaree Neupane, of Canterbury University's physics and astronomy department. The awards were presented on June 20 at the MacDiarmid Young Scientist of the Year Awards. The awards come from a bequest from the estate of Ellen Dalton, who wished the money to be used for research.

The lahar pours down the Whangaehu river bed

Mt Ruapehu's Crater Lake

Dr Shane Cronin installs a load-cell in bedrock in February 2007

All hands on deck for the Ruapehu lahar

On Sunday March 18 2007 all was in readiness. Within 90 minutes of the first alarm being triggered by the oncoming lahar from Mt Ruapehu, three teams of Massey volcanologists and students were dispatched to catch the phenomenon in action.

At the peak of the torrent they collected sediment samples, measured the speed and density of the flow, and hoped that instruments installed along the Whangaehu River would survive the tumult of boulders and trees.

PhD student Susy Cole was one of 17 postgraduate students and research officers from the Volcanic Risk Solutions research group and the Institute of Natural Resources waiting for the lahar.

An hour before the flow reached Collier's Bridge (approximately half way between the mountain and the coast), Ms Cole installed the last of three seismometers to gather information about the vibration of sediment in the flow. The instruments were purchased in December as part of a $720,000 Marsden Fund project led by Dr Shane Cronin, director of the Volcanic Risk Solutions Group and Dr Vern Manville from the Institute of Geological and Nuclear Sciences (GNS).

Dr Cronin says the technique used to gather information about the internal dynamics of the lahar, using the seismometers, is a world-first in volcanology. In the past two years Dr Cronin and Ms Cole trialled instruments and fine-tuned their technique at the site of lahars in Semeru, Indonesia, and their results will be crucial to global volcanology.

At a meeting hosted by the group, the Massey team met with researchers from Horizons Regional Council, the Department of Conservation and GNS to swap data and share experiences after a week of intensive fieldwork following the event.

Dr Cronin says all the sensors and instruments installed in the path of the lahar worked perfectly and that several significant results have emerged from the data. The most surprising result relates to the high density of water compared to the sediment-heavy lahar that broke from Mt Ruapehu's Crater Lake in 1995.

"We were able to measure the density of a lahar for the first time using a pore pressure sensor installed in the bedrock of the river, and a radar suspended above the flow," Dr Cronin says.

He says the "lighter" more watery flow may be the reason for the comparatively mild amount of damage in its wake.

"The main problem with lahars is the amount of sediment they pick up. More sediment typically means a heavier, faster, more devastating lahar."

He says the time of year impacts on the amount of sediment, which may account for the differences between the 1995 (early spring) and most recent lahar.

By measuring the pH of water throughout the flow, his team found that the lahar up to the peak of its flow was "normal" water from the river followed by water from the crater lake.

"The majority of sediment, including trees from the Kariori forest, was picked up much lower down the channel than in 1995. This pushed the river water ahead of it like a piston."

The impact of the lahar on the riverbed and mountain will be established in the near future when Drs Cronin and Manville conduct an aerial survey using digital laser technology to take up to 83,000 measurements of the land surface per second. Using this data they will create a 3D topographic numerical model of the channel, and compare it with that created before the lahar in February 2006.

Dr Cronin says the flow matched a predictive model developed by PhD student Jon Procter.

"Significantly, Jon's model predicted almost perfectly the impact of the lahar on the bund structure that protects the Tongariro River and Lake Taupo from contamination."

Drs Cronin and Manville recommended the bund following the 1995 lahar, and

later installed it at the base of the mountain where it spills on to the surrounding fan of flat slopes.

Professor of Earth Science Vince Neall was positioned at Collier's Bridge with three postgraduate students. They estimated the lahar travelled at peak speeds of about 35km/h upstream, dropping to 20km/h in the lower reaches of the Whangaehu River.

In mid-February Professor Neall made a field trip with Department of Conservation scientists to study the tephra dam, and the consensus was reached that the dam would break in March or not again until next summer.

He says the lahar was a "purely gravitational event" in a total absence of volcanic activity. Of the possibility of volcanic activity related to the lahar, he says it is generally accepted among scientists that the hydrostatic pressure of a crater lake can reduce small-scale volcanic activity.

"The pressure of the geothermic field under the lake must exceed that of the lake itself for surface activity to occur, and most scientists agree that crater lakes can act as valves on comparatively smaller eruptions. This is not the case for larger, more serious eruptions however."

For more information about research under way in the Volcanic Risk Solutions Group go to: http://volcanic.massey.ac.nz/.

Functional food first for Omega-3 joint venture

Blueberry muffins containing the recommended daily dose of Omega-3 oils were served at the launch of Speirs Nutritionals Ltd, which will develop, licence and market an emulsion-based micro-encapsulation Omega-3 technology developed by the Riddet Centre.

The micro-encapsulation allows the active ingredients of Omega-3 in fish oil to be incorporated into foods at very high levels without the sometimes associated smell and taste of fish.

Distinguished Professor Moughan, who alongside Professor Harjinder Singh is a Centre co-director, says scientific studies of the nutritional benefits of fatty acids such as Omega-3 have been accepted by the United States Food and Drug Administration and the Health Claims Initiative in Britain. The oils particularly benefit heart health in adults and growth in children.

"The general view is that there are few food ingredients that can compete with Omega-3 in terms of research that supports its health benefits," he says.

Market researchers Frost and Sullivan have reported sales of $NZ450 million for Omega-3 oils in Southeast Asia and an annual growth rate of 12 per cent.

Professor Moughan predicts that other commercially valuable technologies will also spring from the work being conducted by the Riddet Centre. Scientists in the centre are currently working on four products in collaboration with major New Zealand businesses.

Deputy Vice-Chancellor (Research), Professor Nigel Long says this is the third major joint venture for the University in a decade and the most important to date, as it takes breakthrough technology developed at Massey to the international consumer market.

The new company – a business partnership between the Riddet Centre and Manawatu-based businesses the Bio-commerce Centre and Speirs Foods – holds exclusive global rights to commercialise the emulsification technologies. It will produce and sell Omega-3 emulsions to food manufacturers in Asia, Australia and New Zealand, and it will seek licensing arrangements with partners in Europe and America to manufacture and sell the emulsion to other food and dietary supplement producers.

Speirs Nutritionals will invest $2.7 million to establish a manufacturing facility at Marton. The company will be managed by Speirs Foods, a division of the Palmerston North-based investment company, Speirs Group Limited.

Speirs Group Ltd executive chairman Nelson Speirs says the new partnership is a "natural fit" and furthers the company's future in functional foods.

The Riddet Centre is a partnership between Massey University, the University of Otago, and the University of Auckland.

Nelson Speirs samples a muffin enriched with Omega-3 alongside Professor Paul Moughan and Riddet Centre technologist Amit Taneja.

Art in Flanders Fields

It is unlikely that the latest art work by senior lecturer Kingsley Baird will ever be exhibited in New Zealand or seen outside Ypres in Belgium. By comparison, one of his earlier works – the Tomb of the Unknown Warrior – is viewed by many thousands every year, in its place in front of the National War Memorial in Wellington's Buckle Street. A more recent work, the International Nagasaki Peace Park sculpture, *Te Korowai Rangimarie, The Cloak of Peace*, is seen by millions annually.

His new work, called *Diary Dagboek*, relates to World War I, exploring memory, memorial forms and relationships between New Zealand soldiers and their loved ones at home. But it was created in Belgium while he was artist-in-residence at the Flanders Fields Museum in Ypres earlier this year. The work is large and its components – planks, knitted wool, lace, clay and blood – make it fragile and perishable. "Although it had its beginnings in New Zealand, and has strong connections with this country, the logistics of bringing it home are possibly too difficult – and too expensive," he says.

The work remains in Flanders, on show at the museum until October. "After that, I would like to see the museum arrange for a large hole to be dug in the fields and the work to be buried, providing a sort of continuance because it is possible it will be discovered and dug up again some time in the future."

As an artist-in-residence, Baird says he set out to create a work "that not only tells the story of WWI but does so, in part, through the eye of the artist as witness and conscience". His concept partly had its origins in a 1915 photograph of a group of knitters in Wellington. "Women knitted, both as an expression of support for the loved one who was away at war, and also for the war effort. There was ambivalence there because many women's groups in New Zealand opposed the war and formed international alliances to express that opposition."

As a first step, he asked a group of knitters in the Wellington suburb of Karori – Café Knitting – to create 200mm square patterns, "knitting in" images and words that included excerpts from letters and a rubbing from his own Tomb of the Unknown Warrior. With the help of Wellington ceramist Katherine Smyth, these samples were dipped in a clay slip then fired. Once technical aspects of this process were resolved, the knitted works were carefully packaged and shipped to Flanders.

In Belgium he approached local lace makers who agreed to produce lace works for the project, with different words and images, which – along with the knitted woollen patterns from New Zealand – were again dipped and fired. "In this process the wool and lace are burnt out leaving behind their 'memory' in fired clay," he says. "The ceramic 'tiles' look almost ossified, hard and brittle, which could represent the transformation undergone by those who died or were injured."

For the final assemblage, he used planks painted with pigs' blood, which further echoed the sense of "earth", and the red tones created by rusted iron weaponry in the fields around Flanders. The tiles were mounted on the painted background, forming a dramatic, 10-metre long "wall".

Copies of the substantial catalogue for the exhibition will be held at the Massey University Library and at Te Papa and will be given to those who contributed to the project. Baird, who is with the School of Visual and Material Culture in the College of Creative Arts, says it may be appropriate that the work itself will not endure. "Part of its message is to question whether memorials of robust materials can really guarantee we will 'never forget'."

He has reason to believe that it may resurface one day. In Flanders he joined up with a local group of amateur archaeologists called The Diggers who have permission to undertake a survey with metal detectors when an area is being cleared for development. They have found more than 200 missing bodies from WWI, and many artefacts.

Clockwise from left: the Cloth Hall in Ypres which holds the Flanders Fields Museum where Baird's exhibition was held; the Cloth Hall in 1917; Café Knitting, Karori, Wellington, 2007, *Citylife/APN News and Media, Crispin Anderlini*; *Diary Dagboek* (detail), In Flanders Fields Museum 2007, *Koen Blomme*. Below: A Commonwealth war cemetery.

Honoured







Upper row from left: Distinguished Professor Kerry Howe, Distinguished Professor David Lambert, Professor Robert McLachlan, Professor Mick Roberts, Professor Janina Mazierska. Lower row from left: Professor Graeme Wake, Professor David Parry.

Distinguished Professor appointed

Historian Kerry Howe has been appointed a Distinguished Professor, one of only six within the University to the title

He Vaka Moana: Voyages of the Ancestors edited by Professor Howe won the history category of this year's Montana Book Awards. It is reviewed on page 70.

James Cook Research Fellowship

Distinguished Professor David Lambert is one of four recipients of a James Cook Research Fellowship, one of New Zealand's most prestigious science and technology awards.

Professor Lambert has earned an international reputation for his research programme in molecular ecology and evolution, which he has been developing over 20 years. Using ancient DNA technologies, Professor Lambert and his research group have built a high profile in the scientific community for their sometimes novel studies.

The James Cook Fellowship will allow Professor Lambert to continue his work with ancient DNA on a project entitled *Does a simple sequence DNA evolve simply?*

The James Cook Research Fellowships are awarded in a number of categories across the sciences and social sciences to 'forward-thinking' researchers who will make a significant contribution to New Zealand's knowledge base. The fellowships enable them to focus on their chosen research for two years.

Professor Lambert is based at Massey's Auckland campus, as are two other recent recipients, Professors Gaven Martin and Peter Schwerdtfeger.

The fellowships are funded by the Government and administered by the Royal Society of New Zealand.

Dahlquist Prize

Professor Robert McLachlan has been named the recipient of the prestigious Dahlquist Prize, the first time the award has gone to a mathematician from the Southern Hemisphere.

The award by the Society for Industrial and Applied Maths is for original contribution to the fields associated with Germund Dahlquist, especially the numerical solution of differential equations and numerical methods for scientific computing. Professor McLachlan's citation notes his outstanding contribution to geometric integration and composition methods, and the application of his work to many areas, including physics.

New Zealand Mathematical Society Research Award 2006

Professor Mick Roberts from the Institute of Information and Mathematical Sciences received the New Zealand Mathematical Society's Research Award for 2006.

Professor Roberts is internationally recognised for applying mathematical modelling to the epidemiology of modern disease including SARS, HIV and avian influenza.

IEEE Asia Pacific Directorship

Professor Janina Mazierska has been elected to a two-year term as Director of the Institute of Electrical and Electronics Engineers (IEEE) for the Asia Pacific Region.

Professor Mazierska, head of the Institute of Information Sciences and Technology at the University's Palmerston North campus, is the first woman to lead the more than 66,000 IEEE members in the Asia Pacific region.

She is known for her research into precise microwave characterisation of low loss materials (especially High Temperature Superconductors).

Maclaurin Fellowship

Professor Graeme Wake, Institute of Information & Mathematical Sciences, has been awarded the Maclaurin Fellowship for 2007 from the New Zealand Institute of Mathematics and its Applications.

Shorland medal

Professor David Parry has been awarded the Shorland medal by the New Zealand Association of Scientists for his outstanding contribution to biophysics.

Association president Dr Hamish Campbell says the medal recognises the contribution of Professor Parry's research, in particular his analysis of the fine, ultrastructure of fibrous proteins, to society.

The fibrous proteins he has studied include those in hair, collagen, muscle, tendon, skin and the cornea, and his understanding of the assembly of these protein complexes contributes to fundamental science but equally has practical applications.

He discovered the mechanisms by which muscles contract and relax and this led to commercial applications to meat carcasses to maintain tenderness. He has also contributed to techniques used in plastic surgery to reduce scarring.

As the head of the Palmerston North-based Institute of Fundamental Sciences from 1998 until recently, Professor Parry has led a resurgence in student enrolments in the fundamental sciences (chemistry, mathematics, and physics). On an international level he has contributed substantially as president of the International Union of Pure and Applied Biophysics and as vice-president of the International Council of Science – the first New Zealander to be elected to that position.

2007 Marsden grants

The Royal Society's Marsden fund is supporting eight new research projects led by University staff and four Fast Start projects for emerging researchers, with new funding totaling $5.86 million over three years. Many other Massey staff are acknowledged as associate investigators in projects led by other institutions. In 2006 the University received funding for six projects and five fast start grants, totaling $5 million.

Administered by the Royal Society of New Zealand and funded by the Government, the Marsden Fund supports excellence in leading-edge research in New Zealand. This year the Fund awarded grants totalling $44 million.

Distinguished Professor Gaven Martin, Institute of Information and Mathematical Sciences, Auckland campus, $502,400 for a project on modern analysis and geometry. The work will investigate two central areas of modern mathematics: Non-linear analysis and low-dimensional topology linked by conformal geometry. When deforming an object, including heating or stressing, physical laws state the deformation minimises an energy functional and can be found as the solution to a usually non-linear partial differential equation. This research exploits unexpected connections between minimisation problems for scale invariant measures of energy and distortion and harmonic mappings to give applications in theoretical materials science and critical phase phenomena, and addresses fundamental questions relating to microstructure and length scales in degenerate settings. The work also seeks to classify conformal dynamic systems in higher dimensions and to identify the basic fundamental constants of hyperbolic geometry and identify all the arithmetically defined generalised triangle groups – relating geometry and arithmetic.

Dr Ulrich Zuelicke, Institute of Fundamental Sciences, Palmerston North, $800,000 for the project *Jitterbug on a chip: Semiconductor nanospintronics meets relativistic quantum physics*. Einstein's laws of special relativity generalise those of Newtonian mechanics, famously predicting new behaviour for fast-moving objects. Conspiring with quantum physics, relativity is ultimately responsible for the phenomenon of spin, which makes electrons behave like tiny permanent magnets. Dr Zuelicke's research, with colleagues from North Illinois University and the University of New South Wales, will contribute to the effort to achieve the ultimate miniaturisation of electronic chips using spintronic devices. It will also pursue recent theoretical work that has reopened discussion on the jitter of free electrons in a vacuum, by showing that electrons in microchips exhibit an analogous, spin-related jittery motion. The project will also investigate how concepts of relativistic quantum physics may inspire new ways to make spin-electronic devices.

From top: Distinguished Professor Gaven Martin, Dr Ulrich Zuelicke, Professor Peter Schwerdtfeger.

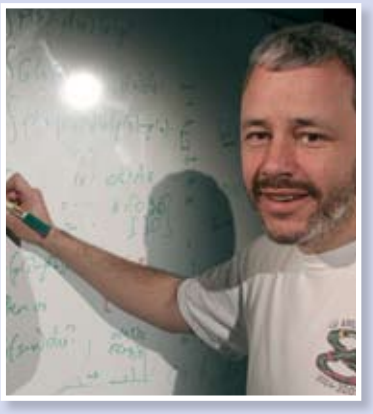
Professor Peter Schwerdtfeger, Institute of Fundamental Sciences, Auckland, $720,000 for work on chemistry under extreme conditions. Because life is limited to a narrow range of temperatures and pressures, most modern chemistry and physics is focused around 'normal' conditions. Recent advances in high-pressure physics, however, have made it possible to study materials at ultra-high pressures – outside the laboratory these conditions are only found in detonations of high-energy materials or in the interior of planets or in comet collisions. At such extreme conditions the chemical bonds break and new ones form, leading to interesting new materials or phases. Materials chemistry under ultra-high pressure is an important new research area, opening up exciting new routes for stabilising novel and interesting materials or original structures of different compounds. Professor Schwerdtfeger's work will address material chemistry under ultra-high pressure by using first-principles relativistic quantum mechanical methods to study new phases and accompanying electronic properties.

Professor Robert McLachlan, Institute of Fundamental Sciences, Palmerston North, $350,000 for a project on geometric integration, a novel approach to simulating the motion of large systems. New methods, inspired by chaos theory but driven by the demands of modern applications, are faster, more reliable and often simpler than traditional approaches. Although used in diverse areas, these systems have in common features that make them amenable to a new approach – they all preserve some underlying geometric structure which influences the qualitative nature of the phenomena they produce. In geometric integration these properties are built into the numerical method, which gives the method markedly superior performance, especially during long simulations. In this new research Professor McLachlan will, with

colleagues from La Trobe University, explore the geometric or structural features that systems can have, the implications for their long-time dynamics, and how to design efficient numerical integrators that preserve these geometric properties.

Professor Barry Scott, Institute of Molecular Biosciences, Palmerston North, $750,000 for a project addressing the biological role for reactive oxygen species. One of the most successful strategies that plants have evolved is the ability to form symbiotic associations with microorganisms. Professor Scott and his colleagues recently demonstrated that fungal production of reactive oxygen species (ROS) is crucial for maintaining a symbiotic interaction between the fungal endophyte *Epichloe festucase* and its host perennial ryegrass. The new project, undertaken with colleagues at Japan's Nagoya University, will test the resultant working model by identifying key fungal proteins required for sensing and transducing the molecular signs that lead to ROS production and control of hyphal growth. The work will provide insights into the molecular and cellular basis for mutualism in fungal-plant interaction.

Dr Joachim Brand, Institute of Fundamental Sciences, Auckland, $670,000 for a project studying the dynamics of ultra-cold atoms. Two people who hate each other are trapped in a room. As both try to exit quickly, will they end up taking more time than people with less sentiment acting independently? What happens when three, or more, people are involved? Replacing people with atoms, and cooling them to ultra-low temperatures, the world of quantum mechanics is entered, leading to the discovery of counter-intuitive behaviour like reflection from attractive surfaces or that independent atoms leak from a box more slowly when their number is counted repeatedly. This phenomenon is known as the quantum Zeno effect. This project, with collaborators from Massey and the University of Heidelberg, will address questions including whether interactions between particles will modify or enhance the quantum Zeno effect, computing the exact dynamics of ultra-cold particle systems containing two to 30 interacting atoms.



From top: Professor Robert McLachlan, Professor D Barry Scott, Dr Joachim Brand, Associate Professor Doug Armstrong

Dr Lara Shepherd, who is to work with the Allan Wilson Centre for Molecular Ecology and Evolution, Palmerston North, $596,000 for a project tracing the domestication of history and whakapapa of cultivated New Zealand plants using DNA markers. The domestication of plants and animals was the most important development in human history during the past 13,000 years, with most crops thousands of years old and their initial domestication undeterminable. The relatively recent settlement of New Zealand by Māori, however, provides a unique opportunity to investigate an early phase of crop domestication. Dr Shepherd, with colleagues from the University's Institute of Natural Resources and the Department of Conservation, will genetically analyse four endemic New Zealand plants cultivated by Māori: karaka, rengarenga, whau and coastal kowhai. Genetic data, combined with traditional oral histories, will reflect and illuminate pre-European Māori settlement routes and mobility.

Associate Professor Doug Armstrong, Ecology group at the Institute of Natural Resources, Palmerston North, $791,000 for an experimental investigation of predator-prey dynamics in a fragmented landscape. A key aspect of predator-prey theory is the functional response of a predator to its prey.

Dr Armstrong, with colleagues from the University of British Columbia, will test the functional response of ship rats (exotic predator) to North Island robins (native prey) in remnant forest fragments. As the first experimental test of functional response in a wildlife system, the project will have international significance for both population ecology and conservation biology.

See page 48 for more about Professor Armstrong's work.

Fast Start Funding Recipients 2007



Fast start grants of $170,000 each went to:

Dr Manuhuia Barcham, Director of the Centre for Indigenous Governance and Development, Palmerston North, (pictured above left) to study indigenous corporate structure. In recent years indigenous groups have begun to establish corporations to manage proceeds of treaty settlements. In order to receive settlement and ensure legitimacy of the claim, indigenous groups are being forced to adopt certain forms of organisational structure. A problem arises in that the Anglo-American corporate models do not necessarily provide the best vehicle for the provision of the needs and aspirations of indigenous groups. The adoption of inappropriate organisational structures and processes – and ultimately, values – could be one of the biggest threats facing indigenous groups. Dr Barcham's project will explore these tensions, and look at what is working and what is not working, and why. The key question is what are the most appropriate and effective governance structures and processes for indigenous groups in order to manage resources to provide the best possible outcomes for their people?

Dr Vyacheslav Filichev, Institute of Fundamental Science, Palmerston North, (no image available) for the project *Synthetic probes yielding stable and selective DNA triplexes for gene visualisation*. Gene visualisation in cells has attracted the attention of scientists due to the intriguing prospect of being able to map the location of genes on chromosomes and directly observe and study chromosome dynamic architecture, which can give a better understanding of fundamental native processes like replication, transcription and gene expression. This may lead to progress in diagnosis of genes associated with diseases and advances in cytogenic research and the development of new drugs. This project will develop highly efficient and selective triplex-forming DNAs through the chemical modification of nucleic acids with novel type of intercalating moieties, first in vitro and later in living cells using a laboratory at the University of Heidelberg.

Dr Patrick Bowman, of the Centre for Theoretical Chemistry and Physics, Auckland, (pictured above centre) for a project called *Bondage and confinement: How hadrons keep their quarks*. The strong force is one of the four fundamental forces of nature; it binds protons and neutrons to form atomic nuclei. These, however, are just the most common members of a family of strongly interacting particles, the hadrons. This large family can be understood as a number of small constituent particles called quarks, bound together in twos and threes. According to the theory of quantum chromodynamics, quarks interact by exchanging another particle, called a gluon. Dr Bowman, with colleagues from Dublin's Trinity College, plans to study the quark-gluon interaction by calculating the quark-gluon vertex using a numerical method known as lattice QCD. A precise understanding of the quark-gluon vertex will provide insight into the mechanism of quark confinement and understanding of confinement is central to understanding the structure of matter.

Dr Phil Battley, Ecology group, Institute of Natural Resources, Palmerston North, (pictured above right) to explore how globally-migrating shorebirds cope with the limitations of their multi-purpose coat, by investigating the roles of melanin levels (which colour and strengthen feathers) and feather wear in shaping the visual signals of the breeding plumage. The colourful plumages of birds, while fascinating to humans for aesthetic reasons, serve crucial physiological and social roles, and in flight feathers aid thermoregulation and act as an important signalling agent. Plumage informs other birds about the sex, condition, social status and identity of the individual, but it degrades over time. Dr Battley and colleagues from the University of Groningen will address questions including whether more investment in plumage at the start of migration grows stronger feathers that resist physical breakdown.

Dr Chris Wilkins

Middle classes beginning to abandon P

Methamphetamine, although it continues to be widely available, may be falling from favour among the middle class because of its associations with addiction and violence. The link is suggested in the findings of the most recent iteration of the Illicit Drug Monitoring System, a regular survey of 318 frequent drug users divided into three groups: ecstasy users, intravenous drug users and methamphetamine users.

Alone among the groups, ecstasy users reported fewer of their friends were using methamphetamine. Why might this be? Dr Wilkins, the study leader, speculates that it may be because the ecstasy users – who generally have a more middle class profile – are deterred by the drug's association with violence and addiction.

Certainly the trend does not correlate with availability of methamphetamine: the survey found that methamphetamine was easily obtainable and, indeed, overall there was some evidence of increasing use and declining prices.

The survey also measured trends in drug related harm. Intravenous drug users had the highest level of drug dependency, had high levels of physical and psychological problems, and reported the highest likelihood of accessing an ambulance in relation to their drug use. However the frequent methamphetamine users also experienced numerous physical problems and a range of psychological problems, many of which were consistent with the symptoms of drug psychosis.

Mental illness – how we see it

A new survey shows that most New Zealanders are sympathetic to people with experience of a mental illness and are willing to have them as neighbours, workmates and friends.

However, compared to people with a physical illness, those with a mental illness are more likely to be seen as less trustworthy, less productive and less employable.

Professor Phil Gendall, head of Massey University's Department of Marketing, says the survey shows that stigmatism of mental illness varies depending on the specific circumstances involved.

"For example, people are less willing to have a personal relationship with someone with a mental illness, to have them marry someone related to them, or to have them teach or look after children," Professor Gendall says.

"Some even believe they should not be allowed to have children, to hold public office, or to supervise others at work. On the other hand, most people believe someone with experience of mental illness is just as intelligent as anyone else, and should be hired like any other person, if they are qualified for a job.

"Furthermore, this is a relative phenomenon. Some measure of stigmatism applies to anyone with an observable physical condition: stigmatism of mental illness is simply higher than that of physical illness.

Professor Gendall says one surprising result was the relatively high number (at least a third of those surveyed) who believed that people with schizophrenia or depression should be forced by law into medical or psychiatric treatment.

As many as 60 per cent thought people with schizophrenia should be forced by law to take prescribed medication and 50 per cent thought they should be forced to be examined at a clinic or by a doctor.

"This willingness to coerce seems rather high but is tempered by the knowledge that similarly high numbers considered people with schizophrenia or depression not very able to decide whether they should receive treatment."

He also notes a paradox in the findings:"Few respondents believed that schizophrenia or depression were something to be embarrassed about or kept secret. But between 40 and 50 per cent agreed that someone with these conditions would lose friends or opportunities if people knew they were having treatment. Perhaps getting treatment implies the condition has been officially diagnosed, which in turn implies a level of severity likely to result in stigmatisation. If so, it is not surprising that many with experience of mental illness do not seek treatment."

Professor Gendall says overall the survey results are in line with findings by the Ministry of Health and confirm that the Ministry's *Like minds, like mine* advertising campaign has improved public attitudes to and understanding of mental health.

The survey was conducted between August and November last year and involved 1020 New Zealanders aged 18 and over. Participants were given three vignettes, describing schizophrenia, depression and asthma, to test whether stigmatism varies for different disorders and to compare attitudes to mental illness with those to a physical condition.

It is part of an international study of the stigmatism of mental illness, involving 16 countries. Professor Gendall notes that such research is not simply a matter of curiosity: "Understanding the stigmatism of mental health will help to develop interventions designed to combat it."

The full report is available at: http://marketing.massey.ac.nz/files/NZ_Attitudes_to_Mental_Illness.pdf

Professor Phil Gendall

A new study has shown that lung damage in smokers continues to advance, even after they have stopped smoking. It has been widely thought that lung damage ceases when smoking ceases. The new study is the first to show that once smokers have established lung disease with the bronchial inflammation caused by smoking, it will continue after they have stopped smoking.

The finding comes from an international team of researchers in respiratory medicine including Massey University clinical pharmacology lecturer Dr Felix Ram.

"The study has wide implications for how we manage patients with smoking related lung disease and for all smokers at large," Dr Ram says. "Instead of telling smokers that it's never too late to quit, the new public health message is never take up smoking."

The study was conducted with bronchial biopsy samples from patients in various hospitals in Britain, including the London Chest Hospital. There were 65 current smokers and 36 former smokers, aged between 60 and 65 years, who had been or still were smoking a pack a day, says Dr Ram. The study subjects had the smoking-related chronic obstructive pulmonary disease that brings with it chronic bronchial inflammation.

The researchers say their results showed no statistically significant differences between smokers and ex-smokers in the numbers of any of the inflammatory cell types or markers analysed.

"This doesn't mean that there is no point in quitting smoking," Dr Ram says. "Lung inflammatory damage will continue but smoking has other health effects and smokers will still benefit from giving up."

Although now based at the School of Health Sciences at Massey University's Auckland campus, Dr Ram has ongoing research collaborations with leading researchers in respiratory medicine in Europe.

The research was recently published in the journal of the European Respiratory Society.

Ticks and crosses - how New Zealanders feel about their Government

Lower taxes *and* more social services: no one ever said we should be consistent in our desires. In a major survey, the Government gets ticks from the public for its performance in protecting the environment, fighting unemployment and dealing with security threats. But its performance in providing a decent standard of living for the old and health care for the sick is rated less highly, and it gets the thumbs down for failing to control crime. Taxation is another big source of dissatisfaction.

The results of the survey, conducted between August and October 2006, also provides evidence that a decade of MMP has increased satisfaction with New Zealand's political system, though the report's author, Professor Phil Gendall, says perceptions of being disenfranchised remain high.

The survey is part of the International Social Survey Programme, which involves leading academic institutions in 40 countries. Surveys cover a different topic every year in a roughly seven-year cycle: The last on the role of government was in 1997.

Key findings include:

- Perceptions of the role of government have changed relatively little over the past 10 years, except for a sharp decline in the expectation that the Government should provide a job for everyone who wants one.
- Most people favour cuts in Government spending but there is strong support for more spending in health, education and law enforcement.
- The belief that low and middle-income earners pay too much tax is widespread and has increased since 1997, most sharply among middle-income earners.
- The introduction of proportional representation (MMP) has reduced dissatisfaction with the political system, but the feeling that ordinary people have little influence over the Government remains widespread.
- New Zealanders have liberal views on actions designed to challenge the Government. Most believe organising public meetings, protest marches and demonstrations should be permitted. Even when people with extreme views want to overthrow the Government, most believe they should be allowed to publish books or hold public meetings to express these views.
- Concerns about terrorism are reflected in widespread support for measures such as phone tapping, detention without trial and random stopping and searching, if the Government suspects a terrorist act is about to happen.
- New Zealand is generally regarded as free of the corruption that characterises some other countries. But about 15 per cent believe there is corruption among some politicians and public officials. And there is a strong perception that the treatment people get from public officials depends on who they know.
- Concerns about smoking, drinking and obesity show up in strong support for interventions designed to reduce the undesirable effects of cigarettes, alcohol and unhealthy food. Nearly half support extending the smoking ban to include all public places, and 75 per cent support returning the drinking age to 20.
- There is strong support for stricter enforcement of existing liquor laws, and some support for requiring warning labels on alcohol.
- There is strong support for removing GST on fresh fruit and vegetables and for more regulation of food advertising, particularly advertising to children.

2250 people aged 18 and over selected from the Electoral Roll were surveyed by mail. The response rate was 60 per cent and the maximum margin of error is plus or minus 3 per cent.

New Zealand has been included in the ISSP surveys since 1991. Data from the surveys is stored in central archives in Madrid and Cologne and allows researchers to monitor differences between countries and changes over time.

The full report is available at http://marketing.massey.ac.nz/files/RoleofGovt.pdf

Māori views on immigration harden

Māori attitudes towards immigrants have hardened in recent years while New Zealanders generally are ambivalent about the impact of immigration, a study has found. The study, part of the New Settlers Programme, draws on a survey of attitudes to a wide range of issues to immigration conducted in 2003 and 2006 with sample sizes of 1100 and 750 respectively.

Although there was no dramatic change in results between 2003 and 2006, Māori attitudes to immigration had hardened. "Māori are more likely to agree than non-Māori that Chinese, other Asians and Pacific peoples take jobs away from people who were born in New Zealand," the report says.

Māori attitudes were consistent with their "protection of interests in maintaining a bicultural society, and the assertion of their rights under the Treaty of Waitangi; and their recognition of employment opportunities that might be compromised by ongoing migration".

Interestingly, Māori were much less likely than non-Māori to agree that Chinese, other Asian or Pacific peoples increase crime rates, the survey found.

But New Zealanders generally were "still quite ambivalent about immigrants", says Professor Paul Spoonley, one of the report's authors. "We like the (diverse) food and we like what they're doing to our economy by contributing skills and capital. But New Zealanders also see immigrants as sticking together rather than integrating, and that is seen as a negative thing."

Aucklanders, young people and those without tertiary qualifications tended to be less positive towards immigrants.

"Attitudes to immigrants and various aspects of immigration are usually (but not always) more negative among Aucklanders than among other New Zealanders, though perhaps less so than might be expected given the greater impact immigration has had on Auckland compared to the rest of the country," the report says.

The 2006 census found that Asians were the fastest-growing ethnic group – up 9.2 per cent to 354,552 since the 2001 census. Two-thirds of the Asian population live in Auckland, where almost one in five people identify with one or more Asian ethnic groups, the highest proportion nationally.

More than a third of people living in Auckland were born overseas; by contrast, in Southland the figure was one in 13.

More New Zealanders in 2006 than 2003 saw value in having immigrants fill job shortages, but they also wanted more government consultation with the public on immigration matters, the report says.

The New Settlers Programme is a multi-disciplinary research programme supported by grants from the Foundation for Research, Science and Technology. The programme is intended to contribute to knowledge and an understanding of the settlement experiences of immigrants and their impact on aspects of New Zealand society.

Higher use of drugs, alcohol and tobacco in gay, lesbian and bisexual population

Gay, lesbian and bisexual people are significantly higher users of alcohol, tobacco and illicit drugs than the heterosexual population, according to an analysis of national health data conducted by Frank Pega of the Whariki Research Group.

The data was drawn from the New Zealand Health Behaviours Surveys commissioned in recent years by the Ministry of Health.

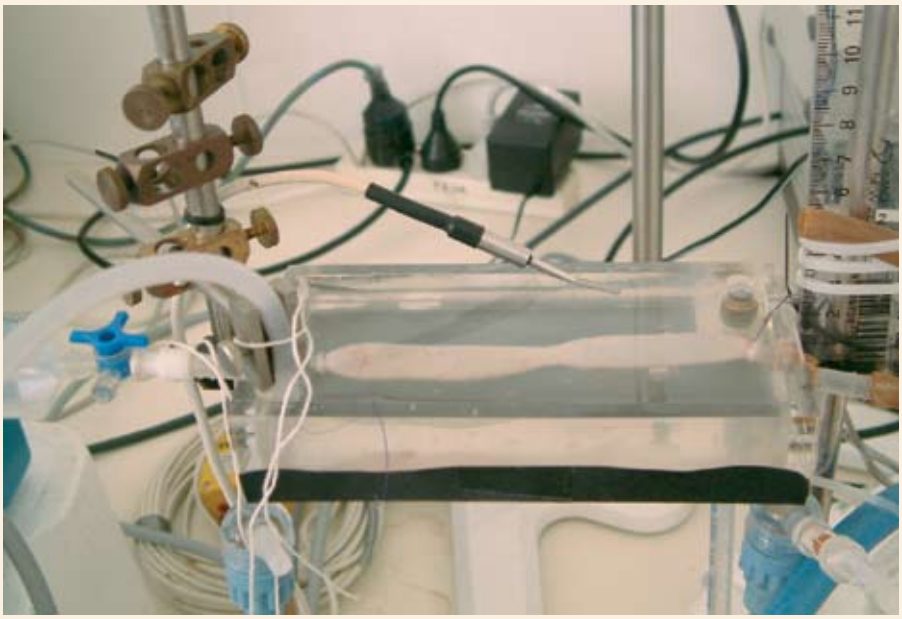
The analysis found that the gay, lesbian, and bisexual populations were only slightly more likely to use alcohol. However, while 42.7 per cent of the gay, lesbian and bisexual group reported smoking tobacco regularly over the past year, only 27.7 per cent of heterosexuals did so. The gay, lesbian, and bisexual population was also more than twice as likely to have used marijuana over the past year than heterosexual survey respondents; nearly four times as likely to have used amphetamines regularly in the past year; more than four times as likely to have used LSD over the past year; and more than three times as likely to have regularly used ecstasy over the past year.

The researchers also compared various sub-groups, finding that disparities in illicit drug use were particularly elevated among lesbian and bisexual women, and for alcohol and tobacco, among gay and bisexual men. Māori gay, lesbian and bisexual people reported lower usage of alcohol than Māori heterosexuals and non-Māori gay, lesbian and bisexual people. However, they reported a higher usage of tobacco and some illicit drugs.

Lead researcher Frank Pega says that public health policy on substance use needs to include gay, lesbian and bisexual communities as priority populations. "The findings also highlight a need for health promotion initiatives and substance use interventions targeted specifically at gay, lesbian and bisexual populations to be established.

"Other research has already established that gay, lesbian and bisexual people's substance use is related to their experience of discrimination and to social stress arising from this."

Mr Pega is a member of the Whariki Research Group working with the Centre for Social and Health Outcomes Research and Evaluation (SHORE).



Gut instincts

For an organ which is so intimate a part of all of us, it is surprising how poorly its mechanisms have been understood. In fact, the best way until recently to understand the workings of the small intestine – the principal organ of digestion and absorption – has been via mathematical simulation. But no longer.

In a benchtop apparatus in Associate Professor Roger Lentle's laboratory a section of 'living' possum intestine is being directly observed in a tank simulating normal conditions in the body. Here the University's Digesta group, a multi-disciplinary team of researchers, based at the University's Institute of Food, Nutrition and Human Health, are analysing *in situ* how food is mixed during digestion.

The team has developed an electronic spatiotemporal mapping technique which simultaneously measures lengthwise and widthwise changes in the living intestine. Five pictures of the gut per second are captured on video and electronically processed to generate movement maps.

Coloured pulses of material are released into the intestine and the level of mixing and the movements of the intestinal wall are assessed.

The results? Whereas the mathematical modelling had suggested that mixing would be poor, the small intestine was found to produce quite good levels of mixing. This was partly due to the turbulence created by the jerky motion of the muscles in the intestinal wall and partly to the coiling of the small intestine inside the belly.

The thicker the consistency of the food, the more poorly it was mixed by the intestine. The slower pace at which thicker foods are digested had previously simply been attributed to delays in the emptying of the stomach.

One implication is that by adjusting the physical properties of a foodstuff you can regulate the pace of digestion and hence its glycaemic index.

Foods that are designed to thicken on entering the small intestine will mix poorly and be digested more slowly, so delaying their release load of glucose or fats.

"An example of a potential future application is a new drink which you may have in the morning with your bacon and eggs, which thickens when it reaches the intestine and stops or slows the absorption of the fats," Dr Lentle explains. Drinks could also be developed to impair the absorption of glucose and cholesterol.

The findings could be useful in devising better treatments for the sufferers of intestinal diseases such as Crohn's disease or Ulcerative Colitis. Some drugs used for treating these conditions need to be held within the small intestine, Dr Lentle says; a drink could be formulated to take with the medicine to ensure the drug is not prematurely absorbed. "So the medicines end up in the place where they can do most good," he says. "A further use is in getting probiotics [dietary supplements containing potentially beneficial bacteria] to the lower bowel, which is where they can do the most good, by preventing them from being killed on their way through the small intestine by mixing with bile salts."

The findings are currently being published in the prestigious *Journal of Physiology*.

Chathams research challenges theory on New Zealand prehistory

A combination of geological and biological findings support the hypothesis that the Chatham Islands were under water until three million years ago. The results have implications for interpretation of the age and origins of New Zealand's flora and fauna.

Traditional thinking is that the islands of New Zealand split from the ancient super-continent Gondwanaland about 85 million years ago, and stayed above the oceans since then. This is challenged by the findings of the Marsden-funded, multidisciplinary project that has been researching the Chathams, named the *Chatham Islands Emergent Ark Survey*. The team of biologists and geologists includes Dr Steve Trewick, Senior Lecturer at the Allan Wilson Centre for Molecular Ecology and Evolution, who is also co-Principal Investigator. Dr Trewick was part of a team who visited the islands in 2004.

Findings include identification of remnants of deepwater limestone from about three million years ago, overlaid by beach deposits of sand, indicating that the Chathams may be much younger than previously thought. A further significant discovery was the previously unmapped formation in the southwest corner of the Chathams, volcanic rocks of a type that erupted and accumulated under sea. By using fossils from within the rocks and radiometric ageing, researchers found the formation was probably deposited less than 2.5 million years ago. The rocks were originally on the seabed, but now form the highest point on the Chathams, indicating that the entire land area was under the sea until uplift about two million years ago raised it to above the water level.

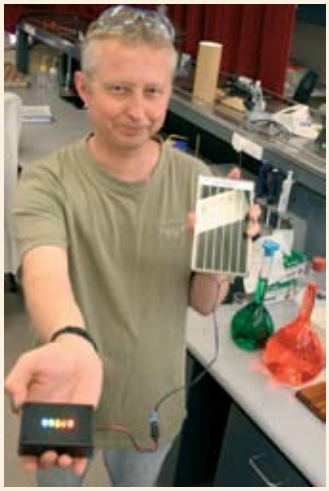
Biological findings now coming to hand are compatible with the geological findings, indicating that Chatham Islands birds, plants and insects have been separated from their New Zealand relatives for less than three million years.

The final report on the Marsden-funded project was published in August 2007. Participants include staff from Otago, Lincoln and Massey universities and GNS Science. A collaborative publication involving members of the ChEARS team, led by Dr Charles Landis, questioning the antiquity of New Zealand's biota will be published in the peer-review journal *Geological Magazine* in early 2008.

Power play

As societies and individuals grapple with the twin issues of peak oil and climate change, there is an ever increasing interest in alternative sources of energy, one of them sunshine. The best commercial silicon photovoltaic cells are now achieving 15 per cent efficiency, and efficiencies of 20 per cent are being reached in the laboratory. Why then aren't the rooftops of the nation aglint with silicon? One immediate sticking point is a worldwide shortage of poly-crystalline silicon, the main component of silicon solar cells, but the more fundamental problem is cost: poly-crystalline silicon is expensive and itself takes large amounts of energy to manufacture.

Are there viable alternatives? Not quite yet, but wait a while. In the 1990s Austrian scientist Michael Grätzel and his collaborators developed the photoelectrochemical cell that now bears his name. Between two layers of glass, the Grätzel cell sandwiches a layer of titanium dioxide doped with a photosensitive ruthenium-based dye and a layer of a conducting liquid electrolyte. When the cell is exposed to light, electrons in the dye jump to the titanium dioxide particles, which then are attracted to one of the electrodes. At the same time, the electrolyte carries electrons back from the other electrode to replenish the dye particles. To date the Grätzel cell has achieved efficiencies of greater than 10 per cent. It works well in low light, and titanium dioxide – a principal ingredient in white paint – is cheap.



Dr Wayne Campbell holds up a working example of a photovoltaic cell powered by a Massey-developed dye. The cell itself has been engineered by Dyesol, an Australian firm with a licence to manufacture Grätzel cells.

The catches? One is engineering – managing the technical feat of sealing corrosive and volatile liquids between layers of glass in a way that enables a cell to withstand high temperatures. The second is the dye: ruthenium, one of the dye ingredients in Grätzel's original cell, is rare and expensive.

But solve the engineering problems and find a cheap, effective dye and you would have solar cells that, if not as efficient per-square-metre as silicon, would be far more cost effective, producing power at perhaps a tenth of the cost.

Researchers at Massey's Institute of Fundamental Sciences MacDiarmid Centre (a member of the MacDiarmid Centre of Advanced Materials and Nanotechnology) are looking for dyes that are suitable candidates.

Carried out under the direction of recently appointed Centre director Associate Professor Ashton Partridge, the work is a continuation of endeavours that began in the late 1990s under Professor David Officer (recently departed for the University of Wollongong, but still actively involved).

In a laboratory overlooking the Palmerston North campus, Dr Wayne Campbell holds up a token of what might be: a working solar cell powered by a synthetic version of chlorophyll, nature's own sunlight harvester. According to Dr Campbell, unlike the silicon-based solar cells currently on the market, the 10x10cm demonstration cell still works well in low and diffuse light, generating enough electricity to run a small fan.

Chlorophyll is one of the class of molecules known as porphyrins in which the Centre has taken a special interest. (Haemoglobin, the oxygen carrying molecule that gives blood its colour, is another.) But the Centre's dyes are by no means limited to porphyrns. Behind Dr Campbell on a lab bench are flasks holding other suitable aromatic-compound dyes in vivid shades of orange and yellow.

During Dr Campbell's research career he has witnessed dye efficiencies rise from 0.1 per cent to 7 per cent. This has been achieved by fine tuning both the chromophore – the chemical group that absorbs the light –and the binding group that attaches it to the surface of the inorganic titanium dioxide. Early on, it was thought that larger arrays of chromophores would lead to more electrons being captured; in practice smaller discrete arrays were found to be more efficient at electron injection into the titanium dioxide.

As for that other challenge – engineering a cell that can contain corrosive and volatile liquids – one option may be to sidestep it by using solid-state electrolytes. Here too the centre's dyes are proving their worth. One porphyrin dye has already achieved 4 per cent efficiency in a solid-state cell, "which is as good as any ruthenium dye so far," says Dr Campbell.

Keas' taste for lead endangers wild population

Anyone who has spent time in New Zealand's high mountain huts will be familiar with the pleasures of keas cavorting on the roof, in the early mornings, skittering down the corrugated iron between the rows of what were traditionally lead-head nails.

But lead and keas are not a good mix. Of 15 dead wild keas found in the Mt Cook area over a 10 year period, nine at post-mortem were found to have tissue levels of lead considered to be compatible with death due to lead toxicity. Samples taken from live wild keas showed a similar story: 26 of the 28 birds sampled had blood lead in excess of 0.1mg/l and 12 were in the range accepted to cause severe toxicity.

The samples were analysed by staff at the New Zealand Wildlife Health Centre in Palmerston North, who have been working with the Department of Conservation and behavioural researchers from Victoria University.

Lead is the most widely scattered toxic metal in the world. It is a component in construction materials – such as the flashing and lead-head nails used in older huts – in shot, petrol, paints and batteries.

What is more, for an inquisitive kea, lead is pleasingly malleable and (as the Ancient Romans who used it to store wine knew) it has a naturally sweet taste.

At higher levels, lead causes clinical signs like vomiting and ataxia; at lower chronic levels it is known to interfere with intelligence and learning ability. Lead may be stored with calcium in the bones and deposited in eggshell.

At Mt Cook, DOC staff have been working to identify where the lead poisoning in the keas is coming from and to produce a plan to reduce exposure. This work will be used to reduce lead exposure in other kea areas.

Massey vets are working with the Department of Conservation to determine the extent of the problem in the Mt Cook area and elsewhere in the South Island.

Satellite-tracking the flight of the godwit

E7 has landed. The first ever godwit to have its journey across the Pacific monitored by satellite technology is now going about its business in Miranda, on the Firth of Thames.

E7, is one of 16 godwits tagged by ecologist Dr Phil Battley from the University's Palmerston North campus in February of 2007 in an attempt to track the migrations. The 11,000km southward migration of the godwit from Alaska to New Zealand is thought to be the longest non-stop migration of any bird. Godwits arrive in New Zealand in September each year and the adults leave in mid-March, with adolescent birds staying until they are up to three or four years old. The largest populations are found in the Kaipara Harbour, Manukau Harbour and Farewell Spit.

Dr Battley says that E7 set the record for the longest flight of the 16 birds tagged on the journey north.

"E7 first went to the Yellow Sea, flying 10,200km direct from Miranda in the Firth of Thames, where she was banded up, to Yalu Jiang Nature Reserve in China. She spent five weeks refuelling there and then at the start of May flew to the breeding grounds in Alaska, another 7300km. She went to the Yukon-Kuskokwim Delta and spent the next two months there – she stuck to a fairly small area and was almost certainly breeding.

"She left there about mid-July and went to the mudflats on the edge of the Yukon Delta where she refuelled again, getting nice and fat until the end of August. On or around August 31 she took off, and she landed on September 7."

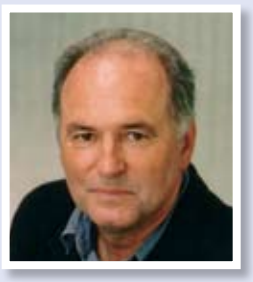
Dr Battley says that on arrival in New Zealand E7 would have "hung out" on the tidal flat. "First she would have had a big drink, a big sleep and got feeding because she hadn't eaten or drunk for a week and her wings would have been really sore after such an incredible flight. Now, essentially, she has a recovery period, does a complete feather moult, and soon it'll all start again. She'll moult into breeding plumage, fuel up again, and take the same route back to the Yellow Sea and Alaska. What's really amazing is that once her chicks have fledged they'll be left to their own devices and will have to migrate to New Zealand without parental guidance."

Dr Battley says it is not known why the godwits migrate to New Zealand. "It's the riskiest migration they could make. They have no other options en-route but an odd coral atoll dotted around. If things don't go well they are in trouble – we know that from last year when we had a bird who had bad winds a lot of the way. It had to change course and flew towards Australia, but it only got as far as New Caledonia where it died, so there is a very real risk to doing this."

Eight of the birds were fitted with backpack tracking devices, and another eight had devices surgically implanted. Dr Battley, who has been working on movements and demographics of godwits for the past three years, has been awarded a $170,000 Marsden Fast Start grant to continue his research. The project will provide crucial information about the migratory behaviour of declining species. Throughout the East Asian and Australasian flyways, 85 per cent of shorebird populations are declining, and 40 per cent of shorebirds inhabiting Oceania are classified as threatened or near threatened.

The satellite track of the godwits' travels can be viewed online at: http://alaska.usgs.gov/science/biology/shorebirds/pacific_migration.html

Individual



Professor Neil Pearce

Over several decades Professor Neil Pearce has significantly contributed to the understanding of public health issues in New Zealand and worldwide.

During the 1980s Professor Pearce showed there were strong socio-economically-linked differences in mortality in New Zealand. His work led to a number of follow-up studies and to changes in health policy.

Work led by Professor Pearce found that the high mortality rate for Māori could be attributed to difficulties in access to healthcare as well as socio-economic factors.

In 1988 he showed that meat workers were at an increased risk of some types of cancer. His findings, subsequently confirmed in overseas studies, have prompted research into the likely aetiological mechanisms.

Asthma and its causes and treatment have been a longtime interest. Between 1976 and 1979 deaths from asthma in New Zealand tripled. Professor Pearce was one of the team of researchers who established that the asthma drug fenoterol was the cause of this alarming upsurge and he was one of those who lobbied successfully – in the face of considerable opposition – for the availability of the drug to be restricted.

(The saga, together with an examination of the issues surrounding international drug safety and the conflict between the commercial imperative and science, is compellingly told in Professor Pearce's 2007 book, *Adverse Reactions: The Fenoterol Story*.)

Professor Pearce has been significantly involved in the development of the international Study of Asthma and Allergies in Childhood, involving more than two million children in 250 centres in 100 countries. He has published a series of reviews and commentaries questioning the importance of the allergic mechanisms for asthma, stimulating interest in non-allergic mechanisms.

In 1998 Professor Pearce was awarded the Silver Medal from the Royal Society of New Zealand, and in 2005 he was elected a Fellow. He is serving as president-elect of the International Epidemiological Association from 2005 to 2008 and will serve as president from 2008 to 2011. He is an honorary research fellow at the Ministry of Health's Public Health Intelligence Unit.

Professor Pearce holds a BSc in mathematics, a DipSci in mathematics and a PhD in Epidemiology, all from the University of Otago. He completed a DipORS at Victoria University in 1978 and a DSc in Epidemiology at Massey in 2003. Prior to joining Massey, Professor Pearce was Professor and Director of the Asthma Research Group at the Wellington School of Medicine.

Professor Pearce founded the Centre for Public Health Research in 2000 when he joined Massey University. The Centre was awarded the Research Team medal in 2006.

Professor Pearce is also the recipient of the Individual Researcher Award from the College of Humanities and Social Sciences and of a University Technicians Award (see page 79).

Supervisor

Professor Barry Scott

During his tenure, Professor Scott has supervised 17 completed doctorates and eight completed masterates. Currently he is supervising one masterate student and three doctoral students.

Professor Jeremy Hyams, Head of the Institute of Molecular Biosciences, who is co-supervising a current doctoral student with Professor Scott, has seen first hand the care and attention he brings to the role of supervisor.

"Critically, he ensures that the student has the background knowledge and more importantly, the confidence, to address an intellectually challenging and experimentally demanding project. Then he gently encourages them to take more and more ownership of the project, designing their own experiments and planning the strategy of the project."

A former student, Dr Austen Ganley, now himself a senior lecturer in Massey's Institute of Molecular BioSciences, remembers Professor Scott's unwavering support, his willingness to immerse himself in a subject in order to offer knowledgeable advice, and his positive editorial input.

As a supervisor, in 1988 Professor Scott introduced a formal oral defence for doctoral students proceeding from provisional to full registration at the end of their first year, a practice now widely adopted within the University.

Professor Scott has a BSc (Hons) and a PhD in biochemistry from the University of Otago. He was appointed Professor of Molecular Genetics at Massey in 1985 after having worked for the DSIR.

The accomplishments of his team include:

- The first molecular cloning and genetic analysis of the gene cluster for the biosynthesis of an indole-diterpene. (The significance of this research was acknowledged when Professor Scott was awarded the 2005 Applied Biosystems Award by the New Zealand Society for Biochemistry and Molecular Biology.)
- New insights into the process of concerted evolution through the study of inter-specific hybrids of grass endophytes.
- New insights into the mechanisms of plasmid integration in fungal genomes.
- The first identification of the evolutionary origins of non-culturable fungal endophytes of grasses.
- The first demonstration that a fungal metabolite can provide protection to a plant host from insect herbivory.
- The identification of a novel role for reactive oxygen species in maintaining a mutualistic interaction between a fungus and a plant.

Professor Scott has been the recipient of four Marsden grants, including one in the 2007 round (see page 15). He has delivered numerous invited presentations at international conferences, one of the more recent being the plenary lecture at the 24th Fungal Genetics Conference in 2007.

Team

Centre staff, from left: Steve Stannard, Maureen Holdaway, Chris Cunningham, Isaac Warbrick, Janice Wenn, Eljon Fitzgerald, Amohia Boulton, Bevan Clayton-Smith, Hope Tupara, Brendon Stevenson, Victoria Simon, Will Edwards, Kelly Rongonui, John Waldon.

Research Centre for Māori Health and Development

The Research Centre for Māori Health and Development has its origins in 1993 in the health programme established by Professor Mason Durie at the School of Māori Studies. Two seminal research programmes were established: Te Pūmanawa Hauora (Māori health research unit) and Te Hoe Nuku Roa (A longitudinal survey of Māori households). The programmes grew and in 1996 Dr Chris Cunningham was appointed as director of health research with one of his first tasks being to bring the two programmes together under a single umbrella organisation within Massey's School of Māori Studies, Te Pūtahi-A-Toi.

In 2000 Te Pūmanawa Hauora established a second office sharing premises with the Wellington-based Research School of Public Health.

In 2003 the Research Centre for Māori Health and Development was formally established as an independent research centre, its mission being to improve Māori health through research and scholarship. Dr Cunningham was appointed Professor of Māori Health and the centre's first director.

With its Wellngton presence being co-located with the Research Centre for Public Health, the Research Centre for Māori Health and Development enjoys strong links with professors Pearce and Gander and their teams.

Since its formal establishment, the Centre has secured more than $25 million in external funding from agencies such as the Health Research Council and Foundation for Research, Science and Technology. The centre's research encompasses such matters as mental health, diabetes and insulin resistance, and the health of both older Māori and children. The Centre is also active in advising Government on the formulation of health policy.

Professor Cunningham attributes the centre's success to its ongoing commitment to workforce development and to the merit of its research programmes.

"While everything in the area of Māori health is a priority, the plans we have around exercise science are particularly exciting. They really draw on our talent in the exercise sciences and the talent within the Research School of Public Health."

Professor Barrie Macdonald, the Pro Vice-Chancellor of the College of Humanities and Social Sciences, describes the centre as an examplar of how to set about building research capacity. Since its inception, the centre has produced 10 Māori PhDs (it currently has 18 doctoral students) and has hosted six postdoctoral fellows.

Professor Durie was named a Companion of the New Zealand Order of Merit in 2001 and elected a Fellow of the Royal Society of New Zealand. Professor Cunningham is an Honorary Professor at the Wellington School of Medicine and a Visiting Research Fellow and Associate at the University of Sydney.

Professor Mason Durie

Professor Cunningham, at right, using an underwater weighing tank to determine lean and fat body mass.

Early Career

Dr Ben Marshall

Dr Ben Marshall has had a string of papers accepted for publication in top ranking finance journals and has received numerous prizes and awards.

He completed his PhD in 2005 and has already had papers accepted by 15 international journals. His publication record has contributed materially to Massey's high international ranking in finance. Dr Marshall's research work in progress has gained acceptance for presentation at the top three finance conferences globally in the face of strong international competition.

If the number of times Dr Marshall's business working papers have been downloaded from the social science research network (SSRN) is used as an index, Dr Marshall already ranks among the top 3.4 per cent of the world's academic finance authors.

Dr Marshall's research has attracted the interest of the financial media, and he is known for his ability to fluently explain complex financial theory. His research expertise is highly valued among students and he is sought after to provide research supervision to students at master's level.

As well gaining rapid acceptance from international conferences and publications so early in his career, he has had considerable success in attracting research funding, including a PricewaterhouseCoopers Global Competency Grant of 4000 Euro.

Dr Marshall is also the recipient of an Early Career Award from the College of Business.

Early Career

Dr Ajay Awati

An expert in mammalian digestion and gut microbial fermentation, Dr Awati is a postdoctoral fellow at the University's Riddet Centre. He graduated PhD at Wageningen University in 2005, after completing a BVSc at the MP Agricultural University in Rahuri, India in 1998 and an MSc at Wageningen University, The Netherlands, under Nuffic University Fellowship Program in 2001.

Dr Awati has published 16 scientific papers in leading peer-reviewed journals, one invited book chapter and several industry reports and scientific abstracts.

Co-director of the Riddet Centre Professor Paul Moughan says that Dr Awati is clearly an up-and-coming young researcher with excellent prospects.

"Dr Awati has had a prolific publishing output, has been a frequent invitee to present at local and overseas conferences and workshops and is increasingly being recognised by his peers as an invited journal referee."

Dr Awati says he was pleased to join the Riddet Centre, a Government-recognised Centre of Research Excellence hosted by Massey University. He has particularly appreciated the ability to work with Professor Moughan and the progressive nature of the Riddet Centre, allowing strong team interaction and exposure to a range of projects.

"Winning the research medal as a person who has just been around for a couple of years and being recognised by the University for the work you do is very encouraging. Certainly the environment created within the Riddet Centre plays a major part in making that possible."

Dr Awati is also enjoying the opportunity to pursue his passion for photography, taking time to photograph many unique New Zealand landscapes.

Dr Awati is also the recipient of an Early Career Award from the College of Sciences.

Early Career

Dr Glen Pettigrove

Dr Pettigrove, who completed his PhD at the University of California at Riverside in 2003, has been a lecturer in the philosophy programme at Massey since 2005.

Dr Pettigrove has had 10 sole-authored articles published in peer-reviewed journals, a further three under consideration. He has also authored a book chapter and presented many papers to professional audiences. The award earlier this year by the American Philosophical Association of the Baumgardt Memorial Fellowship is a measure of the calibre of his work. The award, made every five years, is usually awarded to academics at a later stage in their career.

Dr Pettigrove has two principal research interests. The first is the role of emotion in our judgement of right action. "You don't just want your friends to be in the right places at the right times doing the right things, you also want them to be caring in the right kind of way."

The second is the matter of the way in which groups can be held morally responsible. "There has been an interesting change over the past 15 years as nations, corporations, and other groups have acknowledged moral responsibility for their actions. For example the US apologised to Japanese Americans for how they were treated in World War II. In many cases the wrong was done prior to any current member of the group's existence.

"It's also interesting that 50 years ago this was barely conceivable that a group could apologise or offer forgiveness to another group. The idea that a nation could do moral wrong to a group of people who were not its citizens became salient after World War II due to the treatment of Jews in The Holocaust."

Dr Pettigrove is also the recipient of an Early Career Award from the College of Humanities and Social Sciences.

How to Give

Organisational psychologist Professor Stuart Carr talks to Malcolm Wood

The only way to truly appreciate the everyday reality of the poverty in which a large part of the world's population lives is to witness it directly.

For Professor Stuart Carr, his experience – a life-changing one – came on the continent of Africa, in Malawi, one of the world's poorest nations, average GDP US$600. Fresh out of Scotland's Stirling University with a PhD in Social Psychology, Carr had accepted a contract position with the University of Malawi, arriving with his partner Françoise and their two children in 1989. They stayed for four years.

While there, he witnessed the ousting of President for Life, Hastings Banda. He saw the first depredations of AIDS, the loss of students and colleagues. He came to appreciate a little more the tragedy and scandal of children dying unnecessarily because of preventable diseases like malaria and dehydration, and lack of access to basic health services and health service organisations.

He also came to know the apparatus of the aid organisations on which the Malawian economy has come to depend. Here, he thought, was an interesting – and a socially useful – line of work for a psychologist: to disentangle the human-scale mechanisms that make aid more or less effective.

The people of Malawi are not alone in facing the demon of poverty. In 2004, 980 million people worldwide lived on less than US$1 a day, their plight a stain on the global conscience.

In September 2000, at its New York Assembly, the United Nations issued eight Millennium Development Goals, the first being to eradicate extreme poverty and hunger. Between 1990 and 2015, the UN

declared, the proportion of people whose income is less than $1 a day would halve.

Of course, this was not the first high-sounding aspirational goal to be set by an international agency. Yet, powered by the economic miracles taking place in India and China, this one might just be met.

But exclude China and India and the problem looks more intractable. Take Sub-Saharan Africa, of which Malawi is a part. Between 1990 and 2004, the same period during which Eastern Asia managed the trick of having the percentage of its population living on less than $1 a day fall from 8.9 to 2.1 per cent, Sub-Saharan Africa's percentage fell two percentage points from 19.5 to 17.5 per cent.

How do you best address systemic poverty? Might more aid do the trick? Surely some. But at least as important is making sure that aid is done right; that it works.

There so are many things that can conspire against effective aid. Aid can create dependency. It can distort or destroy local economies. It can create bureaucracy. It may be tied to the sale of services by the donor nation. It may be spent on building roads or infrastructure when the simple maintenance of the roads and infrastructure already in place would present much better value. It may be delivered according to models that fail to suit local conditions.

And then there is the "elephant in the room", says Carr, the not-to-be-mentioned-in-polite-conversation matter of the vast pay disparities between expatriate and host-nation aid workers and the damage this does both to them and to the processes of aid and development.

After Malawi, Carr chose to take himself and his family to Australia, which, he says, was always the long-term emigration goal. For five years he worked in the University of Newcastle's industrial psychology programme, "but the stuff from Africa just wouldn't leave me alone; it was just too important".

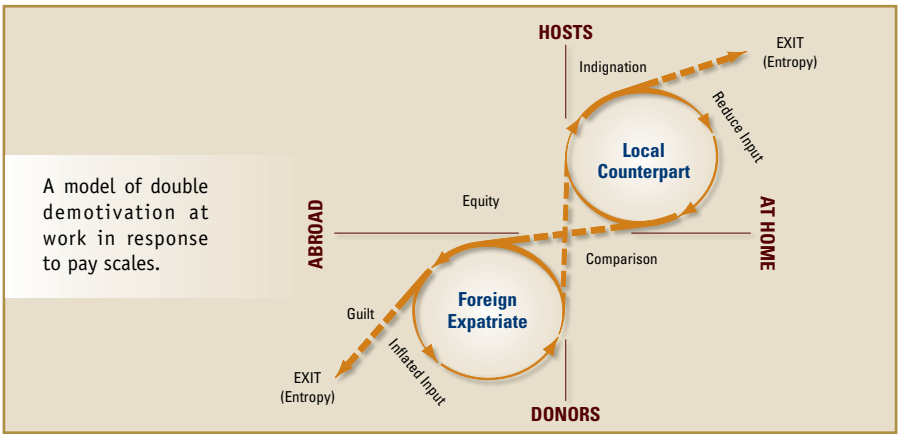
He continued a number of research collaborations with his former colleagues in Malawi, but his interests were regarded as a little left field, so when the opportunity to work for the Northern Territory University in Darwin arose, he seized it, thinking it would put him closer to the issues that interested him. Darwin was, after all, closer to places where development issues were to the fore: to Indonesia, East Timor and southern Asia, and, for that matter, to the indigenous communities of northern and central Australia. (He deplores the Howard government's heavy-handed interventions into Aboriginal affairs.) He stayed for three years.

Massey's Auckland campus, his next port of call, was not necessarily meant to be a long term sojourn (though his father had always told him he had to visit New Zealand). But this time the stars seemed to be in alignment. Of all the universities he had worked for, this was the one that best understood what he wanted to do. As he puts it, the anchor went down. He took out his first-ever mortgage, and he and Françoise and their five children – the oldest is now 20 – took up occupation of a house on the Whangaparaoa Pennisula.

It has been a productive period. In 2003 he published the highly readable text *Social Psychology: Context, Community and Culture* and, in 2004, the Harvard-recommended *Globalisation and Culture at Work: Exploring their Combined Glocality.* (Glocality, says Carr, is the intersection we all occupy between the local and the global: "There is all the a-contextual global stuff coming out of America and the local stuff saying we are not having a bar of that. In reality, neither holds.")

And now? Now to deal with that elephant.

In July 2006, Carr sat down with Wendy James from the University's research services and worked at a computer for a solid day to write an online application for the funding of a multidisciplinary, international team



A model of double demotivation at work in response to pay scales.

project to pursue his interest in exploring the implications of pay disparities within the aid world. The application was addressed to two United Kingdom bodies, the Department of International Development and the Economic and Social Research Council. In October 2006 he discovered he had been successful – a considerable and unusual coup for a Southern Hemisphere-based initiative.

Project ADDUP: Adding Value to Poverty Reduction Initiatives is to examine the vast disparities in pay in the sphere of poverty reduction work. It will examine how people perceive the disparities, how they affect development work, and whether they can be better managed.

And to be sure that the project cannot itself be accused of perpetrating pay inequities, the team – whose current membership includes academics based in Ireland, Uganda, Britain, the Solomon Islands, India and Australia as well as New Zealand – have agreed to a common pay scale.

How significant are the differences in pay rates? When Carr was working in Malawi he and his fellow lecturers, whether local or expatriate, were being paid at local rates. But even on the same university campus a different reality held as well. Here the expatriate 'expert' would often be paid 10 to 20-or-more times the rate paid to the local. The result? Guilt and compensatory emotions on one side; resentment on the other.

It's a scenario that leads to what he calls double de-motivation. The expatriate feels guilty, develops an inflated sense of self worth, and becomes de-motivated; the host-nation worker feels devalued becomes indignant and inclined to lower his or her output in response to the lower compensation.

Another related scenario Carr terms 'Pay Me!'. He gives as a vignette illustrative of aid folklore, the case of a group of villagers asked by aid workers to help unload some drilling equipment to drill a deeper well. With a deeper well, the villagers will no longer need to walk many miles for water during times of drought, yet they refuse to help without payment – after all, the aid workers are being paid, so why should they work for nothing?

Surveys done by Carr since then of aid-experienced respondents have shown that in particular circumstances – say, among communities with a long-term experience of aid agencies – this is exactly the response anticipated. Every gift, he says, also takes something away.

(Carr also writes of a third scenario, this one unrelated to pay disparities, in which the value of aid is compromised by imbalances between the expectation of achievement as an individual, and achievement through the group. Too much collectivism may partly stifle the individual; too much individualism is likely to lead to a backlash from the group.)

Can the matter of pay disparities be addressed? Aren't overseas aid workers entitled to be paid at rates similar to those of their peers who emerged from university and chose to work in their own countries?

Carr says tackling the problem will require some ingenuity, although there are not-for-profit organisations, such as *Médecins Sans Frontières*, that make a particular point of living like the locals.

Is Carr still in touch with people from his days in Malawi? He is, but only occasionally and tentatively. "It's partly fear – fear of finding out who has gone." 'Gone' meaning lost to AIDS, which infects around 14 per cent of the adult population and has largely been the reason that life expectancy has fallen to 37 years.

It's a chapter of his life now closed, he says. Nowadays his territory is Oceania.

But Malawi will always be with him. "People live in different worlds," he says. "The one on the goggle box, it isn't real."

Courting the donor dollar

Professor Carr and ADDUP project coordinator Ishbel McWha.

The images used to present the plight of the poor when organisations are competing for the aid dollar may be counterproductive, says Carr.

He means those stock images with which we are all familiar: the close up of the wide-eyed and pitiable waif – or waifs – in impoverished surroundings.

These images, he says, despite their undeniable emotional pull, have a number of associated problems. One is that many people will naturally recoil from them, averting their gaze or switching the channel; a phenomenon that has also been observed with graphic road safety campaigns.

"Although they may be effective for a particular religious segment of the population, a lot more people get disaffected by those images. They find them distressing."

A second problem is that the photos show their subjects as passive. "The risk at an implicit level is that we begin to think 'These people are hopeless cases, we keep throwing money at them and it isn't working. Maybe it's something wrong with the culture or the people...' That's the risk. Most of us don't want to think like that but a lot of psychology points to the fact that we can end up with these stereotypes whether we like it not."

One of Carr's honours students, Ishbel McWha, devoted her research thesis to just this topic, gauging reactions to photographs cropped to show victimhood (the wide-eyed child) or wide-framed to show context (that child at work in a classroom).

(McWha, who recently returned from aid work in India and Cambodia, is now Project ADDUP's co-ordinator.)

Caritas and Oxfam are two organisations that win praise from Carr for adhering to codes of practice specifying that any image used in advertising or publicity must respect the dignity of the people portrayed.

Classroom Culture

Nāu te rourou, nāku te rourou, ka ora tātou katoa.

[Your food basket and my food basket will provide for everyone.]

Associate Professor Jill Bevan-Brown talks to Malcolm Wood.

If you did not know, you might not guess. "Bevan-Brown" sounds impeccably British and Associate Professor Jill Bevan-Brown's appearance matches her name: fair complexioned, with a wave of fine fair hair and an engaging smile. The accent is educated middle-New Zealand. But Bevan-Brown is very much Māori, genealogically through her father's side, in her personal identity and in her working life, where she is doing all she can to improve the education outcomes for Māori children with special needs

The mismatch between who people automatically assume her to be, and who she actually is, has occasionally given Bevan-Brown a privileged view of the state of race relations in New Zealand.

"While at boarding school I once went to a classmate's home for Sunday lunch. I remember the mother in this house talking about the Māoris down the road and how dirty and horrible they were. So I stood up and told her off." She chuckles, a little embarrassed at her cheek. "I was never invited back." A pause. "I got myself into hot water a few times."

Jill Bevan-Brown grew up in Wellington's Porirua basin. Her mother was (and remains) a New Zealander of Irish extraction; her father, a Māori. He was also an All Black at a time when South Africa – New Zealand's rugby arch-rival – refused to play teams containing 'coloured' players. For most of the 20th century, this was just the way things were. But in the early 1950s, when Bevan-Brown's father found himself excluded from the All Black side to tour South Africa, there was increasing disquiet. "When I was little, there were reporters coming to the house and asking him what he thought about not being chosen," says Bevan-Brown, who felt the injustice with a child's intense sense of *fair* and *unfair*.[1]

Bevan-Brown did well at school, then went off to train as a teacher – one of the several then conventional career options for a bright girl. She did a three-year teaching qualification at Wellington Teachers College while working on a bachelor's degree at Victoria University.

After graduating as a teacher, she taught for a while in the Porirua basin, before heading to Britain, where she became a supply teacher.

Along the way, she often found herself dealing with children from outside the mainstream culture and with children who had special needs.

Her classes in Porirua – a satellite city to Wellington, with a large proportion of state houses – included many Māori.

In Britain, her classes were populated by the children of Caribbean migrants, many of whom had English as a second language. "My worst class was all boys and had, I think, just one white face," recalls Bevan-Brown. "In the first half hour they were throwing things at me, they were climbing out the window. It was your real *To Sir with Love*-type classroom. Just horrible. When I came back from morning tea one student said to me 'Hey, miss, what are you doing here? No one has ever come back.' I thought, 'You are not going to beat me.'" Eventually Bevan-Brown found the one child in the class who was interested. "And then another child started listening and then another and soon I was teaching the whole class. By the end of the week it was a reasonable job."

At the close of her OE she returned to Porirua, this time as a Guidance and Learning Teacher, visiting intermediate schools to assist teachers in working with children who were experiencing behavioural and learning problems. The root cause? "I found the majority of problems arose because children couldn't cope with the level of work they were being given. Children reading at the age of a six-year old would be given reading material designed for their chronological age of 12. That's why they had started playing truant or becoming abusive."

Next Bevan-Brown took up a position at the Otaki Health Camp School, catering to the children referred for six-week stays at the health camp for a variety of health-related, behavioural, and family problems. Again, reflecting the national indices of relative social disadvantage, the children were disproportionately Māori. It was while with the health camp school that Bevan-Brown did her master's degree extramurally. "I realised I needed some 'topping up'," she says. Then came a graduate one-year diploma course in teaching children with special needs. This was at Massey, as was the PhD which followed. "And I have been here ever since," she says.

At this point a brief history lesson may be in order, for the landscape of today's Māori education is vastly different from that of 1990, when Bevan-Brown joined Massey's staff. In 1990 the first kōhanga reo (early childhood education centres where teaching is in the Māori language) had just turned eight and the first kura kaupapa Māori (state schools where teaching is in the Māori language) had reached the grand old age of five. Bevan-Brown had a number of questions she was eager to answer, but no research literature to turn to. "What is the Māori perspective on intellectual disability? What do Māori parents want for their children who are intellectually disabled? Do they get different services? Do they need different services? Back in 1989 there just wasn't anything out there. My first research project, which was on Māori perspectives of intellectual disability, was borne out of necessity."

The book that resulted from Bevan-Brown's PhD thesis, *Cultural self-review: Providing culturally effective, inclusive education for Māori learners*, is used by schools and early childhood centres throughout New Zealand.[2]

How might the Māori perspective on special needs differ from that of mainstream New Zealand and why should it make a difference? One difference might be in how a special need affects interactions within a culture.

Consider autism or, more broadly, Autism Spectrum Disorders (ASD). Someone with ASD will have difficulty in learning to engage in the give-and-take of everyday human interaction. Frequently he or she will avoid eye contact, and interpreting the thoughts and feelings of others, something most of us do instinctively, is something the child with ASD struggles with. It is not an easy condition to live with, but within Māoridom it presents still greater difficulties. "One important value for Māori is *whakawhanaungatanga*. When you meet someone new, you want to know: Where they come from? What tribal area? Who are their whanau? Do you have any relatives in common?" ASD does not sit easily

with the practices of *whakawhanaungatanga*. Within mainstream culture, a certain degree of social reticence or awkwardness may be less of an impediment. "Autism is a medical diagnosis which is outside of culture, but how it plays out in children's lives is influenced by cultural practices, beliefs and values," says Bevan-Brown.

'Giftedness', on the other hand, is a mutable concept, one that shifts according to cultural standpoint. There is such a thing, Bevan-Brown writes, as cultural giftedness, by which she means not just culture-specific giftedness – such as, say, in Māori arts, craft, music, history or language – but also giftedness within culturally-valued properties. These might include such things as *awhinatanga* and *whakaritenga mahi* (helping and serving others), *māia* (courage or bravery), *manaakitanga* (hospitality), and *pukumahi* and *pūkeke* (industriousness and determination).

There are also differences in the way cultures view giftedness as a property that can belong to individuals or groups. Mainstream Western culture views giftedness as a quality that belongs to the individual; Māoridom extends this to the concept of giftedness belonging to the group. And this doesn't just mean that the sum of the individual talents is greater than its parts: Lennon plus McCartney gives you the Beatles. It means that the giftedness is inherent within the group and it is the act of the group working together that sparks the gift. A gifted group need not consist of members who are each considered individually gifted.

This is a message Bevan-Brown often finds herself delivering to teachers. "Sometimes a group of Māori kids have produced say a brilliant science project, and the teacher will say, 'Gee, I wonder which one of them is responsible for this.'

"I tell teachers, 'Well it may not be any one child, it may have been produced by the interaction of the group, by the kō tahitanga.'"

Of course that doesn't mean that there aren't individually gifted Māori children. "I asked one school about what they were doing with giftedness and they said they did team sports, because Māori are gifted in team sports. "I said 'Yes? What about [champion golfer] Michael Campbell?'"

Nor is her wider definition of 'giftedness' meant to lead to children being glibly declared to be, say, 'gifted in helping and serving others'. Rather, what Bevan-Brown is doing is urging teachers to be alive to the variousness of children in their classrooms and to respond to their individual needs and circumstances. "Teachers have to provide for the children they have in their class, and those children

aren't all average white middle-class kids; they are Asian or Māori or Samoan; they are kids with special needs and special abilities. That's the challenge of teaching. If we are teaching to the middle, to the norm, then all these other kids are missing out. I acknowledge that it's a lot to ask, but that's the responsibility that goes with being a teacher."

In the 18 years since Bevan-Brown began her research career, there have been many changes in the provision of education for Māori.

> **"... they said they did team sports, because Māori are gifted in team sports. I said 'Yes? What about Michael Campbell?"**

Today a generation of young people schooled entirely through kōhanga reo, kura kaupapa Māori and whare kura are entering the workforce or higher education. There are now university degrees – such as Massey's Te Aho Tātairangi (BEd Teaching) – that are delivered entirely in te reo.

In fact, so rapidly has the provision of Māori immersion education grown that it has outpaced the ability of the system to provide the requisite special education specialists. "You can count the number of speech language therapists who speak Māori on one hand. People who can sign in te reo Māori, you can count them on one hand too," says Bevan-Brown. But scholarships are on offer for Māori to train as speech language therapists, and in the meantime there are ways to work around this. "I have seen speech language therapists who can't speak Māori going into kura with someone who does to do the translation."

Another marked change in the education environment is in the willingness to fund research into Māori special education. "When I first started, the attitude from officialdom was often, what's the point? Now almost any research project will have a Māori component," says Bevan-Brown.

As her research has progressed, Bevan-Brown has formed networks of firm friends. Parents she once interviewed for her study of autism have now formed a group to create and distribute ASD resources, such as informational DVDs. "When a Māori child is diagnosed with ASD, you need information that you can give to the whānau," Bevan-Brown explains. Calling on the help of her brother, a lawyer, Bevan-Brown has been involved in setting up a trust to enable the group to access funding to develop these resources.

Bevan-Brown finds working with people with special needs constantly uplifting. Currently she is researching the experience of being Māori and visually impaired. Some of her subjects go jogging. One is building a yacht. Another explained to her that he wasn't allowed to used the coffee making machine, all the while very competently doing just that. What hampers these people is not so much the disability as society's attitudes, says Bevan-Brown. We can do better.

Just this last Sunday a kura-based teacher told her about a child with ADHD (Attention Deficit Hyperactivity Disorder). "She said how delighted the therapist working with the child had been to find that that child was 'Josephine'; not, as she might have been elsewhere, 'the child with ADHD'."

In valuing inclusiveness and cherishing the worth of the individual, Māori education may have much to teach all of us.

1. Recently, in a nice coda to her father's exclusion from the team to tour South Africa, one of Bevan-Brown's nephews toured South Africa as a Hurricanes rugby player.

2. *The Cultural self-review: Providing culturally effective, inclusive education for Māori learners*, Jill Bevan-Brown, NZCER, 2003. ISBN: 1-877293-25-3

Staying cool

Professor Don Cleland talks to Anna Meyer.

Each year, many billions of dollars worth of beef, lamb, kiwifruit and other food products make a sea journey of several weeks, reaching Europe and other markets in excellent condition. Behind this almost miraculous phenomenon is an active, evolving field of research in refrigeration technology. "New Zealand is uniquely dependent on refrigeration," says Professor Don Cleland, Head of Massey's Institute of Technology and Engineering. "Our economy is still largely based on agricultural production, and we are a trading nation. Approximately half of our exports are food, and about two thirds of that is refrigerated."

Cleland's research group's work covers areas as diverse as moisture movement, heat pumps for water heating (see Pump it up), energy efficiency in industrial refrigeration, heat transfer rates during freezing and chilling, product weight loss, and air infiltration into refrigerated facilities. "There are still lots of developments being made in the refrigeration area. We've done a lot of product-related research, as well as what I call 'creating cold' by the refrigeration

system itself, where the main emphasis is around cost and energy use," he explains.

Several changes in recent times have provided a push for new research in refrigeration. First, as well as traditional bulk commodity products like legs of lamb and other large pieces of meat, the trend in exporting is to send more highly processed, 'value-added' products overseas, many of which have particular refrigeration needs. Ready-to-eat prepared meals, for example, pose many challenges. In theory, each of the meal's ingredients – say, perhaps, meat, vegetables and pastry – should have its own refrigeration regime; in practice accommodations must be made. Then too, the large surface area of the ready-to-eat meal means a greater risk of microbial growth, particularly when it must withstand a long sea voyage.

"Refrigeration is much more difficult when a product is a ready meal than if it is just meat or vegetables alone," says Cleland.

An international trend for consumers to prefer fresh over frozen has also brought challenges for refrigeration technologists. "People are getting a lot fussier – they perceive that frozen isn't as good quality as fresh. So there's a drive to, where possible, supply fresh goods. We used to export mainly frozen products because they last longer, but the technological developments over the years now mean that we can export chilled products instead. But that in itself is a challenge. There must be a lot more emphasis on controlling the cold chain and designing appropriate packaging, because you need to get longer shelf lives."

Cleland has been at Massey since his student days, helping to build a research team that has produced students who have spread to many areas of the world. "I did a biotechnology degree, where I did projects that involved growing microorganisms. They're very unreliable in their behaviour, so I decided to get into something more on the physical side – that's a bit more predictable," he laughs. "My brother was involved in the refrigeration area at Massey at the time, so there was also a bit of a legacy to follow."

Cleland's early work, which he considers a career highlight, involved investigating the rate of heat transfer from food products as they are cooled or frozen. "We led the world in that area, and the ideas and concepts developed are still reasonably state-of-the-art. One of our key contributions was quantifying the effect of shape on rates of heat transfer. We came up with a formula to calculate shape factors that was simple yet sufficiently accurate for industrial practitioners," he says.

These early efforts have led to a variety of related research. "A lot of our work involves mathematical modelling of processes, which then become the basis of a prediction tool – you can apply knowledge gained from one system to different applications," Cleland explains. For example, for every new commercial food product, an appropriate freezing or chilling process, packaging system, and storage and transport procedures are needed, and appropriate mathematical models can be a tremendous help with the design and optimisation of these processes. "We're trying to provide methods so this can be done quickly, systematically and more accurately, rather than being by trial and error. The research gives confidence that what is being designed is going to be commercially viable."

One of Cleland's most active current areas of research involves energy efficiency improvement for the food industry. "Energy

is 5 to 10 per cent of costs for some of these businesses, and refrigeration can be a major energy user," he says. "Most of our work is about operating the systems they have more efficiently, and giving the company confidence that in making changes, they're not going to compromise reliability and product quality, which from their perspective, is more important than reduced energy use." He stresses the importance of ongoing relationships in this line of work, in order to make real, long lasting changes. "Energy efficiency is often seen as an area where you can just go in and do an audit and then leave, but you've actually got to engage with the staff and organisation on an ongoing basis because implementation of the audit recommendations and making them part of normal practice is hard to do but essential." To help foster these relationships, Cleland and his colleagues run courses for industrial practitioners. "These involve presenting research findings so they can use them to improve what they're doing," he explains. "By doing this we also get to understand some of the issues that they have, and that allows us to target our research to address issues that are important."

One such issue that Cleland is currently investigating is moisture movement in refrigerated facilities, which is a big problem for the industry. Moisture contained within food tends to slowly evaporate when the food is refrigerated or frozen, due to a lower moisture content in the air compared to the product itself. Anyone who has left a carrot or apple in the fridge for too long will be familiar with the floppy, shrivelled, unappealing object that eventually emerges. A similar process occurs with frozen products – the ice inside them sublimes, causing the drying effect known as freezer burn. Not only does moisture loss cause a quality issue in terms of texture, appearance and taste, it also reduces the weight of the product which, as many products are sold by weight, leads to a direct loss of value. "We're looking at how to reduce this," says Cleland. "Packaging can help, but does not always stop it. Another thing we can do is to control the relative humidity – if we can get this high then there will be less weight loss."

A related problem that Cleland is also working on is moisture uptake by the cardboard packaging which is commonly used in the food industry. Cardboard soaks up moisture a bit like a sponge, losing strength in the process, while at the same time lowering the relative humidity of the air, which can accelerate product weight loss. "If you have a box of apples and you go to pick it up and the handholds pull away because the packaging's moisture content is high, then that's a waste of time and money," says Cleland. "There's a tension between keeping packaging dry, yet not lowering the relative humidity and getting more weight loss in the products. We're looking at the rates of moisture uptake by various packaging. The results could affect how we design our refrigerated facilities to increase or decrease the relative humidity of the air, and also how to design the packaging to ensure it retains enough strength if it does get damp."

Cleland enjoys being part of an industry that is so important for New Zealand. "The big buzz for me is as a country we are dependent on refrigeration, and creating that underpinning knowledge means that we can continue to extract value out of our inherent advantages, like our climate. I like that I can contribute to translating that into economic benefits."

Pump it up

Most household water heating systems still rely on traditional electric immersion heaters, which simply consist of an element inside the hot water cylinder. Like oversized electric kettles, they are not particularly energy efficient, as they rely entirely on electricity. More sustainable alternatives are desirable, both economically and environmentally, but currently, only a limited number of alternative systems are available. The most familiar one is solar water heating, which uses heat from the sun.

In conjunction with a local company, Cleland is developing an alternative for energy efficient hot water - an electric heat pump. Like the familiar heat pump systems for heating rooms, the water heating system will use heat from the air to help produce hot water, meaning it could use less than half the electricity than an immersion heater, for the same hot water output.

Heat pumps operate on a fairly simple principle – the refrigerant collects heat from the ambient air and is evaporated from a liquid to a gas, and is then compressed. The heat is then transferred to the water, while the refrigerant is cooled and condenses back to a liquid. To begin the cycle again, the refrigerant is expanded back to a low pressure so that it can evaporate again, collecting more heat from the air in the process. "It's a refrigeration cycle, but instead of cooling, we are interested in the heat rejection," says Cleland. "We consider this system is 'virtual solar'," he says. "The sun heats the air, and most of the energy that we're putting into the water comes from the air, with just a small amount of electricity to upgrade it to a higher temperature. Over a year, the amount of electricity use compared to electric immersion for solar is in the order of a third to a half. Overall, we are trying to provide the same outcome, but hopefully we're going to be able to do it cheaper, and in a bit more reliable way than solar water heating."

There are some technical challenges involved with the project, mostly surrounding the high water temperatures that need to be achieved. "To heat up a room, you're only trying to get the air temperature to perhaps 25°C maximum, whereas we have to get the water to 60°C. It's a bit trickier to do that whilst keeping the heat pump energy efficient."

The system they are developing could be used with new hot water systems or connected into existing ones, making it very versatile and potentially relatively portable. "The challenge is that we want the technology to be invisible – the outcome, hot water, is the same as with current systems. However, we're trying to lower the life-time costs, so it becomes a very good investment."

All the world's a stage

From New York, Associate Professor Dorita Hannah talks to Alexander Bisley.

From Wellington to New York, from Prague to Lebanon, for Dorita Hannah, all the world's a stage. "My focus on Performance Studies provides a lens on the world that reveals life as a series of layered and complex performances: from everyday encounters to aesthetic displays to political events, where (in the words of my American colleague Jon McKenzie) we 'perform or else'," she says.

Performance and architecture are the key strands that run through Hannah's art, teaching and research. As a Catholic schoolgirl, she wanted to be an architect and build churches. Now long-lapsed, she designs performing arts buildings and the events they house. "There is a connection to theatres which, last century, replaced churches as temples, especially for the avant-garde, who saw them as sacred places of public communion."

This Massey Associate Professor of Design has gone bush in New York to complete her PhD dissertation. "I hide myself away in a Chelsea apartment, shared with a friend who is also ABD (All But Dissertation), and treat myself to theatre, galleries and meals with friends, but generally I spend time reading, writing and scouring library shelves."

She is addicted to the energy of New York City and all it has to offer: great events, food, lectures, exhibitions and scholarship. "It is not easy to make work in NYC because it is a city for consuming rather than producing. However, I have enjoyed teaching my own courses at Parsons and Columbia."

One highlight is New York's food culture. "I am interested in culinary performativity and my roommate, Mitchell Davis, who is a fabulous foodie, has introduced me to the complexities of the medium." The two are currently organising an international conference and workshop on *Food, Performance and Landscape* to be held in Italy in 2009, which will be based in and around a Renaissance garden in Florence.

Hannah has had a longtime involvement with the Wellington International Arts Festival on both sides of the stage. She says it provides an essential opportunity to bring the world to New Zealand. Because the performing arts rely on an actual experience of the spatial and time-based medium of live performance (in real space and real time) it is critical that we get to see what is happening in the very best of theatres around the world – to take part in the lived and participatory experience of performance, rather than to reconstruct various productions through photographic images and DVD material. "So to witness the theatre of Robert Lepage or the compositions of Heiner Goebbels or the choreography of Teresa De Keersmaeker is magic for us, it bridges the vast physical distance."

However, Hannah says what we see in the Festival are well-honed touring pieces that have been developed and refined through substantial budgets, lengthy rehearsal periods and general support for the arts. "What New Zealand artists require is the same support for new works so that they can also travel the world. The Festival has become a major producer of new work, which is fantastic and much appreciated by the performing arts community."

Hannah says, however, with often only four weeks to develop and rehearse a work it is

HerTopia (September 2005) Rooftop dancers in Athens © *Fotis Traganoudakis, www.publiceye.gr*

difficult to compete on the international stage. "It's not that we aren't making projects of a world standard, it's just that we aren't receiving the time and support to get them to a stage where they reflect the huge talent that lies behind them. This could be seen in the 1996 production of *Ricordi*, which I participated in, and that I believe was an extraordinary gathering of artists and a magic production based on Katherine Mansfield's short stories. However, it was not easy to create such an ambitious new work in so little time, and unfortunately little energy was left to take it further, although it was a stunning and original piece of New Zealand performance."

Another one of Wellington's strengths is its tertiary institutions, Hannah says. "It is my belief that the most exciting performance work is coming out of the teaching institutions such as VUW, Toi Whakaari and Massey. They are also creating the artists of the future through their programmes."

Dorita, at right, presents the *HerTopia* project model and research to the dancers in Athens.

Hannah has been excited to be part of Massey's design school. "The College of Creative Arts – and particularly the Design School – is a great asset for Massey. It is also helping the University review what research can be as a cultural and creative endeavour. I am particularly grateful to Professor Duncan Joiner. Our great success in the PBRF owes much to his former role as Head of the College of Design, Fine Arts and Music. He supported and encouraged my international involvement in projects such as the Prague Quadrennial."

Hannah is acclaimed for her work at the Quadrennial, the Olympics of theatre design. The Quadrennial is a four-yearly international exposition on theatre architecture and design involving over 60 countries. New Zealand has exhibited there for some time through the instigation of Wellington's Raymond Boyce and Auckland's Ian Aitken. In 1995, Hannah was selected to represent New Zealand. She felt that we could make a greater impact through the way we displayed our work, subsequently forming a design guild, which hosted a national exhibition and symposium for the Wellington Festival in 1998 and received funding to design and construct a touring exhibition. *Landing: 7 stages: Aotearoa/NZ* gained a UNESCO Special Prize at Prague Quadrennial 1999. From this, Hannah was invited to direct the design of the central exhibit for Prague Quadrennial 2003. "This was an amazing collaboration with fellow Wellington designers Sven Mehzoud and Lee Gibson and it was widely published and presented, receiving a NZIA (NZ Institute of Architects) award for architectural research."

She has just been on the international jury for the 2007 Prague Quadrennial, awarding gold prizes to the best set, costume, production designs and theatre architecture. While there she also ran a three-day design workshop, convened an international panel on theatre

Aarero Stone, Wellington 2006
© *Robert Catto, www.catto.co.nz*

architecture and became Vice-Chair of the History and Theory Commission for OISTAT (International Organisation for Scenographers, Theatre Architects and Technicians). "It was such a privilege to spend the time with designers I greatly admired looking at a vast range of work from all over the world."

The Quadrennial is charged with history. "It was set up in 1967 as a way of bridging East and West, celebrating design and architecture for the performing arts."

This was the year before the Prague Spring and yet the Quadrennial thrived; the city has since survived the Soviet regime and undergone massive changes, becoming part of the European Union and a celebrated tourist draw.

"There remains a great sense of history and a commitment to art and thought. The people organising the Quadrennial have lived through a lot and believe passionately in this event, which is a gathering ground for international theatre designers."

What does Hannah want audiences to take away from her work? "I am interested in how the design contributes to the total experience as an integrated but highly performative feature, having an active force within the performance rather than providing a passive backdrop. For me, the scenographer is a theatre artist commentating on the contemporary condition as much as themes in a play. My design work tends also to refer to the space within which people gather, emphasising their role in history as a community of active participatory watchers, listeners and witnesses. This is also important for me as a theatre architect where my aim is to bring about the most dynamic and engaged relationship between performers and audience, public and theatre professionals, city and venue."

Style-wise, you could say her theatre work is architectural and her architecture is theatrical. Her creative philosophy poses a huge question: "And one I cannot answer quickly and easily because my philosophies are changing all the time with experience. I believe in interdisciplinarity, collaboration and cross-cultural dialogue, and this has driven my work as a designer, architect and teacher. I do not believe in the heroic singular artist, which is why I focus on theatre, where truly creative productions are dependent on strong working relationships. Good collaborations are not easy and require standing one's ground whilst acknowledging that it is a shared ground. I do not believe in compromise but in seeking creative alternatives that satisfy the complex challenges of a project, often improving one's original preconceptions. Being challenged can enhance the work for all involved and the rigour in the work is consequently and unconsciously experienced by the audience."

Knowledge is in constant flux, Hannah says. "Teaching for me is critical to research. I am inspired by student responses to design projects and how they contribute to my own thinking. I do not teach because I know the answers but because I want to be stimulated and delighted by solutions proposed to the challenges I set. I have had the good fortune of being able to include students in many of my projects as collaborators and to take some of them to Prague, Berlin, Antwerp and Rome to participate in international design workshops."

Successful work, Hannah says, shifts consciousness in some way. "It is transformative, even if very subtly. It somehow allows us to see the world afresh. I am also interested in the cultural effects of work as social commentary and a harness of community. This is true of good art, design, architecture and performance."

Her advice to the youngsters, channelling Katherine Mansfield, is "risk everything". "I think that when you are young you can afford to take risks. You learn how critical this is to your work as you mature. Fear of failure can be debilitating whereas out of failure beautiful

HerTopia, Dancers on Aqueduct at dusk, Athens, 2005
© *Fotis Traganoudakis, www.publiceye.gr*

HerTopia, Dancer in courtyard, Athens, 2005
© *Fotis Traganoudakis, www.publiceye.gr*

Aarero Stone, Dancer in pool, Wellington, 2006
Photograph by Paul McCredie

things can emerge. I am also interested in how young New Zealanders can be in-the-world without permanently leaving the country. Our distance is a great challenge but can be bridged through technological communication and necessary live interaction. Robert Lepage has said that the 'universal' is more important than the 'global' and this can only emerge from exploring the 'local'. It is therefore critical that we develop our own means of creative expression as makers in New Zealand and the Pacific but without too much self-consciousness... culture is dynamic and always in flux."

Hannah enjoys having a dynamic, busy life. "It is both exhausting and exhilarating. Life is to be lived as fully as possible, pushing my comfort zone and enjoying how experience accrues. A Chilean colleague gave me a fridge magnet that said 'do something everyday that scares you'. If we don't cross those thresholds we don't enter new spaces."

Her current main objective is to complete her PhD in the Department of Performance Studies in the Tisch School of the Arts at NYU. "My doctorate combines spatial theory and performance theory to review theatre architecture, particularly how it was influenced by the historic avant-garde early last century. It takes modernism as a period where architecture rejected the theatrical and performance rejected architecture, proposing some spatial models that arose from the avant-garde that were never realised in built form."

Hannah's currently co-editing a book on performance and has an ongoing collaborative relationship with choreographer Carol Brown. Their collaboration *Aarero Stone*, which featured as part of last year's Wellington Festival, was described by Lumiere's Kiran Chug as "irrevocably moving". They are now working on a dance-architecture project called *HerTopia* that began at the Duncan Dance Research Centre in Athens and which they hope to develop further in other locations in the region, such as Cyprus, Lebanon and Turkey. "It asks questions about freedom in these times where wars are fought in its name. Unfortunately last year's attack on Lebanon meant cancelling a workshop we had planned there for the project."

Hannah is better known overseas than at home, but accepts it as a local condition. "I keep returning to New Zealand because I enjoy the challenges it offers and its particular evolving place in the world. We remain a pioneering country, which is very difficult to deal with sometimes but satisfying to be part of."

She enthuses about ever-advancing technology. "Technology has been advancing since a man struck two pieces of flint together or a woman wove a screen to provide shelter. It has always been incorporated into theatre to create the magic of calling those from other times and places into the here and now. The virtual has been part of performance since stories were first told or enacted. Therefore any form of technology can be utilised as, in the words of Heidegger, a poetic 'challenging forth'. Hannah is intrigued by the tensions and possibilities of theatre versus film. "The greatest challenge to theatre has always been film, which in many ways has replaced it as the popular art form. I am therefore interested in looking at where theatre and film cohere and diverge as 21st century art forms. The critical difference for theatre is its 'liveness' which technology can enhance and critique."

But theatre is a communal event; does Hannah worry about society becoming more individualistic and online? "I believe that ultimately people still like the comfort and immediacy of sharing space and time with others. They still enjoy the dynamic force of a collective event – be it a sports game, a fireworks spectacle, a political rally, a lap-dance or a picnic. An awareness of this allows us to review what theatre is and where it occurs, realigning it to become more significant for our contemporary condition where technology can bridge the vast distances and bring us literally closer as embodied participants in cultural life."

The French connection

From his office in central Paris, overlooking the Eiffel Tower, Professor Ralph Sims is buoyant. At last the world's attention is turning to the problem of climate change and sustainable energy, and he is making a difference.

Sims is in Paris on a secondment to the International Energy Agency, where he is writing for the 2008 World Energy Outlook. He is a coordinating lead author of the chapter on energy supply in the report *Climate Change 2007: Mitigation of Climate Change* published by the Intergovernmental Panel on Climate Change.

There can be few people better qualified for the role. Professor Sims has devoted his 34-year career to energy research. Currently the director of Massey's Centre for Energy Research, Sims has lectured in renewable and sustainable energy for many years, served on the New Zealand Energy Efficiency and Conservation Authority, and immersed himself in projects ranging from renewable energy for remote rural communities to driving a biodiesel powered car for the Energy-Wise Rally. (Sims made his first biodiesel in 1973 using tallow as his feedstock.)

In 2003 Sims was awarded a Silver Medal by the Royal Society of New Zealand for his conspicuous contribution to the science and promotion of sustainable energy.

He talks to Lindsey Birnie.

What do you like most about living in Paris?

The thing I like the best is getting out on my bike. I live by the Louvre and my office is by the *Tour Eiffel* and I cycle along the Seine. Paris shuts off some key roads on Sundays and has them just for cyclists and rollerbladers, so when we have friends over we hire a couple of bicycles and take them cycling down the Champs Elysee.

How did the IEA secondment come about and what are you doing?

I was the New Zealand delegate on the IEA renewable energy working party for five years or so. IEA is very much focused around collaborative research networks and sharing information. The renewable energy unit was short-staffed so New Zealand offered me to the renewable energy unit for six months as a contribution-in-kind.

With half the world's population living on less than US$2 a day, how do you balance raising living standards and sustainability?

You can't get sustainable development without access to energy, and you can't get energy sustainability without it being renewable energy and used efficiently, therefore we have to leapfrog those technologies requiring coal, oil and gas and jump to renewable energy technologies.

What about population growth?

Population growth is going to have a huge impact. From six to nine billion people, if those people are going to have the same lifestyle as we do in New Zealand then we need five to six planets. But how can you stop people having children? In many developing countries these children are their social welfare for their old age. Say you have eight or nine children, five or six will survive and three or four may be able to provide food to keep the older people going.

It is going to put extra strain on all the resources.

If you could nominate one change worldwide, what would it be?

Can I have one globally and one nationally? Globally it would be to do with transport … strong regulations to reduce car size to family saloons. So many people are buying bigger cars than they need. I'd like the status symbol to be a small, efficient car rather than a big fuel-guzzling one.

Because of the increasing oil price there has been some change of attitude, but it's been very marginal. It's just so wasteful when you see one person sitting in a limo in a traffic jam for hours.

If I had one wish for New Zealand it would be to have the building code mandate solar hot water heaters and the proper level of insulation. The owner of a new house would recover the extra two or three thousand dollars it might cost in four or five years and for an older house the sums might be even more attractive.

So what's your car?

I don't have a car. I'm selling the one here [Palmerston North]. The interesting thing is when you get to China they ask you what car you drive … they are all desperate to have cars for their status; they want to get off their bicycles.

Tell us about the potential of biofuels?

Worldwide there is a limited opportunity, but in New Zealand if we really wanted to grow biofuels and it was cost effective, we could do so: we have an agricultural base, a group

of skilled cropping farmers, a good climate and low population.

The opportunity cost is too high right now, but, if the oil price goes up and stays up and if meat and wool products are relatively low value, there could come a point when growing biofuels is a better option rather than selling meat to import oil.

There are three uncertainties: the future meat price, the future oil price and the future exchange rate. The Government's role, I suppose, is to see if there are incentives to encourage growing biofuels.

You've changed your stance on nuclear energy... or have you?

Modern generation-three nuclear energy includes security and waste treatment within the plant. It is actually a better technology for China and other places than building more coal-powered stations.

In New Zealand, nuclear doesn't work because one power plant would be a huge chunk of our energy needs – if the plant shut down that would not be good. Also, there's the infrastructure needed to support it: you'd need to import the uranium and transport the waste and to secure it. Just for one plant it doesn't make sense. In Australia they could have five or six plants so they could have the infrastructure to manage the waste etc.

The smallest generation-three plant is 1500 megawatts – that's about one-sixth or one-fifth of New Zealand's total energy supply. But watch this space… when we get 5-6000 megawatt power plants then we should consider the options. Everybody wants energy but nobody wants power stations whether they be nuclear or whatever they may be. The one bit of technology people may accept is solar panels on the roof!

You've said it is easier to change technology than change people... Is there a case for a global taskforce on changing behaviours?

Probably not, because it varies so much from country to country, and there are all sort of cultural implications. Maybe it would be good to start by measuring not dollars of GDP growth but dollars in worth of happiness.

When economic growth and population expansion go hand-in-hand it's a no-win for the planet – somehow or other we have to change this drive for economic growth at all costs.

What role should New Zealand's universities play in moves to ameliorate climate change?

Our role is to produce people who can develop a scientific, political and social understanding of this whole area; who can raise public awareness; who can design and install appropriate technologies. We need skilled people, whether they be trades people or planners and policy makers in Wellington.

What happens to you next?

Next year I will be working on the *World Energy Outlook*, the publication that comes out from IEA every year. Climate change is the main theme.

The Corrections

Professor Henk Berkman talks to Juha Saarinen about what happens when markets and human behaviour interact.

When Professor Henk Berkman looks out from his corner office on Massey's Auckland campus over some of the remaining still-rural North Shore, it must be with some satisfaction.

The green, uncrowded spaces of New Zealand were part of the attraction when Berkman and his wife emigrated here some 14 years ago. "We came back to Amsterdam from a honeymoon in Norway, and found the city enveloped in yellow smoke," he says. That

> "the average crisis costs investors US$ 280 billion. Since on average there are six crises starting every year, investors get hit to the tune of US$ 1.6 trillion annually"

was a defining moment for the Berkmans, who realised they wanted something else than the cramped and polluted confines of the Netherlands.

Now he and his wife live on a four-acre lifestyle block and although the once-rural character of the landscape around the campus is changing, he knows to count his blessings. "Where else in the world are you just 15 minutes away from the beautiful countryside, at work?" he asks.

Although Berkman says he and his wife are never homesick, they nevertheless maintain a connection with their country of origin. His wife teaches at a Dutch school with 120 students, keeping the language and customs alive.

Berkman also enjoys what he does. He says that in general, the academic facilities here are good, and in New Zealand there is more time to concentrate on pure research – a factor to be traded off against the undoubtedly great rewards and recognition available in Europe and the United States.

Berkman has other options too. His skills could be lucratively employed in the private sector, but despite a spell at Arthur Andersen he is untempted. Academic research is his calling.

The areas of research Berkman favours reflect his interest in people and how they react rather than pure financial theory alone. Among his research interests is behavioural finance, exploring how people's emotive reactions influence their investment decisions.

The interest in behavioural finance developed while Berkman was studying for a PhD in market microstructure at the Erasmus University in Rotterdam, the Netherlands (incidentally avoiding Dutch mandatory National Service in doing so).

Market microstructure is the in-depth study of trading as it takes place, literally tick-by-tick. Berkman had access to a large amount of detailed data from real-life trading at an exchange and developed a model around it.

Then, he took the model to a trader on the floor, and explained what he was trying to do. "That's bullshit," was the surprising response from the trader. Back to the model he went.

Why do traders make the decisions they do? Why do some succeed while others fail?

Until recent times, trading was a black art. Often the traders themselves lacked any formal financial grounding and were unable to explain, with any rigour, why they made any particular decision.

By matching his research data with the trader's intuitive expertise, Berkman was on the path towards understanding how people actually interact with financial instruments.

Over the years, Berkman's research has produced some fascinating results. Extensive analysis of decades of data from stockmarkets around the world shows that people tend to make emotive decisions when investing in financial instruments. Often these decisions, says Berkman, are overly optimistic and this in turn leads to the overpricing of some stocks with an "emotive component". Furthermore, the people who have bought these "emotive component" stocks are often reluctant to sell short, even when this is the rational thing to do.

Overall, these effects are detrimental to correct price formation – the market is very efficient, Berkman says, but people aren't. An asymmetry between positive and pessimistic views of pricing is created, according to Berkman, as there is an unwillingness to short stock, especially in countries like New Zealand where there is no real mechanism for such trading.

The two-day period just before companies' earnings announcements usually sees a run-up of over 1 per cent, according to Berkman's work. This is followed by an approximately 3 per cent price reversal in the two days following the earnings announcement when reality sets in for investors, he says.

It tends to be retail investors, rather than institutional ones, who cause such overpricing of stocks through optimism, says Berkman. Word on stocks that retail investors speculate in spreads fast thanks to the Internet, with message boards and chat rooms buzzing ahead of announcements – as well as afterwards, when the correction occurs. Berkman analysed some seven years worth of data from various Internet-based message boards for his work.

An abundance of data forms the backbone of Berkman's efforts. Financial researchers have access to mountains of information from stock exchanges and other sources, giving them the opportunity develop and test scenarios in extraordinary detail.

For instance, Berkman co-wrote a paper in which a database of 440 international political crises between 1918 and 2002 was used to ascertain the effect of these on the world's stock markets. Even though the data has been there and the crises have been picked over extensively by historians and political scientists, Berkman writes that economists have largely been quiet on the subject of war's indirect costs.

The results of the work are staggering even for non-economists: the average crisis costs investors US$280 billion. Since on average there are six crises starting every year, investors get hit to the tune of US$1.6 trillion annually. That sort of research has people sitting up.

Currently, Berkman coordinates the research activities of some 70 New Zealand-based research students and he supervises six international master's students and three PhD students. His advice to his PhD students is to "have fun" and to be creative. Berkman loves it when his students try something unusual and go that extra mile. A PhD is usually a once-in-a-lifetime event he says; the students should make the most of it, and not just think about the letters after the name.

Again, his interest in people shines through.

Rereading the Victorians

Once widely dismissed, the Victorian poets are receiving a critical reassessment. Professor Warwick Slinn, a specialist in the dramatic monologues of Robert Browning, talks to Di Billing.

> And then how shall I lie through centuries,
> And hear the blessed mutter of the mass,
> And see God made and eaten all day long,
> And feel the steady candle-flame, and taste
> Good strong thick stupefying incense-smoke!

What to make of such an example of Victorian poetry, in this case a notorious passage by Robert Browning? According to many critics, in its time and during most of the 20th century, Victorian poetry was prudish and sentimental, a matter of "fairies and waterfalls", a moralised form of romantic verse.

Professor E. Warwick Slinn takes a very different view. As a world authority on 19th-century poetry and a specialist in Browning, he has been part of a movement towards an emphasis upon literature as 'cultural critique'. Since the late 1960s, a generation of scholars has made discoveries about poetry and other creative writing by studying the sophistication of language and the context in which it was written. Slinn's contribution to this approach has helped to rehabilitate respect for Victorian poetry.

"The view that it was sentimental and prudish was based upon inadequate reading and inadequate understanding," he says. "Much of it was very sophisticated and was subtly finding a way to challenge those very assertions. It is riddled with irony – and the politics of personal power."

In a paper on Browning's *The Bishop Orders His Tomb*, he notes that the passage cited at the beginning of this article has generally been read

as expressing the Bishop's "moral corruption, his greater concern with sensuality than spirituality". Closer consideration, however, reveals that there is much more to it. For example, the Bishop's monologue "displays his obsession with what we now know as cultural capital – his value and place, both literally and metaphorically".

The Bishop's language can be read as "a psychological response to the metaphysical and Biblically proposed threat of impermanence: by concentrating on the physical details of his tomb he can reassure himself of an identifiable and personal continuity".

As a student, researcher and teacher, Slinn was literally in at the beginning of the shift in attitude and a leader in its advancement. A graduate of the University of Canterbury and the University of Hawaii, he was already a vocal proponent by the time he completed his PhD at the University of British Columbia in 1971. Since then he has written three books, including the much cited *The Discourse of Self in Victorian Poetry* and the more recent *Victorian Poetry as Cultural Critique: the Politics of Performative Language*, edited four others and produced more than 50 refereed articles and extended reviews.

He talks of the excitement of discovery along the way. "When I started out, the main interpretive approach to poetry – to all forms of creative writing – was to focus on the text itself, almost out of context. You took a poem or a novel and read it as carefully and in as sophisticated a manner as you could, by itself, with perhaps an allusion to historical location.

"But that approach was criticised as trying to pretend that works of literature exist in some vacuum in time. Over the past 25 years, the thinking has become that all literature is directly related not just to social environment but also to the psychology of the author, to historical developments, the ideas and ideologies of the period, to what was going on, and, crucially, to what words are doing.

"So, increasingly, the question has become not 'What does this poem mean?' but more: 'How does this poem, novel or play function? What role does it play in its society, in its historical and cultural context?' It is about the relationship between text and context. You pay attention, for example, to how the work was received in its day, to discussions of the time as well as to interpretations since."

Unexpectedly, Slinn notes that his interest in what can be revealed by the sophistication of language leads to issues of politics. "If you go back 60 years, a great deal of the interpretation of poetry involved historical rather than social matters – historical in the broad sense of issues like religion and belief systems. What was left out was politics. Then, during the sixties, when I was taught, and the seventies, when I began to teach, the focus began to change and by the eighties there was a wider view, creating three strands of criticism. The 'feminists' observed that literature deals with gender issues. The 'Marxists' pointed out that literature deals with class issues. The 'deconstructionists' argued that it was all about the sophistication of language use, and it was this that most interested me.

"However, you come to realise that they are all interrelated, that if you talk about how language works, you have to talk about how gender and class are also being incorporated and dramatised. Which leads you to politics, to power relationships between people, and to one of my primary theoretical interests: how language is a means of constructing identity and political perceptions."

Before he discovered deconstruction and cultural criticism, Slinn had made an early selection of Victorian poetry as his research domain. Asked why, he offers a range of answers. "I am a New Zealander and, in an historical and cultural sense, any Victorian writing is of interest to New Zealand because we were colonised by 19th-century Britain. There is a direct cultural link.

"But for me, there was another attraction: the development in the 19th century of dramatic poetry, of poets introducing speakers who are not themselves. The dramatic monologue form – which leads to the area of 'performativity' – has fascinated me for most of my career as work where you have the human endeavour represented in its most complex linguistic form. You become interested in the means by which a speaker is established, in the role of language in producing a point of view. It is about what it is to be a 'self' through the use of language.

"I am curious about the relationship between discursive action and human understanding – between how we speak and how we think – and about the way that interconnection affects the politics of power."

Both Robert and – to a lesser extent – his wife Elizabeth Barrett Browning were central figures in the phenomenon of the dramatic monologue, with others, like Tennyson, Rossetti, and Arnold, contributing. The complexity of Browning's language and construction also explains Slinn's preoccupation with his work. He was regarded as a difficult poet, with Tennyson more widely read and admired in his time. And, says Slinn, there are some funny stories about Browning:

An early poem, *Sordello*, was long considered incomprehensible and still remains a difficult poem. Tennyson said that he understood only the first line – "Who will may hear Sordello's story told" – and the last - "Who would has heard Sordello's story told" – and said neither of them was true, because he couldn't understand anything in between. Jane Welsh Carlyle, a very intelligent woman of the time, got to the end and had to inquire whether Sordello was a man, a city or a book.

Slinn has been with the Department of English at Massey since 1972 and holds a personal chair in English Literature. As Head of the School of English and Media Studies he has observed the recent rise in popularity of creative writing as a study option. The number of those wishing to create literature is outstripping the number of those wishing to study it. Does this mean literary study will be neglected? Not as much as one might think, he says. With his colleagues, he believes that to be a good writer, you must be a good reader, and that means an informed reader. Massey was the first among New Zealand universities to insist on a close connection between creative writing and the study of literature. He notes that Professor Bill Manhire, at Victoria University of Wellington, has also taught his students how to read, including the art of reading their own work to get it right. Other universities are now moving in the same direction. It is something of a full circle, he observes, with evident satisfaction.

True literary exclusiveness

"Don't you admire Robert Browning as a poet, Mr. Fitzsnook?" "I used to, once; but everybody admires him now, dontcherknow - so I've had to give him up!"

Browning was regarded as a difficult poet in his time and only achieved popular success late in his career, the period from which this cartoon dates.

Cartoon from Punch, Vol. 101, October 10, 1891

From 'White Russia' to the Land of the Long White Cloud

Professor Serge Demidenko talks to Kim Griggs.

Wellington panorama by Donovan Govan

Most New Zealanders, if asked, would probably find it hard to place the nation of Belarus, let alone identify elements New Zealand and Belarus share in common.

But here are some: Belarus and New Zealand are rowing rivals. In 2006, New Zealand's top women rowers, Caroline and Georgina Evers-Swindell, were second and third in the world rankings; first was Ekaterina Karsten of Belarus. Both countries have strong traditions in women's shotput. Both have a thing for freestyle skiing. And both, oddly enough, have highly successful whiteware companies: Fisher and Paykel in New Zealand and Atlant in Belarus.

The observations come from Professor Serge Demidenko of Massey's School of Engineering and Technology, now himself something the two countries share.

And what of Belarus itself? Belarus is a flat, land-locked nation of around 200,000 sq km (New Zealand is 270,000 sq km) and 9.7 million people. Once known as White Russia, Belarus was a constituent republic of the USSR, attaining independence in 1991.

These days, the country produces about 8 per cent of the world's tractors and 30 per cent of the world's heaviest trucks. It is the largest manufacturer of integrated circuits and semiconductor devices in Central and Eastern Europe. It controls more than 50 per cent of the watch-and-clock integrated circuit market in South East Asia. It manufactures radio and communication equipment, advanced optics, consumer electronics, watches, refrigerators, and machinery.

It was after World War II that the country became a hive of industrial and engineering activity.

It had lost a heartbreaking 30 per cent of its population in the war; it was not until 1972 that Belarus reached the level of its pre-war population. The capital, Minsk, was almost obliterated.

Faced with a 'clean slate', the country, with the help of the rest of the USSR, set about reinventing and reinvigorating itself.

"They built an absolutely new city and they built new industries. Belarus became the high-tech assembly line of the former USSR," says Demidenko.

For a bright student in Belarus, going into engineering was almost a given, and for Demidenko, whose parents were engineers themselves, the choice was easier still. "Belarus's industry was first class. And because of that it was easy for us, the younger generation. We wanted to be somewhere in the forefront of development.

"To be an engineer was very prestigious. Those with good brains always thought about careers in radiophysics or electronics."

He studied for his first degree (a five-year combined bachelor's and master's degree was the norm in the USSR) in electrical engineering with a specialisation in computer engineering. He finished sixth out of 157 students, but given that the first two places in the class were always reserved for those active in political circles, some adjustment is warranted. "Therefore, if you count that, (I) would be number four," he says wryly.

Demidenko did not feel the urge to become politically engaged. Besides, his family history militated against his becoming a communist party member.

Demidenko's grandfather had fought in Verdun in France during the First World War when the country was still under Tsarist rule. Two decades later, during one of Stalin's purges, he was arrested by the KGB and disappeared. "Nobody knows where."

Demidenko's father would also fall under the suspicion of officials. After fighting against Germany in the Second World War, first as a volunteer in the army and then as a resistance fighter in German-occupied territory, he ended up a prisoner of war in Nazi death camp for almost three years before being liberated by Soviet troops. Yet this record of patriotism tainted him in the eyes of the regime. "Soviets never trust those who had been prisoners of war; they always suspect they might be traitors," says Demidenko. "[My father] was put into the paratroopers, where the message was, "If you die, you die. If you survive, [that's] your luck."

"It was," says Demidenko, sipping coffee in the university staff cafeteria on a wintery Wellington day, "a totally different planet."

But despite the upheaval of the communist revolution and then the ravages of World War II, the country continued to cleave to some of its traditional institutions. One of these, the Academy of Science, founded by Peter the Great in 1724, was the next step for Demidenko. He gained his PhD in engineering cybernetics and information theory at the Belarus branch of the Academy for Science and stayed on for 15 years as a researcher at the Academy's Institute of Engineering Cybernetics. His institute was involved in many research programmes and nationally significant projects, including the Soviet space shuttle program Buran. This was the time of the Cold War, and the Soviet Union needed its researchers to carry out not

just theoretical investigations, but also to solve defence-related applied research problems – for example, to figure out how missiles and their electronic equipment would withstand the stress and vibrations of a launch. "The idea was to collect data from real conditions of vibration and shock and then reproduce it in hangars far away so nobody could see what we were testing."

In 1987, he joined a huge computer company — it had 12,000 employees — in the Belarus city of Brest where he headed the joint (academy-industry) test laboratory. "Obviously now I can tell about it easily: there was civil production – computer displays and terminals – and there was quite a lot of defence production."

That included testing the electronics and control systems for things like missiles, torpedoes, submarines, surface and airborne data collection and control centres. "Our concern was mainly to ensure functionality and reliable operation of electronic and computer equipment of these high-complexity defence systems."

Meanwhile, major political and economic shifts were under way. 1987 was the year in which perestroika, the restructuring of the Soviet economy under Mikhail Gorbachev, began. The private ownership of businesses in the services, manufacturing, and foreign-trade sectors became possible; state enterprises became self-financing; foreigners were allowed to invest in joint ventures. Within this newly open environment, Demidenko spent

Testing the limits

How many faults can you tolerate? One in a thousand? Two in a thousand? Five in a thousand? Probably none if that one-in-a-thousand fault meant that you lost your braking system, your steering system or even your whole engine while you were driving down a motorway at 160 kilometres per hour.

These days over 20 per cent of the cost of the cars we drive is associated with their electronics circuits and systems, and in those parts crucial for vehicle safety – in particular the smallest integrated circuits or chips that are the building blocks of electronic equipment – there is no tolerance for faults.

"They have to be properly tested, not only to perform their functions as they were designed to, but also to work reliably for a long time," says Professor Serge Demidenko of Massey's School of Engineering and Technology.

But how do you test something to be as sure as you possibly can be that it won't fail? And how do you do that economically? And with something as small and complex as an electronic chip containing hundreds of millions of transistors? Figuring that out has been what has driven Demidenko's academic career and research.

It started back in his native Belarus when he was studying for his PhD. For his research he helped test trucks (Belarus is one of the world's leading manufacturers of heavy trucks including the gargantuan affairs that are used in the likes of South African gold mines) to find out how they withstood shocks and vibrations, and to test noise levels – including infrasound: vibration frequencies too low to be audible.

"Not too many people know that a noise and vibration test of vehicles is vitally important for the health of drivers," explains Demidenko.

Within a particular band of frequencies, infrasound can cause an overall mechanical resonance of organs in the abdominal and chest cavities. "You instinctively know it's very, very bad," says Demidenko.

Infrasound and low frequency vibrations must be appropriately dampened.

For that research, way back in 1977/8, the electronics expert built his first computer to collect and process data on board the lorries. "It was very simple in today's terms, but at that time I was very proud of it."

Substantially more complex were the algorithms, software programmes and equipment used in the research lab back at the plant. Here the required shocks, vibrations and noises could be simulated and reproduced and measurements taken of the stresses at the chosen points of any complex mechanical system.

Today's testing regimes owe a debt to the work of Demidenko.

Testing electronics, and in particular integrated circuits, is an expensive and time-consuming business. Today, up to 40 per cent of the cost of an integrated circuit lies in the cost of testing it. A single system for production testing sophisticated integrated circuits can be worth US$4-5 million, and from dozens to hundreds of systems will be needed on the production floor to provide the required throughput. The systems, which will become obsolete within a couple of years of their introduction, will be used three shifts a day, seven days a week to recoup the investment that has been made in them. And even with the use of such sophisticated systems, testing each and every one of the millions of transistors inside a chip is, says Demidenko, "practically impossible".

The technique used to identify and isolate problems is called pseudorandom

1990 in the United Kingdom at the invitation of the Royal Society of London, as a visiting research fellow at Brunel University.

But perestroika had unforeseen effects. Under the hybrid of central planning and market economics, the Soviet Union's economy plummeted. In 1991 the Soviet Union's gross domestic product declined by 17 per cent. That same year, the Soviet Union was dissolved.

"That was a really bad time," says Demidenko.

The Brest company, because it worked mainly for Soviet defence, lost most of its portfolio. Demidenko switched back to his alma mater, the Academy of Science; it too was scrambling to find funding. His job was to find international research collaborations. "We did projects for the Syrian air force, Indian defence, Pakistan, Kazakhstan, China, whoever had money."

The sudden demise of the Soviet regime had more personal consequences. As the all-pervasive Soviet ideology evaporated, religious cults began filling the void. One day Demidenko returned home from work to find his wife and two daughters had disappeared into one such cult. "It became very hard."

It was then that he resolved to quit his homeland. "I decided that I needed to go to a new place and start all over again."

He had a standing invitation to work in Milan, but that first foray was also fraught. A financial crisis hit the lira and, as the economy contracted, foreign researchers were the first to be shed. Once again, Demidenko had to dust himself off to sort out the next stage of his life. He ended up with two job offers: the West Indies and Singapore. He plumped for high-tech Singapore, teaching and working with industry for six years. He remarried there. A holiday in New Zealand triggered his first four-year stint at Massey in Palmerston North before he returned to Asia to refresh his connection with the large electronics industry by taking up an academic position in his second wife's homeland, Malaysia. Now he's back again at Massey. As well, Demidenko maintains his myriad international connections as a fellow of leading professional organisations, the Institute of Electrical and Electronics Engineers (USA) and the Institution of Engineering and Technology (UK). He also edits and referees international professional engineering journals. As well as supervising PhD students, he's also busy making new connections for Massey with industry and other academic collaborators.

And he has reforged ties to his homeland, Belarus, and is back in regular contact with his two daughters and his two grandchildren.

testing – pseudorandom referring to apparently random numbers generated using deterministic processes. "The method generates pseudorandom signals with some pre-specified parameters, applies them to the inputs of a very complex system, and uses the response to judge whether the system is working correctly."

But detecting a fault in any one of the millions of gates in a chip, Demidenko explains, is just half of the job. "You need to find what caused the malfunction. Was it a microscopic speck of dirt shorting two separate data paths? Was it a manufacturing defect, say a particular circuit disconnected that was supposed to be connected? Was it a design fault leading to unstable functionality? Could it be some problems with the parameters of the fabrication materials employed? Was it a microscopic crack on the silicon wafer?"

A malfunctioning circuit will be bombarded with various diagnostic test signals to narrow the list of the suspected faults and find their location on the chip. Then the chip will be delivered to a failure analysis lab for a battery of tests, using the best and latest technology: transmission and electronic scanning microscopes, acoustic and thermal imaging systems, various signal analysers.

Why go to all this bother? "Because if a fault has occurred then something is likely to be wrong with the fabrication technology, materials or design."

Demidenko co-authored a book on this work, which, when translated into English from the original Russian, "opened doors for us immediately", he says.

That international recognition, combined with the upheaval of the dissolution of the Soviet Union, has taken Demidenko far from Belarus (see personal profile), including at one stage to Malaysia, where he worked for Australia's Monash University at its Kuala Lumpur campus.

On the Monash campus, he and his students worked very closely with Freescale Semiconductor, the world's biggest producer of integrated circuits for the automotive industry. Among the several projects Demidenko

worked on with his students was one on so-called 'burn-in', which is perhaps the most widely used method of accelerated reliability testing, aimed at ensuring that integrated circuits not only work, but are long lasting.

Here, researchers stress the chips under conditions that should provoke early failures in marginal or weak devices. "With an integrated circuit we cannot wait for several years to see whether it survives the required long-term application in its normal operational conditions, or not. So we apply various stress factors – such as high temperature, elevated power supply levels, high humidity, shock and vibration – over a specified time to produce very harsh conditions. If the chip survives such a stress test, then in normal conditions it will survive for 10 years or whatever is required."

At Massey, Demidenko continues his collaboration with multinational semiconductor companies based overseas. He hopes to set up links between academia and the local electronic industry. In addition, he plans to pursue new research projects where his knowledge and expertise could be of use.

One set of projects that is to go ahead involves monitoring and controlling cardiovascular and nervous system functioning. The research will be a collaboration between Massey's School of Engineering and Technology and two teams from Monash University – one from its School of Engineering, the other from its School of Medicine and Health Sciences (including its Brain Research Institute).

"The aim is not just to employ advanced electronics for monitoring the conditions of people who are in a high risk group, but also to be able to detect potentially dangerous developments and to avert them by means of sending minor correction signals to the system, thus moving it into safety."

For Demidenko, the challenges and possibilities of testing are never ending. "It is all the time a challenge because you develop something most advanced and yet you have to develop test methods and tools that will be even more advanced."

Shift Worker

In the bush and farmland of Benneydale, the North Island robin is revealing how species respond to translocation. Associate Professor Doug Armstrong, a specialist in reintroduction biology, talks to Malcolm Wood.

From left: intern and masterate student Pierre-Yves Regnier, Associate Professor Doug Armstrong, postdoctoral student Yvan Richard

Friendly, curious, bold: these are the epithets people use to describe the North Island robin. Take a breather anywhere in the bush where robins are present and you are soon likely to find yourself the object of an intent, bright-eyed investigation. Perhaps, if you are quiet, the bird will fleetingly alight on a boot or a pack, before letting loose with a delicate squirt of white guano and moving on, your interest to it having passed.

Robins are easy to like. Perhaps this is why postdoctoral student Yvan Richard has an image of a robin on his computer monitor as his screensaver, that piece of real estate more usually occupied by a picture of the new baby or maybe the girlfriend.

"I have spent more time with that one than with my girlfriend in the last five years," he observes, mock sardonically in French-accented English, tilting his head towards the monitor.

And robins are also easy to study. Richard's supervisor, Associate Professor Doug Armstrong, often describes them as handy generators of data – data now made visible on another screen as Richard computer models the behaviour of robin populations in the King Country, changing parameters, such as breeding success, mortality, and the birds' ability to cross pastureland, to see what happens.

Think ecology, and you probably bring to mind the subject you remember from high school biology classes: a 'soft,' descriptive sort of science.

This is not ecology as Yvan Richard or Doug Armstrong know it. Ecology as it is practised here is a rigorous discipline which combines painstakingly collected field data with higher mathematics and which, while it may produce practical lessons, stands on its own merits as a fundamental science.

Most ecologists can point to some formative childhood experience of wilderness and Armstrong is no exception. Although he grew up in the suburban fringe of Toronto, he had the use of a hunting-and-fishing cottage left to the family by a grandfather. Roaming the territory around the cottage, capturing frogs, salamanders and turtles, Armstrong developed a fascination with the natural world. But he wasn't – and still isn't, he says – the archetypal naturalist who can put a name to everything.

Biology wasn't his most favoured subject either. Maths and physics were his strengths. Maths and physics *and* art; by the time he came to consider college, Armstrong was already selling paintings, his love of the natural world expressing itself in his choice of subjects: landscape and wildlife. Art school beckoned.

But then he also liked the idea of doing something for wildlife and conservation, and, an important consideration, he knew which path would better please his parents.

(Armstrong maintains that the discipline and satisfactions of producing good art and good science are similar.)

He did his undergraduate degree at the University of Guelph, then moved to the University of British Columbia for his masterate. At UBC he intended to study the evolution of intelligence using hummingbirds as his model system, but when the topic proved intractable (the data was maddeningly inconclusive) he turned instead to marking and following hummingbirds in the field to determine their territorial behaviour and energetics.

He then moved to Sydney, Australia, on a Commonwealth Scholarship to pursue his PhD, studying the behaviour of white-cheeked and New Holland honeyeaters on the heathlands of Brisbane Waters National Park north of Sydney.

On completing his PhD, he went travelling with a now ex-partner, formally emigrated to Australia, and, in an odd side-excursion,

Robin photo by Rebecca Boulton; Benneydale panorama by Yvan Richard

did postdoctoral work on the evolution of seed size.

But his larger ambition was to take what he had learned and see it given practical application. He decided the opportunities lay in reintroduction biology, a field in which an enthusiastic and charismatic New Zealander, John Craig at Auckland University, was exercising some sway.

Of all the substantial habitable land masses on earth, New Zealand was the last to be settled by mankind, first by the Polynesians, perhaps 1000 years or so ago, and then, within the last two centuries by the European.

During the millions of years of New Zealand's isolation, a peculiar fauna had evolved, one absent of mammals (several species of bats being the exception) and dominated by birds.

The newcomers and the animals they brought with them wrought devastation. After the arrival of the Māori, a number of bird species known from subfossil records vanish: moa, a flightless goose, a giant eagle.

After the arrival of the European, many other species joined them in extinction. They included birds (the bush wren, the laughing owl, the New Zealand thrush or piopio, and the huia, to name a few) skinks, frogs, fish, snails, insects and fish. Many other species were left occupying tenuous footholds of isolated natural habitat on mainland New Zealand or survived only on predator-free offshore islands.

The loss of bird life in the latter half of the 19th century was dramatic and conspicuous. In 1877 the pioneering ornithologist Walter Buller was prophesying – incorrectly as it happens – the vanishing of the bellbird (korimako) from the North Island, and the government's introduction of stoats, weasels and ferrets in the 1880s to control rabbits was disasterous: vast areas of forest fell silent.

One of the first efforts to save New Zealand's fast-vanishing bird life came in the 1890s when the government appointed Richard Henry caretaker of the newly-declared (and then predator-free) Resolution Island nature reserve in Fiordland. Over six years, he moved more than 200 kakapo to the island, only for the enterprise to founder when the island was invaded by stoats.

Since then, New Zealand has amassed a huge amount of experience in translocations as a technique in species recovery.

Notably, translocation has been successfully applied to birds, helping to bring species like the takahe, the kakapo, and the black robin back from the very brink.

In 1992 Armstrong arrived in New Zealand to take up a postdoctoral fellowship (funded by the University of British Columbia) he had wangled with John Craig. His project was to ascertain the effect of familiarity in bird reintroductions.

Robins (toutouwai) were translocated to Tiritiri Matangi Island in the Hauraki Gulf and saddlebacks (tieke) to Mokoia Island in Lake Rotorua. Armstrong explains: "Either we would take a neighbourhood of birds that we thought would have pre-existing social relationships or we would grab birds from all over place that wouldn't know one another."

Their findings? No significant difference: in both cases the birds quickly dispersed. In retrospect, it was naive to hope for more, says Armstrong.

But the two species and their population dynamics in their new homes would be subjects Armstrong would frequently return to after he joined Massey in 1993.

In 1994 the great New Zealand-born ecologist Graeme Caughley published a major review of the theoretical bases of conservation biology and of the factors determining population viability.

In it, Caughley suggested two strands in conservation thinking: the small population

paradigm, which focused on small population dynamics, and the declining population paradigm, which emphasised the factors causing populations to decline in the first place: perhaps habitat loss, overhunting or the introduction of exotic species. To Caughley's thinking, neither seemed adequate. The small population paradigm, with its strong theoretical underpinnings, needed the support and validation of more field research; the declining population paradigm built around field research needed more theory and generalisation; and while particular instances might be found to best fit a particular paradigm, ideally ways needed to be found to combine the two.

Armstrong suggests that as conservation biology has advanced, these paradigms, which apply at smaller scales, are finding their complement in broad-scale, multi population paradigms.

The declining population paradigm, Armstrong proposes, is matched by a habitat paradigm (explaining species distributions within a landscape using habitat characteristics) and the small population paradigm is matched by a metapopulation paradigm (explaining species distributions by assuming that populations are subject to chance extinctions and that the proportion of patches of suitable habitat that are occupied depends on the rate of extinctions and colonisations).

Like Caughley before him, Armstrong believes that conservation ecology will be best served when these various modes of approach can be both integrated and drawn on as needed.

"My interest is driven by my involvement in species reintroductions. If the decline in a species is driven by metapopulation dynamics, then all we need to do is to shift populations around to make up for the lack of connectivity in fragmented landscapes. But if the decline is driven by changes in habitat quality and the habitat is degraded, then this isn't going to work."

Can the various paradigms be incorporated into a single model? They can.

Take Benneydale, in the Waikato King Country. Until late in the 19th century, Benneydale was heavily forested. These days the bush that remains is confined to remnants: the occasional tree or clump of trees; isolated patches in gullies too steep to farm; and occasional larger areas of continuous forest held in reserves. And, containing it all, hectare upon hectare of green pastureland, scattered with an occasional farm house and garden, and plots of plantation forest.

Here, from a bush robin's point of view, is an haphazard archipelago of islands of habitable territory: some sizable, some tiny; some bountifully provided for with understory, some trampled bare by stock; and, surrounding them all, terrifying – for a robin – expanses of pasture.

On the screen of Yvan Richard, the archipelago is displayed in aerial view. He calls up a screen of input fields and enters some variables. How wide a span of pasture will his computer-generated robins be able to fly over? How large a territory does each bird demand? How quickly will they reproduce? How vulnerable are small populations to chance extinction?

He pushes 'Enter' and the algorithms do their work. A moment later, and dots representing individual robins populate the bush fragments, their numbers slowly changing, crowding into some areas, vanishing from others.

It is an impressive demonstration of how the dynamics of a natural population can be computer modelled and of how far and fast technology has progressed.

Four years ago, says Richard, who coded the model using the computer language C++, he could not have run such a simulation on a desktop: the computing power was not there.

The North Island robin (*Petroica australis*) is a territorial insectivorous forest bird. Typically the species forms monogamous pairs that endure until one member dies. One or more clutches of two or three eggs are laid from September to January, and the pairs fledge up to six young over a breeding season, with the young birds becoming sexually mature adults by the beginning of the next.

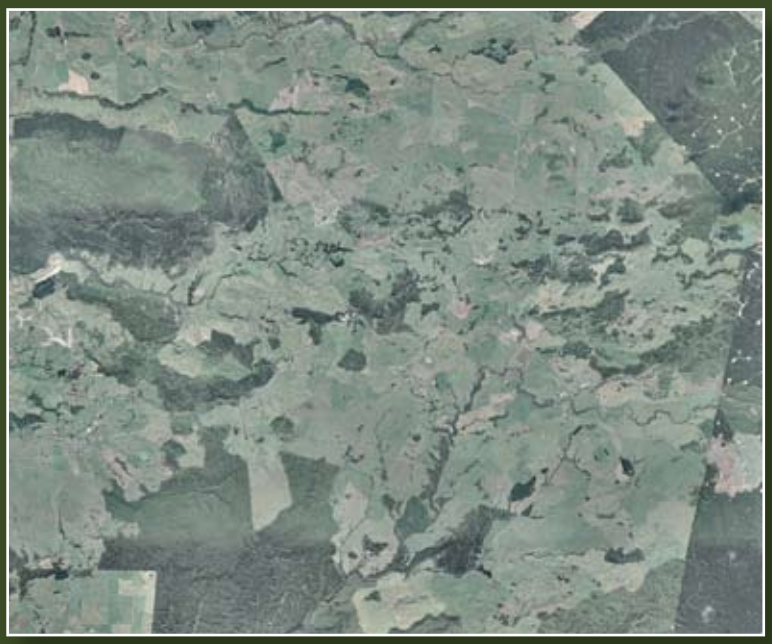
As a research subject, the robin has many merits: it is territorial, relatively fearless, and easily observed and caught. "You can catch juveniles with a hand net, almost like catching butterflies," says Yvan Richard. Doug Armstrong mentions the bird's useful weakness for mealworms. "They are mealworm addicts," says Armstrong. "I often describe robins as small grey Homer Simpsons who go, 'mmmmmmm meaaalworms'."

The species also has one other characteristic that endears it to clarity-minded researchers: its apparently irreproachable fidelity. A three-year study of nestlings found no evidence of what is known as extra-pair paternity.

On Tiritiri Matangi Island there is data on the population dynamics since 1992, when the species was first introduced.

Once classified as a subspecies of the New Zealand robin, the North Island robin was awarded species status in 2001.

Inset: Yvan Richard tracking robins using radiotelemetry.



Robin country: the patchwork forest and farm landscape of Benneydale.

With the model up and running, it can be fed increasingly detailed data about the habitat qualities of the bush and plantation forest around Benneydale, and the actual manner robins behave, both singly and in populations.

Sitting close by Yvan is fellow Frenchman Pierre-Yves Regnier, one of many European university masterate students (most from Holland) who have, over the years, spent time interning with Armstrong in New Zealand.

Of the five months he has so far spent in his internship, Regnier has spent two out in the field.

An earlier study using radio telemetry to follow the dispersal of a population of robins translocated to empty patches of bush. Around half of 80 birds fitted with transmitters have dispersed to patches distant from where they were released.

Regnier is working on determining the factors affecting the probability of a bird leaving a given patch of bush.

"Sex, time-effect, habitat quality, the presence of rats and mice ..." he explains.

He has also been involved in the measurement of habitat quality.

Over the years he, and others like him, have amassed a trove of data. This is now being used to feed back into models such as Yvan Richard's.

What has been learned in Benneydale? Most striking is the importance of stepping stones and corridors between the islands of habitat.

"Even if there are single trees, the robins can use them as stepping stones. They can use pines, willows, farmers' gardens ..." says Richard.

Close to the continuous forest, every patch of forest, no matter how poor, was continuously inhabited.

Further away, says Richard, the best-looking habitat in the study area remained uninhabited.

The scientific method consists of a balanced mix of induction and deduction: Induction draws on many observations, with the intention of formulating a few, powerful statements about how nature works. Deduction starts with a few true statements, with the intention of proving that many other true statements logically follow.

Of course neither stands alone. Induction feeds deduction; deduction is used to produce hypotheses that can tested by induction.

Over the past 15 years, Armstrong writes, most reintroduction research could be classified as descriptive and inductive. It is, in other words, the sort of approach you might expect from practitioners in the field working with limited sample sizes and few resources.

This applies both internationally – as Armstrong has shown in an analysis of the literature – and locally.

"We have so many brilliant field workers – for practical know-how DoC [the Department of Conservation] is amazing," says Armstrong.

Where we have been weaker has been in the more academic tradition of the hypothetico-deductive method – carefully testing models derived from careful observation and theory.

"We need to complement good fieldwork with good analysis."

How might the sorts of models being created by Armstrong and his colleagues serve the cause of successful reintroductions? In one instance, Armstrong's simulation has shown how supplementary food could make the difference between success and failure. In another, he has shown the level at which robins destined for translocation can safely be harvested from Tiritiri Matangi Island.

"Even if there are single trees, the robins can use them as stepping stones. They can use pines, willows, farmers' gardens ..." says Richard.

Benneydale panorama by Yvan Richard

1. The small population paradigm includes stochasticity: the workings of blind chance, which have a negligible effect in a large population, may be catastrophic for a small population. It includes the inbreeding depression that may emerge when a small population is genetically unfit. And it includes Allee effects,the phenomena whereby, for a variety of reasons, the breeding success of the population is density dependent: below a certain size the population tends to decline, above it to rise.
2. Bayesian logic is a branch of logic applied to decision making and inferential statistics that deals with probability inference: using the knowledge of prior events to predict future events. According to Bayesian logic, the only way to quantify a situation with an uncertain outcome is through determining its probability.
3. See www.iucnredlist.org.
4. Hitchmough, R.; Bull, L.; Cromarty, P. (comps) 2007: *New Zealand Threat Classification System lists—2005*. Department of Conservation, Wellington. 194 p.
5. The Reintroduction Specialist Group, which was created in 1988, exists under the auspices of the World Conservation Union's Species Survival Commission. To view the website of the Oceania section of the RSG go to http://www.massey.ac.nz/~darmsto/rsg.htm.

Perhaps the most interesting application of Armstrong's work is in guiding the level of predator control that is needed to ensure that mainland populations of threatened species persist.

New Zealand's proud record of successful reintroductions is largely attributable to one thing – the successful eradication of exotic mammalian predators. But this is an enterprise that can only be successful inside fenced reserves or on offshore islands. For most of mainland New Zealand, predator control is the best that can be hoped for.

Armstrong's models have shown that a population of saddlebacks would be unlikely to prove viable if aerial poison drops were used to control mammalian predators, but might be if poison bait stations were used instead. And for the 'mainland island' of Paengaroa, where robins were reintroduced in 1999, his model has shown what is likely to happen to the population when various rat tracking rates are recorded. If rats are recorded in more than one-in-five tracking tunnels over a night, the population is likely to decline; as fewer tracks are recorded, so the likelihood of survival and growth increases.

Armstrong's next ambition is to bring into play multiple population approaches that will allow him to create a reliable model for what is likely to happen when a new population is introduced into a novel situation.

If, for example, there have been a number of instances where saddlebacks have been reintroduced and data has been gathered, then he will hope to be able to draw on these to arrive at a model for the way a new reintroduction will behave.

And the data harvested from the new reintroduction will be fed back into the model, which will be constantly re-evaluated and recalibrated.

The mathematics, however, are not trivial, demanding a sophisticated Bayesian approach.[2] Under Armstrong's supervision, Jay Gedir, a postdoctoral student with experience in wildlife management, including reintroduction, has already begun work.

Sometimes it can be difficult to maintain much optimism about the prospects for New Zealand wildlife.

In total 56 New Zealand species are listed as 'endangered' or 'critically endangered' in the *2006 IUCN Red List of Threatened Species*.[3] They include birds, frogs, skinks, insects and plants.

A number of our iconic bird species are, it has been said, effectively 'the living dead' surviving only as highly-managed transplanted populations.

Once not-uncommon species are declining too. In the *New Zealand Threat Classification System*,[4] the rifleman in both its North Island and South Island subspecies has been moved from 'not threatened' to 'gradual decline'.

Yet there are good things happening as well. Some populations are rebounding, and the establishment of mainland islands is a cause for hope.

A website put together by Armstrong on behalf of the Oceania Section of the Reintroduction Specialist Group (RSG)[5] (which he chairs) lists over 200 projects involving 84 plant and animal species carried out in New Zealand since 1990.

Somehow there is the whiff of something Churchillian to the air. Perhaps some day, all going well, New Zealand's beleaguered wildlife will, with the help of multidisciplinary teams of scientists and resource managers, begin to take back what once was theirs.

Soundings

More heat than light has come from the phonics debate. Professor Tom Nicholson wants to change that. He talks to Jennifer Little.

He's been damned by one opponent as "the most dangerous man in New Zealand", while, according to another, "Tom Nicholson should be taken out at dawn and shot".

Shot? Surely not. Not this congenial, gently-spoken academic.

After all, Massey's Professor of Literacy Education doesn't eat children. He just wants them to be able to read, and he happens to believe that the reinstatement of phonics – the once-traditional word-sounding, spelling-focused method of teaching reading – could turn around our dismal youth reading statistics.

Literacy is, he says, the key to success in life. "Literacy has all kinds of positive effects and spin-offs. Not just academic success; it gives you a sense of success as a person. Failing to achieve in school signals that you are a failure and that's the last thing you want kids coming out of school feeling."

How literate are New Zealand children? If the measure is average literacy then New Zealand is just outside the top third. In 2001 New Zealand ranked 13th out of 35 countries in the reading achievement of 10-year-olds.

But by other measures we are not doing so well. We were 30th out of 35 in terms of the reading gap between the top and bottom readers. We were 31st out of 35 in terms of the reading gap between girls and boys.[1]

Up to one in four children in New Zealand struggle with reading and literacy – or so the statistics for the numbers of children receiving remedial reading tuition after one year at school suggest.

In the 1980s New Zealand adopted a whole language approach to learning to read, with children expected to predict word meanings from context. Now, on the evidence, says Nicholson, we have to admit the approach is failing and do something about it.

"To me, everybody should be reading and there's absolutely no excuse for that not to happen.

"If one in four children is struggling, that's the likelihood of one in four adults slipping through the cracks. That's too many. That's not acceptable."

Phonics, Nicholson says, "is

not heresy, or black magic. It's just science, it's knowledge of our language and how it works. It means telling children how language works instead of not telling them."

Based at Massey's brand-new Centre for Excellence for Research on Children's Literacy (CERCL) on the Auckland campus, Nicholson is midway through a year-long, reading research study investigating how children respond to different ways of teaching reading.

The study builds on three years of earlier work during which Nicholson, then the co-head of the School of Education at Auckland University, ran reading summer schools at schools in Grey Lynn, Devonport and Otara.

Funded by the donations made by parents and private donors, including a charitable trust, the current study has enlisted 108 students at three South Auckland decile-one schools (Flat Bush, Bairds Road and East Tamaki). The children have been randomly selected from those identified as having reading difficulties and, randomly again, divided into three groups.

Each of the children is receiving tuition from specially-trained qualified teachers for an hour once a week.

The first group is receiving a contextual guided reading approach similar to the current classroom approach. The second is receiving phonics tuition using Nicholson's 415-page *Phonics Handbook*.[2] A third 'control' group, receives maths tutoring. (This controls for the positive 'placebo effects' of receiving one-on-one tuition.)

This is the first randomised controlled study to examine the relative and respective advantages of the phonics and whole language approaches. Nicholson says it will provide the hard data to inform debate. And every child, whatever the group he or she falls within, is expected to benefit from the tutoring.

The study will be the first of many, Nicholson hopes. Down the track, he would like to study the cognitive, neuro-physiological and instructional aspects of literacy to find out exactly why some children have trouble learning to read.

Nicholson wants to link up with top international reading research centres at Harvard and Yale universities where MRI (Magnetic Resonance Imaging) brain scans are being used to detect physiological changes in the brains of children with reading difficulties. Their results have shown that some youngsters are involuntarily using the wrong parts of the brain when reading.

"What they are finding is that when they introduce an intervention to help kids read better, the brain function changes."

Despite a resurgence of phonics-based teaching in the US and UK, educational policy makers here are steadfastly sticking to the whole language system.

"There is a deeply ingrained belief that whole language learning is the way to go," Nicholson notes.

The Ministry of Education's focus has been on improving reading recovery teaching, which itself is essentially a whole language approach.

Although phonics teaching is beginning to creep back into some classrooms and is being incorporated into reading instruction at the teacher's discretion, a fundamental change in the way children are taught to read is needed before the problem will be truly remedied, he believes.

There's no point in trying to improve something that is, as he sees it, innately flawed.

Internationally, Nicholson's views are hardly radical.

In Australia, *Teaching Reading, a report by the National Enquiry into Literacy* (2005) found:

> The evidence is clear, whether from research, good practice observed in schools, advice from submissions to the Inquiry, consultations, or from Committee members' own individual experiences, that direct systematic instruction in phonics during the early years of schooling is an essential foundation for teaching children to read.[3]

In Britain the recent debate has been less about the relative merits of whole language and phonics than it has about which particular type of phonics to employ.

In 2006 the British Government-commissioned report of an independent review of early reading was published.

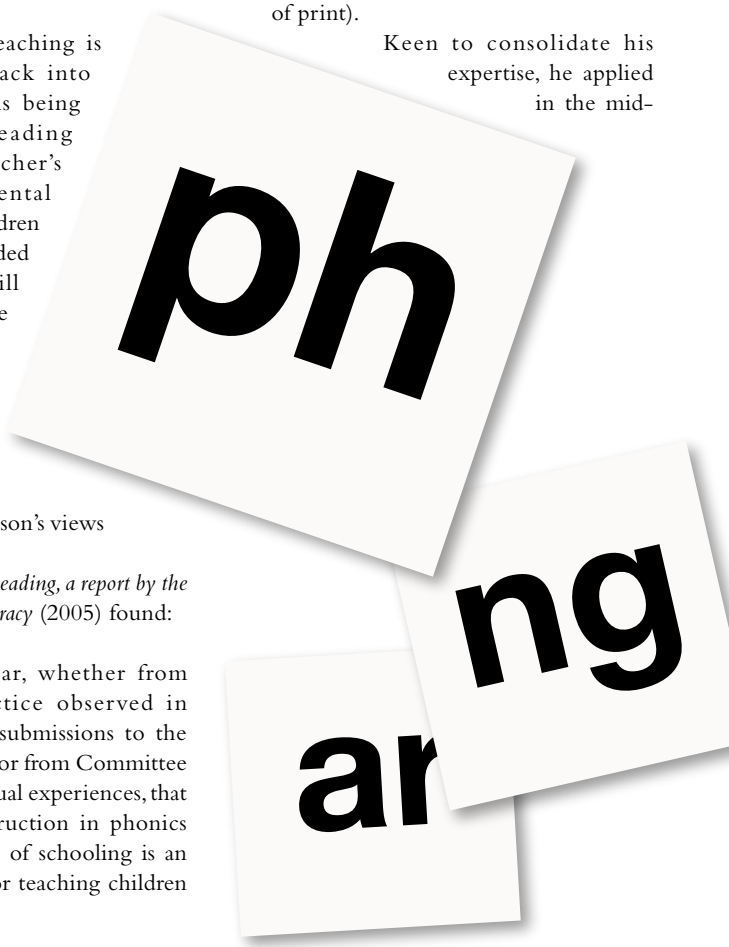
In it, the report author, Jim Rose, endorses phonics – specifically synthetic phonics – as offering:

> ... the vast majority of young children the best and most direct route to becoming skilled readers and writers.[4]

Australian-born Nicholson's fascination with acquisition of literacy began on his first day in front of a third form class in Sydney.

"The curriculum said I had to teach texts like *Macbeth* and *Huckleberry Finn*, but these students were struggling to read even the most basic of texts," he recalls.

After five years of teaching, he worked as a researcher for the Department of Education in Adelaide, where he was asked to write a brochure for teachers on how to teach reading. He plunged headlong into researching the subject and produced a book called *The Anatomy of Reading*, which became a benchmark reference for teachers (now out of print).



Keen to consolidate his expertise, he applied in the mid-1970s to do a PhD at the University of Minnesota, where he studied linguistics, cognition, child development and reading. In his doctoral thesis he investigated whether good readers who make word comprehension errors in reading then change the meaning of the text to adapt to their errors.

Despite winning the International Reading Association's annual doctoral research award for his work, he struck opposition at home and abroad from the influential pro-whole language lobby. Over the years he's learned to weather the ideological storms that erupt whenever he's spoken in support of phonics-based teaching.

Since then, Nicholson has gone on to write more than 150 publications, including 16 books. As well as being a columnist between 2000 and 2002 for *North & South* magazine on learning issues, he has been widely interviewed on radio and in the press on literacy matters. He's co-authored several books on reading comprehension for the NZCER (New Zealand Council for Educational Research) and has just co-written a new book on reading comprehension with Dr Sue Dymock from the University of Waikato.[5]

At Massey he teaches developmental psychology, language and child development, current issues in education, learning and reading difficulties, and the reading process.

For Nicholson, social justice is at the heart of reading debate. Being able to read means access to information, jobs, skills and life choices.

Beyond the current theoretical battleground that has polarised educationalists for years, it is rigorous research that he hopes will clarify what works best to get all students reading well.

"At the end of the day, I'm open-minded about it. If it turns out we're wrong, we're wrong."

Either way, the statistics on reading achievement demand a response.

"If you want a nation of readers, you've got to find better ways of teaching and better ways of getting kids literate because literacy is still the key to success in life," he says.

"If you don't have a literate society, you are not going to be a successful society."

1. PIRLS (Progress in International Reading Literacy Study) is designed to help countries monitor changes in their children's reading literacy achievement, with the study administered every five years. The project collects reading assessment data at the fourth grade (Year 5), together with extensive background information from students' parents, their reading teachers, as well as from school principals and policy makers. See www.pirls.org.
2. *Phonics Handbook*, Tom Nicholson. ISBN: 1-86156-438-4, Paperback, 434 pages, February 2006. John Wiley.
3. For the National Inquiry into the Teaching of Literacy see http://www.dest.gov.au/nitl/report.htm.
4. For the Rose report see http://www.standards.dfes.gov.uk/phonics/earlyreading/.
5. Title to come.

Word wars: phonics or whole language?

In his big, blue *Phonics Handbook*, Professor Tom Nicholson demystifies the reading and spelling of English.

In it, students learn about the history of English language, of how it grew from its Anglo-Saxon (Germanic and Scandanavian) origins to encompass thousands of French words that entered the language after the 1066 Norman invasion of England. Then there are the Greek and Latin words, and the fascinating stories that accompany their arrival and amalgamation into English. Children, he finds, love learning this stuff.

But the point of knowing it is that the student understands the reasons behind the apparent idiosyncrasies of English. For example, 'ch' sounds like a 'k' in 'Christmas' because this is a Greek word, like 'ch' in 'chop' because this is Anglo-Saxon and like 'sh' in 'chef' because this is French.

On the practical side, students work through carefully constructed exercises that deal with the mechanics of consonant blends, long and short vowels, compound words, and silent letters, as well as story writing and reading comprehension - all aimed at showing students that "English writing does have method. It is not madness as some would have it."

The whole-language, or 'look-and-say' approach is more a philosophy of literacy than an instructional method. Gradually introduced in New Zealand since the 1960s in keeping with American educational trends and taking a firm hold by the 1970s, the whole language method is based on the premise that children learn to read naturally, and that literacy develops through context and meaning, rather than dissecting a text word-by-word and letter-by-letter.

It employs a more holistic approach to understanding text rather than concentrating on the individual components of spelling and grammar. Guesswork is an integral part of whole language learning.

Is it an either/or choice, or can a blend of the two work?

Will New Zealand eventually follow the global shift away from whole language to a renewal of phonics? Is it an either/or choice, or can a blend of the two work?

Nicholson wants both sides to make peace – for our children's sake. Phonics and whole language both have lots to offer but while both camps are not talking to each other, he feels like saying "a pox on both your houses".

"Everyone agrees that phonics is important but most teachers as yet do not know how to teach it," Nicholson says.

"Massey researchers are training a new generation of teachers the skills of phonics, to give them that extra string to their bow, but we desperately need to train the rest of the country. That is the huge challenge ahead."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Clearing the water

Environmental engineer Dr Andrew Shilton talks to Malcolm Wood.

Flying over rural New Zealand you see them everywhere: small collections of ponds gleaming in shades of emerald green outside every small township.

These incongruously beautiful features are wastewater treatment ponds – the principal barrier between the wastes discharged from toilet or sink and the natural environment of lakes, rivers and waters New Zealanders so treasure.

And generally the ponds do a good job for very little expense; they are the very definition of an appropriate 'lo tech' approach: cheap to build, simple to run, powered by no more than sunlight, gravity and the biochemical energy locked in the sewage itself.

Held in the shallow ponds, a complex ecosystem of algae and bacteria is at work. In the shallows, populations of algae bask in the life-giving sunlight, soaking up a rich soup of nutrients and photosynthesising madly, charging the surrounding water with oxygen. Around the algae, bacteria proliferate, breathing in the oxygen as they feast; deeper in the pond, and in the rich layers of sludge carpeting the pond floor, they increasingly turn to anaerobic respiration, to fermentation.

The ponds themselves may be simple, but the biology and biochemistry they play host to has been termed the most complex of all the engineered biodegradation systems known to man.

All of this has a near-miraculous effect. The egg and cysts of parasites precipitate out into the sludge. Sunlight, oxygen, elevated pH, and predation by micro organisms all play a part in killing the pathogens held in human and animal faeces. Even the major part of the sludge itself will be metabolised and vanish: just 20 per cent will remain to be disposed of.

The raw sewage that passes in to the first of the series of wastewater treatment ponds should emerge from the last with a high level of treatment.

But for the sewage treatment to work, the wastewater must move through the ponds gradually, over a defined number of days. This hasn't always happened.

Dr Andy Shilton, whose work has largely redefined the understanding and design of pond hydraulics, talks of sending his students off to conduct a dye tracing experiment at a local wastewater treatment pond. The pond was meant to retain water for 11 days; after four hours the dye added at the inlet was already pouring through the outlet.

Because the designers had not incorporated a knowledge of fluid dynamics into their work, the pond was 'short circuiting', discharging untreated effluent.

Shilton began his academic career with what he terms a jack-of-all-trades bachelor of civil engineering at Auckland University, progressed to a master's in biotechnology, this time at Massey, and, again at Massey, a PhD in environmental engineering, which he completed in 2002.

Between degrees he was employed as a consultant in New Zealand and internationally, working in civil and environmental engineering after his BE and, among other things, constructing a large anaerobic biogas digester for a Dunedin meatworks between finishing his masterate and beginning his PhD.

His decision to undertake a PhD was prompted when the opportunity arose to return to Massey to help create and launch New Zealand's first degree in environmental engineering. But shifting to academia required a further degree: he began a PhD part time.

The topic he chose for his thesis was the hydraulics of wastewater stabilisation ponds, an area that a series of literature searches revealed to be greatly under researched.

"It seems that people often have specialist research skills in well researched areas, while immediately alongside are other areas of investigation that are hardly touched," Shilton explains. "Everyone in hydraulics who works with flow down a channel, for example, works with flow at a reasonable speed. Rivers and hydro spillways for example."

Slow flows through shallow basins – the topic Shilton would effectively address – was much less well understood.

Shilton's PhD research would be a six-year quest, as he tenaciously investigated the fluid dynamics of wastewater ponds, beginning with a 1:12 scale replica of a pond in the laboratory, then moving to two local secondary treatment ponds.

"One of the obvious things to do in a pond to stop effluent shooting right through is to put in baffles; every engineer knows that. But how many baffles should there be and where should they be placed? Where should the inlet and outlet be positioned? There are just so many basic questions that were left to guesswork."

To see what was happening in the ponds, he measured the movement of dye and, introducing his own technique, he tracked the paths of 'drogues' – small floats with large keels – using surveyors' theodolites in the field and (with help from Dr Don Bailey of the Institute of Information Sciences and Technology) image analysis in lab.

Because the movement of dye can be hard to trace, many earlier researchers had simply measured the concentrations of dye at the pool inlet and outlet, treating the pond as if it were a 'black box'.

The drogues gave the patterns of flow, and as the results came in Shilton would adjust his computer models to make them more highly predictive.

From left: 1. During Shilton's PhD research, a 'drogue' is placed in a wastewater pond. The theodolites on the banks are used for tracking its movements. 2. Dye tracing in a treatment pond. 3. Dye tracing in the laboratory.

What did he find? For one thing, it was soon apparent that the assumption made by a number of researchers, that the movement of fluid from the inlet to the outlet would dictate flow patterns, did not hold. Instead, wherever the pond inlet supplied a source of momentum the pond contents were circulating in large cells at velocities many times greater than if the flow were simply moving from inlet to outlet. He found that a horizontally aligned inlet – a commonly used configuration – was an almost certain recipe for 'short circuiting' but once understood could become a tool for an engineer to design and control the flow pattern in a pond. And his computational fluid dynamics models (similar modelling is used to design racing cars and jet planes) proved their worth, to the point where inlet, baffle and outlet configurations could be inexpensively assessed away from the field.

But for Shilton this was not enough. He would not feel his work complete until he had seen his findings integrated into common practice. So he secured funds and hired a research assistant and over the next two years the two of them developed a set of guidelines for the hydraulic design of waste stabilisation ponds.[1]

These have become something of a standard, winning plaudits internationally. For New Zealand is not alone in its use of wastewater treatment ponds; in France there are upwards of 2500; in the United States, upwards of 8000. Worldwide, wastewater treatment ponds represent billions of dollars of infrastructural investment.

The effect of Shilton's research? Let the feedback sent to him from one US consultant engineer be representative:

> I have shared the ideas behind your work with hundreds of lagoon operators and engineers over the past year. Many of these operators and engineers have taken your information on baffle placement and influent/effluent structure design and applied the principles you teach with great success. [One engineer I know] modified his lagoon using the principles you teach to get his lagoon in compliance for the first time in years. Others are reporting similar results.

In 2005 the textbook *Pond Treatment Technology* was published by London-based IWA publishers. Shilton is the sole editor and the author of five of the 25 chapters.[2] It has been described as the definitive work in its field.

1. Shilton, A. and Harrison, J. (2003). Guidelines for the Hydraulic Design of Waste Stabilisation Ponds. Institute of Technology and Engineering, Massey University.

2. Shilton, A. (2005). Pond Treatment Technology. London, UK, IWA Publishing. ISBN: 1843390205.

In the Centre for Environmental Technology and Engineering, from left: Dr Chris Pratt and a sample of phosphate-capturing slag; Alistair Broughton and Dr Shilton; Peter Brown testing the methane-generating potential of waste mixtures.

Why methane?

In his book, *The Climate Makers*, Tim Flannery describes methane as the first step on the carbon-free ladder. This is because methane (CH_4) has just one carbon atom for every four hydrogen atoms.

Generating and then burning methane also displaces other higher carbon fuels. It has been estimated that a cubic metre of biogas replaces 0.5 kilograms of oil and reduces carbon dioxide emissions by 2.6 kilograms.

The methane released by uncontrolled landfills or uncovered anaerobic ponds is a far more potent greenhouse gas than carbon dioxide. According to the Intergovernmental Panel on Climate Change, the GWP (Global Warming Potential) of methane is 23 times that of carbon dioxide when integrated over a time horizon of 100 years.

Collecting and burning the methane that would otherwise escape into the atmosphere therefore has a host of benefits.

Methane is the principal ingredient of an orthodox fuel: natural gas.

Fuels from ferment

As an object lesson to all environmental engineers, consider the dairy cow as a model compact multi-stage bioreactor. Most industrial bioreactors are huge. The cow's bioreactor, by contrast, is a miracle of compression: the first two chambers of its stomach, the rumen and reticulum, hold between 150 and 190 litres of liquid. It is the workings of the rumen and reticulum that explain how, over the course of a year, a single cow can generate hundreds of kilograms of protein, lactose and fat (plus, less desirably in the cow, considerable amounts of methane) from no more than pasture and water.

Shilton would like to emulate the compactness and efficiency of the cow's digestive system in treating dairy farm wastes.[1]

Instead of large wastewater ponds bubbling the greenhouse gas methane away into the atmosphere, he sees a day coming when every dairy milking shed will be accessorised with its own compact, low-maintenance digester, extracting the energy from the waste before it is returned to the fields as an organic fertiliser.

The operation of the digester will be largely set-and-forget. "The farmer is there to make milk, not to run a treatment plant," says Shilton.

The emphasis is understandable. Shilton's is a weekend farmer himself: he and his wife Bettina work a partly-bushed property on the ranges behind the Palmerston North campus. (The perfect complement and antidote to the rigours of teaching and research, he says.)

Then, too, there are the lessons he learned with wastewater ponds: "With wastewater ponds everything is simple, and because they are simple people like the technology and have widely utilised it."

Dairy waste digesters have been around since the late 1970s, and indeed are now an almost off-the-shelf technology. But simple they usually are not. Often they require heating or mixing or other mechanical processes.

Shilton and Alistair Broughton, the project's lead research officer, envision a two-phase process, first capturing and fermenting the solids and then drawing off a rich leachate of volatile fatty acids which will be used to generate biogas.

The two-stage process removes the need to have large wastewater ponds. Conventionally these are built far larger than they technically need to be. This is because they have to store large volumes of sludge. The scale of the ponds makes them very expensive to cover – which is what would have to happen if methane were to be captured from them directly.

Shilton calculates that a simple concrete bunker for collecting and leaching solids combined with an anaerobic methane reactor the size of five water tanks would suffice to serve one of Massey's dairy units. The freed-up wastewater ponds could then be used to hold and batch-treat water for deferred irrigation, avoiding nutrient run-off.

The methane will be used to run a power plant to generate electricity. Even the 'waste heat' generated by the power plant will be used to heat the shed's hot water.

How would the dairy industry greet such a development? Shilton has already fielded enquiries from farmers impatient to adopt the technology as soon as it becomes available. Some are currently undertaking dairy farm conversions.

Power self-sufficiency is not the limit either. "Instead of having the cows out in the paddock waiting around to be milked, why not shift them, once they have eaten their fill, to a holding pad next to the milking shed?" asks Shilton. "We don't sit at the cafeteria all day. Why should cows? People like Mike Hedley's group in the Institute of Natural Resources have recognised the great potential this could have for managing nutrients better, and such an approach would also have a big impact on the biogas production. You'd be capturing all those cow pats in a confined area. Instead of the 10 or 15 per cent of manure that we capture at the dairy shed, we'd be capturing a huge amount and our farms would then be positioned to export a significant amount of electricity to the national grid."

In a similar venture, Shilton is working with the Palmerston North City Council (already generating methane from its landfill and using it to generate power and sell carbon credits internationally) to devise a scheme for generating methane from industrial and municipal wastes, such as lawn-clippings.

Again, the scheme appeals to Shilton the pragmatist. Some people have proposed growing and harvesting grass as a way of producing biofuels, he says, but any such enterprise would have to compete with the dairy farmer who wants to grow grass to produce milk. As an economic proposition, it isn't going to stack up any time soon.

On the other hand, the New Zealand population grows – and mows – a lot of grass for no return other than its visual amenity: the clippings end up in the compost or landfill.

"People want to build solar panels and put them on roofs to harvest sunlight using physiochemical techniques, but that's what grass does," says Shilton. Carbon energy is being fixed and then wasted.

He proposes simply redirecting the grass clippings and similar wastes that turn up at the Palmerston North City Council dump to a special repository where they will be allowed to ferment, generating a liquid rich in volatile fatty acids – the same brackish run-off you might see trickling from the base of a compost heap gone bad. This will be the stuff from which a methane-producing fermenter will be run.

1. The project 'Innovative Anaerobic Pond Design – Making Sustainable Energy Recovery a Practical Reality' is supported by Dairy Insight funding.

P class

It was a sad outcome for a once pristine lake. In 2005 algal blooms in Lake Rotoiti in the central North Island prompted the medical officer of health to warn the public not to drink the lake water, or indeed, to undertake any recreational activity that would bring them into contact with it.

The culprit? There were many, but chief among them was phosphorus, partly washed in off the surrounding farmland, partly the legacy of inflows of treated wastewater effluent.

In many of New Zealand's fresh waters, phosphorus is the growth-limiting element. It is the lack of phosphorus, more than anything else, that has kept New Zealand's lakes and rivers so legendarily clear.

Ideally the water that emerges from wastewater treatment plants should contain negligible amounts of phosphorus, but it is a difficult element to remove.

The use of various metal salts to precipitate phosphates from wastewater was introduced in the mid-1950s (its first use was to remove phosphate from the water being discharged into Swiss lakes), but this is expensive. A second method, introduced in the late-1970s, cycles activated sludge through a sequence of anaerobic and aerobic cycles, during which bacteria are triggered into absorbing amounts of phosphorus far in excess of their metabolic needs. Again, this is an expensive and complex process unsuited to use by smaller communities. So what alternatives are there?

Shilton and the team of researchers at the Centre for Environmental Technology and Engineering have two: the use of filter beds of steelmaking slag and the possibility of using algae to sequester phosphates.

In 1993, filter beds were installed as part of a new wastewater treatment plant for the township of Waiuku. Slag from a local New Zealand Steel steel mill was used as a cheap filter material, and while phosphorus removal was never the primary reason for choosing slag, it proved remarkably effective at doing so. Over the next five years the beds removed, on average, over 70 per cent of incoming phosphorus.

Shilton passes over a handful of what looks like grey scoria pebbles, pitted and sponge-like. This is steel-mill slag, the leftovers from a experiment recently completed by postdoctoral fellow Chris Pratt.

Work conducted at the Centre by Pratt, Shilton and others has elucidated the mechanisms of how it is that the slag adsorbs (binds on its surfaces) phosphorus and how it can be used most effectively. Iron oxides, electron microscopy reveals, are the major adsorption sites, and the slag performs best when the water is well-oxygenated and has relatively neutral pH.

This, and earlier work by the centre on the use of slag in phosphorus removal, is world-leading. (A referee's report describes the insights in a recently published paper as of crucial importance.)

Shilton can foresee a time when slag filters can be used to capture the phosphorus from municipal and agricultural effluents and then release it application to the land when farmers actually need it.

But there may be another even more elegant way of sequestering phosphorus. The activated sludge method of removing phosphorus 'tricks' bacteria into taking up far more phosphorus than they actually need. There are now hundreds of large cities around the world that use activated sludge for treating wastewater. Could a similar trick be played to induce algae to do something similar in the pond systems that serve small communities?

Under certain conditions in eutrophied lakes algae will indulge in a 'luxury uptake' of phosphate, storing polyphosphate within their cells. But nobody has yet done that for waste stabilisation ponds. "That's what we're trying to pull off," explains Shilton, standing alongside a series of silver-foil-lined aquaria where brews of brilliant-green algae churn away under bright lights.

Nicola Powell, who is completing her doctorate on this work, has systematically worked through a matrix of factors that might hold the key to understanding inducing the luxury uptake of polyphosphate.

"From Nicola's work we know there is something very interesting happening here in response to light. Something does appear to be triggering different levels of polyphosphate uptake.

"If we can nail this down, the implications for waste treatment are large," he says. It is potentially the most scientifically important work the centre is doing.

In its research into phosphorus removal filters, the Centre for Environmental Technology and Engineering is sponsored by the Palmerston North City Council, Massey University Research Fund postdoctoral funding, and OECD postdoctoral funding.

Above: Steelmaking slag in the laboratory and *in situ* in filter beds at a sewage treatment plant
Below: Doctoral student Nicola Powell is working on how to make algae more phosphorus hungry and so a more potent means of cleaning phosphorus from water

Feeding the birds

Professor Velmurugu (Ravi) Ravindran talks to Faye Lougher.

Velmurugu Ravindran, Professor of Poultry Science and New Zealand's sole poultry scientist, is a believer in the power of chance.

When the then lecturer arrived at Virginia Tech for a sabbatical in 1992 his expertise was in pig nutrition. "But just before I arrived, the two poultry professors there had a fight with the university and left and there was nobody to look after the poultry research. I was asked if I could do it and I said 'yes'."

Chance also favoured him when it came to research he pursued while there: phytase, a feed enzyme that had just become established in the US market.

Many plant tissues – particularly bran and seeds – use the chemical compound phytate as their principal means of storing phosphorus. For ruminant animals, such as cattle and sheep, this isn't a problem: the microbes in their rumen produce a digestive enzyme called phytase which breaks down the phytate molecule, making the

phosphorus available for digestion. But non-ruminants, such as pigs and poultry, are not so blessed. Most of the phytate they consume will pass through their gastrointestinal tracts unutilised and on into their manure. Here it becomes an environmental pollutant: phosphorus, one of the primary causes of the eutrophication of lakes and estuaries, is difficult to remove from water.

But add phytase to pig and chicken feed and this changes: the phosphorus becomes bioavailable.

Ravindran elected to carry out a complete evaluation of phytase. "There was a big grant and our group generated most of the basic data on the enzyme, which is used by poultry and pig industries all over the world. Some of the findings were cutting-edge, but they came about by chance; everything in life is chance."

While working with phytase to improve the phosphorus availability in feed, Ravindran

was also developing a consensus amino acid digestibility assay for chickens.

Combining the two research strands gave him "totally unexpected" results. The phytase improved the availability of energy and amino acids, and food utilisation on a total basis.

"The work we did with phytase in terms of phosphorus, amino acids and energy is used commercially all over the world. It simultaneously reduced pollution – that was the key – and improved efficiency of the birds and the profitability in the industry."

Enzymes such as phytase offer many benefits. They reduce the variability in the nutritive value of ingredients and allow a greater range of feedstuffs to be used in feed formulations. They can shift the gut flora towards favourable bacterial species and improve gut health.

Not only will there be less manure, but what manure there is will be drier and contain lower concentrations of potentially polluting nutrients such as nitrogen and phosphorus.

In the years since he embarked on his sabbatical year he has become a world authority on the use of feed enzymes in poultry feed, and particularly on phytase.

But there are many other challenges within feed science.

Finding alternatives to meat and bone meal and imported soya bean meal – feeds

Tastes like chicken

The world's most popular meat is chicken. Worldwide, at any moment there are twice as many chickens alive as people and chickens now account for the majority of the 50 billion animals eaten every year.

New Zealand is no different in its eating patterns. According to Professor Ravindran, chicken overtook beef four to five years back to become the principal meat consumed by New Zealanders. On average, we each consume around 40 kilos annually; in the 1960s it was around a kilo.

Why has chicken become so ubiquitous? It is cheap, low in saturated fat, and lends itself to many types of cuisine.

Ravindran describes New Zealand's poultry industry as highly responsive to consumer concerns.

He also says it is the most efficient in the world in achieving poultry growth rates and feed efficiency.

In part he attributes this to the industry's willingness to test and adopt new technologies. But the industry also enjoys a natural advantage: New Zealand is the only country in the world free of the three major diseases of poultry: bird flu, Newcastle disease and infectious bursal disease.

Being free of these diseases means there is no need to vaccinate against them. Vaccination, he explains, carries an immune cost.

"If you don't vaccinate, there are more nutrients diverted into growth and the birds can grow faster and they are healthy and comfortable."

A number of myths and half-truths have attached themselves to the poultry industry, which Ravindran is eager to dispel. The first is that hormones are used within the industry.

The basis for the myth is understandable, says Ravindran. Chickens have become larger and meatier over the years. We eat far more chicken than we used to. Our children are growing taller and reaching puberty earlier. It is easy to confuse these observations and draw the wrong conclusions.

In fact, hormones have never been used in the New Zealand chicken industry. The reason the birds have become bigger over the years? Selective breeding. The birds have been bred to grow faster, to metabolise feed more efficiently and to produce larger amounts of breast meat.

What about the industry's use of antibiotics? Antibiotics are not used in the diet of laying hens and when antibiotics are administered to broiler chickens – not as a growth promoter but to control diseases such as necrotic enteritis – they are withdrawn seven days prior to slaughter to ensure the meat is antibiotic-free. (Antibiotic residue levels are routinely checked in conjunction with the New Zealand Food Safety Authority.)

Just two antibiotics are now used within the poultry industry; the remainder have been voluntarily withdrawn by the industry in response to consumer concerns. However, Europe has banned the use of antibiotics from 2006 and this could well happen here.

Ravindran and his colleagues are working on alternatives. "We are testing quite a few things which from literature in Europe we think might be working. This includes essential oils and also spices, probiotics and prebiotics. With probiotics you put the microflora, the good bacteria, into the gut, while prebiotics promote the growth of good bacteria and acids. We know no individual tool can totally replace antibiotics so we are planning to test combinations of these options."

that provide poultry with proteins and amino acids – is a current priority.

Post-BSE, the use of meat and bone meal in animal feed manufacture has been banned in some parts of the world and its long-term future in New Zealand seems uncertain.

The drive to replace imported soya bean meal, on the other hand, has to do with the industry's desire to provide the GE-free product consumers want at the best possible price.

Ravindran explains that because the world market is dominated by GE soya bean meal, the non-GE product enjoys a price premium – a premium that must be passed on to consumers.

For the past four years Ravindran has been researching the viability of New Zealand-grown field peas and fababeans as possible soya-bean replacements.

"We have tested six different legumes and found these are the two which grow reasonably well in our conditions. Companies are already buying peas and using them, based on our data, and they are getting good results.

"That's the advantage of vertical integration; one company controlling all the steps in production – hatchery, feed mill, marketing – so a decision can be made at the top and within months it's in the field."

Whole grains are also being tested as a feed; a change expected to be good for bird health as well as industry profitability.

"By feeding whole wheat we are challenging the growth of the gizzard and that brings in benefits because the feed spends more time there. It also benefits the producers because grinding the wheat is a big cost item."

If Ravindran never expected to become a world expert in feed science, then his attachment to Massey has also come as something of a surprise.

Before joining the University in 1998, he had taught for five years at the University of Sydney. "Initially I came on a three-year contract and the idea was to go back to Sydney – but we stayed."

It has been a good fit. As the challenges confronting the poultry industry have evolved in response to consumer demands, so has Ravindran's research, and he enjoys the multidisciplinary cooperation made possible by the breadth of research being done at the University.

Another change has been in the balance between fundamental and applied research.

"Ten years back, we were happy with the applied aspects of research. Today that is not good enough. We want to know what is driving things at the gut level or metabolic level – if something is improving, why is it improving?"

Is he ever tempted to head overseas permanently? Despite occasional overtures from overseas employers, he seems happy to be where he is.

"I come from a Hindu background and I look at it in a philosophical way. I am happy with my life in New Zealand and the environment at Massey; that is the key thing. We have built an accomplished team and I get along with everybody."

Ravindran is by necessity a seasoned traveller. Many of the developments within the industry he needs to follow are happening overseas; he needs to network; and then there is his research funding, 90 per cent of which comes from overseas.

His expertise also brings a flow of invitations to lecture and queries from all over the world. "Often they are asking simple questions – 'Why did you do this?', 'Why did you use this level?' – you know, simple things. We are very lucky to have access to all this knowledge on a day-to-day basis, but there are countries in the world where they are far behind."

Within his speciality of feed science, Ravindran has, to his surprise, achieved a certain celebrity among some audiences.

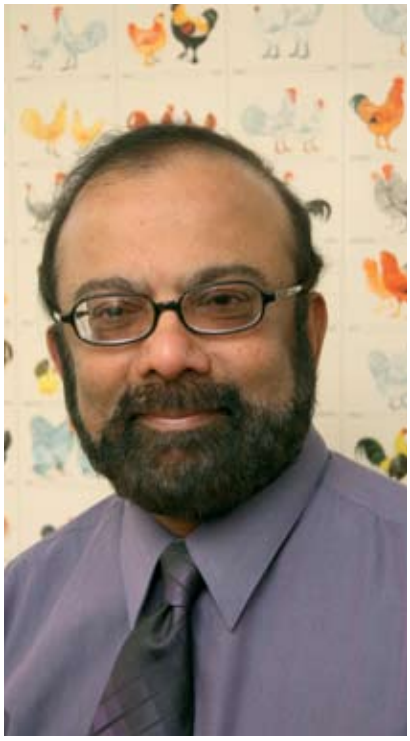
"As soon as my name is mentioned they want to take photographs with me to show their friends! Especially students, because they use the methods we have developed."

Ravindran's doctoral students also bring the world to his door. Currently he is supervising five doctoral students (two from New Zealand, one each from West Timor, Jordan and Iran); two more (from Thailand and Nigeria) are to arrive in 2008.

"We depend on the interest and willingness of the postgraduate students to test our research ideas."

He enjoys the stimulation and the exposure to other cultures the students bring with them.

"It's a very rich experience. These people go back to their countries and lead their industries. It's good training for them and it is a good feeling for me."



Professor Velmurugu Ravindran

Professor Ravindran is Professor of Poultry Science within the Institution of Food, Nutrition and Human Health. In addition he is the Institute's Director of Postgraduate Research, a role in which he coordinates postgraduate issues with Massey's Graduate Research School. This is no small role – the Institute currently hosts over 200 postgraduate students, including 80 PhD students.

For the past 10 years, Ravindran has served on the expert panel on 'New Feed Resources' for the Rome-based Food and Agriculture Organisation of the United Nations – advising scientists in developing countries on research methodologies to evaluate local feedstuffs for poultry and pigs.

Ravindran serves on the editorial boards of a number of international journals. These include the *Journal of Animal Science* (the official journal of the American Society of Animal Science), the *British Journal of Nutrition* (the official journal of the Nutrition Society, UK), *Animal Feed Science and Technology*, *Poultry Science* and the *Journal of Applied Poultry Research* (the last two being official journals of the American Poultry Science Association).

He holds a BAgrSc (Hons) from the University of Sri Lanka (1975) and an MSc in Animal Science (1982) and a PhD in Animal Nutrition (1985), both from Virginia Tech.

There's no place like home

Artist, writer and curator John Di Stefano talks to Mark Amery.

'Citizen of the world' is a phrase of increasing ubiquity and weight. Where once we identified with Dorothy swept up out of a dustbowl chanting "There's no place like home" we now relate more to Bill and Scarlett in *Lost in Translation*, nursing jetlag in the New York Bar on the 52nd floor of the Tokyo Park Hyatt.

So what does it mean now to call yourself a citizen of a country? Particularly in a country where, unless you're tangata whenua you're classed an immigrant?

Artist, writer and curator John Di Stefano is a New Zealand citizen who shifted here seven years ago, has Italian-born parents and was brought up in Québec, French Canada.

Director of the Postgraduate Studies Programme in Fine Arts at Massey, Di Stefano's area of interest as an academic is experimental documentary (more on that label later).

Currently completing his PhD, his research is concerned with notions of home and identity, and how these things are negotiated in moving image.

"As an immigrant, as a child of immigrants, as someone who's lived all over the world, one of the things that is most current to me as a subject matter is this idea of displacement," Di Stefano says.

"There's much literature and film studies dealing with diaspora, but my doctoral research looks at marginalised moving image material. Home movies, low-tech artist videos, artist collectives working with the theme of diaspora, exile, or hyphenated identity.

"There are certain things that only circulate within specific, localised communities. There's an incredible array of things that we maybe only have limited access to. I'm sourcing and viewing as much of this material as I possibly can in order to examine it as a phenomenon. To ask: What vocabularies are being used within these communities? What would a video of a first birthday outside your native land communicate?

"I think of my parents in Canada. All they watch is Italian satellite television. That in itself is a kind of displacement. I'm interested in how for instance a Turkish guest-worker watching Turkish satellite television in Germany is writing a history of Turkey from outside Turkey. How as an Italian-Canadian living here I am writing a history of Italy from outside its territorial boundaries."

Video stills from HUB (2001)

Documentary was once equated with nationhood – we stood up at the cinema for 'God Save the Queen' before the National Film Unit newsreels. The camera was the machinery of the state and a vehicle for an ideology. Today it draws together different sorts of communities.

"You need narratives of belonging," says Di Stefano, "but whether they're about a nation that is defined solely on the notion of geographical territory - I think we're seeing that dismantled at a rapid rate. The notion of nation needs perhaps to be with a small 'n' rather than a capital 'n'. I think there's all sorts of ways people can form nations with a small 'n', and these can overlap and even exist in contentious and conflictual ways. Sovereignty to a sole territory is an 18th century idea really and it's becoming more and more irrelevant, superceded by the reality of multiple-belongings."

Di Stefano recounts how people in the local art world have questioned whether he really qualifies to represent New Zealand internationally as an artist. It's these kind of complexities in how we read each other's identities that interest him.

"I was brought up at a time when the term 'Canadian Mosaic' was coined, and that's quite an interesting image to carry around with you as to what a nation is. I grew up in an officially bi-cultural country where there was always a battle between French and English, but things were more complex than that because, as the child of non-English or French immigrants, I identified as neither.

"So I grew up with never having a cohesive holistic view of what a national identity was. It's always been fragmented, multiple and invisible in many ways. And in a way I look at that now and think how lucky I am because that is what the world has become. I learned early on to understand that conflict and negotiate ways of being within it."

Yet Di Stefano still describes the euphoric feeling of 'coming home' when flying into Wellington after a long haul flight. It's the same feeling I felt last year flying into Heathrow, the country I left for New Zealand with my parents when I was six years old - the country I'm still a citizen of.

As Di Stefano writes in one of his texts for his 2001 film *Hub*, "Although a passport is

highly individualised, it does little to describe a lived experience – it is not designed to impart such information. A passport merely names us, and equates us to a number – now universally computerised and part of a huge global database accessible to airports around the world."

So where then is home for John Di Stefano?

"I don't have an answer, it's that simple. It depends on the circumstances. It's certainly not solely a geographic location. It can be, and at times it is, but that whole idea that home is where you were born or where you grew up or some fantasy about place of origin – well, I'd love to believe that it's true, but it's not true for me. I guess my answer is that there are multiple homes and they are constantly shifting."

Hub had the rare distinction of making *Artforum*'s 'Best of 2001' list. It is set in airport terminals and positions the airport as a kind of home for these citizens of the world.

The airport is viewed through a kind of kaleidoscope. Di Stefano's text contains fragments of individualised interior monologues, but all are performed in the same flat monotone. The camera likewise gives the sense that there are always barriers between oneself and others, between places of contact. Glass reflects back at you, figures are reduced to distant silhouettes, always looking out and away to somewhere else. Shots crossfade into each other and the camera moves as if scanning it all. Everything is in a constant state of entrance and exit, looping endlessly like a baggage carousel.

These citizens carry the notion of home in their heads.

"To me the whole point of *Hub* is that while an airport is not a home to inhabit, what is homely about it is the familiarity of it. The airport is built around a type of a routine that makes it familiar. Every transit lounge is pretty much the same and there are ways in which in the familiarity of my behaviour there I have a sense of belonging, even though the circumstances at the periphery of it may elicit something altogether different and foreign.

"At a place like the airport there can be horrible goodbyes, real gut-wrenching high drama or the most banal 'just let me get through here so I can go wherever'. There's an incredible scope of feelings and experiences."

Hub mimics surveillance video, and in this way it touches on Di Stefano's interest in experimental aesthetics in documentary making.

"... the whole point of *Hub* is that while an airport is not a home to inhabit, what is homely about it is the familiarity of it. The airport is built around a type of a routine that makes it familiar."

"I'm interested in documentary practices and, when I say documentary I mean it in the widest possible sense of the term. So not what one might encounter in *National Geographic* necessarily, but I like to engage with the 'real', for want of a better term.

"I situate myself in the zone where art and documentary intersect or overlap. I am not invested in fiction film as say Peter Jackson might be. I'm really in that marginal area between the two."

In the past several years Di Stefano has been involved in organising a biennial documentary conference called Expanding Documentary. The last two conferences have been at Massey University Wellington in conjunction with the New Zealand Film Archive and University of Auckland. It includes film, video and photographic documentary practice. This year the conference linked in with the DocNZ documentary film festival, for which Di Stefano curated an Experimental Documentary section.

"In New Zealand, experimental documentary practices tend to fall into art schools where it gets swallowed up by all sorts of other discourses, which may or may not be good for it, or those practitioners go into the more traditional made-for-TV model. There's no real place for it."

Still, he defends the need for its own attention given it so often falls outside the conventional frames. He's interested in film that doesn't necessarily work within defined conventions – where the filmmaker or subject matter has helped determine the structure. Likewise this may determine where it should be viewed – in the gallery, the cinema or on DVD at home. "Not everything fits into an international

film festival format," he says, citing the 20-hour opus by Hans-Jurgen Syberberg, *Our Hitler* (1977).

"One challenging work I programmed for DocNZ was *Natureza Morta (Still Life)* by Susana de Sousa Dias. It was excruciatingly slow, even for me, and the images were at times quite horrific, shot during the fascist Portuguese period. But I felt it was really important to include a work like that because there's something about watching and scrutinising this type of archival footage where your sense of being in that place was changed."

When Di Stefano saw the work of pioneering New Zealand video artist Darcy Lange at the Adam Art Gallery recently he saw a strong local foundation for experimental documentary practice. An ELAM art school and London Royal College of Art graduate, Lange started making film and performance in the early 70s that had currency in the art world, in documentary practice and as sociological study.

In this way Di Stefano is interested in artists who engage fully with the history, mechanics and aesthetics of film and documentary making. He struggles to name artists in New Zealand who he feels are exploring the medium fully in the way that Lange was.

"In my opinion, the way most contemporary artists use video is in a default manner. There is something very seductive about the moving image and that has been co-opted by the art world. I think generally there is a lack of serious understanding about the medium with often very little knowledge of historical context."

Peter Greenaway is a seminal figure for Di Stefano. Not because Greenaway makes films that are perfect creatures but because, as he writes in his essay *Peter Greenaway and the failure of Cinema*, the artist and filmmaker rejects the illusion that cinema represents some kind of reality in favour of testing the language of cinema, exploring how it can have a physicality and be more textural like painting.

"Greenaway has always pushed what film is, in terms of duration, narrative, structure etc. His museum installations for instance illustrate where cinema falls apart or can't hold his ideas any more, and where he has to go beyond cinema in the material world. To me that doesn't make him any less a filmmaker, but rather, expands the vocabulary of the moving image."

Di Stefano also doesn't restrict himself to one medium. His art is project-based and multi-layered in the texts it provides. He's interested in the complexity of readings of a subject, and cracking open the way different media represent something.

"I call it working in a modular way. Usually my works start off with writing. For many years I only made book works, and I started off as a photographer, so there's always been an intimate relationship between the image and the word – a caption, a subtitle or something. One of the things that brought me to moving image was that I could modulate the writing as a soundtrack."

Di Stefano's installation *Picturing Pasolini: Subtitles and Subtexts* contained recropped and rephotographed paparazzi images of controversial Italian filmmaker and poet Pier Paolo Pasolini. It sought to expose the conflicting readings of the artist, while reclaiming them for his own as part of his autobiography.

"Every time you reread something you're rereading it against the first or the second time you've encountered it, and I'm a great fan of re-watching films or reading novels again. It's an assignment I often give to students as a means of sharpening and deepening their ability to understand textual material, be it a novel, a film, etc. This is an effective means of engaging with memory as an active and critical tool in the creation of one's own texts."

Hub was the first work Di Stefano made in New Zealand. It's about coming here "without being overt about it", he says. A new film project that is nearing completion takes the ideas of belonging and displacement in *Hub* and locates them in actual locations.

The film is in three sections: one continues the investigation of airports, another is about the imaginary home –in this case Di Stefano's mother's village in Italy ("every immigrant or displaced person has the fantasy of the return"), and the third about monuments and how they can act as a kind of surrogate place of return.

For this third part Di Stefano filmed a monument in Amsterdam which is a memorial to persecuted homosexuals.

"Architecturally it's almost entirely nonspecific and open to any interpretation, and it's a monument that's actually embedded in the cobblestones of the city. I have incredible footage which is the linchpin of the whole film, where - completely unscripted - two people come into the frame and throw someone's ashes into the canal. A very poignant thing to have captured on tape.

"Where does one dump someone's ashes? How does one return home? Here it was at this monument. A monument which does not represent a geographic nation - perhaps a 'queer nation' that is based on the imaginary not on the geo-political."

This moment also involves something else Di Stefano is intensely interested in – the dynamics of the camera as a witness to things.

"I'm very interested in the fact that the camera is not objective, is not invisible. The way the camera witnesses, becomes the mechanism or the intersection of the event that unfolds in front of the lens. What's behind the camera is just as important as what's in front of it."

In this way Di Stefano sees everything he makes as autobiography.

"If I were to bring it down to one common denominator, all of my work is about autobiography, the perpetually unfolding story of my experiences."

War and peace

Margaret Trawick chose to study Tamil culture while still an undergraduate. She had been reading 2000-year-old works of Tamil poetry translated by the scholar AK Ramanujan. "It grabbed your heart and pulled it out of your chest," she says. "Through falling in love with the poetry I fell in love with the culture." Her anthropological fieldwork in India in 1980 resulted in *Notes on Love in a Tamil Family*, which was awarded the 1992 Coomaraswamy award for significant scholarly work on South Asia.

In 1997-98, the 49-year-old Trawick spent eight months in the island nation of Sri Lanka in the midst of the then 14-year-old civil war between the Sinhalese-dominated government forces and those of the Liberation Tigers of Tamil Eelam, more commonly known as the Tamil Tigers. (Tamils are Sri Lanka's largest ethnic minority.) Paduvankarai in the Batticaloa district, where she was based, was at that point LTTE territory, while just across the lagoon the town of Batticaloa was government-held. Her experiences appear in her recently published account *Enemy Lines: Warfare, Childhood and Play in Batticaloa*.

Trawick's research methodology has been described as dialogic. "Sometimes tape-recorded interviews are fabulous, but at other times they are stiff and formal and people don't relax," she says. "Informal conversations initiated by other people are much more interesting." This means Trawick is very much a part of what is going on around her. Trawick's engagement with her subjects and readiness to question her own assumptions make *Enemy Lines* more than an academic study. Malcolm Wood spoke to her.

The thing that strikes me most about your experience is its unreality. That by crossing a lagoon and going through a checkpoint you could move from government-held to LTTE territory. That in the midst of a civil war people could be leading strikingly normal lives.

Unreal? I call it surreal. The juxtaposition of things you wouldn't think of together, like high school sports contests and battles with guns where people were being killed. It was all part of the same scene. People lived with killing going on around them, with the corpses of their loved ones coming in every day. And life went on. And not only went on. The army would put on celebrations that they wanted the people to attend, competing with Tigers to entertain the people. It was very bizarre. There was always spontaneity and there were good times – celebrations and events that were fun. Maybe these celebrations were more than a diversion, maybe they were a way to keep the soul alive, a way of saying yes, you are oppressed, *but what can you do?* People had tremendous courage. If you spoke out against the government you would be killed, but that didn't mean people avoided speaking out. They did; they still do. Thousands upon thousands of people have been killed. People are being 'disappeared'. What could be more horrible than to lose a son, a daughter, a wife or a husband and not know what has happened? Maybe a dead body turns up years later.

You were well treated on both sides of the lagoon.

My foreignness was my protection. People weren't going to go out of their way to kill me. But they were all very nice people. On one side of the lagoon they were nice; on the other side they were nice. Army soldiers would be among the bus passengers on one side of the lagoon, Tamil Tigers on the other. But had they encountered each other face-to-face they would have killed each other.

Did you ever feel that people were putting on their best possible face for you as an outsider?

Finding out what really happened is very hard. You cannot take on faith anything that anybody tells you, and people *are* going to put on their best possible face – you can't spy on them. But what constitutes their best possible face is itself interesting, and not everything

From top: A painting by a 15-year-old Tamil boy, now living and working overseas but still in touch with Trawick; the extent of territory that is controlled by the LTTE and the Sri Lankan Government as of July 2007, as against the portions which the LTTE claims; Margaret Trawick, at right, with a friend in Batticaloa.

can be hidden. Supposedly the LTTE did not have recruits under the age of 17. But I met girl recruits who were under 17 and they took me back to their camp, right in the village. The older Tigers had not wanted me to know these girls existed.

You write that one of your frustrations was your informants' habit of fabricating stories.

They'd just lie about everything, even things that they had no reason to lie about. They would make up incredible stories that they knew I would find out were just incredible stories. At first I was irritated, then I was entertained. I thought, this is part of the show. On the other hand, they had to be careful. Telling the truth could get them killed, and there were times when they were very truthful.

Were you lonely?

Lonely? No, I liked these people. They were my friends. What I longed for was alone time when I could smoke a cigarette, read a magazine, lie there under a fan. For me, the heat and mosquitoes were the worst thing.

And all of this was happening in an intensely beautiful place.

Paduvankarai has wonderful beaches; surf; nice, friendly people; wildlife you wouldn't believe... the whole nine yards. When I was doing fieldwork in India, life was much harder. It was drier, there was more disease, you had to defecate in the fields, and the people were somewhat rougher. Sri Lanka is almost too nice. You certainly shouldn't go there to holiday if you are concerned about human rights.

What has subsequently happened to the people in your book?

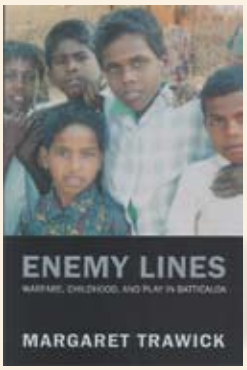
Some went north to the Vanni area, some fled overseas. There was the tsunami in 2004, and that killed a lot of people. Some were shifted out by the army and then shifted back.

Do you hold out much hope?

No, I don't have much hope. I think at this point all you can do is rescue individuals, and the only way you can rescue them is to find them asylum overseas, and that isn't easy. There isn't very much I feel I can do any more. When I was writing I wanted to let people know what was being lost and to show the Tigers are people just like you and me. A negotiated settlement was always what reasonable people said would be the best end to the war, but there were so many political forces working against it.

So all we can do is watch?

We can watch and speak out. You can go there to witness. If I knew what to do, I'd be doing it.



Enemy Lines: Warfare, Childhood, and Play in Batticaloa

Margaret Trawick, University of California Press, 2007

A ceasefire agreement between the government and the LTTE was signed with international mediation in 2002. However, renewed hostilities broke out in late 2005 and have continued to escalate, resulting in the deaths of more than 4000 people since November 2005. In March 2007 government forces took Paduvankarai where Trawick had been based. Most of the population fled. Many thousands are still displaced.

Adverse Reactions: The Fenoterol Story

by Neil Pearce, Auckland University Press, ISBN-10: 1869403746, $40.00
Reviewed by Patrick Morgan

Beginning in 1976 deaths from asthma in New Zealand rose suddenly, tripling by 1979. In *Adverse Reactions: The Fenoterol Story*, epidemiologist Professor Neil Pearce tells the story of how he and a group of researchers discovered that the asthma drug fenoterol was the cause of this alarming epidemic.

Facing pressure and opposition from conservative medical opinion and the drug industry, they persisted in exposing the link between fenoterol and asthma deaths, and finally saw their conclusions accepted, the drug restricted, and the death rate fall.

Pearce draws attention to the many issues surrounding drug safety in New Zealand and internationally, and to the contest between money and science in medical research.

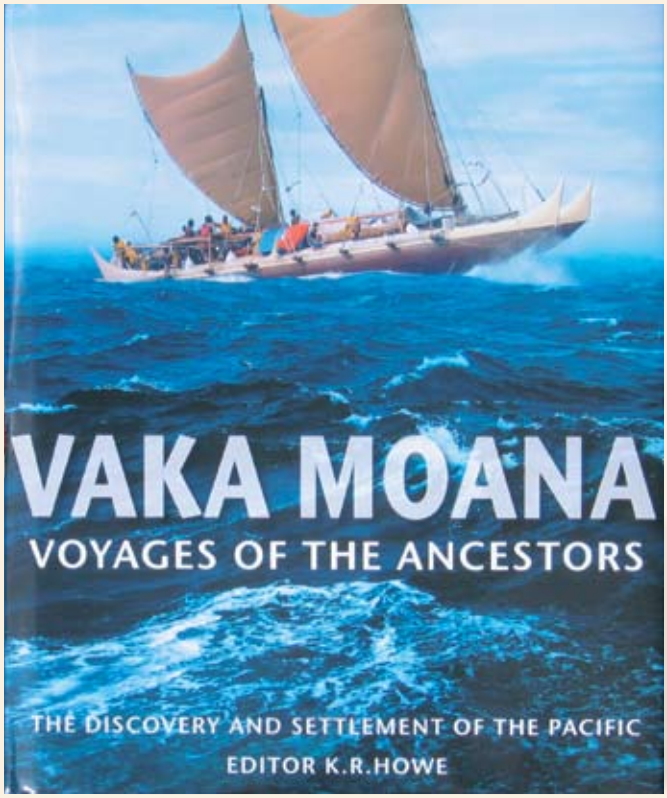
He says the same problems have occurred many times when university-based researchers have discovered that a particular drug or chemical is dangerous.

"Other examples include the controversies about oral contraceptives and stroke, the toxicity of benzene, diesel fumes, passive smoking and chromium (the chemical featured in the film *Erin Brockovich*).

"The usual approach is for the company concerned to hire consultants to criticise the research publicly, either when it appears in print, or even prior to publication. In recent years, these efforts have been further developed and refined with the use of websites and publicity that stigmatises unwelcome research findings as 'junk science'. In some instances these activities have gone as far as efforts to block publication.

"In many instances, academics have accepted industry funding which has not been acknowledged, and only the academic affiliations of the company-funded consultants have been listed. Thus, the fenoterol story is still relevant today."

Neil Pearce, PhD, DSc, FRNZ, is an epidemiologist (a health researcher who studies the causes of epidemics). A professor at Massey's Wellington campus, he is Director of the Centre for Public Health Research, which he established in 2000. The centre conducts a wide range of public health research including respiratory disease, cancer, diabetes, Māori health, Pacific health and occupational and environmental health research.



Vaka Moana: Voyages of the Ancestors. The Discovery and Settlement of the Pacific

Edited by K.R. Howe. Auckland: David Bateman/Auckland Museum, 2006.
ISBN: 9781869536251. 360pp. Plates, maps, index. $90.00.
Reviewed by Professor Barrie Macdonald

Few who have lived, worked or travelled in the Pacific Islands can fail to ponder on questions posed by Captain James Cook 250 years ago concerning the origins of the Polynesians. How did the Polynesian peoples, with their similar languages and cultures, reach their remote and scattered islands, and where did they come from?

For me, these questions were first posed in the late 1960s, before I even went to the islands. At the Australian National University, I had the office next to that of Dr David Lewis who gathered and preserved ancient navigational knowledge that was remembered but not written, and helped to encourage a renaissance of canoe building and inter-island voyaging.

A few months later, as I was engaged on research in the islands of Kiribati, located where the equator intersects with the international dateline, I sat as an audience of one as Lewis gently interrogated a renowned navigator. He led his informant through intricate matters of navigation and land-finding. The old man explained how, when sailing between the island we were on and its neighbour, he could always identify his position by interpreting waves, swells and currents even when cloud prevented his use of sun, moon or stars.

With regard to land-finding, the navigator spoke of bird flight paths and the interpretation of cloud patterns. At one stage it was clear, even to me (for I had witnessed it from the trading vessel on which I had travelled to the islands) that Lewis wanted comment on the colours reflected on the underside of clouds (especially the milky green that indicated an atoll lagoon). The navigator spoke in great detail about the building of clouds and the subtle interpretation of their shapes and movement, but made no mention of colour. Making no progress, Lewis finally asked a direct question and after a short silence, was given a gentle explanation. Lewis's reputation had come before him from the Micronesian islands to the north; he was himself a navigator and had proved this by turning up in his small, battered ketch. The cloud effect he referred to was so obvious that anyone could see it; for a real navigator, it was merely confirmation that land already identified from a much greater distance was now close at hand.

The next revelation came a few weeks later when, on a larger island to the south – in reality, several scattered islets along a reef and enclosed by a large lagoon – I needed to travel between two villages almost at opposite ends of the lagoon. Too impatient to wait for the government ship that was not due for several days (or might take weeks), I decided to hire the Island Council's canoe, which came complete with boatman and a prisoner as crew.

As an aside, under British colonial regulations, our crewman was an 'Extramural Prisoner', my first introduction to extramural anything. Extramural means 'outside the walls' after all and, in this case, it meant living at home, providing your own meals, and working on public works for no pay. For small remote islands, extramural imprisonment, despite its contradictions, made sense. The main offences were drunkenness (from fermented sap of the coconut tree) and fighting with (very sharp) knives, usually in combination. Until I came to Massey, I assumed the words extramural and prisoner to be inextricably bound, which is, perhaps, why I have always preferred "distance education" to "extramural studies".

The canoe was about eight metres long, pointed at both ends, with the hull standing 1.2 metres high but less than half a metre across the top at its widest point. The timber

may have been imported, but the construction was all traditional. Thin, narrow planks, most no more than a metre or two long, were tied and caulked with string and wadding made from coconut husk fibre. All was tied; no nails, screws or glue were used. A lattice of poles about three metres wide provided a deck from which was suspended an outrigger float shaped from a single log. There was a triangular sail suspended from a central mast.

We had a journey of two halves – the first laboriously tacking across the lagoon making, it seemed, little progress towards our destination. Laborious because every tack meant that the boatman and prisoner had to change ends – the former carrying his steering oar, and the latter having to transfer the downward point of our triangular sail from one end of the canoe to the other so that the outrigger would always stay on the windward side.

The second half was altogether different. After a final tack, we turned towards our destination, now too far away to be seen, and began an exhilarating downwind run of some 35 km. As the passenger hung on grimly, the prisoner tried to maintain his balance as he moved in and out on the outrigger to the shouted instructions of the boatman so that we obtained the maximum speed with the outrigger float staying largely clear of the water and just skimming the top of every fourth or fifth wave. For his part, the boatman seemed to have no difficulty in managing the steering oar by tucking it under one arm while rolling a smoke (using pandanus leaf rather than paper), and singing *It's a long way to Tipperary*, the only discernible evidence of his mission education at the hands of Irish nuns.

Decades later, the fascination and questions remain, which is why I picked up *Vaka Moana* with keen interest, and I was not disappointed. At the heart of *Vaka Moana* is that same question posed by Captain Cook – of where the Polynesians came from and how they reached their widely scattered islands with cultures and languages that were clearly related. And what was the stepping-off point – Asia, specifically Southeast Asia as commonly assumed (even by Cook on the basis of his observations of material culture) or South America, India, or the remoter reaches of the Nile, or were they one of the lost tribes of Israel? All have been the subject of speculation across the past 250 years.

Reviewer Professor Barrie Macdonald is Pro Vice-Chancellor of the College of Humanities and Social Sciences. In a previous life as a Pacific historian, he had a particular interest in decolonisation, development and good governance in the countries of Oceania.

To make the puzzles even more intriguing, the movement of Polynesians to colonise the south and eastern Pacific – the last region on earth to be settled by humans – was the first migration to cross significant stretches of water. In other words, after the end of the ice age and the consequent expansion of the oceans, Polynesians reached the remote islands of the Pacific with boat-building, navigation and land-finding skills thousands of years in advance of any other population of the time. Whereas most of the rest of the world was settled by people who walked to their destinations, crossing short stretches of water using primitive craft and a measure of hope, the Polynesians sailed. Even if they did not know what lay ahead, they knew where they had come from and where they were, and were confident upon the ocean. The DNA evidence suggests a 'founding' female population for New Zealand of between 70 and 190, which means that the canoes reaching New Zealand were bent on exploration or settlement and not warfare or fishing, both of which were male preoccupations.

It is, perhaps, the romantic heroism that was constructed around this great undertaking that has perpetuated the myths promoted by the likes of Thor Heyerdahl (South American origins) and Percy S. Smith (the settlement of New Zealand by a great canoe fleet) long after they had been discredited, and has kept scholarly interest in the subject alive over recent decades despite the resolution of most of the unanswered questions, using new scientific techniques.

In its own origins, *Vaka Moana* is the book of an exhibition of the same name that opened in December in the Auckland Museum. The exhibition is a huge undertaking – demonstrating not only the 'family tree' of Polynesian settlement (where DNA sequencing is finally resolving arguments carried on by generations of archaeologists, linguists and plant biologists), but the means of migration and the evolving material culture and social organisation of the newly settled societies. As well as the expected canoes, carvings and stories of the founding gods and goddesses of Polynesian mythology, there is a chance to see original works from Cook's voyages by Webber and Hodges, and to explore islands and oceans for oneself through artefacts and multimedia displays; a real highlight is a night sky as it was seen, and used, by Micronesian navigators. *Vaka Moana* is the book of the exhibition, and a valuable complement to it, but it is also much more.

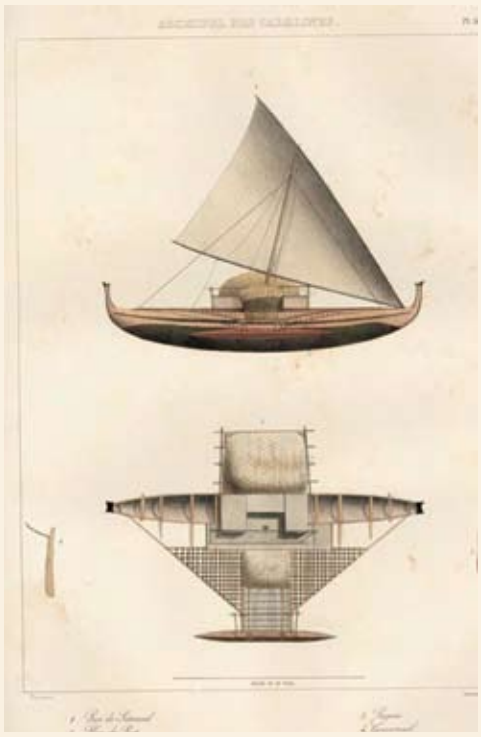
Vaka Moana has more maps, reproductions of artworks, and photographs of people, places, events and artefacts than an exhibition could possibly accommodate. It also has a broader

scope, with an extensive coverage of canoe and sail types, the star compasses and other concepts and devices used for inter-island voyaging, and land-finding techniques. It covers post-settlement societies, later voyaging (including for head-hunting) and the later interaction of the 'two worlds' – Polynesian and European. Just as fascinating are the accounts of the dispersal of plants and the non-human (and often unintended) migrants, notably the Polynesian rat and dog.

As editor (and with a hand in the curating of the exhibition), Massey University's Professor Kerry Howe has gathered an international who's who of scholars to provide this state-of the-art account of Polynesian migration and settlement. Under Howe's over-arching editorship, each section has a lead author and may include contributions by a number of others. It includes, among others, Rawiri Taonui on oral traditions; Geoff Irwin on the archaeological evidence of voyaging and settlement; Ben Finney on canoes, navigation and the voyaging renaissance; Roger Neich on voyaging in the post settlement period; and Anne Salmond on European voyagers and the meeting of Polynesian and European cultures. Howe rounds off the book with an analysis of western views of Polynesian migration and the ways in which these have been bounded more by European perceptions than by Polynesian realities.

The book is well-written, lavishly illustrated and beautifully produced; it gathers the current state of knowledge and packages it well. It is a fitting tribute to epic voyages, Polynesian and European, and brings great credit not only to the editor and authors but also to the museum and publisher who have sponsored the whole enterprise; it has been an epic journey of its own.

So: should you buy this book, despite its price? Absolutely, if you are fascinated by the sea or want to learn and understand more about New Zealand's past and its Pacific connections. If you buy a copy from the museum, you could get the exhibition T-shirt and cap as well, and have a matching set.

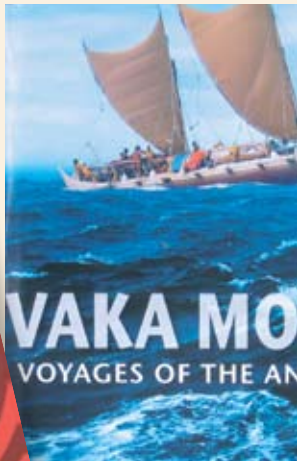


Remolding and Resistance Among Writers of the Chinese Prison Camp: Disciplined and published

Editors: Philip Williams and Yenna Wu
ISBN: 9780415770200,
ISBN-10: 0415770203, Routledge, £65.00

Even in the 21st century, the contemporary Chinese prison camp system remains a relatively obscure and poorly understood realm – what the Sinologist Jean-Luc Domenach has dubbed "the forgotten archipelago" (*l'archipel oublié*). Insisting upon employing its own interpreters and interviewing prisoners in private, the International Red Cross has routinely been denied access to Chinese prison camps. Some Chinese inmates who have smuggled out frank, unofficial accounts of their incarceration have had their prison sentences extended as a result of these accounts' publication overseas.

This volume of annotated essays by senior specialists in history, political science, sociology, and literature offers insightful comparisons between ex-inmate dissident writers in China and their counterparts in Japan and Eastern Europe. The issues of prison enterprise economics, thought "remolding", and post-traumatic stress disorder are all considered, drawing both parallels and contrasts with Soviet, Nazi, and Czech prison camp practice. What emerges is a broad spectrum of literary responses to imprisonment, from self-critical ambivalence to pointed defiance. This book will appeal to anyone interested in how the human mind responds to extremity, as well as to those studying history, sociology, politics, literature, and Asia-Pacific human rights.



Encyclopaedia of Film Noir

Editors: Geoff Mayer and Brian McDonnell
ISBN: 0-313-33306-8,
ISBN-13: 978-0-313-33306-4, Greenwoood Press, Connecticut, US$85.00

Dr Brian McDonnell didn't realise the 1944 movie *Double Indemnity* – starring Fred MacMurray and Barbara Stanwyck in a murder pact – was a classic film noir when he first watched it, gripped, on a black-and-white telly at home one rainy Sunday afternoon as a teen.

As a university student in Auckland in the 1970s, he was struck by the 1974 neo-noir film *Chinatown* and wrote a lengthy critique of it for student newspaper *Craccum*, comparing it to earlier film noir movies such as *The Maltese Falcon* and *The Big Sleep*.

The recent publication by an American press of a handsomely authoritative yet highly accessible tome on film noir is the culmination of his lifelong intrigue with the edgy, erotically-charged 1940s and 50s American classic crime movies, starring the likes of Humphrey Bogart and Lauren Bacall.

A senior lecturer in film and media studies at the Auckland campus, Dr McDonnell has co-authored the 496-page hardcover *Encyclopedia of Film Noir* with Australian academic Associate Professor Geoff Mayer, who teaches at La Trobe University in Melbourne.

The pair – who have both taught at the Palmerston North campus – have collaborated across the Tasman to produce a comprehensive, illustrated guide to film noir titles, actors and directors. They've also penned a series of informative, rigorously researched essays delving into film noir themes to explore "the vexed question of whether it can be considered a film genre, its relationship to hard-boiled crime fiction, its iconic presentation of the American city, political and cultural influences associated with the post-war and Cold War periods (including the activities of the House Committee on Un-American Activities), and film noir's distinctive visual style".

The publication of such a substantial book is in itself a testament to the enduring popularity and influence of film noir long after the genre's fedora hat, trenchcoat-wearing, cigarette puffing heroes made their mark.

Film noir refers to the wave of low-budget American films based on hard-boiled crime fiction by authors such as Raymond Chandler, Dashiell Hammett and James Cain that were made between the early 1940s and late 1950s. As McDonnell points out, the term 'film noir' was coined by French critics later on.

"It was a term made up by people looking back: a retrospective, critical label."

This label by French film critics came about after a deluge of moody, unsentimental American crime films hit the French cinema after World War II. During the war years from 1939 to 1945, French audiences were banned by Nazi occupiers from seeing American films. When US movies did return, critics noticed a distinct change in style, theme and treatment.

Recognisable by their iconic visual style of high-contrast lighting, sinister or downbeat urban settings, use of flashback and voice-over and commonly featuring a detective and femme fatale embroiled in an ill-fated affair, film noir has retained an element of chic and kudos that reverberates in film and fashion well into the 21st century. Unlike the conventional, syrupy and simplistically wholesome Hollywood movies and musicals of the same era that endorsed the ideal happy family American lifestyle, film noir has proved a more enduring film genre with its shadowy worlds, and its haunted characters driven by carnal instincts and plagued by moral ambiguities, says McDonnell.

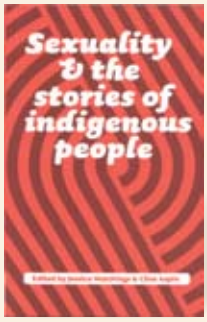
While the characters in conventional Hollywood movies were cleanly defined goodies and baddies, a film noir hero was a tangle of good and bad impulses.

Film noir was very much a post-World War II phenomenon too, reflecting a toughening of the American psyche as the nation faced economic hardship, and returned soldiers came home to unemployment and a dismantled family and community, he explains.

McDonnell has visited film noir archives in recent years at UCLA (University of California, Los Angeles) and USC (University of Southern California) in Los Angeles and the University of Wisconsin to view hundreds of the films – many unavailable commercially. His own personal collection numbers over 500 film noir videos and DVDs.

Commenting on the significance of two Antipodean academics gaining top billing with the publication of a prestigious international book on an essentially American phenomenon, McDonnell suspects their "outsiders' sharp eye" brings an added dimension to film noir scholarship. After all, it took the French as outsiders to conceive of film noir in the first place.

"Now the Antipodes is planting a flag in the midst of this very American genre," he says.



Sexuality and the Stories of Indigenous People

Editors: Jessica Hutchings and Clive Aspin,
ISBN: 1-86969-254-3, $40.00

Indigenous stories of sexuality are the focus of a new book co-authored by a researcher from Te Pūmanawa Hauora, the Research Centre for Māori Health and Development.

Sexuality and the Stories of Indigenous People by Jessica Hutchings and Auckland University's Clive Aspin explores aspects of being takatā pui – the Māori word that describes non-heterosexuals, lesbians, gays, bi-sexuals, transsexuals and queers.

The book was compiled while Hutchings was the Inaugural Resident Scholar at Te Mata o Te Tau, the Academy for Māori Research and Scholarship. She calls it a milestone for Te Mata and a marker of achievement among the Māori research sector at Massey.

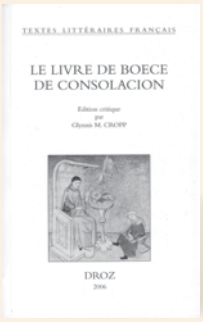
Hutchings (Ngāi Tahu, Ngāti Huirapa) says since the beginning of time sexuality has played a fundamental role in ensuring good health and well-being of people throughout the world.

"Today, there is a growing understanding of the importance that sexuality plays."

She says for indigenous people, understanding of sexuality today is heavily influenced by the historical understandings passed down by the ancestors.

"Gradually, as we uncover the truth about what our ancestors believed and peel back the veneer of colonisation, it is clear that the sexuality of indigenous peoples is vastly different from the dominant Western paradigm."

Stories in this book from 17 contributors testify to the diversity of Māori and indigenous sexuality and provide inspiration for people who want to know more about sexuality and its role in our lives.



Le Livre de Boece de Consolacion

Edition critique par Glynnis M. Cropp
2006 ISBN 2-600-01028-9
ISSN 0257-4063

An edition of a French translation of a work by fifth and sixth century Roman statesman and philosopher Boethius has been published by Professor Emeritus Glynnis Cropp.

Le Livre de Boece de Consolacion, which dates from 1350-1360, was the most widely known French translation of Boethius's *Consolatio Philosophiae* in the 14th and 15th centuries.

An Honorary Research Fellow in the School of Language Studies, Cropp says the anonymous translation survives in 65 manuscripts.

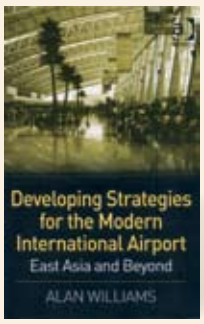
"Boethius wrote the *Consolatio* in prison, before his execution in 524–525. Throughout the Middle Ages, it was well known in Latin and in various vernacular translations."

She says New Zealand libraries hold about 200 medieval and renaissance manuscripts, but the publication of an edition of one of these manuscripts seldom occurs.

Cropp worked with a manuscript from Sir George Grey's Collection held in the Auckland City Library, and used a second manuscript of the same translation, held by Massey University Library, as a control manuscript in establishing the text.

Published by the Librairie Droz, Geneva, this edition includes extensive critical and interpretative material.

The one illustration of the Auckland manuscript, showing the author dictating to a scribe, is reproduced on the cover.



Developing strategies for the modern international airport : East Asia and beyond

by Alan Williams, Aldershot, England ; Burlington, VT : Ashgate Pub. Co., 2006.
ISBN: 0754644456 9780754644453

The publication of a book on Asia's burgeoning airport development has brought international recognition for transportation researcher Professor Alan Williams.

Developing Strategies for the Modern International Airport: East Asia and Beyond, analyses the primary issues facing modern international airports, and their role in a global economy, with special reference to China and East Asia. He says the topic is of great interest at the moment, with airport developers in Asia jostling for strategic placement to dominate air traffic as trade from China comes fully on stream.

Williams, who is with Massey University's School of Aviation, says the book has a strong personal endorsement from Professor Richard de Neufville, from the Massachusetts Institute of Technology, one of the world's leading consultants on airport development. The two researchers are now corresponding on matters of mutual interest.

Williams has also been invited to deliver a seminar on an airport strategy for the Pearl River delta, at Hong Kong International Airport in February.

This year he is working on a second book commissioned by the same publisher, with the working title of *Contemporary Issues Shaping China's Civil Aviation Policy: Balancing International with Domestic Priorities*. He will have an opportunity to do fieldwork for the book when he returns to China early next year, to teach in the International Masters of Business Administration at Sun Yat Sen University Business School. The second book is scheduled for publication in early 2008.

Massey University College Research Awards

College of Creative Arts: Individual

Professor Donald Maurice has sustained a dual career as a published academic and as a performing and recording artist. Professor Maurice was appointed Professor of Music with the College of Creative Arts in 2004 and is now with the New Zealand School of Music. He has an international reputation as a viola player and has played with major orchestras in Europe, Britain and New Zealand. He taught viola at Cambridge University. His academic interest in the music of Béla Bartók and his revision of the *Viola Concerto* earned him invitations to give seminars in Switzerland, the United States and Australia. Professor Maurice's current research projects include the editorship and annotation of the *Leipzig Diary* of Alfred Hill, New Zealand's first professional composer, and recordings of his 17 string quartets. His transcription for viola of George Enescu's *Third Violin Sonata* will be premiered at the 2008 International Viola Congress in the United States.

College of Creative Arts: Supervisor

Jacqueline Naismith is programme leader for the Master of Design Programme, and programme leader in History Theory and Research for the Department of Two Dimensional Design in the College of Creative Arts. Her specialist teaching areas are visual communications design studies, theory, history, and visual research methodologies, and she teaches in the Master of Design programme. Her recent research includes projects that examine relationships between mass media design languages, social formation and identity construction; design languages and their technologies of production; visual communications design pedagogy, and visual research methodologies. Her research was cited in a recent 'state of field' paper published in the *Journal of Communication*, Oxford University Press. Ms Naismith has played a leading role in establishing a culture of research in the School of Design and the Institute of Communication Design. She is completing a PhD in Sociology titled *Destination, locality and design; consuming and performing places through tourism imagery in New Zealand 1955-2004.*

College of Creative Arts: Early Career

Dr Claire Robinson is head of the Institute of Communication Design in the College of Creative Arts. Her research interests include political marketing, political communication and electoral studies, with specific emphasis on the visual communication of political messages. In 2006 she completed a PhD in politics, examining the political advertising messages of the seven major parties contesting the 1999 and 2002 New Zealand general elections. She examined the associations between demonstration of market orientation and political gain. Dr Robinson is often called upon for comment on radio and television on political advertising and political marketing. In 2004 she was awarded a Wallace Electoral Award for her CD-ROM contribution to the book *New Zealand Votes*. The award is made by the New Zealand Electoral Commission for the scholarly work considered to have best promoted public understanding of electoral matters. In 2004 Dr Robinson was also the recipient of a College postgraduate research excellence award.

College of Business: Individual

Professor Janet Hoek's research has appeared in leading business and marketing journals. In the past decade she has initiated and developed four research programmes, all of which examine issues in marketing regulation. These research initiatives have involved numerous colleagues and attracted substantial grants, directly strengthening the research environment. She is widely known for her work in the regulation of tobacco marketing. She has contributed to the development of government policy on this issue and played a large role in developing tobacco research in New Zealand. She has had international recognition for her research into consumer understandings and responses to tobacco related messages and warning labels on cigarette packs. Professor Hoek has more recently been researching food marketing and exploring the relationships between food promotions directed to children and obesity. In this area too her findings have played a role in health policy development and to her appointment as an expert adviser to the Select Committee enquiry into obesity and Type 2 diabetes. Professor Hoek has also been an active researcher into the marketing of medicines direct to consumers and consumer deception issues related to marketing and advertising. Her work has also encompassed alcohol marketing to young people and her reputation as a social marketing researcher led to a relationship with the Centre for Social and Health Outcomes Research and to further work in this area with a million dollar Health Research Council grant.

Massey University College Research Awards

College of Education: Individual

Professor Roger Openshaw who holds New Zealand's only Chair in Education History, has consistently employed the skills and perspectives of a historian to his work. Curriculum issues and development have been a particular focus. In the past two years he has co-written and co-edited eight books which impact the entire education field, including curriculum, policy, pedagogy, administration, and the critical study of culture. In 2002, Professor Openshaw was awarded his personal chair in Education History and a Claude McCarthy Fellowship. In 2006 he received an American Educational Research Association Outstanding Book Award, together with successive Visiting Senior Scholar appointments from the Open University, Milton Keynes, England.
Professor Openshaw also receives a University Research Fellowship.

College of Humanities and Social Sciences: Supervisor

Associate Professor Keith Tuffin, an experimental social psychologist, has a successful supervision record stretching from 1986, when he first began supervising graduate research. His supervision has covered areas from racism, emotion, grief and suicide to clinical psychology and disabled people online. Dr Tuffin says his approach is one of "working with" students, guiding them through the research process and balancing praise with critique. "As a graduate student I was very fortunate to have supervision of the highest quality," Dr Tuffin says. "I now provide my own research students with high quality professional supervision, helping them through the challenges and complexities of conducting original research. Dr Tuffin also serves as a mentor to Te Rua Puawai scholarship students, acts as an external PhD examiner and as a journal referee for several publications.

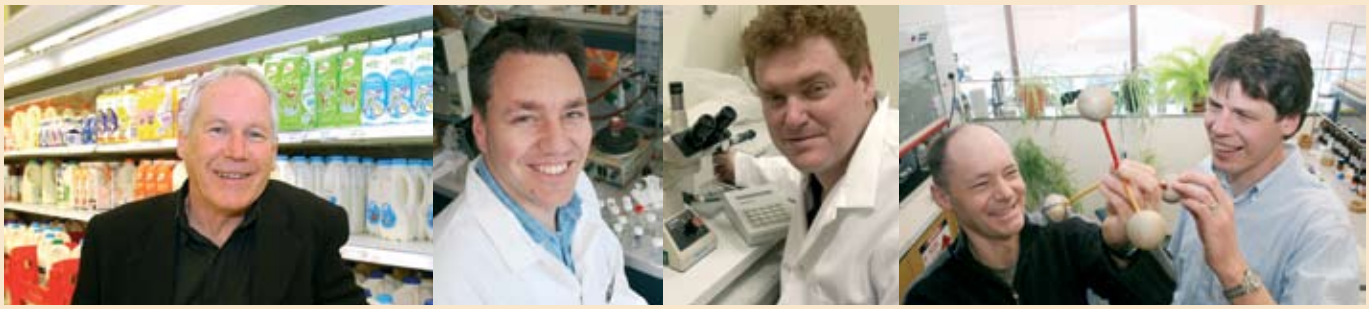
College of Science: Individual

Professor Harjinder Singh, Fonterra Chair in Dairy Science and co-director of the Riddet Centre. He is considered a world authority on milk proteins and their relationship to dairy technology and processing. Professor Singh's early research focused on understanding the chemical and physical changes in the structures of milk proteins, in particular casein micelles and why proteins during heat processing. After moving to Massey University in 1989, Professor Singh broadened his interest to investigate structure-function relationships of milk products in food colloids, providing many new insights and new measurement techniques. This work has had a major international impact and has also allowed the new Zealand dairy industry to develop new protein products with highly enhanced functionality. The international standing of Professor Singh's contribution has been recognised by an industry sponsored Chair at the University since 1998, Fellowship of the Royal Society of New Zealand, the Marshall Rhodia International Dairy Science award and Professor Singh's recent fellowship to the International Academy of Food Science and Technology. Since taking up the chair, Professor Singh has published 120 papers, 12 book chapters, 10 referreed conference papers and has authored four patents.

College of Science: Supervisor

Professor Tom Barry has served as first supervisor for 11 bachelor's honours theses, 11 masterates and 14 doctorates, as well as co-supervising others. He has contributed to building a strong research environment by playing a major role in the building of the nutrition laboratory and expanding the deer unit and has since 2000 been responsible for the Riverside farm field laboratory. He has worked in collaboration with external agencies including AgResearch, HortResearch and the CSIRO plant division (Australia). Professor Barry is regularly asked to act as an examiner both at Massey and externally and as a reviewer. Head of the Institute of Veterinary, Animal and Biomedical Sciences Professor Grant Guilford says Professor Barry's passion for research and scientific rigour has inspired a commitment to excellence in numerous young staff. "Caring for his students, their day-to-day needs and their future careers is very important to Tom and he works tirelessly to ensure their educational experience is as good as it possibly can be. He sets very high standards and successfully develops an appreciation for scientific rigour, creativity and self-motivation in his students by a skilful balance between supervisory guidance, respect for his students."

Massey University Postdoctoral Fellowships



Left to right: Professor Kerry Chamberlain, Dr Paul Plieger, Associate Professor Max Scott, Dr Shane Telfer and Dr Mark Waterland. Absent: Dr Glenda Anthony.

Dr Glenda Anthony, from the School of Curriculum and Pedagogy, won a fellowship for a project called *Maths Teaching/Learning Nexus*, a collaboration with colleagues from the College of Education that involves participation of mathematics education researchers from 15 countries in an international video-based study.

Professor Kerry Chamberlain, from the School of Psychology, won a fellowship for a project involving councils, church groups, charitable organisations and international researchers called *The Meanings of Home and Homelessness*. It will enable additional research to be conducted to assist a project, which already has Marsden funding, on social reintegration and social interaction for homeless people.

Dr Paul Plieger, a senior chemistry lecturer in the Institute of Fundamental Sciences, won a fellowship for a project called *Metal Salt Extracts*. The associated funding will enable him to continue his investigation into electrochemically-controlled anion encapsulation. Dr Plieger received a Marsden Fast Start grant two years ago.

Associate Professor Max Scott, from the Institute of Molecular Biosciences, won a fellowship to develop a project on the role of histone modifications in the establishment and maintenance of long-term memories called Are Memories Written in the *Histone Code?*. Vinegar flies will be the experimental subject.

Dr Shane Telfer and **Dr Mark Waterland** of the Institute of Fundamental Sciences won a fellowship for a project entitled *Connecting the (Quantum) Dots*, which lies at the cutting edge of nanoscience research. Gold nanoparticles are very small clusters of several hundred gold atoms. The researchers intend to tether these nanoparticles together in a controlled way. Applications may include extremely sensitive censors for both metal ions and biological compounds. Because of the technical difficulty the project poses, the team requires an individual with a highly specific skill-set including organic and inorganic synthesis, nanoparticle chemistry, microscopy and spectroscopy.

Massey University Research Fellows

Dr Rukmani Gounder is an associate professor in the Department of Applied and International Economics. Her research interest is economic development in Fiji, and her study will investigate a broad range of issues relating to the economic development of this small island state. These include the nature and recent transformation in Fiji for economic growth and development, the reasons for economic growth (or lack of) in small states during the 1990s; the trajectory of economic policy to meet the objectives of growth; and the economic and political dynamics behind policy change. Along with economic factors that explain growth, other factors that influence economic outcomes such as attitude, social capital and social capability are also being explored in this study. The study is the basis of a book *Economic Development in Fiji* which is expected to have a significant role in identifying factors that contribute to differentials in growth rates among countries.

Professor Roger Openshaw, in the School of Educational Studies, is completing a book for inclusion in an acclaimed international series *Secondary Education in a Changing World*. Professor Openshaw's book will critically examine the *Picot Report* and the subsequent Labour government policy document, *Tomorrow's Schools*. In the late 20th century, the *Picot Report* brought in the most significant and far-reaching educational reforms in New Zealand's history. These reforms still impact on the theory and practice of education. This study of a key New Zealand educational reform policy will be situated within multi-disciplinary scholarship in the United States, the UK and Australia and within the broader context of education policy studies internationally. It is expected to generate interest among researchers in social sciences, humanities and professional studies who share common interest in the development of public policy. Professor Openshaw's book is expected to have a broad general readership. Professor Openshaw also receives a College Research Award.

Massey University Women's Awards

Left to right: Kylie Foster, Liqiong Tang, Dr Doreen D' Cruz, Dr Sandra Hefferman, Dr Marie Wong, Dr Margaret Walshaw.

Kylie Foster is a lecturer in the Institute of Food, Nutrition and Human Health. Her research project is a study of human mastication, chewing trajectories and jaw shape. The human chewing process is highly variable depending on numerous factors including the individual, food properties and circumstances. Ms Foster will recruit her subjects according to strict dental and health criteria, measure each subject's jaw and trajectories of the jaw while chewing. From data gathered from the study subjects she will explore the correlations between jaw properties, food properties and chewing trajectories. The project is an extension of mastication research which investigated the relationships between food properties and chewing behaviour. She expects the project to be of particular interest to research groups looking at modelling and reproducing human chewing trajectories.

Liqiong Tang is a member of the Institute of Technology and Engineering research team investigating the use of computer technologies to assist medical surgery. Research will first focus on understanding the requirements of medical professionals and learning how to couple engineering techniques and skills with medical requirements in order to solve particular medical problems. Subsequent research will focus on software and hardware interface development, programming modelling and individual case study. This project is in the new but very active field of computer-assisted surgery (CAS), which is currently attracting the attention of both engineering researchers and medical professionals. CAS has the potential to improve surgical outcomes through the combined application of safe, non-contact data collection, accurate and fast data processing, precise medical models, virtual surgery simulation, rapid tooling for implants and surgery jigs, and real time surgery monitoring.

Dr Doreen D'Cruz, of the School of English and Media Studies, is working in collaboration with Dr John Ross on the project 'Sad, Mad or Bad: Isolates in New Zealand Fiction.' The project explores some major texts and authors in New Zealand fiction using the topos of the 'man alone', most famously exemplified by John Mulgan's book *Man Alone* as a starting point for the enquiry. A recent survey of this topos within New Zealand fiction by Lawrence Jones has not only listed recurrences of it but has also shown the parallel development of the woman alone as a strong motif. The study seeks to interpret this aspect of New Zealand fiction using a multiplicity of critical methodologies that will assist in facilitating an understanding of the various ways in which isolation works textually.

Dr Sandra Heffernan, of the College of Creative Arts, has a particular research interest in textiles. Her project aims to analyse and document socio-cultural aspects of textiles and dress through material culture research. It will focus on 1930s depression era to 1940s utility era textiles owned by Wellington-based textile collector and author, Rosemary McLeod. These textiles will be examples of ordinary clothing from everyday life in the eras such as mended and re-mended knitted clothes, dresses and textile designs both typical and atypical of the depression and utility era. Dr Heffernan intends to curate an exhibition and produce a catalogue of the textiles and garments. She says both Auckland Museum and the National Museum of New Zealand, Te Papa Tongarewa, have expressed interest in exhibiting the items following the completion of the project.

Dr Marie Wong, of the Institute of Food, Nutrition and Human Health, is researching healthy edible oils, and for the past five years she has been carrying out collaborative research on avocado oil with Dr Allan Woolf at HortResearch. Her research team is now well-recognised internationally as experts in avocado oil extraction, composition and quality. Ongoing research aims to define maturity indices for olives and their influence on oil composition and quality. This research will start next autumn at harvest. Dr Wong now intends to write up all her research on avocado oil for publication.

Dr Margaret Walshaw's project focuses on the scholarly work of Michael Foucault and explores how his thinking might be applied within mathematics education. Dr Walshaw, of the School of Curriculum and Pedagogy, plans to write a text for the mathematics education community that challenges traditional thinking. Her text will attempt to capture the potential of Foucault's philosophy to move current understandings within the mathematics discipline forward. She says Foucault's system of ideas will present a different way of looking at practices and processes such as teacher education and mathematics classroom teaching and learning. Dr Walshaw says the timing of this project is opportune as the discipline is currently searching for new directions to explain phenomena in a way that is not tied to conventional thinking.

The University Women's Awards enable staff involved in teaching or administrative work to take time out to write up research results for publication or to collect data. Each award is worth up to $10,000.

Massey University Māori Awards

Pani Kenrick
Ngāti Kahungunu ki Te Wairoa

Peti Kenrick
Ngāti Kahungunu, Muaupoko, Ngai Tahu

James Graham
Ngāti Kahungunu, Ngai Te Whatuiapiti

Pani Kenrick, a lecturer with the College of Education, is conductng a qualitative Māori-centered study titled 'He Ahi Kā, He Pōkai Rānei'. This is examining the provision of a total immersion Māori pre-service teacher education programme. The study focuses on the ways in which the induction process, self-efficacy and professional development programmes within various classrooms and educational settings contribute to supporting beginning teachers. Issues related to access and participation in such support programmes and contributions of key personnel to the provision of beginning teacher support are also explored.

Peti Kenrick, who is based in Napier at the College of Education's Ruawharo Centre, is researching an EdD thesis focusing on beginning teachers' perceptions of their preparation for teaching Māori children and the basis of these perceptions. She also aims to ascertain if teachers can identify why they may believe they can or cannot teach Māori pupils.

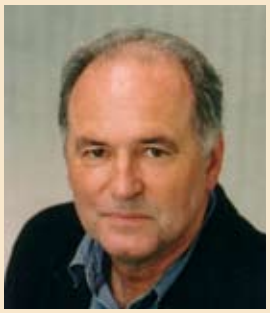
James Graham, who is based at the College of Education's Ruawharo Centre in Napier, is researching the role of Te Aute College in Hawke's Bay and its contribution to Māori development. It is envisaged that a range of personal experiences and influences through stories, and various literature will contribute to Te Aute's story and hence its contribution to Māori advancement since the latter stages of the 19th century. The research will explore how Te Aute might maintain its unique Māori focus and character, while assisting with possible strategies to assist transition into the 21st century. .

Each Māori Award carries funding of up to $10,000 to enable researchers to take time away from administrative and teaching duties to write up research results or to collect and analyse data.

Massey University Technicians Awards

Gareth Rowlands

Dr Jan Schmid



Professor Neil Pearce

Gareth Rowlands, of the Institute of Fundamental Sciences, receives a technicians award for research that aims to study alternative forms of chirality in the development of novel organocatalysts, with a goal to improve the efficacy of these catalysts. Organocatalysts is the pre-eminent method to achieve enantioselective synthesis due to its numerous advantages over its metal-based counterparts, particularly in the area of waste control. The first stage of the current project will be to complete preliminary studies; synthesis of the catalysts by a technician, to resynthesize catalysts first prepared in Britain.

Dr Jan Schmid receives a technicians award for a project on *Candida* contingency genes. Dr Schmid, a senior lecturer from the Institute of Molecular Biosciences who is collaborating with Dr Barbara Holland from the Allan Wilson Centre, Dr Mark Patchett from the Institution of Molecular Biosciences and an Otago researcher, has discovered that two hypermutable surface proteins in *Candida albicans*, the most important fungal pathogen of humans, are pathogenicity determinants and that more such proteins may exist. The finding resulted in a hypothesis, which will now be tested.

Professor Neil Pearce, director of the Centre for Public Health Research, receives an award for the centre's project 'Balancing Innate Immunity in Asthma'. The funding for a full-time technician will allow establishment of a research programme into the immunological mechanisms of asthma, which will be developed in collaboration with the Malaghan Institute of Medical Research. This study will be the first of its kind to examine interaction of different cells derived directly from the airways. Eighty asthmatic children and 40 control children will be recruited.
Professor Pearce also receives the individual research medal, page 3.

The Technicians Awards provide for an annual salary of up to $35,000 to be paid for two years to provide technical support and assistance for a specific research project.

Tertiary Education Commission Top Achiever Doctoral Scholarships

Two Massey PhD students have been awarded the Government's top scholarships with a total value of more than $152,000.

Rachel Bell: $71,488 Ms Bell will pursue a doctoral thesis entitled *National History / National Memory: New Zealand's Official histories of WWII.* She will be supervised by Dr Kerry Taylor in the University's School of History, Philosophy and Politics in Palmerston North. Ms Bell's thesis will examine the recording of New Zealanders' experiences during the Second World War in the series of Official Histories produced following the war. It will assess the methodology employed in the Histories and the social and political factors that influenced their production.

Nick Albert: $81,078 Mr Albert will study the regulation of anthocyanin pigment production in petunia plants. He will be supervised by Associate Professor Michael McManus in the Institute of Molecular Biosciences in Palmerston North. Mr Albert says anthocyanins are important plant pigments providing colour to flowers, fruit and leaves. The genes that encode the enzymes in this pathway have been cloned and characterised in many plant species. The petunia is a model species for investigating anthocyanin biosynthesis and regulation.

WOOL RESEARCHER PAR EXCELLENCE
DR FRANCIS WILLIAM DRY

Massey Archivist Louis Changuion writes

Born in Yorkshire in 1891, Francis William Dry, or William as he was known, obtained an MSc from the University of Leeds in 1914. After a stint in the United States and working as a government entomologist in Kenya, he was awarded a research fellowship at the University of Leeds in 1921. Dry's research at Leeds was based on the hairs and the coat of mice and their growth pattern and led to him being awarded a DSc in 1925. His research was published the following year and remained the definitive work for decades to come.

While at Leeds, Dry ventured into research in genetics and studied the inheritance of coat colour in Wensleydale sheep. This was to be the start of his pioneering work in wool research. Funding for this research was short-lived and in weighing up his options, Dry accepted a position as senior lecturer in agricultural zoology at the newly established Massey Agricultural College in Palmerston North in 1928.

At the time, the tendency of the crossbred wool clip to contain a large amount of hairy fibres (halo-hairs) was regarded as a problem by wool producers. In an attempt to address this problem, Dry focused his research on this issue and established a flock of very hairy Romney sheep at the College. Instead of breeding sheep with less hair, Dry, unconventionally, reasoned that through a strict breeding and selection process for more hairy fibres, some sheep would show no hairiness in their wool.

From a study of Romney fibre morphology and succession, Dry and his students, over the next decade or so, confirmed that the occurrence of hairy fibres were genetically determined. The study, reported in 1955, proved that the presence of a dominant N-gene led to an abundance of halo-hairs. Many of his peers considered this study to be the most extensive investigation conducted into the genetics of a species of farm livestock anywhere in the world.

After World War II some wool buyers became interested in Dry's flock as it was shown that the fleece of sheep with the N-gene was ideally suited for carpet production. Unfortunately, due to a rapid rise in the wool price at that stage, the production of this coarse wool was not explored any further.

In 1953 Dry was promoted to the position of associate professor and in 1956 he retired from Massey. The promise held by the coarse wool fibres for carpet production was not forgotten and in 1961-1962 specialty carpet-wool production was set up under Massey's control. The sheep flock produced through Dry's experiments was named the Drysdale breed in his honour.

After his retirement Dry took up an honorary fellowship at his alma mater, the University of Leeds, where he proved the suitability of the wool of his sheep flock for carpet manufacturing. In 1963 he returned to Palmerston North, where he would live for the rest of his life, and continued his research on fibre types. This led to the publication of *The architecture of lambs' coats: a speculative study* in 1975.

For his enormous contribution to research, Dry was awarded, among other distinctions, an honorary DSc by Massey University in 1966 and an OBE in 1973.

Massey University Archives: B-7-1-2-2 Vol. 17, Council Documents C65/159;

Rae, A. L. 'Dry, Francis William 1891 - 1979'. Dictionary of New Zealand Biography, updated 22 June 2007, URL: http://www.dnzb.govt.nz/

Images, clockwise from left: Dr Dry and nickname (1929); Dr Dry studying fleeces (1929); Dr Dry, at right, during the 1960s or '70s; Dr Dry in the 1970s.

Massey University Growing New Zealand

Progressive: A future-focused approach and understanding of what will drive New Zealand forward.

Academic excellence: Applied, specialised and highly relevant programmes support New Zealand's economic, social and cultural transformation.

National reach: Campuses in Auckland, Palmerston North and Wellington and a national distance education programme offer research led teaching and research training to a wide and diverse student body.

Connected: Strong partnerships with industry and commerce contribute to economic development regionally, nationally and internationally.