2010
ANNUAL
RESEARCH
REPORT
FACULTY OF HEALTH, ENGINEERING AND SCIENCE

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VICTORIA UNIVERSITY
MELBOURNE AUSTRALIA
Victoria University
Faculty of Health, Engineering and Science
2010 Annual Research Report

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Victoria University is a large multi-sector University located in the west of Melbourne, developing an academic heritage and an international reputation for research excellence. Universities are primarily institutions for the generation and transmission of knowledge. This means that research, or the generation of new knowledge, is fundamental to every aspect of our activities. Our research is relevant, innovative and connected. Relevant, because it addresses today’s concerns while looking ahead to tomorrow’s unimagined possibilities. Innovative, as it solves practical and theoretical problems, in novel and creative ways. Connected, because it links to families and communities, to business and government, both locally and globally. Whilst our research informs and enriches our teaching, it also makes a large and critically important contribution to the cultural, social, and economic development of Victoria and the world.

The Australian government’s 2010 intergenerational report predicts that Australia’s population will grow from 22.3 million in 2010 to 35.9 million by 2050. Such a large increase in numbers will have important implications for communities in terms of quality of life (housing, transport, health and education). The next few years will be exciting as we grapple with the problems that confront society at a time of demographic and economic change.

To compete in a global environment, we depend upon technology, vital services and, most importantly, talented people. We have a strategic vision to achieve and sustain national and international prominence in our chosen areas of research interest. Our mission is simple: empower researchers to make extraordinary discoveries and innovations; partner with industries; and lead efforts to train a workforce for the future.

Our researchers continue to win major grants in a highly competitive environment and publish in leading international journals and with top academic publishers. The recent ERA Ratings have reflected that many of our research areas are world class.

In this report, you will find a sampling of the research successes. You are invited you to read, enjoy and be inspired by the work of our researchers who are redefining the realms of their disciplines. New projects, publications, research highlights and other activities have been compiled. It is hoped that you enjoy reading about the exciting range and depth of current research and our plans for the future as our organisation steps up our activities.

Michelle

Professor Michelle Towstoless
Executive Dean

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• 21st Australasian Conference on the Mechanics of Structures and Materials
  7 – 10 December 2010, VU Conference Centre, Melbourne, Australia.  86
• 8th Asia-Oceania Symposium on Fire Science and Technology
  7 – 10 December 2010, Park Hyatt, Melbourne, Australia.  87
• Australian Institute of Physics Congress co-located with the
  35th Australian Conference on Optical Fibre Technology
  5 – 9 December 2010, Melbourne Convention and Exhibition Centre, Melbourne.  87
The Faculty of Health, Engineering and Science aspires for excellence in teaching, learning and research, and is committed to providing students with sound scientific training from leading educators, an innovative learning environment, and customised teaching methodologies. The Faculty takes pride in combining theory and practice with strong links to industry and community experience to ensure our graduates are ready for the real world.

The Faculty is committed to providing quality education with the latest training facilities to prepare students in their chosen career and enhance their learning in the workplace experience.

The Faculty strengths include:

**Problem Based Learning (PBL)**
- Specialised teaching and learning approach that focuses on using ‘real life’ problems
- Offers technical knowledge and important skills (problem solving, teamwork, communication)
- Effective tool in developing critical thinking skills to resolve engineering and other problems in the real world

**Engineering Industrial Experience**
- Strong links with Engineers Australia
- Professional practical experience for three months
- Exposure within an engineering environment to observe human and industrial relations, job organisation, maintenance, safety and environmental procedures
- Excellent industry links

**Clinical Learning Experience**
- Innovative teaching designed to enhance the student’s clinical learning experience
- Opportunities to experience the real nature and challenges of contemporary nursing practice
- Work alongside expert clinicians
- Positive and supportive clinical learning environments across the spectrum of nursing specialties

**Nursing Simulation Lab**
- State-of-the-art nursing lab in a safe teaching environment
- Emphasis on simulation learning to gain exposure on space and functions of an inpatient setting
- Interactive simulation facilities with live video streaming capabilities for enhanced student participation

**Health Service Clinics**
- Emphasis on providing learning, teaching, research and practice facilities for the next generation of health professionals
- Focuses on industry based projects and simulation laboratories

**Paramedic Clinical Placement**
- Exposure on responsibilities and experiences of the ambulance paramedic
- Professional development for students to learn to observe, consolidate and extend their knowledge and skills in the clinical care of patients in a pre-hospital environment
Research
The Faculty has a strong reputation in undertaking fundamental and applied research, focused on developing innovative technologies. The Faculty operates world-class research and development in our three specialised research centres:

- **Centre for Applied Informatics (CAI)**
  The Centre focuses on e-research, data mining, data management, internet and web services-based technologies that can be applied to almost every industry and sector. Our key research and applied areas are: community, business, education, environment, health, and security, in projects as diverse as e-health, water resource management, social computing, etc.

- **Centre for Environmental Safety and Risk Engineering (CESARE)**
  A leading research centre and course provider in the area of fire safety and risk engineering. Research and consultancy work are undertaken for a variety of industrial and government organisations such as: OneSteel, BlueScope Steel and Fire Code Reform Centre.

- **Centre for Telecommunications and Micro-Electronics (CTME)**
  This Centre is focused in telecommunications, microelectronics, optics and photonics. The Centre has strong affiliations with the Australian Communications Research Network (ACoRN) and the National Networked Teletest Facility for Integrated Systems.

The Faculty has three Schools with courses in the following disciplines:

### Courses

- **School of Engineering and Science**
  - UNDERGRADUATE
    - Architectural Engineering
    - Building Engineering
    - Building Surveying
    - Civil Engineering
    - Electrical and Electronic Engineering
    - Information Technology
    - Mechanical Engineering
    - Science Specialisation
      - (Biotechnology, Chemistry, or Ecology and Environmental Management)
    - Sports Engineering
  - POSTGRADUATE
    - Computer Science
    - Electrical and Electronic Engineering
    - Project Management
    - Wireless and Network Engineering

- **School of Biomedical and Health Sciences**
  - UNDERGRADUATE
    - Biomedical Sciences
    - Clinical Science — Osteopathy
    - Dermal Therapies
    - Nutritional Therapy
    - Nutrition, Food and Health Science
    - Paramedic Science
    - Science/Psychology
  - POSTGRADUATE
    - Food Science
    - Osteopathy
    - Dietetics

- **School of Nursing and Midwifery**
  - UNDERGRADUATE
    - Midwifery
    - Nursing
  - POSTGRADUATE
    - Acute care
    - Diabetes
    - Mental Health
    - Midwifery
THE FACULTY OF HEALTH, ENGINEERING AND SCIENCE IS MANAGED BY

Professor Michelle Towstoless
Executive Dean

Professor Stephen W. Bigger
Deputy Dean

Mr Fernando Scarmozzino
Associate Dean (International)

Professor Chris Perera
Associate Dean (Research and Research Training)

Dr Kylie O’Brien
Associate Dean (Teaching and Learning)

Professor Richard Thorn
Head of School, Engineering and Science
Dr Daryl A. Cornish  
Acting Head of School, Biomedical and Health Sciences

Associate Professor Kristine Martin-McDonald  
Head of School, Nursing and Midwifery

Professor Yanchun Zhang  
Director, Centre for Applied Informatics

Associate Professor Stephen Collins  
Director, Centre for Telecommunications and Microelectronics

Professor Graham Thorpe  
Director, Centre for Environmental Safety and Risk Engineering

Mr Gordon McRobert  
Acting Faculty General Manager
The Faculty of Health, Engineering and Science undertakes fundamental and applied research focused on developing innovative technologies with direct application to industry and the community. Research is concentrated in the applied areas of health, engineering and science. Research activities support the academic courses offered by the Faculty and vice versa.

**Research strengths**
Our research focus is on:
- Fire Safety and Risk Engineering
- Sustainable Buildings
- Vibrations, Dynamics and Thermofluids
- Chemical Synthesis and Analytical Science
- Smart Energy
- Telecommunications and Microelectronics
- Internet Technologies and Applied Informatics
- Mathematical Applications
- Food Science and Nutrition
- Biomedical Research
- Diabetes
- Acute and Chronic Nursing and Midwifery
- Mental Health
- Water Resources
- Ecology and Environmental Management

Most of the research is conducted through the University Research Centres hosted by the Faculty:
- Centre for Applied Informatics (CAI)
- Centre for Environmental Safety and Risk Engineering (CESARE)
- Centre for Telecommunications and Micro-Electronics (CTME)

Research in the Faculty is aligned with University Research Strengths and the faculty researchers also have direct links with the University Institutes:
- Institute for Sustainability and Innovation (ISI)
- Institute for Logistics and Supply Chain Management (ILSCM)
- Institute of Sports, Exercise and Active Living (ISEAL) and
- the University recognised Research Group of Australian Community Centre for Diabetes (ACCD).
PROBLEM BASED LEARNING

Problem-based learning (PBL) is a team-based teaching and learning approach that uses ‘real life’ problems to help you gain technical knowledge and develop important skills like problem-solving, teamwork, communication and locating information. What makes PBL different from conventional teaching is that it starts with problems related to real world practice. This makes it different from conventional teaching where content is first taught in lectures and then applied by solving problems in tutorials and assignments. PBL is designed to help you become an independent learner but it does not do this by using a sink-or-swim approach. Instead, it provides you with plenty of support as you develop the skills you need for learning in a PBL team.

Skills taught include:
- Communication in all forms
- Mathematical and numerical ability
- Use of information communication technology
- Creativity
- Interpersonal and team working skills
- Improving own performance and self learning skills
- Problem solving
- Business skills
- Project management skills
- Information literacy skills

The VU Engineering PBL model

From 2010 a new PBL model is being used for all BEng courses at VU. This model is built on the principles of active learning (problem-based and project-based learning), collaborative learning (learning in PBL teams) and integrative learning (applying knowledge from several units of study).

It includes a staged introduction to PBL that commences with short problems in first year and progresses through community-based projects and then to industry-based projects in later years. The first year of the course is common to all Bachelor of Engineering courses and has a strong emphasis on helping you to make the most of learning in a PBL environment. It also includes built-in student support in learning, language, mathematics and technical skills.

Key features of the VU PBL in Engineering model are:
- Active learning, collaborative learning and integrative learning
- Common first year
- Staged introduction to PBL
- Community-based and industry-based projects

Special features of PBL Engineering model

One of the most important features of our model is that the problem/project is in the centre of the curriculum. The model allows students to work on small problems in year 1, community and/or industry projects in years 2 and 3, and Engineering practice on industry projects in year 4. Our engineering students think and practice beyond engineering in an interdisciplinary approach.
The Centre for Applied Informatics (CAI) focuses on e-research, data mining, data management, internet and web services-based technologies that can be applied to almost every industry and sector, and given the widespread use of the internet, now applies to every modern community.

The success of the research undertaken by the Centre has already demonstrated the diversity of the application areas, such as:

- **Community** — research that applies within a social population community content;
- **Business** — research that applies to general business performance initiatives, such as web services-based projects;
- **Education** — research that applies to e-learning initiatives;
- **Environment** — research that applies to environmental science based initiatives, including the conservation, sustainability and resource usage (e.g., water resource management);
- **Health** — research that applies to health and medical initiatives, that includes medical practitioners, administrators and support staff informatics requirements, and extends to the general public information requirements as users of medical facilities; and
- **Security** — research that applies to information security, law enforcement and defence initiatives.

### Academic Staff Members

- **Professor Yanchun Zhang** (Director)
- **Professor Kerry Bennett**
- **Professor Yuan Miao**
- **Professor John Zeleznikow**
- **Associate Professor Arthur Tatnall**
- **Associate Professor Hao Shi**
- **Associate Professor Liza Heslop**
- **Associate Professor Xun Yi**
- **Associate Professor Nalin Sharda**
- **Dr Jing He**
- **Dr Guandong Xu**
- **Dr Xuehong Tao**

### Selected Publications


### Enquiries should be directed to:

- **Professor Yanchun Zhang**
- Phone: +61 3 9919 5060
- Email: yanchun.zhang@vu.edu.au
The Centre for Environmental Safety and Risk Engineering (CESARE) undertakes research in the areas of fire safety and risk engineering and sustainable architecture. The Centre has world-class facilities for testing the response of materials and structures to fire. CESARE has a burn hall that has a width and length of 40m and 70m respectively and it can be used to carry out very large scale fire tests. Our academic and research staff have research and practical experience in areas of structural behaviour in fire, heat transfer, mechanical systems, human behaviour in fire, risk assessment and management, fire detection systems, and sustainable architectural design.

Our research covers sustainable architecture and almost all areas of fire safety engineering which includes:

- **Sustainable architecture**
  - The integration of architecture and engineering
  - Building form and environmental sustainability

- **Fire dynamics in enclosures**
  - Bench-scale experimentation
  - Full-scale fire tests
  - Computational fluid dynamics

- **Fire risk analysis**
  - Analysis of fire statistics
  - Effectiveness of fire safety systems and components
  - Protection of transport systems such as trains, bridges, etc

- **Structures in fire**
  - Large displacement behaviour of structural steel buildings in fire
  - Design of steel and composite floors for fire resistance

- **Human behaviour leading to and during fire**

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**Academic Staff Members:**

**Engineering Group:**
- Professor Graham Thorpe (Director)
- Professor Ian Thomas
- Mr David Proe
- Dr Khalid Moinuddin
- Dr Maurice Guerrieri

**Human Behaviour Group:**
- Professor Dorothy Bruck
- Dr Michelle Ball
- Professor Ian Thomas

**Sustainable Architecture Group:**
- Professor Graham Thorpe
- Mr Sam Kashuk
Selected Publications:


Bennetts ID, Moinuddin KAM, Thomas, IR and Proe, DJ (2008) Sprinklered office fire tests. Fire and Materials, 32 (3). pp. 159-198. ISSN 0308-0501


Bennetts ID, Moinuddin KAM, Goh CC and Thomas IR (2005) Testing and factors relevant to the evaluation of the structural adequacy of steel members within fire-resistant elevator shafts. Fire Safety Journal, 40 (8). pp. 698-727. ISSN 0379-7112

Enquiries should be directed to:

Professor Graham Thorpe
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The research within the Centre for Telecommunications and Microelectronics (CTME) is associated with the discipline of electrical engineering and related areas of science and has close links with academic staff from the School of Engineering and Science. The laboratories and facilities have been built-up over a considerable period of time, and significant internal funding in recent years has enabled the upgrading of vital equipment. Key equipment includes the wireless laboratory (up to 40 GHz) with network analysers, signal analysers, spectrum analysers, complemented by the microelectronics laboratory offering EDA tools (Cadence, ADS, etc.), access to HP93000 based System on a Chip (SoC) ASIC test equipment, Opnet for mobile networks, etc. Well-equipped optics facilities includes high power lasers, supercontinuum source, optical fibre Bragg grating fabrication facility (based on a frequency-doubled argon ion laser), confocal scanning microscope, spectrum analysers and monochromators, wavemeter, plus vibration-isolation optical tables, etc. The Centre is focused on the research strength of VU in communication and sensor technologies, and includes the fields of:

- Telecommunications — future wireless telecommunication services.
- Microelectronics — design of new microelectronic systems for solving instrumentation problems.
- Optics & Photonics — optical fibre technology and optoelectronic imaging.

The research of CTME includes:

- Multiple input multiple output wireless systems
- Cognitive radio
- Microelectronic systems for instrumentation
- Microelectronic systems for healthcare
- Optical fibre Bragg grating sensors, including civil and biomedical applications.
- Rare-earth-doped optical fibres and their use for sensors and amplifiers
- Optoelectronic imaging of optical devices

**Group Leaders:**

Professor Mike Faulkner: Telecommunications
Associate Professor Aladin Zayegh: Microelectronics
Associate Professor Stephen Collins (Director): Optics & Photonics

**Academic Staff Members:**

Professor Greg Baxter
Dr Nicoleta Dragomir
Dr Horace King
Dr Daniel Lai
Dr Thinh Nguyen
Dr Fotios Sidiroglou

**Electrical Engineer (Research Support)**

Lance Linton

**Selected Publications:**


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CAPABILITY OF COMMERCIAL ACTIVITIES

The Faculty of Health, Engineering and Science strives to work with industry, government and the community through research collaborations, provision of services, and technology transfer.

Research Collaborations
The Faculty undertakes collaborative research with industry, other research institutions, government agencies, and other organisations throughout Australia and around the world. Collaborations with industry can be supported by ARC Industry Linkage Grants, or through other arrangements of mutual benefit to all parties.

Services
The Faculty can provide a variety of services to various clients through its schools and research centres. We provide a range of initiatives, investment opportunities and services to help organisations achieve their goals. Our industry expertise extends across two industry clusters and is supported by excellence in research to help organisations become industry leaders.

These clusters are
- Engineering and Infrastructure
- Health

Contract Research and Development
Our research leads to the discovery of new knowledge and innovative technologies that can be applied to practical problems. Our researchers create new and improved products or processes in organisations, and our equipment, facilities and infrastructure are accessed to conduct tests and experiments that will benefit the industry. We can provide strategic advice and apply our research strengths to solve problems or develop expertise or new technologies in organisations from a variety of industries.

Our contract research and consulting services teams provide the following services:
- Strategic advice on how our research strengths can assist
- Collaborative research or research partnerships (including arc linkage grants)
- Commissioned research
- Testing and analysis
- Access to university equipment, facilities and infrastructure
- Project management

Commercial Opportunities and Investing in Research
We are continually developing new knowledge and innovative technologies with the potential for commercial development with industry partners. If you are an investor or are interested in finding out about opportunities to collaborate with us to grow your organisation by using our technologies, please contact us to find out more.

Consultancy
Our business development and research teams provide specialised consultancy to help organisations achieve their goals. We provide tailored training solutions and specialist expertise to help develop staff capabilities and grow organisational capacity. We will work with organisations to:
- Identify opportunities to work together on initiatives, including research that leads to innovative technologies and solutions
- Assess organisation’s readiness for change
- Assess the gap between existing and desired performance of staff
- Assess the current knowledge, skills and attitudes of staff and those needed to achieve the organisation’s goals
- Design and tailor training solutions to address the performance gap
- Measure and evaluate the benefits of investment in training
- The faculty is particularly strong in providing services that are based on years of research expertise through its research centres.

Technology Transfer and Investment: Licensing Opportunities
The Faculty is continually developing new technologies and processes that are available for licensing or commercialisation.

The University is currently seeking expressions of interest for investment capital or licensing and invites interested organisations or individuals to contact the Office Innovation and Commercial Development.

Enquiries should be directed to:
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Faculty Innovation and Development Manager
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Crossbreeding between Pacific Black Ducks and Mallards in Australia

Dr Patrick-Jean Guay and Ms Alice Taysom

Hybridisation or crossbreeding with Mallard ducks is a poorly investigated threat to an iconic Australian native duck, the Pacific Black Duck. Although it caused the extinction of Pacific Black Ducks in New Zealand twenty years ago, crossbreeding is only now starting to be recognised as a problem in Australia. The problem stems from the fact that hybrids are not only healthy, but they are also fertile and can breed with either Pacific Black Ducks or Mallards. After a few generations, the resulting population is thus composed of a very large number of animals with both Mallard and Pacific Black Duck genes and very few genetically “pure” specimens of either species. This is what has happened in New Zealand. Genetically “pure” Pacific Black Ducks are now extinct there. It is feared that a similar situation will occur in Australia. Unlike New Zealand where wild Mallards from Europe and North America were released in the wild, the Mallard population in Australia is principally of domestic origin. Thus, rather than having wild Mallards spread throughout the countryside like in New Zealand, we have farmyard ducks living in urban ponds in towns and cities throughout the country. These domestic ducks are sedentary and more often than not rely on humans for food. Who has never thrown bread to big white ducks at their local pond? This has delayed the spread of Mallard genes in the wild Pacific Black Duck population because crossbreeding can only occur in cities. Unfortunately, hybrids can then in turn fly away from cities and breed with Pacific Black Ducks in the bush. Studies on the appearance of ducks shot by hunters suggest that hybridisation is not very prevalent, but this may be misleading since second generation hybrids (i.e. birds with only one Mallard grandparent) may look very much like Pacific Black Ducks and can go undetected.

This is where Dr. Patrick-Jean Guay and Ms Alice Taysom from the Ecology and Environmental Management Group of the School of Engineering and Science come in. They are planning to use genetics to investigate the level of hybridisation in the wild Pacific Black Duck populations throughout Australia but with a specific focus on Victoria. In a project currently funded by Birds Australia and Victoria University, they will use genetic markers that are specific for each species to determine the pedigree of ducks collected by hunters over the last five years. The use of genetic markers will allow evaluation of the rate of hybridisation irrespective of the duck’s appearance and will thus allow detection of “cryptic” hybrids. The collected information will then be fed back to the Victorian Department of Sustainability and Environment and to local councils to influence legislative changes preventing the release of domestic ducks on urban ponds. This will ensure that, unlike New Zealand, future generations of Australians will be able to enjoy this icon that is the Pacific Black Duck.
Obesity
Dr Michael Mathai and Dr Chris Stathis

Australia’s obesity problem has become an epidemic and we are facing a bleak future of high health costs if this trend is not stopped and reversed. The incidence of obesity is rising at an incredible rate, more than doubling over the last 20 years and creating a significant economic strain on the health care system as well as imposing unnecessary disease and lifestyle complications on the affected individual.

Victoria University is at the forefront of research into obesity and ways to improve health within the community, with two current groundbreaking research projects already attracting attention.

Intervention programs and educational tools such as food labelling have been implemented to help the public gather nutritional information from food products. However, this information has often been difficult for consumers. Technology has become a major point of treatment and disease management in people with chronic conditions. Now, through a unique research project by Nutritional Therapy senior lecturer Dr Michael Mathai, shoppers tempted by fatty foods could soon receive a red light warning on their mobile phone before placing unhealthy products in their trolley.

The new interactive technology, developed to help fight obesity and high blood pressure, has been successfully tested by Victoria University researchers in supermarkets across Melbourne’s western suburbs. During an eight-week trial in 2010, 17 overweight shoppers used mobile phone cameras with a special application to scan barcodes on a variety of packaged foods that were destined for their trolleys. Within seconds the shoppers received a ‘traffic light’ rating of the sodium and saturated fat content of each product from a database of recommended serving values determined by the National Heart Foundation. The red, amber or green signal on the mobile phone’s interface indicates an unhealthy, neutral or healthier product choice based on the individual’s age, body weight and blood pressure levels.

The research participants, each with a Body Mass Index of more than 25, undertook the four-week observational stage of the research, completing weekly three-day food consumption diaries followed by a trial stage where they scanned and purchased foodstuffs. The study found 40 per cent of participants changed their purchase because of the information they were provided via their mobile phone and more than 90 per cent indicated that such a system would be useful to their needs if more products were included. Only breads, breakfast cereals and biscuits were used as part of the study.

Dr Mathai says many supermarket products carry bar codes which are administered by not-for-profit organisation GS1 Australia, giving them potential to be added to the system. “What we know is that very few people read nutritional information on food packs because they’re complicated and generic,” he says. “Our program offers a simple colour-coded rating system based on your individual body weight and age. “The results of the study were very encouraging. We saw a downward trend of salt and fat intake in our participants. “Clearly they were being educated by it and once you get an idea about what is in the food you’re eating, you can transpose that information to other products. It’s part of the campaign against obesity and part of the education process.”

Dr Mathai says he was “pleasantly surprised” that the participants, who were aged between 45 and 55, adapted quickly to the technology, which was developed by VU’s School of Engineering and Science. “All you need is a camera on your phone and wireless internet connection. The only thing that interrupted them was the odd problem with internet reception within a supermarket. “The scanning process is also not something you have to do in the supermarket if you’re in a rush. You can scan the products after purchase in the comfort of your own home and make educated decisions about whether you will buy that product on your next visit. “We also see this technology as crossing language barriers because the whole program is based on numbers and symbols.”

Dr Mathai says VU and GS1 Australia are now working with Novotel St Kilda to test the practicality of including the bar coding information system on hotel meal menus. “Hotels such as Novotel tend to have a rotating menu so they know what is in each of their meals, but for consumers it can be a total mystery. We’re adapting the program for restaurant food, which will open up many more opportunities for us. “Most of the big food manufacturers are saying this is the way to go because they see it as another way of competing. They understand that people want to know what is in their food and want it to be healthy. “We have no idea how big this program could be, but everyone we’ve spoken to is supportive and thinks it is very innovative.” The project was supported by GS1 Australia, Schepisi Communications, Acratus and Diabetes Australia.

In the second study, Dr Chris Stathis is leading a team investigating methods of altering metabolism with modified exercise and dietary manipulation techniques in an effort to understand and devise future intervention strategies to maintain stable healthy weight ranges in individuals. Recent studies have indicated an accelerated weight loss potential using a high-intensity intermittent exercise protocol. These researchers demonstrate increased levels of glycerol in the plasma suggesting an increased fat metabolism and that this is possibly due to increased adipose mobilisation resulting from elevated adrenaline. They suggest that this is the likely reason that participants reduced adipose tissue content during a 15 to 20 week training period.
However, it is unclear from their observations what metabolic mechanisms result in the required energy imbalance for weight loss in the training period. No mechanistic rationale was offered as to where a possible alteration in the energy input or expenditure was derived to achieve a negative energy balance.

Dr Stathis’s experiments compare constant exercise protocol matched to a high intensity intermittent exercise bout of the same total work, as well as protocols of different intensities of intermittent exercise protocols to measure physiological and biochemical variables during and after exercise.

In addition, his research team is investigating long-term fasting prior to exercise and caffeine supplementation to provide additional metabolism manipulation during exercise. This is to superimpose the metabolic stress and understand the oxidation of macronutrients during intense exercise. It is hoped that this research will provide some insight into the external influences that are responsible for energy balance and weight control and result in potentially more effective fat loss and weight management strategies.

“The Victoria University and the Western Bulldogs have been in partnership since 2005 and have been a great support and resource to one another. Recently a new initiative concerning Nutrition and Dietetics was developed with the Victoria University, Faculty of Health, Engineering and Science and the Western Bulldogs Football Department. The University together with the Bulldogs recently advertised and subsequently have appointed a PhD scholarship in Nutrition and Dietetics placed with the Western Bulldogs. This jointly funded PhD scholarship will provide the student the opportunity to work directly in the field of elite sport providing up to 15 hours of direct support and education for Bulldogs players, whilst still under taking a research project in line with PhD requirements.

This unique opportunity extends research into the elite sports arena and in particular into the field of AFL Football. Whilst the final research project is being finalised the scope of opportunity is broad and extensive. As a Football Department we are extremely excited about the possibility of advanced research being conducted in this area which has enormous implication on high performance. The University are to be commended on this innovation and professionalism in which they have operated.”

James Fantasia, General Manager Football Western Bulldogs

Bedside Nursing Handover

Dr Deb Kerr and Dr Lucy Lu

Clinical handover has been defined by the Australian Commission on Quality and Safety in Health Care as ‘the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis.’ It is a high risk activity associated with discontinuity of care, critical adverse events and legal indemnity. Nurses give handover to nurses of the oncoming shift on a daily basis using verbal and written techniques.

A collaborative research project involving Western Health and Victoria University eventuated out of concern about lack of standardised handover structure, no formal guideline, and minimal patient involvement in handover processes. An organisational wide survey involving 23 wards and 153 nurses found that current handover practice is time consuming, varied in style, lacks patient involvement, and may negatively impact on standards of nursing care and documentation.

Bedside handover has the potential to reduce handover related errors and improve the care given to patients. It can improve accuracy of information, and including patients in their handover acts as another safety mechanism. Bedside handover allows patients to participate and take an active role in their treatment and nursing care.

A pilot study evaluated the impact of bedside handover for 3 wards (medical, surgical, maternity) at Western and Sunshine Hospital. This 8-week before/after study found significant improvements in nursing care and documentation after implementation of bedside handover. Outcomes of this project have included the development of a Western Health online education resource titled ‘Bedside Handover Guideline’, peer-reviewed journal publication (International Journal of Nursing Practice, at press), and future conference presentation (ANF Annual Conference Melbourne, June 2011).

Further planned research includes the investigation of the opinions of nurses and patients regarding bedside handover and other potential strategies to enhance nursing care at the bedside, and development and implementation of an alternative model of nursing handover for the emergency department at Sunshine Hospital.
Break-Through On Predicting Cold Damage In Oranges: Value For Orange Exporters
Associate Professor Mary Millikan

Cold damage due to storage and frosts can adversely affect the quality of oranges for fresh fruit. Research to determine if cold damage in oranges could be detected earlier than six weeks has been funded by three external sources: Pacific Fresh Pty. Ltd, Murray Valley Citrus Board and Colour Vision Systems Pty. Ltd. This research that spans almost ten years has now come to fruition. Associate Professor Mary Millikan’s research students’, in collaboration with CQU Prof. Kerry Walsh, have developed a method for predicting cold damage in oranges prior to the appearance of physical symptoms. This is an important finding for the orange industry in that it reduces the holding time before oranges can be assessed for export. Joe Nardi of Pacific Fresh said “we value highly a breakthrough on the early detection of frost damage”. The current practise is to store the oranges for up to six weeks after a frost or cold damage event has occurred. Damaged oranges are not suitable for fresh fruit and are lighter weight so they are used for juice, while sound oranges are available for export. Inside a damaged orange there are some dry segments, which vary according to the extent of the cold or frost damage and also blemishes on the skin.

Two PhD students and two research assistants have worked on this project. The initial PhD project was funded by the three external sources mentioned above. The industry, however, has continued to support this work with samples and in-kind support from Pacific Fresh Pty. Ltd.; E.J. T Packers and Golden Circle as well as on-going assistance from Colour Vision Systems Pty. Ltd. The current PhD student has been partly funded by a Faculty of Health, Engineering and Science, Postgraduate Scholarship.

Investigation of rare-earth dopant distribution in optical fibres. Why is it important?
Dr Fotios Sidiroglou

Photonic devices, such as optical fibres, fibre lasers, and fibre amplifiers play an important role in today’s society. Their capabilities have found use in a vast range of various scientific and industrial environments amongst which the communications field has been influenced the most. They have recently become a key factor behind the tremendous growth in internet traffic, and optical technologies will be even more important in enabling and supporting the future expansion of internet traffic. As a result, optical fibres and optical fibre based products now appear to be the best media for propagating information — through light signals — over long distances. Some major technological achievements in glass fabrication and characterisation were necessary to finally deliver on the promises of optical fibre based communication systems.

An important advance in optical fibre technology has occurred with the development of fibres that amplify light through stimulated emission. Such fibres are made by incorporating various rare-earth dopants (i.e., Er, Yb, Nd, Th, etc). Rare-earth doped fibre based devices constitute an important area of research for the fibre optic research laboratories in the world. The quest to optimise the design and manufacture of these devices has proved to be a continuing challenge to optical scientists and engineers.

We have demonstrated the application of a number of chemically analytical based schemes or optical imaging systems for the analysis of RE dopants present in the core of optical fibres. These methods were utilised as part of F.Sidiroglou’s PhD candidature. They include: Nano-Secondary Ion Mass Spectroscopy (NanoSIMS), Fluorescence intensity confocal optical microscopy (FICOM) scheme and Near-field Scanning Optical microscopy (NSOM).

Consequently, this type of research has laid the foundation for more precise characterisation of the distribution of dopants within optical fibres. Once it is possible to determine the way that dopants respond to the fabrication process, these techniques can be modified so that preforms can be particularly designed to produce fibres optimised for a range of applications.

“I believe the research will inform the service of clinician’s attitudes towards, and suggestions for eliminating, the use of restraint and seclusion. It will also provide a practical system-wide model for promoting better quality care with contemporaneous strategies for eliminating the use of restraint and seclusion in aged psychiatry inpatient units not only within NorthWestern Mental Health but also, potentially, throughout Victoria and elsewhere in Australia. Moreover, further collaborative research is planned between clinicians of NorthWestern Mental Health and Professor McCann of Victoria University.”
John Baird, Manager, North Western Aged Persons’ Mental Health Program
Ensuring That Tall Buildings Do Not Collapse In Fires  
Mr David Proe and Professor Graham Thorpe

High rise buildings must remain standing even after they have been attacked by intense fires. For engineers to design buildings that withstand fires they traditionally test the performance of single building elements such as beams, columns and slabs at temperatures in excess of 1000°C. However, there is a significant problem with this process. The furnaces in which the building components are exposed to fire are usually limited to sizes less than 3m. Furthermore, the performance of a single element might be quite different from that of the network of elements that form the structural skeletons of tall buildings. As a result, VU has undertaken a global research effort to study the performance of entire buildings under realistic fire conditions.

During 2010 researchers at CESARE prepared an experiment to test the performance of a reinforced concrete floor that is 20m long and 16m wide — it is planned to burn over 20,000 litres of E85 petrol under the floor and observe its integrity. The floor will be loaded with 360 drums each filled with 200 litres of water that is the equivalent of about 1000 people. The experiment was set up in Victoria University’s SA5m purpose-built experimental facility located at Fiskville, about 80km west of Melbourne. The facility has a floor plan of 40m by 70m and its height is 20m. The research is prompted by results from experiments carried out in the mid 1990s in the UK. These experiments indicated that the structural performance of an entire structure subjected to fire might be better than that expected if only the strengths of individual members were considered. The proposed experiment will test this hypothesis. If it is correct it might be possible to save money when constructing buildings because not every structural member must be protected against fire.

Considerable analysis has been carried out since the tests were carried out in the UK. It is now believed that buildings subjected to fire retain some structural integrity because the concrete slab itself contributes some inherent strength. Hence, even if some beams supporting the floor of a building are not protected against fire and they give way, the forces required to support the floor with be transferred from the floor to fire-protected supporting columns. The inherent strength of the floor will also help to prevent the structure from collapsing. Features to be studied in great detail are:

- The ability of those beams that have been protected against fire to take up the load shed by unprotected beams.
- The effects of deflections of the beams around the perimeter of the floor on how they affect the strength of the floor as it sags as a result of the fire.
- The effects of the steel reinforcement in the concrete becoming weaker as the fire progresses.
- The effect of horizontal movement of beams around the perimeter of the floor on the vertical columns that support the structure.

This work is supported by a consortium of leaders in the steel making industry and the architectural, building and construction industries. Generous funding is also provided by the Federal Government under its Industry Cooperative Innovation Program. Results of the work are likely to contribute to building codes in Australia that will result in safe buildings that are less expensive to construct.

“...The National Measurement Institute (Port Melbourne) and the Faculty of Engineering and Science of Victoria University have a long standing collaborative partnership. This collaboration has resulted in many opportunities for VU students to obtain carry out research and obtain work experience in industry in a number of areas including chemistry, biotechnology and microbiology. A number of major research projects have been successfully carried out including research on pesticide residues, tripolyphosphates in seafood, cholesterol and plant sterols, folic acid and antioxidants. The results of NMI and VU collaborative research projects have been presented in a number of international scientific forums including the Government Food Analysts’ Conference (GFAAC), the Conference of Residue Chemists (CRC) and the International Food Data Conference (IFDC). This ongoing partnership continues with VU students currently undertaking research in natural folates, allergens, bioactives, antioxidants and cellular antioxidant assays and sterols in bovine milk.”

Dr. Simon Buddhadasa, Principal Scientist, National Measurement Institute
RESEARCH EXPERTISE STAFF PROFILES

SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES
Dr Swati Baindur-Hudson
Areas of Expertise: Biomedical Science; Biochemistry; Molecular Biology; User Bioinformatics.
Research Interest: DNA and diversity; Telomeres, ageing and cancer; Molecular basis of cancer.
Current Projects: Investigation of the use of DNA in prediction of age: Telomere length variation and Mitochondrial mutations; Biodiversity determination using molecular methods; Investigation of the use of CDX1, CDX3, p53 expression as predictors of gastric cancer progression.
Industries: Biomedical Science, Education, Health Science
Research Strength: Sport performance, exercise science and active living

Dr Nivedita Datta
Areas of Expertise: Dairy ingredients; Milk and dairy processing; Neutraceuticals; Food safety; Product development with Lupin flour prevents diabetes and obesity; Membrane processes in dairy industry
Research Interest: Dairy processing; Value-added dairy ingredients; Bacteriophages in food safety; Membrane cleaning in dairy applications.
Current Projects: Membrane cleaning in dairy applications; Bacteriophages in food safety; Value-added dairy ingredients.
Industries: Health
Research Strength: Sustainable environmental technologies; Diversity and wellbeing

Dr Crispin Dass
Areas of Expertise: Cancer Research; Drug Delivery Formulation Technology
Research Interest: Cancer Gene Therapy; Cancer Molecular Therapy; Nanotechnology
Current Projects: Post-cancer stem cell-mediated tissue regeneration Nanoparticle-mediated siRNA cancer therapy Mining for potential drug candidates in marine species Chitosan as an anticancer agent PEDF peptidomimetics and cancer therapy; The uPA/uPAR system and cancer biology and therapy RECK and tumour angiogenesis and metastasis Formulation of scaffolds for tissue regeneration.
Industries: Biomedical Science; Education; Chemistry (physical, polymer, analytical)
Research Strength: Sport performance, exercise science and active living

Dr Nicoleta Dragomir
Areas of Expertise: Optical fibre sensors
Research Interest: Multidimensional light microscopy; Advanced non-invasive optical methods to probe living cells; Three-dimensional structural dynamical processes; Polarised light imaging; Optical fibre sensors.
Industries: Health
Research Strength: Communication and sensor technologies; Diversity and wellbeing; Sport performance, exercise science and active living.
Dr Gary Fryer

Areas of Expertise: Osteopathic principles; Osteopathic technique.

Research Interest: Neurobiological mechanisms of osteopathic manipulative therapy; treatment and management of spinal pain; Use of manipulative techniques by the osteopathic profession; Effect of pain on motor recruitment and performance.

Current Projects: The effect of osteopathic manipulative technique application on EMG activity in the deep and superficial thoracic paravertebral muscles; The effect of osteopathic manipulation on the lumbar flexion-relaxation and responses to postural perturbations in low back pain subjects; Resting EMG activity of deep thoracic transversospinals muscles identified as abnormal with palpation; The use of spinal and sacroiliac joint procedures within the British osteopathic profession.

Industries: Health, Osteopathy

Research Strength: Sport performance, exercise science and active living

Dr Alan Hayes

Areas of Expertise: Muscle contraction; Muscle biochemistry; Exercise physiology.

Research Interest: Muscle contraction and metabolism; Exercise physiology; Muscle mass and ageing; Muscular dystrophy; Diabetes; Calcium and mitochondria.

Recent or Current Projects: Muscle mass matters; Whey protein in resistance training and ageing; Exercise as a strategy for weight loss; Metabolic dysregulation in muscular dystrophy; Improving recovery from muscle damage; Dietary supplementation and muscle function in diabetes.

Industries: Health Science

Research Strength: Sport performance, exercise science and active living

Dr Michael Mathai

Areas of Expertise: Obesity, Diabetes; Thermoregulation; Heat stress; Fever; Nutrition; Osmoregulation; Maternal influences on perinatal development

Research Interest: Obesity and diabetes — nutrition and supplementation; Thermoregulation and fever; Telephone applications that support community health; Cardiovascular disease; Perinatal diet and health.

Current Projects: Dietary supplementation with tocotrienols inhibits the development of obesity-associated disease; The role of the hormone angiotensin in obesity; Using mobile phones to assist the management of chronic conditions; Central control of body temperature; Prevention of fibrosis using tocotrienol forms of Vitamin E.

Industries: Food and Dairy; Health

Research Strength: Sport performance, exercise science and active living

Dr Andrew McAinch

Areas of Expertise: Dietary and Exercise modifications for the treatment of disease states particularly obesity, diabetes and related co-morbidities; The utilisation of human primary skeletal muscle cell cultures and associated research techniques for the investigation of obesity and diabetes related abnormalities.

Research Interest: Dietary and exercise modifications for the treatment of disease states particularly obesity, diabetes and related co-morbidities; The utilisation of human primary skeletal muscle cell cultures and associated research techniques for the investigation of obesity and diabetes related abnormalities.

Current Projects: Adaptive changes in genes, enzymes, fuel storage and leptin, adiponectin and endocannabinoid signalling in skeletal muscle utilising cell culture, animal and human models; Adaptive changes in humans following dietary and exercise manipulations; Use of the latest mobile phone technology as an educational tool to promote improved food choices.

Industries: Health, Molecular Sciences

Research Strength: Sport performance, exercise science and active living
Professor Glenn McConell

Areas of Expertise: Exercise metabolism; Exercise physiology; Exercise biochemistry

Research Interest: Examination of the regulation of skeletal muscle glucose uptake during exercise; The factors regulating the increase in insulin sensitivity and muscle mitochondrial volume following exercise; Whether exercise early in life can normalise insulin action in adult rats that were born small.

Current Projects: Regulation of skeletal muscle glucose uptake during exercise: role of nitric oxide; Regulation of the increase in skeletal muscle mitochondrial biogenesis after exercise; Is skeletal muscle nitric oxide production during exercise required for the increase in insulin-stimulated glucose uptake after exercise?

Industries: Science

Research Strength: Sport performance; exercise science and active living

Dr Patrick McLaughlin

Areas of Expertise: Biomechanics; Statistics; Research design

Research Interest: Biomechanics of techniques (performance improvement and injury prevention); Postural stability; Developing research methods that support evidence based (manual) medicine in Osteopathy and the health sciences; Effect of diabetes on feet; Compression garments.

Current Projects: Development of next generation measurement technologies for compression garments; Measuring load in the cast wall of total contact casts worn by diabetic patients; Using cluster analysis methods to identify golf putting techniques.

Industries: Health

Research Strength: Sport performance, exercise science and active living

Dr Vijay Mishra

Areas of Expertise: Food Science and Technology; Separation processes and operations, food property measurement and modeling, functional foods and nutraceuticals (e.g. antioxidants, dietary fibre, omega-3 fatty acids), shelf life of foods; Grains and fruit and vegetable processing.

Research Interest: Functional foods and nutraceuticals, design and development of separation processes, minimal processing of foods; Processing aspects of cereal grains, fruits, vegetables.

Industries: Food and Dairy, Science, Water

Research Strength: Sustainable environmental technologies

Dr Kulmira Nurgali

Areas of Expertise: Neuroscience; Enteric Nervous System; Electrophysiology; Ion Channels; Gastrointestinal Inflammation.

Research Interest: Effects of inflammation on the enteric nervous system; Inflammatory bowel disease; Post-infection Irritable Bowel Syndrome; Ion channels; Axonal damage and neuronal death; Side effects of chemotherapy on the enteric nervous system.

Current Projects: The roles of ion channels in neuronal hyperexcitability caused by intestinal inflammation; Neuronal death and axonal damage following intestinal inflammation; Triggerring mechanisms of neuronal hyperexcitability following intestinal inflammation; Functioning of enteric neurons in acute stage of intestinal inflammation: from animal models to humans; Effects of colorectal cancer and chemotherapy on the enteric nervous system.

Industries: Health

Research Strength: Diversity and wellbeing
Dr Kylie O’Brien
Areas of Expertise: Chinese medicine education and curricula development
Research Interest: Chinese medicine; Herbal medicine; Acupuncture; Cardiovascular disease; Research into teaching & learning.
Industries: Chinese Medicine; Health
Research Strength: Diversity and wellbeing; Education, access and transition

Professor Nagendra Shah
Areas of Expertise: Fermented dairy products, low fat mozzarella cheese, probiotic cheddar cheese, ACE-I inhibitory peptides; Physiology and health benefits of probiotics and enzymic biotransformation of soy isoflavones
Research Interest: Dairy Science: functional properties of milk, fermented dairy products, low fat mozzarella cheese, probiotic cheddar cheese, ACE-I inhibitory peptides, EPS producing stater cultures; Microbiology: physiology and health properties of Lactobacillus acidophilus, Bifidobacterium spp., and Lactobacillus casei, proteolytic activities of bacteria, bacteriocin, probiotics and prebiotics, and enzymic biotransformation of soy isoflavones.
Industries: Food and Dairy
Research Strength: Sustainable environmental technologies

Dr Emma Rybalka
Areas of Expertise: Duchenne Muscular Dystrophy; Mechanisms of skeletal muscle hypertrophy, atrophy and wasting; Muscle metabolism
Research Interest: Metabolism, mitochondria, metabolic enzyme function, metabolic signalling, hypertrophy signalling, autophagy, calcium regulation in muscle.
Current Projects: Is Duchenne Muscular Dystrophy a primary metabolic myopathy? The molecular mechanisms of muscle atrophy in Type II Diabetes.
Industries: Health; Science
Research Strength: Sport performance, exercise science and active living

Dr Deanne Skelly
Areas of Expertise: Ion channels; Diabetes; Protein-protein interactions; Kidney function
Research Interest: Cell biology; Renal disease; Protein-protein interactions; Endocytosis.
Current Projects: Functional role of cannabinoid receptors in the kidney; Molecular signaling complex in proximal tubule cells; Macromolecular complex in renal endocytosis.
Industries: Health; Molecular Sciences; Science
Research Strength: Sport performance, exercise science and active living
Dr Christos Stathis

Areas of Expertise: Muscle biochemistry and metabolism, exercise biochemistry and metabolism, metabolism of macronutrients.

Research Interest: Exercise metabolism, muscle metabolism and muscle physiology; Dietary supplements and nutrition for exercise and training protocol manipulations for maximal performance and increased energy expenditure for weight management; Investigating mitochondrial function in metabolism.

Current Projects: Physiological and biochemical responses following intermittent exercise; The influence of fasting on metabolic and protein signalling with intermittent exercise; The effect of beta alanine supplementation and bi-carbonate on maximal intermittent sprinting; Understanding energy metabolism with high intensity exercise.

Industries: Biomedical Science; Exercise Science; Health; Nutrition; Science

Research Strength: Sport performance, exercise science and active living

Professor Lily Stojanovska

Areas of Expertise: Women’s health; Chronic diseases (cardiovascular, diabetes, osteoporosis); Complementary and alternative therapy; Improving quality of life through exercise.

Research Interest: Bioavailability and calcium absorption of cow’s and soy milk in postmenopausal women; Prevention of chronic disorders: cardiovascular, osteoporosis and diabetes in postmenopausal women; Complementary and alternative therapy associated with postmenopausal health; Nutrition and diabetes associated with culturally diverse population.

Current Projects: Bioavailability and calcium absorption from dairy and non-dairy products in postmenopausal women; Complementary and alternative therapy associated with postmenopausal health; Nutrition and diabetes in culturally diverse population.

Industries: Community Health; Diabetes education management and training

Research Strength: Diversity and wellbeing, Sport performance, exercise science and active living

Dr Xiao Su

Areas of Expertise: Food, Nutrition and Health

Research Interest: Lipids, Nutrition and Health.

Current Projects: Fish oil supplements and the growth and development of marine animals; Fish oil and vegetable oil supplements and health-benefiting omega-3 polyunsaturated fatty acids profiles; Dynamic changes of genes associated with lipid metabolism; Health-enhancing foods that enrich with omega-3 polyunsaturated fatty acids.

Industries: Food and Dairy, Health, Science

Research Strength: Diversity and wellbeing

Dr Elizabeth Thyer

Areas of Expertise: Pathophysiology; Anatomy and Physiology; Paramedic Clinical Skills

Research Interest: E-learning; blended learning in paramedic students; Workplace transition; Pathophysiology; Cervical trauma; Paramedic intervention.

Current Projects: E-learning in distance education for paramedics; Incidence and management of cervical spine injuries in fatal road traffic accidents.

Industries: Paramedic Science

Research Strength: Education, access and transition
Associate Professor Todor Vasiljevic

Areas of Expertise: Dairy Science and Technology; Food Rheology; Microbial and Enzyme Technology and Engineering; Physical Chemistry of Foods; Functional Foods.

Research Interest: Protein-protein and protein-polysaccharide interactions; Novel methods for preservation of bioactive materials; Intracellular enzymes from thermophilic lactic acid bacteria; Physiological properties of dietary proteins; Immunomodulating potential of probiotics in prevention and treatment of chronic diseases and metabolic disorders; Use of advanced membrane technologies in dairy processing.

Current Projects: The effect of dietary fish peptides on biomarkers of human health; Innovative zero-energy membrane technologies to reduce water consumption in the dairy industry; Improving cheese starter culture fermentation processes using novel membrane systems; Phase properties of encapsulation materials and their effects on the viability of encapsulated probiotics; Improvement of functional properties of whey proteins.

Industries: Food and Dairy; Health; Manufacturing and Industrial; Science; Sustainability and Environment

Research Strength: Sustainable environmental technologies

Dr Anthony Zulli

Areas of Expertise: Biomedical Science

Research Interest: Stem cells in heart disease; Atherosclerosis; Diet and heart disease.

Current Projects: Dietary taurine and atherosclerosis; Stem cells in atherosclerosis; Taurine and heart disease.

Industries: Health

Research Strength: Sport performance, exercise science and active living
**Professor Paul Boon**

**Areas of Expertise:** Ecology and management of aquatic systems

**Research Interest:** Wetland ecology and management; Biology of aquatic plants; Biogeochemical cycles; Climate change.

**Current Projects:** State-wide assessment of Victorian coastal saltmarsh; Mangrove ecology and rehabilitation; Ecology and management of Western Port and the Gippsland Lakes; Use of coastal wetlands for waste-water treatment; Natural and social history of the Hawkesbury River.

**Industries:** Biomedical Science; Science

**Research Strength:** Sustainable environmental technologies

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**Professor Pietro Cerone**

**Areas of Expertise:** Mathematical modelling in a variety of areas. See research interests.


**Current Projects:** Numerous projects involving the above areas of research; Approximation and Bounds in a variety of areas including risk/ruin problems actuarial science and populations; Initiatives in the Teaching and Learning of Mathematical Sciences and training of future teachers; Population dynamics modelling — mainly human but also have and interest more broadly; Real world application of Mathematics with an emphasis on collaborative work within areas of research strengths.

**Industries:** Information and Communication Technology (ICT); Science

**Research Strength:** Sustainable environmental technologies

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**Dr Domenico Caridi**

**Areas of Expertise:** Chemistry

**Research Interest:** Fire investigation is concerned with arson investigation and the identification of ignitable liquid residues in fire debris with particular focus on differentiation of different petrols and interferences by common building materials such as carpet and foam; Preventative healthcare is concerned with phytochemicals in vegetables and their metabolism in animals with particular focus on rapid methods of analysis, profiling in different cultivars and anti-cancer properties; Waste management: is concerned with leaching of metal species from cement-stabilised waste and volatile organic compounds in landfill gas.

**Current Projects:** Test burning of carpet and foam and the determination of potential interferences in identifying petrol in arson investigation; A study of flavonols in bok choy, their metabolites and anti-cancer properties; The effects of Different Feeding Regimes on the levels of fat soluble vitamins in bovine milk.

**Industries:** Chemistry (physical, polymer, analytical)

**Research Strength:** Sustainable environmental technologies; Diversity and wellbeing

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**Professor Silvestru Sever Dragomir**

**Areas of Expertise:** Mathematical Inequalities and Applications

**Research Interest:** Numerical Analysis and Approximation Theory; Information Theory; Coding and Guessing; Probability and Statistics; Mathematical Analysis and Applications in Modelling.

**Current Projects:** Numerical approximations of integrals with applications in Photonics; Divergence measures in Information Theory; Coding and Guessing; Gini Index and its applications in Economics and Wealth Distributions; Theory of Real Functions and Applications.

**Industries:** Information and Communication Technology (ICT); Science

**Research Strength:** Communication and sensor technologies; Logistics and transportation; Sustainable environmental technologies
Associate Professor Mikel Duke

Areas of Expertise: Membrane based separations (desalination and filtration); Ceramic membranes; Membrane distillation; Membrane assisted fermentation

Research Interest: Water treatment; Desalination; Dairy processing; Materials engineering; Advanced sensor materials

Current Projects: Designing the surface and structural properties of MFI zeolite membranes for low energy ion-selective desalination; Development of advanced ceramic membranes: a robust solution to sustainable water treatment; Improving the durability and performance of hollow fibre membranes with nanocomposite and inorganic/organic hybrid materials; Innovative zero-energy membrane technologies to reduce water consumption in the dairy industry; Novel separation processes in the mining industry; Converting waste or solar heat to treated water; Review of zero liquid discharge; Remote Australia solar driven membrane distillation unit proof-of-concept.

Industries: Water treatment; chemicals production; foods processing

Research Strength: Sustainable environmental technologies

Associate Professor Sam Fragomeni

Areas of Expertise: Structural Engineering

Research Interest: Analysis and design of concrete structures; Behaviour of high performance concrete—Shortening behaviour in tall buildings; Concrete in Fire.

Current Projects: Differential shortening of vertical concrete elements in buildings; Damping behaviour of concrete beams; High strength concrete walls in fire; Behaviour of axially loaded concrete walls

Industries: Building, Construction and Architecture

Research Strength: Sustainable environmental technologies

Professor Michael Faulkner

Areas of Expertise: Wireless communications; Telecommunication transmission systems; Radio frequency propagation; Antennas; Signal processing.

Research Interest: Multiuser wireless communications

Current Projects: Software defined radio; Cognitive radio; Green base station architectures.

Industries: Telecommunications

Research Strength: Communication and sensor technologies

Dr Nirdosha Gamage

Areas of Expertise: Structural Engineering

Research Interest: Cement based wood composite; Brown coal fly ash as a raw material for building products; Investigation of chloride affected bridges; Noise wall design.

Current Projects: Investigation of hardwood sawmill residues for particleboard production: process modeling and optimization using experimental design; Bridge infrastructure asset management; Noise wall design.

Industries: Building, Construction and Architecture; Sustainability and Environment

Research Strength: Sustainable environmental technologies
Dr Patrick Guay

Areas of Expertise: Waterfowl ecology; Conservation and population genetics.

Research Interest: Hybridisation in ducks; Human disturbance in birds; Ecology of waterfowl on waste water treatment lagoons; Conservation genetics of Australian Waterfowl.

Current Projects: Impacts of changes in waste water treatment on behaviour of waterfowl; Hybridisation between Mallards and Pacific Black Ducks in Australasia; Impacts of human disturbance on waterbirds.

Industries: Molecular Sciences; Science; Sustainability and Environment; Water

Research Strength: Sustainable environmental technologies

Dr Fuchun Huang

Areas of Expertise: Spatial statistics; Non-smooth optimization algorithms; Time series modeling and forecasting.

Research Interest: Spatial statistics, business and financial time series analysis; Data mining; Industrial system identification and control; Computational problems in biostatistics; Optimization algorithm.

Current Projects: Non-smooth optimization algorithms and their applications in forecasting models.

Industries: Information and Communication Technology (ICT); Science

Research Strength: Sustainable environmental technologies

Associate Professor Jun-de Li

Areas of Expertise: Fluid dynamics

Research Interest: Desalination; Renewable energy; Heat and mass transfer; Fluid dynamics; Turbulence.

Current Projects: Water conservation by replacing cooling towers; Humidification and dehumidification desalination; Membrane distillation desalination; Biofuels from algae; Heat transfer and condensation of water vapour from humid air in compact heat exchangers; Membrane distillation desalination.

Industries: Energy and Utilities; Sustainability and Environment

Research Strength: Sustainable environmental technologies

Professor Akhtar Kalam

Areas of Expertise: Energy Systems

Research Interest: Power transmission and distribution networks utilising underground cables; Development of Smart Energy Systems; Artificial Intelligence and its application to Power Systems; Telecommunication in Power System Protection; Design and development of protection and control tools to enable the efficient and reliable use of cogeneration and renewable energy plants; Fuel cells and its application in cogeneration.


Industries: Electrical and Electronics; Energy and Utilities

Research Strength: Sustainable environmental technologies
Mr Peter Lechte

Areas of Expertise: Water supply and wastewater management; Greywater/recycled water and alternative supply sources; Irrigation; Groundwater

Research Interest: Urban/rural water conservation and reuse; Alternative water supplies; Wastewater management; Water and sanitation in developing countries; Emergency situations.

Current Projects: Rainwater harvesting investigations for companies in Melb’s western suburbs; Urban irrigation efficiency improvements through smart control systems; Technical feasibility investigations for using stormwater as an alternative supply source in urban areas; Wastewater treatment and nutrient removal using grass filtration; Evaluation of potential for greywater reuse.

Industries: Sustainability and Environment; Water

Research Strength: Sustainable environmental technologies

Dr WeeSit Lee

Areas of Expertise: Systems Engineering

Research Interest: Control Systems; Telecommunication Systems; Biomedical Engineering; Signal Processing in Control, Telecommunications, and Biomedical Engineering.

Current Projects: Alternative system identification and control for robust performance; Model predictive control of DC-DC converters; High performance model-based controllers for active magnetic bearing systems; Performance of telecommunication systems operating in fading channels; Detection of epileptic seizures in adults and infants; Signal processing algorithms for sensor networks.

Industries: Electrical and Electronics; Health; Information and Communication Technology (ICT); Telecommunications

Research Strength: Communication and sensor technologies

Dr Qing-Quan Liang

Areas Of Expertise: Structural Engineering; Structural Analysis; Steel-Concrete Composite Structures

Research Interest: Computational mechanics; Structural optimization: topology, shape and sizing optimization; Steel-concrete composite structures; Nonlinear inelastic analysis of structures; Concrete structures; Steel structures

Current Projects: Nonlinear inelastic analysis of concrete-filled steel tubular slender beam-columns with local buckling effects; Nonlinear inelastic analysis of steel-concrete composite columns at elevated temperatures; Nonlinear time-dependent analysis of slender steel-concrete composite beam-columns; Advanced analysis of steel-concrete composite frames under extreme loading; Finite element analysis of composite beams under combined bending and shear; Multi-objective optimization of nonlinear steel frames under seismic loads; Performance-based optimization of structures: theory and applications.

Industries: Building, Construction and Architecture

Research Strength: Sustainable environmental technologies

Dr Alasdair McAndrew

Areas of Expertise: Digital Image Processing; Mathematics; Mathematics education; Computational Methods; Computer Algebra; Computer and Internet Security; Computer Science Education

Research Interest: Mathematics; Mathematics Education; Cryptography; Computer Security; Digital Image Processing; Computer Algebra.

Current Projects: Using the access grid for enhancing student learning; Embedding mathematical software in undergraduate mathematics; Improving learning outcomes for students in first year mathematics subjects; Professional Learning Program for teachers of VCE mathematics.

Industries: Information and Communication Technology (ICT), Science

Research Strength: Education, access and transition
Dr Sandra McKechnie

**Areas of Expertise:** Mammalian Cell Culture; Microbiology; Immunology

**Research Interest:** Cancer Biology; Therapeutic benefits of Probiotics; Allergies and Immune System Modulation; Bioactivity of Flavonoids.

**Current Projects:** Bioactive Bok Choy — assessing the antiproliferative activity of Bok Choy flavonols against colon carcinoma cell lines.

**Industries:** Food and Dairy, Molecular Sciences, Science

**Research Strength:** Diversity and wellbeing

Associate Professor Iwona Miliszewska

**Areas of Expertise:** Database systems; Transnational education; Effective teaching methods; Women in ICT; Learning in the workplace; Technology-based learning.

**Research Interest:** Transnational education; Internationalisation in education; Technology supported teaching and learning; Evaluation of teaching; Females in ICT.

**Current Projects:** Science Safety Game: the development and implementation of a computer game for providing OHS training for science students; An Australian Malaysian nexus on transnational education; Investigation of strategies aimed at encouraging girls from economically and socially disadvantaged backgrounds to consider a career in information and communication technology (ICT); Refinement of a multidimensional model for transnational computing education programs; Engendering equity: fostering Computer Science success among female students.

**Industries:** Information and Communication Technology (ICT)

**Research Strength:** Education, access and transition

Professor Yuan Miao

**Areas of Expertise:** Software Engineering; Artificial Intelligence; Fuzzy Systems; Information Systems; eHealth Systems; Educational Games

**Research Interest:** Fuzzy Cognitive Modeling; Knowledge Oriented Software Engineering; GUI Test Automation; Edutainment, eHealth.

**Current Projects:** Data exchange and service integration with applications in Health Information Systems; ARC linkage; Data integration, Enhancement and mining for collaborative adaptive health management; VU research infrastructure grant; Agent-augmented co-space: growing cognitive autonomous agents for context-aware personalized experience in co-space, NRF Singapore; Collaborative mathematics game for number learning through tablets, Microsoft research Asia.

**Industries:** Information and Communication Technology (ICT), Science

**Research Strength:** Applied informatics

Associate Professor Mary Millikan

**Areas of Expertise:** Water quality analyses; Applied Analytical Chemistry

**Research Interest:** Studies on Chinese medicinal herbs for specific health problems; Water quality analyses; Wine analyses; Composition of range cereals; Analyses of various meat products; NIR analyses of food and agricultural products.

**Current Projects:** Analyses of pesticides residues on fruit; Water contaminant analyses; Chinese herbal studies; Meat product analyses.

**Industries:** Agriculture and Farming; Chinese Medicine; Food and Dairy; Science; Sustainability and Environment; Water

**Research Strength:** Sustainable environmental technologies
**Dr Robin Mitra**

**Areas of Expertise:** Freshwater Bryozoans

**Research Interest:** Investigations in Freshwater Bryozoan Biofouling

**Current Projects:** Prevention of Bryozoan biofouling of water pipeline systems.

**Industries:** Science; Water

**Research Strength:** Sustainable environmental technologies

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**Dr Shobha Muthukumaran**

**Areas of Expertise:** Membrane Technology, Water and Wastewater Treatment; Applied Ultrasonics

**Research Interest:** Membrane Technology; Desalination; Intergrated water Management; Alternative Water Supplies; Applied Ultrasonics; Biofuel Production.

**Current Projects:** Decision Support System for Yarra River Water Management; Water End-use Demand Management; Low Pressure Membranes for the Reclamation and Reuse of Treated Effluent.

**Industries:** Energy and Utilities; Food and Dairy; Sustainability and Environment; Water

**Research Strength:** Sustainable environmental technologies

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**Mr Valli Navaratnam**

**Areas of Expertise:** Computer Programming; Electrical Machines and Power Systems

**Research Interest:** Engineering Education; Problem Based Learning.

**Current Projects:** Role of industry and community in Engineering education.

**Industries:** Electrical and Electronics; Science

**Research Strength:** Education, access and transition

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**Dr Nitin Muttil**

**Areas of Expertise:** Rainfall-runoff modelling — hydrologic and hydraulic modeling using conceptual models; Model calibration using evolutionary algorithms; Forecasting hydrologic and other water resources variables.

**Research Interest:** Urban rainfall-runoff modeling; Hydrologic predictions using data-driven techniques; Climate variability and climate change impacts on water resources; Data mining of hydrologic and water quality data.

**Current Projects:** Impact of high strength wastewater on sewer networks; Statistical analysis to detect climate change and its implications on water resources; Development of a water sustainability index for use in integrated water management.

**Industries:** Sustainability and Environment; Water

**Research Strength:** Sustainable environmental technologies
Dr Thinh Nguyen

Areas of Expertise: Optical fibre sensors; Optical characterisation; Rare earth spectroscopy LabVIEW programming

Research Interest: Sensors Optics and photonics; Environmental and health monitoring Solar technology.

Current Projects: Development of a miniature blood gas analyser using optical-based methods as well as gas sensors for water/environmental monitoring using fibre optics and photoacoustics; engineering education.

Industries: Education; Electrical and Electronics; Mining, Oil and Gas; Photonic and Optoelectronic; Project Management; Science; Sustainability and Environment

Research Strength: Communication and sensor technologies

Dr Cagil Ozansoy

Areas of Expertise: Power Systems Communications

Research Interest: Microgrids; Renewable energy systems; Sustainable buildings; Energy storage; Distributed generation; Energy efficiency.

Current Projects: Modelling and development of microbial electrolysis and fuels cells; Hardware Analysis of Fuel Cell/Photovoltaic Systems; Analysis of Wind Power Potential in Melbourne’s West; Photovoltaic Power Analysis for Brimbank Victoria, Australia.

Industries: Electrical and Electronics; Energy and Utilities; Sustainability and Environment

Research Strength: Sustainable environmental technologies

Professor John Orbell

Areas of Expertise: Biological and Environmental Chemistry

Research Interest: Water management; Environmental management and technology; Wildlife rehabilitation; Traditional medicines; Computational chemistry; Analytical chemistry.

Current Projects: Water management in large industries; Control of biofouling in water pipeline systems; The application of magnetic particle technology to wildlife rehabilitation and environmental remediation; Chemistry of traditional medicines; The chemistry of membrane fouling; Computational chemistry of antioxidants

Industries: Science

Research Strength: Sustainable environmental technologies

Dr Rohani Paimin

Areas of Expertise: Solvent Extraction Membrane Extraction Supercritical Fluid Extraction Analytical Chemistry Alternative medicine

Research Interest: Solvent Extraction; Membrane Extraction; Supercritical Fluid Extraction; Techniques involved include High Performance Liquid Chromatography, Gas Chromatography, GC-MS, Spectroscopy methods including Mass Spectroscopy, Atomic Absorption Spectrophotometry, I.R. Spectroscopy, FTIR Spectroscopy; Alternative Medicine.

Industries: Building, Construction and Architecture

Research Strength: Sustainable environmental technologies
**Professor Chris Perera**

**Areas of Expertise:** Hydrology and Water Resources

**Research Interest:** Optimum operation of water systems; Climate change impacts on water systems; Water conservation and demand management; Urban water cycle management; River water quality management; Water infrastructure asset management.

**Current Projects:** Multi-objective planning and operation of water systems; Urban water demand estimation and water use; Impact of climate change on streamflow and water yield; Water infrastructure deterioration models; Use of stormwater as an alternative supply source; River and catchment water pollution.

**Industries:** Water

**Research Strength:** Sustainable environmental technologies

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**Dr Gitesh Raikundalia**

**Areas of Expertise:** Information and Communication Technology

**Research Interest:** Health Informatics; Groupware (real-time and asynchronous collaboration); Software Engineering.

**Current Projects:** Web-based osteo-arthritis guide; Multi-disciplinary team meetings for cancer care; Hospital simulation; Data warehousing in health care organisations; Microblogging in a virtual organisation.

**Industries:** Information and Communication Technology (ICT), Science

**Research Strength:** Applied informatics

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**Dr Randall Robinson**

**Areas of Expertise:** Plant recruitment; Clonality in plants; Introduced plants; Orchids; Environmental Management.

**Research Interest:** Recruitment in plants, clonality and genetics in plants, introduced plant species, ecosystem management, dynamics of grassland/wetland and wetland ecosystems; Heritability in the genus Cymbidium.

**Current Projects:** Recruitment dynamics of Melaleuca ericifolia; Hypocotyl hairs in Melaleuca ericifolia; Population structure and dynamics in Melaleuca wetlands; Recruitment of Grassland Forbs; Colour inheritance in the genus Cymbidium-Hybridisation and invertebrate host capabilities of introduced plant species.

**Industries:** Sustainability and Environment

**Research Strength:** Sustainable environmental technologies

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**Associate Professor Vincent Rouillard**

**Areas of Expertise:** Dynamics; shock and vibration; Signal measurement and analysis; Engineering Experimentation

**Research Interest:** Stochastic processes; Environmental shock and vibrations; Distribution packaging; Transport and vehicle dynamics; Experimental design.

**Current Projects:** Investigation of the creep characteristics of aluminium alloy conductors at elevated temperatures; Developments of methods for synthesizing non-Gaussian random vibrations; Study into the estimation of road vehicle frequency response characteristics from vibration response data; Development of technique for monitoring the rate of damage of packaging elements subject to random loads; Development of statistical models to characterize stochastic vehicle vibrations; Study in the behavior of non-linear cushioning material.

**Industries:** Automotive and Aeronautical; Building, Construction and Architecture; Energy and Utilities; Manufacturing and Industrial; Mining, Oil and Gas; Transport and Logistics

**Research Strength:** Sustainable environmental technologies
Dr Mark Scarr

Areas of Expertise: Ecology; Ecophysiology

Research Interest: Using stomatal frequency as a proxy indicator of atmospheric CO2 concentration; Examining leaf physiognomic responses to environmental factors; Mangrove incursion in saltmarsh habitat.

Current Projects: The use of stomatal frequency from three Australian temperate broadleaf evergreen tree species as a proxy indicator of atmospheric carbon dioxide concentration; Mangrove encroachment of saltmarsh in Corner Inlet, Victoria: the role of soil salinity, soil water and sea-level rise.

Industries: Science; Sustainability and Environment

Research Strength: Sustainable environmental technologies

Associate Professor Nalin Sharda

Areas of Expertise: Information and Communication Technology (ICT); Human Computer Interaction; Mobile Multimedia; eLearning, eTourism.


Current Projects: Investigations of techniques for maximising the utilisation of harvested rain water using a digital ecosystem; Digital ecosystem for harvested rainwater; Ontology and application generator for tourism systems; Demonstrating potential of travel recommender systems; Leading edge developments in tourism ICT technologies.

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied Informatics

Associate Professor Hao Shi

Areas of Expertise: p2p Network, Location-based services; Web services; Computer/robotics vision; Visual Communications; Internet and multimedia technologies.

Research Interest: Location-based services; e-Health applications; Peer to Peer network; Wireless technologies; Visual Communications; Computer/robotics vision.

Current Projects: Health data management and visualization techniques for health; Decision making support; An innovative smartphone based Wi-Fi application; Peer-to-Peer collaborative research network for sharing and managing digital legal information; Intelligent Object Framework; Computerized performance analysis for ball games; Mobile health data management and data integration.

Industries: Electrical and Electronics; Information and Communication Technology (ICT); Science

Research Strength: Applied Informatics

Dr Juan Shi

Areas of Expertise: Automatic Control and Applications

Research Interest: Intelligent control; Control applications; Power system stabilization; Smart energy systems; System identification; Engineering education.

Current Projects: Analytical feedback design via interpolation approach for the Strong stabilization of a magnetic bearing system; Fuzzy logic control of a magnetic bearing system; Development of renewable energy system v smart energy systems v power system stabilization with FACTS; Engaging Engineering students with PBL (Problem Based Learning); Problems from industry and community.

Industries: Electrical and Electronics

Research Strength: Sustainable environmental technologies
Professor Peng Shi

Research Interest: Control theory and applications; Intelligent systems and information processing; Fault detection techniques; Operational research; Signal and image processing.


Industries: Electrical and Electronics; Science; Telecommunications

Research Strength: Communication and sensor technologies; Logistics and transportation; Sustainable environmental technologies

Dr Fotios Sidiroglou

Areas of Expertise: Rare-earth doped optical fibres (fabrication, characterisation & application in fibre lasers and fibre amplifiers); Fibre Bragg Gratings (FBGs); Environmental monitoring and sensing using optical fibre based sensors; High spatial resolution imaging; Post-processing of optical fibres using mechanical polishing and chemical etching techniques.

Research Interest: Photonics and optical communications; Rare-earth doped optical fibre lasers and amplifiers; Fibre Bragg Gratings; Environmental sensing with the aid of FBGs and other fibre optic devices — microcharacterisation of optical fibres and waveguides and other optical materials using a range of imaging techniques; Tuneable optical devices.

Current Projects: Elemental analysis of RE-doped optical fibres; A novel approach for fabricating rare-earth doped optical fibres; Development of fibre optic based sensors for application in environmental monitoring; CO2 detection in water with the aid of the photo acoustic effect.

Industries: Telecommunications

Research Strength: Communication and sensor technologies

Dr Dung Tran

Areas of Expertise: Data mining

Research Interest: Forecasting models for water systems; Decision support models for water infrastructure asset management; Application of in-situ sensors for monitoring deterioration of water pipelines; Data mining using statistical and artificial intelligence methods.

Current Projects: Rainfall and streamflow forecasting; Investigation of sewer and manhole deterioration; Water quality monitoring of urban wetland using stormwater.

Industries: Water

Research Strength: Sustainable environmental technologies

Dr Srikanth Venkatesan

Areas of Expertise: Earthquake resistant design of structures and ground motion modelling; Bridge infrastructure asset management; Design of industrial buildings, metallurgical plant structures

Research Interest: Earthquake Engineering; Bridge Asset Management; Smart structures and materials Problem Based Learning

Current Projects: Seismic Hazard modelling in regions of low to moderate seismicity; Structural damage detection in timber bridges using response signals; Non-destructive assessment of timber bridge characteristics; Assessing individual contribution in team based pedagogies.

Industries: Building, Construction and Architecture; Sustainability and Environment

Research Strength: Education, access and transition; Sustainable environmental technologies
Dr Thomas Yeager

Areas of Expertise: Mammalian tissue culture; Cancer research; Fermentation development

Research Interest: Molecular biology of cancer — fermentation process

Current Projects: Anaerobic waste water treatment

Industries: Molecular Sciences; Science

Research Strength: Education, access and transition; Diversity and wellbeing.

Associate Professor Aladin Zayegh

Areas of Expertise: Electronics, Microelectronics; Biomedical Electronics; Instrumentation

Research Interest: Biomedical Electronics; Biomedical Sensors; Wireless Sensors; Microelectronic System design; RF Circuit and Systems

Current Projects: MEMS Biomedical Pressure Sensor for gait analysis; Reconfigurable analog-to-digital converter for Ultra Wideband Radio; A reconfigurable bio-signal processor for blood gas analysis; An adaptive low-power analog-to-digital converter for Smart Sensors.

Industries: Electrical and Electronics

Research Strength: Communication and sensor technologies
RESEARCH EXPERTISE STAFF PROFILES

SCHOOL OF NURSING AND MIDWIFERY
**Associate Professor Mary Carolan**

**Areas of Expertise:** Qualitative Methodology; Thematic Analysis; Midwifery cultural diversity.

**Research Interest:** Older maternity; Gestational diabetes among culturally diverse groups; Ultrasound technology and high risk pregnancy; Immigrant women.

**Current Projects:** Perinatal morbidity among Australian women aged 35 years and older; Gestational diabetes among multi-cultural groups in the Western Region of Melbourne; The Australian pregnancy experiences of African women; Anxious waiting: soft markers and high risk pregnancy; Midwifery students’ understanding the role of the midwife: how does student understanding impact on course attrition rates?

**Industries:** Education; Midwifery

**Research Strength:** Diversity and wellbeing; Education, access and transition

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**Dr Maureen Farrell**

**Areas of Expertise:** Medical surgical nursing; Acute care nursing; Health informatics; Mobile technologies; Nursing education; Health management and leadership.

**Research Interest:** Health informatics, Mobile hand held computers; Medical surgical nursing; Nursing education and leadership.

**Current Projects:** Improving patient health outcomes in acute care hospital settings using mobile wireless technology and handheld computers.

**Industries:** Health; Information and Communication Technology (ICT); Nursing

**Research Strength:** Applied informatics; Education, access and transition

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**Dr Deb Kerr**

**Areas of Expertise:** Research ethics; Intranasal medication delivery; Coronary care nursing; Clinical research.

**Research Interest:** Transforming nursing care at the bedside; Bedside nursing handover; Intranasal medication delivery; Medication administration by registered nurses.

**Current Projects:** Patient controlled intranasal fentanyl for women during childbirth; Bedside nursing handover; Medication administration by registered nurses; Gripsox for preventing falls in the elderly during hospitalisation; Exercise for women after breast cancer treatment.

**Industries:** Health; Nursing

**Research Strength:** Diversity and wellbeing

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**Associate Professor Liza Heslop**

**Areas of Expertise:** Health services operations management; Using casemix data for operational decision-making; Informatics; Acute care; Case management; Health service research methods; Nursing specialization and professional studies; Research philosophy and methodology; Nursing theory and practice.

**Research Interest:** Nursing services improvement; Health informatics; Acute health operations management.

**Current Projects:** Health knowledge management in acute health services; Hospital ward redesign; Information needs of nursing managers; Use of casemix data for operational management purposes; Implementation and evaluation of technologies to improve hospital efficiency.

**Industries:** Health; Nursing

**Research Strength:** Diversity and wellbeing
Dr Lucy Lu

Areas of Expertise: Pharmacology; Quantitative research methodologies; Applied statistics in health research.

Research Interest: Medication management; Quality of working life in nursing; Health complications/medical co-morbidity; Quantitative research methodologies; Applied statistics in health research.

Current Projects: Nursing handover at Western Health; The evaluation of the impact of shift-to-shift bed-side nursing handover on quality of nursing care; Evaluation of a medication endorsement program for division two registered nurses.

Industries: Health; Nursing

Research Strength: Diversity and wellbeing

Associate Professor Kristine Martin-McDonald

Areas of Expertise: Chronic Illness

Research Interest: Chronic disease; Renal replacement therapies; Qualitative research; Narrative inquiry; Rural health.


Industries: Health; Midwifery; Nursing

Research Strength: Diversity and wellbeing

Professor Terence McCann

Areas of Expertise: Mental health nursing

Research Interest: Prevention and early intervention in youth with mental health problems; Mental health literacy and help-seeking; Primary caregiver interventions; Improving the quality of care

Current Projects: Mental health literacy of main support people of elderly family members/friends with mental illness; Evaluating the use of restraint and seclusion in inpatient aged psychiatry units; Preventing mental health problems in young people through better mental health literacy; Problem-solving based self-help manual for primary caregivers of family members with first-episode psychosis; Exploring needs — examining barriers to service access: young people with depression, anxiety and substance use issues.

Industries: Health; Nursing

Research Strength: Diversity and wellbeing
Associate Professor Nalin Sharda

Areas of Expertise: Information and Communication Technology (ICT); Human Computer Interaction; Mobile Multimedia; eLearning, eTourism

Research Interest: Digital Ecosystems; User Experience Design; Networked Multimedia Systems; Applied Informatics including e-Learning, e-Tourism, e-Water

Current Projects: Investigations of techniques for maximising the utilisation of harvested rain water using a digital ecosystem; Digital ecosystem for harvested rainwater; Ontology and application generator for tourism systems; Demonstrating potential of travel recommender systems; Leading edge developments in tourism; ICT technologies

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics

Associate Professor Rezaul Begg

Areas of Expertise: Biosignal Processing

Research Interest: Biomedical Engineering; Biosignal Processing; Gait and Movement Analysis; Computational Intelligence and Pattern Recognition; Sensor Technologies for Healthcare; Biomedical Instrumentation; Foot Pressure Sensors, Sensor Design.

Current Projects: Building a smart diagnostic system for low back ailments; Development of an endofunctional capsule for targeted delivery of biomarkers in the alimentary tract; High speed, three dimensional, x ray fluoroscopy for accurate measurement of human joint motion; Non invasive assessment of hip fracture risk in elderly people; Development of a portable sensor for measuring physical activity in the lower limb; Development of a new system to measure pedaling technique in real-world conditions; Gait, trips, slips and falls.

Industries: Science

Research Strength: Applied informatics, Sport performance, exercise science and active living

Professor Yanchun Zhang

Areas of Expertise: Database; Internet and Web information systems; Service-oriented computing; Health Informatics; e-Research

Research Interest: Data management; Data mining; Web mining; Web services; Health informatics; Social computing.

Current Projects: Privacy protection in distributed data mining; A framework for supporting consistent and reliable collaborative business transactions; Data enhancement, integration and access services for smarter, collaborative and adaptive whole of water cycle management; Data exchange and health service integration in health information systems; Real-time and self-adaptive stream data analyser for Intensive Care management.

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics

Professor Yuan Miao

Areas of Expertise: Software Engineering; Artificial Intelligence; Fuzzy Systems; Information Systems; eHealth Systems; Educational Games

Research Interest: Fuzzy Cognitive Modeling; Knowledge Oriented Software Engineering; GUI Test Automation; Edutainment, eHealth.

Current Projects: Data exchange and service integration with applications in Health Information Systems, ARC linkage; Data integration, Enhancement and mining for collaborative adaptive health management, VU research infrastructure grant; Agent-augmented co-space: growing cognitive autonomous agents for context-aware personalized experience in co-space, NRF Singapore; Collaborative mathematics game for number learning through tablets, Microsoft research Asia.

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics

Associate Professor Rezaul Begg

Areas of Expertise: Biosignal Processing

Research Interest: Biomedical Engineering; Biosignal Processing; Gait and Movement Analysis; Computational Intelligence and Pattern Recognition; Sensor Technologies for Healthcare; Biomedical Instrumentation; Foot Pressure Sensors, Sensor Design.

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Industries: Science

Research Strength: Applied informatics, Sport performance, exercise science and active living

Professor Yanchun Zhang

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Research Interest: Data management; Data mining; Web mining; Web services; Health informatics; Social computing.

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Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics

Professor Yuan Miao

Areas of Expertise: Software Engineering; Artificial Intelligence; Fuzzy Systems; Information Systems; eHealth Systems; Educational Games

Research Interest: Fuzzy Cognitive Modeling; Knowledge Oriented Software Engineering; GUI Test Automation; Edutainment, eHealth.

Current Projects: Data exchange and service integration with applications in Health Information Systems, ARC linkage; Data integration, Enhancement and mining for collaborative adaptive health management, VU research infrastructure grant; Agent-augmented co-space: growing cognitive autonomous agents for context-aware personalized experience in co-space, NRF Singapore; Collaborative mathematics game for number learning through tablets, Microsoft research Asia.

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics

Associate Professor Nalin Sharda

Areas of Expertise: Information and Communication Technology (ICT); Human Computer Interaction; Mobile Multimedia; eLearning, eTourism

Research Interest: Digital Ecosystems; User Experience Design; Networked Multimedia Systems; Applied Informatics including e-Learning, e-Tourism, e-Water

Current Projects: Investigations of techniques for maximising the utilisation of harvested rain water using a digital ecosystem; Digital ecosystem for harvested rainwater; Ontology and application generator for tourism systems; Demonstrating potential of travel recommender systems; Leading edge developments in tourism; ICT technologies

Industries: Information and Communication Technology (ICT); Science

Research Strength: Applied informatics
RESEARCH EXPERTISE STAFF PROFILES

CENTRE FOR ENVIRONMENTAL SAFETY AND RISK ENGINEERING
Dr Michelle Ball

Areas of Expertise: Science

Research Interest: Sleep; Neuropsychology; Arousal thresholds to alarm signals across ages, after substance intake and for the hearing impaired; Pitch of emergency notification signals; Fire fatalities and human behaviour; Human factors in fire equipment; Juvenile fire-lighters.

Current Projects: Mental illness as a risk factor for death in fire; Improving the identification of juvenile firesetters at high risk of recidivism; Investigation of risk factors in serious residential fires; Development of Fire Fatality Coronial Database; Arousal thresholds for people under the influence of hypnotics — implications for the smoke alarm signal.

Industries: Sustainability and Environment

Research Strength: Sustainable environmental technologies

Dr Maurice Guerrieri

Area of Expertise: Performance of concrete in fire.

Research Interest: Structural Fire Engineering, performance of concrete in fire, numerical and hybrid technological modelling; Performance of concrete in fire, structural fire engineering of buildings, use of hybrid technology to model real life structures under fire loads.

Current Projects: Measurement and Influence of In-situ Pore Pressures and Temperatures on Spalling of Slender Reinforced Concrete Walls Subjected to fire and the Influence of Polypropylene Fibers on combating Spalling

Industries: Health

Research Strength: Sustainable environmental technologies

Professor Dorothy Bruck

Areas of Expertise: Sleep research; Human behaviour in fire

Research Interest: Sleep; Arousal thresholds across ages, after substance intake and for the hearing impaired; Emergency notification such as smoke alarms; Fire fatalities and human behaviour; Human factors in fire equipment; Juvenile fire-lighters.

Current Projects: Improving the identification of juvenile firesetters at high risk of recidivism; Investigation of survival factors in serious residential fires; The role of location on the effectiveness of smoke alarms; Development of Fire Fatality Coronial Database; Arousal thresholds for people under the influence of hypnotics — implications for the smoke alarm signal.

Industries: Sustainability and Environment

Research Strength: Sustainable environmental technologies

Dr Khalid Moinuddin

Areas of Expertise: Fire dynamics

Research Interest: Enclosure fire dynamics; Computational fluid dynamics; Turbulent flow; Fire risk analysis — Structure in fire; Optimization technique

Current Projects: Experimental and numerical investigation of turbulence-driven secondary motion on a streamwise external corner; Fire development in enclosures; Fire dynamics modelling and use of optimization techniques; Estimates of the reliability of fire safety system components; Efficacy of the sprinkler system in office buildings; Evaluation of the impact of potential fire scenarios on structural elements of a cable-stayed bridge.

Industries: Agriculture and Farming, Building, Construction and Architecture; Sustainability and Environment

Research Strength: Sustainable environmental technologies
Mr David Proe

**Areas of Expertise:** Fire safety; Structural behaviour under fire conditions; Building regulations

**Research Interest:** Fire safety in buildings; Performance-based assessment methods for building fire safety; Structural behaviour under fire conditions; Finite element analysis; Heat transfer; Risk assessment; Modelling the spread of smoke in buildings; Analysis of the evacuation of buildings

**Current Projects:** Improve the building regulations that relate to fire protection in commercial buildings; Information to fire engineers who need to access and design for the safety of buildings.

**Industries:** Sustainability and Environment

**Research Strength:** Sustainable environmental technologies

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Professor Ian Thomas

**Research Interest:** Fire safety; fire engineering; risk management and analysis; human behaviour in fire; behaviour of fire in enclosures; fire dynamics; smoke alarms-activation; sounds and occupant response; building regulations; structural response in fire; structural engineering; fire sprinkler systems; bushfire bunkers.

**Current Projects:** The role of the location on the effectiveness of smoke alarms; Realising community benefits from improved building regulations; Fire risk analysis of commercial buildings; Waking effectiveness of alarms (auditory, visual and tactile) for the alcohol impaired; Waking effectiveness of alarms (auditory, visual and tactile) for the older adults.

**Industries:** Sustainability and Environment

**Research Strength:** Sustainable environmental technologies

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Professor Graham Thorpe

**Areas of Expertise:** Sustainable architecture; Postharvest technology of fresh and durable produce

**Research Interest:** Improving the design and operation of buildings by developing and employing advanced computer-aided design tools; Mitigating the effects of climate change on the built environment; Designing buildings to be fire-safe.

**Current Projects:** The integration, or syncretisation, of engineering and architecture in the building-design process and its likely impact on the education of architectural professionals; An analogous omni scientific approach to postharvest technology is being developed which integrates multi-physics with a range of chemical and biological sciences. This approach will be extended to the design of sustainable buildings.

**Industries:** Agriculture and Farming; Building, Construction and Architecture; Sustainability and Environment

**Research Strength:** Sustainable environmental technologies
RESEARCH EXPERTISE STAFF PROFILES

CENTRE FOR TELECOMMUNICATION AND MICROELECTRONICS
**Associate Professor Stephen Collins**  
**Areas of Expertise:** Physics; Optical fibre technology; Instrumentation; Electronics  
**Research Interest:** Optical fibre sensors, especially strain and temperature sensors, optical fibre Bragg gratings, optical materials including rare-earth-doped optical fibres for optical amplifiers and lasers; Optoelectronic imaging  
**Current Projects:** Fibre Bragg grating microstructures: A novel sensing tool?; Improved fibre Bragg grating sensors for detection of structural hot spots; Thulium doped silica-based optical fibre amplifiers  
**Industries:** Electrical and Electronics; Photonic and Optoelectronic; Science  
**Research Strength:** Communication and sensor technologies

**Dr Ajay Tikka**  
**Areas of Expertise:** Biomedical applications of microvalves; Microelectronics; Radio frequency circuit design  
**Research Interest:** Software defined radio, smart structures, and RF systems  
**Current Projects:** Body area networks; Microvalves; Intrabody communications  
**Industries:** Electrical and Electronics  
**Research Strength:** Communication and sensor technologies

**Professor Michael Faulkner**  
**Areas of Expertise:** Wireless Communications; Telecommunication Transmission Systems; Radio frequency propagation; Antennas; Signal processing  
**Research Interest:** Multiuser Wireless Communications  
**Current Projects:** Software Defined Radio; Cognitive Radio; Green Base Station Architectures  
**Industries:** Telecommunications  
**Research Strength:** Communication and sensor technologies

**Associate Professor Aladin Zayegh**  
**Areas of Expertise:** Electronics; Microelectronics; Biomedical Electronics; Instrumentation  
**Research Interest:** Biomedical Electronics; Biomedical Sensors; Wireless Sensors; Microelectronic System design; RF Circuit and Systems  
**Current Projects:** MEMS Biomedical Pressure Sensor for Gait Analysis; Reconfigurable Analog-to-Digital Converter for Ultra Wideband Radio; A Reconfigurable Bio-signal Processor for Blood Gas Analysis; An Adaptive Low-power Analog-to-Digital Converter for Smart Sensors  
**Industries:** Electrical and Electronics  
**Research Strength:** Communication and sensor technologies
BOOKS, JOURNALS, CONFERENCES
PUBLICATIONS AND AWARDS
BOOKS


Miliszewska, Iwona (2010) Managing the delivery of computing projects in Hong Kong from Australia. in Cases ’a Places: Global cases in educational.

BOOK CHAPTERS


Williams, Andrew , Nancy Capitania and Alan Hayes (2010) Skeletal Muscle in Heart Failure and Type 2 Diabetes: Maladaptions and Potential Treatments. in Muscle Strength: Types, Efficiency and Drug Effects. Ed(s).

JOURNAL ARTICLES


CONFERENCE PUBLICATIONS


Gerber, Tracy, Emma Rybalka, Alan Hayes and Christos Stathis. Caffeine ingestion and high intensity intermittent exercise increases post exercise fat mobilisation and glycoegenolysis in healthy individuals. Proceedings of the Australian Physiological Society 41: 47p, 2010

Gradiscak, Marija , Eren Semercigil and Ozden Turan (2010) A slashing absorber with a flexible container. in IMAC. Ed(s). Wicks and Signhal. SEM, Bethel, CT (USA).


CONFERENCE PRESENTATIONS


EDITORIAL APPOINTMENTS

Carolan, Mary Sub Editor for the journal Women and Birth, Australian College of Midwives, Inc

Dragomir, Sever Editor Advances in Nonlinear Analysis and Applications, Serials Publications, India.

Dragomir, Sever Editor Advances in Non-linear Variational Inequalities, International Publications, USA.

Dragomir, Sever Editor Annals of Differential Equations, College of Mathematics and Computer Science, Fuzhou University, Fuzhou, China

Dragomir, Sever Editor Applied Mathematics E-Notes, National Tsing Hua University, Taiwan, China.

Dragomir, Sever Editor Archives of Mathematical Inequalities, Dynamic Publications, Inc. USA.

Dragomir, Sever Editor Banach Journal of Mathematical Analysis, Banach Mathematical Research Group, Iran

Dragomir, Sever Editor Bulletin of the Polytechnic Institute of Iasi, Section Mathematics, Theoretical Mechanics, Physics, Universitatea Tehnica “Gheorghe Asachi” din Iasi

Dragomir, Sever Editor Communications in Mathematical Analysis, Research India Publications
Dragomir, Sever Editor East Asian Mathematical Journal, Korea
Dragomir, Sever Editor Electronic Journal of Mathematical and Physical Sciences, USA.
Dragomir, Sever Editor Facta Universitatis, Series Mathematics and Informatics, University of Nis, Serbia
Dragomir, Sever Editor FILOMAT, Fac. of Sciences and Math.University of Nis Publications, India.
Dragomir, Sever Editor Global Journal of Applied Mathematics, Research India Publications, India.
Dragomir, Sever Editor Global Journal of Mathematics and Mathematical Sciences, GBS Publishers & Distributors, India
Dragomir, Sever Editor Involve - A Journal of Mathematics, Mathematical Sciences Publishers, USA
Dragomir, Sever Editor International Journal of Mathematical & Computer Sciences, The International Centre for Mathematical and Computer Sciences
Dragomir, Sever Editor International Journal of Mathematics and Mathematical Sciences, Hindawi Publishing Corporation
Dragomir, Sever Editor International Review of Pure and Applied Mathematics, Serials Publications, India
Dragomir, Sever Editor Journal of Applied Functional Analysis, Nova Science Publishers, USA.
Dragomir, Sever Editor Journal of Applied Mathematics and Computing (JANCM), Korea.
Dragomir, Sever Editor Journal of Concrete and Applicable Mathematics, Nova Science Publishers, USA.
Dragomir, Sever Editor Kragujevac Journal of Mathematics, Yugoslavia
Dragomir, Sever Editor Nonlinear Analysis Forum, Korea.
Dragomir, Sever Editor Octagon Mathematical Magazine, Romania
Dragomir, Sever Editor Pacific-Asian Journal of Mathematics, Serials Publications, India
Dragomir, Sever Editor PanAmerican Mathematical Journal, International Publications, USA.
Dragomir, Sever Editor Publications Of The Faculty Of Electrical Engineering, University Of Belgrade, Yugoslavia
Dragomir, Sever Editor Tamkivi Oxford Journal of Mathematical Sciences, Tamkivi Oxford University, China.
Dragomir, Sever Editor The Journal of the Indian Academy of Mathematics, Indian Academy of Mathematics, India

Fryer, Gary International Advisory Board, Journal of Bodywork & Movement Therapies (2005-)

Haslop, Liza Guest Editor, Electronic Journal of Health Informatics. Special Issue on E-Health Strategies including Knowledge Acquisition and Management of Professional Nursing Practice in Acute Health Settings (2010)

Kalam, Akhtar Associate Editor for the Journal of Electrical and Electronics Engineers Australia
Kalam, Akhtar International Editor for the Journal of Electrical Engineering (Elektrika), Malaysia
Kalam, Akhtar Guest Editors for special issues of Journal of Electrical and Electronics, Engineers Australia
Kalam, Akhtar Guest Editors for special issues of Journal of Renewable Energy Engineering

Lai, Daniel Editorial Board Member, (2010-), International Journal of Instrumentation Technology (IJIT)
Liang, Qing Editorial Advisory Board Member, The Open Construction and Building Technology Journal, Bentham Open.
Liang, Qing Editorial Review Board Member, Scientific Journals International.


Mcconnel, Glenn Scientific Journal Editorial Board member Clinical and Experimental Pharmacology and Physiology (CEPP). (2009-)
Shah, Nagendra Editorial board of Bioscience and Microflora (2002-)

Shi, Hao, Editorial Board Member, International Journal of Computer Networks & Communications (IJCNN)

Shi, Peng Associate Editor-in-Chief, Int. J. of Biomedical Soft Computing and Human Sciences (2009-2010)

Shi, Peng Regional Editor, Int. J. of Nonlinear Dynamics and Systems Theory (2002-)

Shi, Peng Area Editor, Int. J. of Intelligent Systems Science and Technology (2010-)

Shi, Peng Advisory Board Member, ICIC Express Letters (2007-)
Shi, Peng Advisory Board Member, ICIC Express Letters, Part B: Applications (2010-)

Shi, Peng Advisory Board Member, Int. J. of System Control and Information Processing (2010-)

Shi, Peng Advisory Board Member, Central European Journal of Engineering (2010-)

Shi, Peng Advisory Board Member, Journal of Information Hiding and Multimedia Signal Processing (2009-)

Shi, Peng Associate Editor, IEEE Trans on Automatic Control (2008-)


66 FACULTY OF HEALTH, ENGINEERING AND SCIENCE 2010 ANNUAL RESEARCH REPORT
Conference Chair and Organising Committee

Collins, Stephen Chair, Australian Institute of Physics Congress co-located with the 35th Australian Conference on Optical Fibre Technology, Melbourne, 5–9 December 2010


He, Jing Co-Chairs, 2010 Workshop on Optimization Based Methods for Emerging Data Mining Problems, (OEDM'10), ICDM 2010, The 10th IEEE International Conference on Data Mining, Dec 14–17, Sydney, Australia.

Kalam, Akhtar Conference Chair of International Conference on Thermal Energy and Environment

AWARDS

The Vice-Chancellor’s Citations and Peak Awards for Excellence in Research and Research Training recognise and reward the diverse contributions that individuals and teams make to facilitate high quality research and research training within the University. The Citations and Awards will serve three main objectives:

• To provide formal recognition within the University of outstanding achievement in research and research training;

• To provide researchers with recognition useful for external and internal career development and funding opportunities, and

• To provide the University with an opportunity to obtain significant publicity for University research and researchers.
Associate Professor Mikel Duke  
Institute for Sustainability and Innovation  
Victoria University, Vice-Chancellor’s Peak Award and Citation for Excellence in Research and Research Training, for training the next generation of membrane technology leaders through research supervision, collaborations with national and international researchers and extensive publication in the field.

Professor Peng Shi  
Institute for Logistics and Supply Chain Management  
Victoria University, Vice-Chancellor’s Citation for Excellence in Research and Research Training for contributing to VU’s reputation as a leader in the field of applied mathematics through collaborative partnerships with other institutions resulting in publications and a range of professional activities.

Dr Eder Kikianty  
School of Engineering and Science  
Winner of the 2010 Victoria University, 3 Minute Thesis Competition.  
Victoria University Medal for Academic Excellence — Higher Degree Graduate  
2010 Vice-Chancellor’s Citation and Peak Award for Excellence — Research Degree Graduate

RESEARCH COMMITTEE

Chair  
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Dr Alan Hayes  
Associate Professor Todor Vasiljevic

School of Engineering and Science  
Dr Gitesh Raikundalia  
Associate Professor Mary Millikan

School of Nursing and Midwifery  
Dr Deb Kerr  
Associate Professor Mary Carolan

Centre for Environmental Safety and Risk Engineering  
Professor Graham Thorpe

Centre for Telecommunications and Microelectronics  
Associate Professor Stephen Collins

Institute for Sustainability and Innovation  
Professor Stephen Gray

Institute for Sport, Exercise and Active Living  
Professor Glenn Mcconell

Institute for Logistics and Supply Chain Management  
Professor Peng Shi

VU Research Office  
Ms Sandy Superina  
Professor Glenn Moloney

FoHES Faculty Innovation Development Officer  
Dr Celia Torres-Villanueva  
Dr Andrew Rudge (from Oct 2010)

Student Representative  
Mr Nilantha Gamage

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Associate Professor Todor Vasiljevic

School of Engineering and Science  
Dr Gitesh Raikundalia  
Associate Professor Mary Millikan

School of Nursing and Midwifery  
Associate Professor Mary Carolan  
Dr Deb Kerr

Centre for Environmental Safety and Risk Engineering  
Dr Maurice Guerrieri

Centre for Telecommunications and Microelectronics  
Associate Professor Stephen Collins

Institute for Sustainability and Innovation  
Professor Paul Boon

Institute for Logistics and Supply Chain Management  
Professor Peng Shi

Student Representatives  
Mr Mohmmedreza Pourakbar  
Ms Deanna Horvath
GRANTS
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<thead>
<tr>
<th>PROJECT</th>
<th>RESEARCHERS</th>
<th>AGENCY</th>
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<tbody>
<tr>
<td>The establishment of human primary skeletal muscle cell cultures to investigate the role of the cannabinoid system in peripheral adiponectin resistance</td>
<td>Andrew McAinch</td>
<td>Clive &amp; Vera Ramaciotti Foundation</td>
</tr>
<tr>
<td>The Effect of Dietary Fish Peptides on Biomarkers of Human Health - The Influence of Processing Conditions and the Environment</td>
<td>Todor Vasiljevic; Michael Mathai; Osaana Donkor</td>
<td>Ambaco Pty Ltd</td>
</tr>
<tr>
<td>The Effect of Dietary Fish Peptides on Biomarkers of Human Health - The Influence of Processing Conditions and the Environment</td>
<td>Todor Vasiljevic; Michael Mathai; Osaana Donkor</td>
<td>ARC — Linkage</td>
</tr>
<tr>
<td>Is there a role for cannabinoid receptors in endocytosis in the kidney?</td>
<td>Deanne Skelly; Andrew McAinch</td>
<td>Helen Macpherson Smith Trust</td>
</tr>
<tr>
<td>Alternative Models of Assessment of Overseas-qualified Osteopaths for their Suitability to Practice in Australia.</td>
<td>Roger Gabb; Patrick McLaughlin; Brett Vaughan; Cameron Gosling</td>
<td>Osteopaths Registration Board</td>
</tr>
<tr>
<td>The role of voltage-gated Na+ and Ca2+ channels in post-inflammatory hyperexcitability of enteric neurons</td>
<td>Kulmira Nurgali</td>
<td>NHMRC — Projects</td>
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<tr>
<td>Private Data Warehouse Query</td>
<td>Xun Yi</td>
<td>ARC — Discovery</td>
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<tr>
<td>An Investigation into the Control of “Tobacco Weed” (Plumatella) Infestation of Water Pipeline Systems</td>
<td>John Orbell</td>
<td>Grampians Wimmera Mallee Water</td>
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<tr>
<td>The Rational Development of Improved Pre-conditioning Agents for the Removal of Oil Contamination from Wildlife and Rocky Foreshore</td>
<td>John Orbell; Lawrence Ngoh; Stephen Bigger</td>
<td>ARC — Linkage, Phillip Island Nature Park</td>
</tr>
<tr>
<td>Data Enhancement, Integration and Access Services for Smarter, Collaborative &amp; Adaptive Whole-of Water Cycle Management</td>
<td>Yanchun Zhang; Xiaofang Zhou</td>
<td>ARC — Linkage</td>
</tr>
<tr>
<td>The rational decay of a range of biocides on fresh fruit and other horticultural produce.</td>
<td>Mary Millikan; Graham Thorpe</td>
<td>Wobelea Pty Ltd</td>
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<tr>
<td>Genetics Study, Breeding System, Ex Situ Management of Swamp Everlasting</td>
<td>Randall Robinson</td>
<td>Dept of Sustainability &amp; Environment</td>
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<tr>
<td>Chemical Analysis of Wine</td>
<td>Mary Millikan;</td>
<td>Department of Primary Industries</td>
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<tr>
<td>Data Exchange and Service Iteration with Applications in Health Information Systems</td>
<td>Yuan Miao; Yanchun Zhang</td>
<td>ARC — Linkage</td>
</tr>
<tr>
<td>Multi-Objective Planning and Operation of Water Supply Systems Subject to Climate Change</td>
<td>Chris Perera</td>
<td>ARC — Linkage, Grampians Wimmera Mallee Water</td>
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<tr>
<td>Strategies for Retrofitting Stormwater Harvesting in Existing Urban Areas</td>
<td>Anne Ng; Chris Perera</td>
<td>CSIRO</td>
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<tr>
<td>Primelea Spinescens Subsp. Spenescens</td>
<td>Megan O'Shea</td>
<td>Dept of Sustainability &amp; Environment</td>
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<tr>
<td>Dolphin Swim Australia Collaborative Research Agreement</td>
<td>Carol Scarpaci</td>
<td>Dolphin Swim Australia Pty Ltd</td>
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<tr>
<td>Economic &amp; Environmental Impact Analysis fo Sewerage Network: A Comparison Study of Sewerage Network due to Centralized &amp; Decentralized Servicing Options on Tropical Island</td>
<td>Nitin Muttil</td>
<td>CSIRO</td>
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<tr>
<td>Real-time and Self-Adaptive Stream Data Analyser for Intensive Care Management</td>
<td>Yanchun Zhang; Xun Yi</td>
<td>ARC — Linkage</td>
</tr>
<tr>
<td>Impact and management of the dolphin-swim industry in Port Phillip Bay, Victoria.</td>
<td>Carol Scarpaci; Patrick-Jean Guay</td>
<td>ANZ Trustees</td>
</tr>
<tr>
<td>PROJECT</td>
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<td>AGENCY</td>
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<tr>
<td>Trace metals in little penguin (Eudyptula minor) populations along the Victorian coastline of Australia.</td>
<td>Carol Scarpaci; Patrick-Jean Guay</td>
<td>Birds Australia</td>
</tr>
<tr>
<td>Assessing the Genetic Origin of Mallard Ducks which have been introduced to New Zealand</td>
<td>Patrick-Jean Guay</td>
<td>Victoria University - Wellington</td>
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<tr>
<td>Margin statistics of high throughput sequencing.</td>
<td>Eder Kikianty</td>
<td>Australian Mathematical Sciences Institute (AMSI)</td>
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<tr>
<td>Adaptive Web Service Integration and Mashup in Cloud Computing</td>
<td>Yanchun Zhang</td>
<td>Nanjing University of Finance &amp; Economics</td>
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<tr>
<td>Ecology of waterfowl at the WTP</td>
<td>Patrick-Jean Guay</td>
<td>Melbourne Water Corporation</td>
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<tr>
<td>Managing disturbance to waterbirds at the Western Treatment Complex: Understanding the basic patterns.</td>
<td>Patrick-Jean Guay; Michael Weston;</td>
<td>Melbourne Water Corporation</td>
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<tr>
<td>Hybridisation between Pacific Black Ducks and Mallards in Victoria.</td>
<td>Patrick-Jean Guay</td>
<td>Birds Australia</td>
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<tr>
<td>Deciphering Attitudes, Exploring Barriers and Facilitator Towards Eliminating Restraint and Seclusion in Inpatient Aged Psychiatry Units.</td>
<td>Terence McCann</td>
<td>Helen Macpherson Smith Trust</td>
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<tr>
<td>The Role of Location on the Effectiveness of Smoke Alarms</td>
<td>Dorothy Bruck</td>
<td>Australian Building Codes Board</td>
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<tr>
<td>Realising Community Benefits from Improved Building Regulations</td>
<td>David Proe</td>
<td>OneSteel Manufacturing Pty Limited</td>
</tr>
<tr>
<td>Nanophotonic Resonators</td>
<td>Gregory Baxter; Ad Roberts</td>
<td>ARC - Discovery</td>
</tr>
<tr>
<td>Sustainability engagement research, development and delivery of training for ambassadors, Brotherhood green staff and other office and retail staff for the Brotherhood of St Laurence.</td>
<td>Colin Hocking</td>
<td>Brotherhood of St Lawrence</td>
</tr>
<tr>
<td>Green Justice.</td>
<td>Colin Hocking</td>
<td>Department of Justice (Victorian)</td>
</tr>
<tr>
<td>Evaluation of the learning and change component of the green precinct project.</td>
<td>Colin Hocking</td>
<td>Moonee Valley City Council</td>
</tr>
<tr>
<td>Ecoviving Behaviour Change Roadmap and Toolkit</td>
<td>Colin Hocking</td>
<td>Port Phillip EcoCentre Inc</td>
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<tr>
<td>Is nebulised doxorubicin-containing nanoparticles a better way to treat pulmonary metastases?</td>
<td>Crispin Dass</td>
<td>ANZ Trustees</td>
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<tr>
<td>Dairy powder samples.</td>
<td>Todor Vasiljevic</td>
<td>Dairy Innovation Australia Limited</td>
</tr>
<tr>
<td>Pterostylis tenuissima (Swamp Greenhood) and Pterostylis lustra (Small Sickle Greenhood).</td>
<td>Randall Robinson</td>
<td>Dept of Sustainability &amp; Environment</td>
</tr>
<tr>
<td>Sustainability and Excellence in Australia’s Power Engineering</td>
<td>Akhtar Kalam</td>
<td>The API Foundation Pty Ltd, The Australian Power Institute Limited</td>
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</tbody>
</table>
## 2010 INTERNAL GRANTS

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<tr>
<th>PROJECT</th>
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<th>AGENCY</th>
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<tr>
<td>Can probiotics regulate expression of T regulatory and helper 17 cells?</td>
<td>Osaana Donkor</td>
<td>VU Researcher Development Grant Scheme</td>
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<tr>
<td>Confocal immunofluorescence imaging of unfixed single muscle fibres - A novel approach.</td>
<td>Nicoleta Dragomir</td>
<td>VU Researcher Development Grant Scheme</td>
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<tr>
<td>Next generation equipment for compression garment assessment.</td>
<td>Patrick McLaughlan</td>
<td>VU Researcher Development Grant Scheme</td>
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<tr>
<td>The effects of whey protein supplementation on endurance performance and metabolism</td>
<td>Andrew McAinch</td>
<td>Faculty Collaborative Research Grant Scheme</td>
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<tr>
<td>The Influence of high Intensity Intermittent Versus Continuous Exercise on Metabolic signalling Pathways and Fat and Carbohydrate Metabolism in Humans</td>
<td>Christos Stathis</td>
<td>Faculty Collaborative Research Grant Scheme</td>
</tr>
<tr>
<td>Structural damage detection in timber bridges using response signals.</td>
<td>Srikanth Venkatesan</td>
<td>VU Researcher Development Grant Scheme ; Faculty Collaborative Research Grant Scheme</td>
</tr>
<tr>
<td>Satellite tracking of pink-eared ducks dispersing from the western treatment plant, Werribee.</td>
<td>Patrick-Jean Guay</td>
<td>VU Researcher Development Grant Scheme</td>
</tr>
<tr>
<td>Cost-Benefit Analysis for road and Rail distributions and Research on Necessary Operational Pattern Shifts</td>
<td>Yong Wu</td>
<td>Faculty Collaborative Research Grant Scheme</td>
</tr>
<tr>
<td>Evaluation of the Impact of Shift-Shift Bed-side nursing Handover on Quality of Nursing Care</td>
<td>Deb Kerr</td>
<td>Faculty Collaborative Research Grant Scheme</td>
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<tr>
<td>Development of a Nursing Services Reference Model (NSRM)</td>
<td>Liza Heslop</td>
<td>Faculty Collaborative Research Grant Scheme</td>
</tr>
<tr>
<td>Nursing handover at Western Health: current strengths, limitations and perceptions.</td>
<td>Lucy Lu</td>
<td>Faculty Collaborative Research Grant Scheme</td>
</tr>
<tr>
<td>Measurement and Influence of Insitu Pore Pressures and Temperatures on Spalling of Slender Reinforced Concrete Walls Subjected to fire and the Influence of Polypropylene Fibers on combating Spalling.</td>
<td>Maurice Guerrieri</td>
<td>Faculty Collaborative Research Grant Scheme</td>
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GRADUATIONS
2010 GRADUATIONS

RIZWAN AHMAD, PhD
CENTRE FOR TELECOMMUNICATIONS AND MICRO-ELECTRONICS
THESIS TITLE: Performance analysis of relay based cooperative MAC protocols

CITATION: Rizwan examined cooperation among wireless telecommunication devices at the Medium Access Control (MAC) layer of existing ad hoc networks and developed two new cooperative protocols. He also proposed an analytical method to determine and reduce energy consumption. He conducted his research in collaboration with British Telecom. Rizwan’s Principal Supervisor was Professor Michael Faulkner and the Associate Supervisors were Associate Professor Fu-Chun Zheng and Dr Sverrir Olafsson.

GRADUATION: 2.12.2010
CURRENT ROLE: Post Doctorial Research Fellow, Qatar Texas, University.

APRIANITA APRIANITA, Masters by Research
SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES
THESIS TITLE: Assessment of Underutilized Starchy Roots and Tubers for their Applications in the Food Industry

CITATION: This research examined the physico-chemical properties of flours and starches extracted from underutilized tubers and roots from Indonesia for their applications in the food industry. These materials have also been recognized as traditional remedies in the alleviation of various medical ailments. The research conducted was first of its kind in this area and demonstrated that these underutilized materials can be successfully applied in the development of a range of different physiologically functional foods. Aprianita’s Principal Supervisor was Associate Professor Todor Vasiljevic.

GRADUATION: 2.6.2010
CURRENT ROLE: PhD Student, Victoria University.

HASSAN AL-KHALIDI, PhD
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: Technical Consideration and Impact of Converting Overhead Power Lines to Underground Power Cables

CITATION: Hassan’s thesis investigates the effect of new technology and practices on moving overhead lines to underground cables, in order to improve the occupational health, safety and wellbeing of electricity sector personnel. It considers local and overseas experience and practices in the area and develops a solution in accordance with the Victorian conditions and regulation. His work has been greatly applauded by all the 3 examiners and has led to the publication of 7 papers. Hassan’s Principal Supervisor was Professor Akhtar Kalam.

GRADUATION: 2.6.2010
CURRENT ROLE: Postdoctoral Research Fellow, Victoria University.

MAGGIE DUONG, PhD
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: Access Control Model and Labelling Scheme for Efficient Querying and Updating XML Data

CITATION: Many existing XML access controls use node filtering or querying rewriting techniques which are rather time-consuming. Maggie developed a fine-grained access control model which supports read and write privileges. This model can be integrated well with the dynamic labelling scheme to speed up searching and querying processes in databases. Her work has been published at 3 conferences. Maggie’s Principal Supervisor was Professor Yanchun Zhang.

GRADUATION: 3.6.2010
CURRENT ROLE: J2EE Developer, Telephony Business Solutions, Centrelink.
YANAN HAO, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Efficient Web Services Discovery and Composition

CITATION: This research develops novel approaches for web services discovery and composition in service computing environments. The outcomes advance theory in service computing, and facilitate users to discover web services and compose them according to quality requirements and transactional constraints. Yanan’s research has received international recognition through high quality publications. His Principal Supervisor was Professor Yanchun Zhang and the Associate Supervisor was Associate Professor Yuan Miao.

GRADUATION: 3.6.2010

CURRENT ROLE: Research Assistant, Centre for Applied Informatics, Victoria University.

SUDINNA KULANGANA HEWAKAPUGE, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Prediction of age from DNA

CITATION: Sudinna investigated the possibility of using DNA to predict the age of a person, a study conducted in collaboration with the Victoria Forensic Police Services. Sudinna’s work is considered an important contribution to the field of Forensic Science, as evidenced by keen interest, worldwide, in her publications in the international journals, Forensic Science International and Legal Medicine. Sudinna’s Principal Supervisor was Dr Swati Baindur-Hudson and the Associate Supervisor was Dr Roland Van Oorsehot.

GRADUATION: 2.12.2010

CURRENT ROLE: Technical Officer, Victoria University.

MATTHEW HATTON, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Intra and inter-specific variation in the reproductive strategies of two Bolboschoenus species from south-eastern Australia

CITATION: The doctoral research undertaken examined the way that wetland plants survive through environmental extremes, and, in particular, the balance between sexual and non-sexual means of recruitment. Matthew used a mixture of novel molecular techniques and traditional ecological approaches in his study. His findings will make a significant contribution to botany, limnology and environmental management. Matthew’s Principal Supervisor was Professor Paul Boon and the Associate Supervisor was Dr Susan Bevan.

GRADUATION: 2.12.2010

CURRENT ROLE: Environmental Consultant, Ecology Partners in Melbourne.

DANUSHA KALINGA, Masters by Research

SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: Delivering B-Glucan via Selected Bakery Systems: Cake

CITATION: Danusha investigated effect of Beta-glucan, a bioactive ingredient with known health benefits, as a functional agent in cake, by studying the effects of type, levels of addition on the quality of batter and cakes. Through the use of thermal and rheometric measurements, her work has shown that addition impacts on pasting behaviours, gel formation and gelatinization. The starch-Beta glucan-water interactions were found to have major influence on the quality of cakes. Her work was recognized by the Cereals Chemists Society (Australia) by providing her financial assistance to enable her to attend the 58th Australian Cereal Chemistry Conference and present her research. Danusha’s supervisor was Dr Vijay Mishra.

GRADUATION: 2.12.2010

CURRENT ROLE: PhD student, University of Guelph, Canada.
EDER KIKIANTY, PhD
SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Hermite-Hadamard Inequality in the Geometry of Banach Spaces

CITATION: Eder’s thesis merges two different streams of contemporary mathematical analysis: Inequalities Theory and Functional Analysis, both of them being of crucial importance in the applications of Mathematics in Sciences. Her research results were published in high impact international journals and presented at numerous international conferences where they attracted the appreciation of the community working in both fields. Eder’s Principal Supervisor was Professor Sever Dragomir and the Associate Supervisor was Professor Peter Cerone.

GRADUATION: 2.12.2010

CURRENT ROLE: Researcher, National ICT Australia.

RIZWANA KOUSAR, PhD
SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: Metabolic Syndrome: Effect of a Culturally Appropriate Diet and Physical Activity in Female Pakistani Immigrants

CITATION: Metabolic Syndrome is an emerging clinical health issue severely affecting Pakistani women. This research designed and implemented a unique culturally appropriate diet and lifestyle intervention for Pakistani migrant females, the first of its kind targeted solely at a Pakistani population. By improving diet and increasing physical activity, most of the components of Metabolic Syndrome were significantly reduced with substantial health benefits. Rizwana’s Principal Supervisor was Associate Professor Jack Antonas and the Associate Supervisor was Dr Cate Burns.

GRADUATION: 2.6.2010

DAVID KING, PhD
SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: On the Importance of Input Variables and Climate Variability to the Yield of Urban Water Supply Systems

CITATION: A novel framework of sensitivity analysis was developed to investigate the importance of input variables and climate variability on the yield estimate of urban water supply systems. The framework was applied to two case studies, which uncovered new understanding and reasoning regarding system behaviour. Four refereed conference papers were published from the thesis and a further three papers submitted to journals. David’s Principal Supervisor was Professor Chris Perera.

GRADUATION: 2.6.2010

CURRENT ROLE: Hydrologist, Bureau of Meteorology, Melbourne.

BETTY KOUSKOUSIS, PhD
CENTRE FOR TELECOMMUNICATIONS AND MICRO-ELECTRONICS

THESIS TITLE: Microscopic Characterisation of Fibre Bragg Gratings

CITATION: A fibre Bragg grating is an important optical device that has revolutionised the telecommunications and sensing industries. Betty’s thesis involved detailed modelling, measurement and microscopic characterisation of these gratings, enabling significant advances in our understanding of their fabrication and performance. Betty’s work had been presented at a number of important international and Australian conferences and has resulted in high quality journal publications. Betty’s Principal Supervisor was Professor Gregory Baxter and the Associate Supervisor was Associate Professor Stephen Collins.

GRADUATION: 2.6.2010

CURRENT ROLE: Postdoctoral Fellow, Centre for Micro-Photonics, Swinburne University.
JOHN LASICH, PhD
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: The Design and Optimisation of a Reflective Concentrator Photovoltaic Generation System
CITATION: Finite resources and global warming make it imperative that we develop economical forms of renewable energy. John has invented a way of concentrating the sun's power 500 times and focusing it on photovoltaic cells, thus greatly reducing the cost of generating electricity from solar energy. He has designed and tested solar power stations that are the most efficient in the world. John's Principal Supervisor was Professor Graham Thorpe.
GRADUATION: 2.12.2010

JIANGANG MA, PhD
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: Towards Efficient Collaboration for e-service Transaction Management: Semantics, Security and Reliability
CITATION: In his PhD work, Jiangang has developed a novel distributed database theory and techniques for supporting reliable collaborations among business communities through distributed software systems. His research has made a considerable contribution in developing distributed software applications and reliable database theory. He has published 7 research papers in top journals and conferences, including one A* ranked journal paper. Jiangang’s Principal Supervisor was Professor Yanchun Zhang and the Associate Supervisor was Dr Fuchun Huang.
GRADUATION: 2.12.2010
CURRENT ROLE: Research Assistant, Centre for Applied Informatics, Victoria University

ADAM MARSH, PhD
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: Design of Effective Traveling Wave Sloshing Absorbers for Structural Control
CITATION: Adam’s thesis is related to the control of dangerous structural vibrations of tall and flexible structures such as skyscrapers, transmission towers and long bridges. His research program involved extensive collaboration with the Commonwealth Scientific and Research Organisation (CSIRO). Adam’s scientific contribution has been recognised very favourably by all three of his examiners, and in 5 international conference papers and 4 journal publications. Adam’s Principal Supervisor was Dr Eren Semercigil and the Associate Supervisors were Associate Professor Ozden Toran and Dr Mahesh Prakash.
GRADUATION: 2.12.2010
CURRENT ROLE: Research Scientist, LFM Ecole Centrale de Nantes, France.

MICHAEL MEW BURN, Masters by Research
SCHOOL OF ENGINEERING AND SCIENCE
THESIS TITLE: Multiple Input Multiple Output Channel Measurements and System Performance.
CITATION: Michael has focused his research in the area of multiple antennas providing higher throughputs using the same power and bandwidth. This work was designed to increase the spectral efficiency by a factor of 200% or more. The work involved lots of channel measurement between multiple antennas to determine the capacity in indoor wireless communication systems applicable to wireless LANs. Michael’s work was of benefit to both Ericsons and Victoria University for future research and commercialization. Michael’s Principal supervisor was Prof Mike Faulkner and the Associate supervisors were Dr Ying Tan and Dr Phillip Condor.
GRADUATION: 2.12.2010
CURRENT ROLE: Secondary Teacher, Department of Education.
ANAND MOHAN, PhD

CENTRE FOR TELECOMMUNICATIONS AND MICRO-ELECTRONICS

THESIS TITLE: A Reconfigurable High Speed Analog to Digital Converter Architecture for Ultra Wideband Devices

CITATION: This thesis presents the design and implementation of two unique high speed analog to digital converters for Ultra WideBand Biomedical, Audio-Visual and Telecommunications applications. The new devices achieved up to 32% less power consumption and have 58% reduction in total area as compared to existing devices. The outcomes from this research have been published in national and international conferences and journals. Anand’s Principal Supervisor was Associate Professor Aladin Zayegh and the Associate Supervisor was Professor Alex Stojcevski.

GRADUATION: 2.12.2010

CURRENT ROLE: Research Officer (ASIC Design), Monash Centre for Synchrotron Science.

THUY THI PHAM, PhD

SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: Enhancing the Transformation Level of Bioactive Soy Isoflavones in Soy-Based Foods by Probiotic Organisms

CITATION: Probiotics in presence of lactulose, and skim milk powder significantly enhanced transformation of isoflavones glycosides into bioactive aglycones in soy foods. Isoflavone aglycones are easily absorbed and provide several health benefits, meaning that this work has commercial significance. Eight research papers have been published in international journals of repute from this research and the work was presented at several international conferences. Thuy’s Principal Supervisor was Professor Nagendra Shah.

GRADUATION: 2.12.2010

CURRENT ROLE: Research Associate, RMIT.

MOHD TAFIR MUSTAFFA, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: A Reconfigurable Low Noise Amplifier for a Multi-standard Receiver

CITATION: The research involves design and implementation of reconfigurable Multi-standard Multi-band Low-Noise-Amplifier for Multi-standard Multi-band mobile Receiver. The topology was designed to replace the complex parallel architecture and was developed to be simple, more power efficient and cost effective. The amplifier allows access to functions such as Voice Calls, Video Call, Multimedia messaging, etc. Tafir published several journal and conference papers. Tafir's Principal supervisor was Associate Professor Aladin Zayegh and the associate supervisors were Associate Professor Alex Stojcevski and Dr Ronny Veljianovski.

GRADUATION: 14.3.2010

CURRENT ROLE: Senior Lecturer, Kampus Kejuruteraan Universiti Sains Malaysia.

LATA RAMCHANDRAN, PhD

SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: Physico-Chemical and Therapeutic Properties of Low-Fat Yogurt as influenced by Fat Replacers, Exopolysaccharides And Probiotics

CITATION: This research developed a low-fat symbiotic yogurt to establish its antihypertensive property in vitro and in hypertensive rats. The product was found to be effective in lowering blood pressure and could have a commercial significance. Nine research papers have been published in international journals of repute from this research and the work was presented at several international conferences. Lata’s Principal Supervisor was Professor Nagendra Shah

GRADUATION: 2.12.2010

CURRENT ROLE: Research Associate, Victoria University.
LIYANA ARACHCHIGE SANJEWANI RUPIKA HERATH, PhD

PACKAGING AND POLYMER RESEARCH UNIT

THESIS TITLE: Development and Evaluation of Low Density Polyethylene-Based Antimicrobial Food Packaging Films Containing Natural Agents

CITATION: Ms Rupika successfully developed packaging films containing antimicrobial agents derived from plant extracts. These novel packaging systems were developed and tested in order to optimise the antimicrobial properties of the films. These films have the potential to extend the shelf-life of commercial food products such as Cheddar cheese by inhibiting the growth of potentially harmful microbes such as E. Coli. Part of Ms Rupika’s work was recently published in the highly ranked Journal of Food Science and four papers were presented and well received at international packaging conferences over the past three years. Liyana’s Principal Supervisor was Professor Stephen Bigger and the Associate Supervisors were Professor Joseph Miltz, Dr Marlene Cran and Associate Professor Kees Somerveld.

GRADUATION: 2.12.2010

WALLAPA SONGPRAKUN, PhD

SCHOOL OF NURSING AND MIDWIFERY

THESIS TITLE: Evaluation of a cognitive behavioural bibliotherapy selfhelp intervention program on the promotion of resilience in individuals with depression

CITATION: Depression is a growing problem in Thailand. Wallapa has demonstrated, in a randomised controlled trial, that the combination of a self-help manual with standard treatment is helpful to people with moderate depression. This thesis has made an important contribution to the quality of life of people with depression in Thailand, and the work has been commended by the examiners. Wallapa is a member of staff of the Faculty of Nursing, Payap University, in Thailand. Wallapa’s Principal Supervisor was Professor Terence McCann.

GRADUATION: 1.6.2010

CURRENT ROLE: Associate Dean, Academic Affairs of McCormick Faculty of Nursing. Payap University.

MELANIE SULLIVAN-GUNN, PhD

SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: An Investigation of NADPH Oxidase in Normal and Diseased Skeletal Muscle

CITATION: Melanie investigated the role of the free radical producing enzyme NADPH oxidase in muscle wasting associated with cancer, motor-neuron disease and aging. Melanie demonstrated an imbalance between free radicals and antioxidants found in muscle were associated with muscle wasting in all three conditions. Data from Melanie’s PhD has been presented at international conferences and lead to a number of scientific publications. Melanie’s Principal Supervisor was Dr Siun O’Sullivan and the Associate Supervisor was Dr Paul Lewandowski.

GRADUATION: 2.12.2010

GABRIELE SORRENTINO, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Option Pricing in a Path Integral Framework

CITATION: Gabriele’s research produced novel techniques for evaluating option prices within a path integral framework. The research achieved a balance between numerical analysis, mathematical modelling in finance and computational aspects. The accuracy achieved is superior to many of the results available in the literature and many of the techniques developed have a potential application in other fields. Gabriele is a staff member of Victoria University. Gabriele’s Principal Supervisor was Professor Peter Cerone and the Associate Supervisor was Dr John Roumeliotis.

GRADUATION: 3.6.2010

CURRENT ROLE: Lecturer, Victoria University.
NUSRAT AHMED SUROBHI, Masters by Research
CENTRE FOR TELECOMMUNICATIONS AND MICRO-ELECTRONICS

THESIS TITLE: Outage Performance of Cooperative Cognitive Relay Networks

CITATION: Nusrat’s research revolved around the use of relays providing a way of improving wireless services in blackspots. Blackspots occur due to services being required indoors, underground, in lifts or other topographical situations. Relays collaborate with each other or with base stations to improve network performance. This research work has contributed to further academic research and will be introduced into the fourth generation mobile phone systems. Nusrat’s Principal Supervisor was Professor Mike Faulkner

GRADUATION: 2.12.2010
CURRENT ROLE: Ph.D student. Wireless Networking Group, School of Electrical and Information Engineering, University of Sydney, NSW, Australia.

MICHELLE VAUGHN, PhD
SCHOOL OF BIOMEDICAL AND HEALTH SCIENCES

THESIS TITLE: Blonde Hair Colour: Classification, Characterisation and Genetic Associations for use in Forensic Science

CITATION: Michelle examined the classification, characterisation and genetic basis of blonde hair colour for use in forensic science. This knowledge will contribute to the growing field of forensic phenotype profiling and will assist in our understanding of pigmentation genetics. Her PhD research has, so far, led to the publication of three journal articles, presentations and award-winning conference posters. Michelle’s Principal Supervisor was Dr Swati Baindur-Hudson and the Associate Supervisor was Dr Roland van Ooschat.

GRADUATION: 2.6.2010

JAREE THONGKAM, PhD
SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: Towards Breast Cancer Survivability Prediction Models in Thai Hospital Information Systems

CITATION: Jaree has developed high performance and reliable breast cancer survivability prediction models using data mining approaches. The success in developing these models has received widespread international recognition and publications. This thesis has made a significant contribution to the breast cancer prognosis community. Jaree’s Principal Supervisor was Professor Yanchun Zhang and the Associate Supervisor was Dr Fuchun Huang.

GRADUATION: 2.6.2010
CURRENT ROLE: Lecturer, Mahasarakham University, Thailand.

YUFRIDIN WAHAB, PhD
CENTRE FOR TELECOMMUNICATIONS AND MICRO-ELECTRONICS

THESIS TITLE: Design and Implementation of MEMS Biomechanical Sensors for Real-Life Measurements of Gait Parameters

CITATION: The research explored how micro-electro-mechanical systems technology can be used to produce new generation biomechanical measurement sensors. The sensors were produced based on industry standard silicon manufacturing services in Europe. The sensors can be used in real-life biomedical applications. The research produced many peer reviewed technical papers published by international professional bodies, especially the IEEE. The Principal Supervisor was Associate Professor Aladin Zayegh and the Associate Supervisors were Associate Professor Rezaul Begg and Dr Ronny Veljanovski.

GRADUATION: 3.6.2010
CURRENT ROLE: Senior Lecturer and Industry Liaison Officer, Northern Malaysia University College of Engineering.
XIN WANG, PhD

SCHOOL OF ENGINEERING AND SCIENCE

THESIS TITLE: A Framework to Manage Message Level Authorisation in Service Oriented Collaborative Business Processes

CITATION: This research has made a significant contribution to both service oriented architecture and role based security realms. Success in developing this framework has received widespread international recognition and commercial interest. Xin’s Principal Supervisor was Professor Yanchun Zhang and the Associate Supervisor was Associate Professor Hao Shi.

GRADUATION: 2.12.2010

STUDENT RECOGNITION

Dr. Eder Kikianty

The winner of VU’s inaugural 3 Minute Thesis (3MT) Grand Final has gone on to receive a prestigious internship at the Australian Mathematical Sciences Institute (AMSI).

The inaugural 3MT final was held at Footscray Park in August in front of a crowd of about 300 people.

HES student Eder Kikianty explained her research in mathematical inequality and the geometry of mathematical objects known as Banach Spaces by referring to the way a Manhattan taxi driver travels around city blocks, and comparing that to how a ghost could go through buildings to find the shortest path.

The clarity and engaging nature of her presentation won Eder the $2000 first prize. She also picked up the people’s choice award as voted by members of the 300-strong audience.

Since coming to VU on a research scholarship in 2006 from her home of Sumatra, Indonesia, Eder has joined the ranks of a handful of mathematical inequality specialists in Australia. Many work at VU, including her research supervisor Professor Sever Dragomir and Associate Supervisor Professor Peter Cerone.

Eder joined winners from other universities across the nation at the Australian and New Zealand three-minute thesis finals, which were held at the University of Queensland on 21 September.

Since then she has been granted an AMSI Internship for the project: Margin Statistics of High Throughput Sequencing.

This project, in association with industry partner National Information and Communication Technology Australia Victoria Laboratory, will pursue the development of statistical filters that can be used to detect biomarkers.

The method focuses on analysis of data obtained by the high throughput DNA sequencing technologies (often referred to as Next Generation Sequencing, NGS). The results will be applied directly to a number of diseases studied at laboratories of NICTA partners, in particular to breast cancer, leukaemia and diabetes.

Kristina Nelson

After nursing her mother in a losing battle with breast cancer, Kristina Nelson left a career in the business sector to follow her life-long interest in human health and nutrition. Inspired by her mothers determination, Kristina embarked on a new direction, studying full time to recently complete a Bachelor of Science (Nutritional Therapy) at Victoria University. Based on her academic performance Kristina was the recipient of a FOHES Summer research scholarships during her 2nd and 3rd undergraduate years, and presented her findings on the effects of food supplements against biological markers in menopause at an international conference in Sydney last September.

She has also recently received a prestigious Cancer Council Victoria Studentship to work at the Burnet Institute’s Cancer and Immunology laboratory whereby she examined the effects of several food supplements in breast and colon cancer cell lines. Kristina is continuing her studies this year, undertaking Honours in Biomedical Sciences at VU, conducting a clinical trial that measures the biological effects of a breakfast intervention in people with obesity.

Kristina is continually fascinated by the connection between lifestyle, diet and health, and says that “we now have a body of convincing or at least probable scientific evidence that suggests certain diets, foods or plant chemicals can be both causative and preventative in cancer and chronic diseases such as obesity”.

Kristina favours an evidence-based approach supported by science and established guidelines, and encourages all people where possible to take responsibility for their own wellbeing through healthy eating, physical activity and a balanced approach to life.

Living with her young family in the Macedon Ranges, Kristina is looking forward to combining a career in research and clinical nutrition, saying “we never stop learning, and I am passionate about contributing to the growing body of scientific nutrition knowledge whilst supporting others in meeting their personal goals to enjoy the best health possible.”
2010 UNDERGRADUATE/GRADUATE RESEARCH SCHOLARSHIPS

This program is offered to students who are nominated for the program by Undergraduate Course Coordinators and external organisations to the Associate Dean (Research and Research Training) based on the following assessment:

- Student’s Academic Achievement in the previous year
- Student’s Academic Achievement over an extended period of time
- Graduate’s interest in undertaking Postgraduate Studies at Victoria University
- Participant’s capacity to complete a Research Project within a defined period of time, with quality outcomes.
- Participant’s potential to complete a paper for publication as a result of the scholarship being offered.

RECIPIENTS OF THE 2010 UNDERGRADUATE/GRADUATE RESEARCH SCHOLARSHIP:

**Jay Aguila**  
Bachelor of Science — Nutritional Therapy  
The regulation of nutrient utilization and energy expenditure in muscle tissue.

**Hannah Britt**  
Bachelor of Science — Ecology and Sustainability  
An assessment of the sugar glider Petaurus breviceps population at Organ Pipes National Park, twenty years after introduction.

**Mary Cowling**  
Bachelor of Science — Ecology and Sustainability  
Population genetics in Black Swans

**Ben Coyne**  
Bachelor of Science — Computer Science  
Real-time interface software for the IntelliRain System for maximising the utilisation of harvested rainfall

**Jessica Danaher**  
Bachelor of Science — Nutritional Therapy  
The effect of caffeine and sodium bicarbonate co-ingestion on performance and substrate metabolism during high-intensity intermittent exercise in health adults.

**Renee Flack**  
Bachelor of Science — Ecology and Sustainability  
Can leaf-margin characters of Victorian collected specimens from the temperate-evergreen tree Acacia melanoxylan (R.Br.,Mimosaceae) be employed as a proxy atmospheric carbon dioxide [CO2] indicator?

**Adam Hull**  
Bachelor of Engineering — Civil  
An investigation into water desalination methods for different uses and their application to different water types.

**Justine Mizen**  
Western Health — Registered Nurse  
The development of an on-line education package to increase uptake of bedside handover

**Kristina Nelson**  
Bachelor of Science — Nutritional Therapy  
The effect of Lepidium meyenii, Spirulina platensis and Olea europaea on human breast cancer cell line, MCF — 7

**Edirimuni Soyza**  
Bachelor of Engineering — Civil  
Investigation of cement composites with sawmill residues as light weight building material

**Jennifer Tanner**  
Bachelor of Science — Medical forensic and analytical  
Computational Characteristic Analysis and Comparison of the Antioxidants in Green Tea

**Cara Timpani**  
Bachelor of Science — Biomedical Science  
Assessment of mitochondria structure and function in the mdx mouse model of duchenne Muscular Dystrophy and the Zucker rat model of Type II Diabetes

**Mallory van Moorst**  
Bachelor of Science — Biomedical Science  
Establishing a tumour cell-endothelial cell co-culture assay

**Charlie Varjabedian**  
Bachelor of Science — Specialisation  
Exploration of a thermodynamic method to quantitatively determine the surface “roughness” of synthetic membranes

**Jonathan Wilson**  
Bachelor of Science — Ecology and Sustainability  
Preliminary investigation into a rapid assessment tool for determining ploidy level in the genus Cymbidium

**Briannyn Woods**  
Bachelor of Science — Biomedical Science  
Assessment of mitochondria structure and function in the mdx mouse model of duchenne Muscular Dystrophy and the Zucker rat model of Type II Diabetes
CONFERENCES IN 2010
ACMSM 21 Melbourne, 7–10 December 2010

“Incorporating Sustainable Practice in Mechanics of Structures and Materials”

Victoria University Conference Centre, City Campus, 7–10 December 2010.

The conference theme was: “Incorporating Sustainable Practice in Mechanics of Structures and Materials” which is appropriately aligned within one of Victoria University research areas of strength of Sustainable Environmental Technologies.

ACMSM21 was organised by members of the emerging Structural Mechanics Group at Victoria University, and ably supported by the School of Engineering and Science and Faculty of Health, Engineering and Science. The local organising committee was headed by conference co-chairs Associate Professor Sam Fragomeni and Dr Srikanth Venkatesan. Apart from main representation from Victoria University, the steering committee also comprised of representatives from The University of Melbourne, RMIT University, Swinburne University of Technology and Monash University.

The first ACMSM conference was held in 1967 at the University of New South Wales and since then another 20 of such biennial conferences have been hosted by various universities across Australia and New Zealand. ACMSM conferences provide the forum for academics, researchers and practitioners to discuss and review latest developments in the broad area of structural mechanics and materials. These conferences place strong emphasis on participations from research students. ACMSM21 provided this established forum with resounding success.

Over 150 delegates from the various universities around Australia and New Zealand, with additional representation from a further 15 countries ensured that the papers presented generated the desired discussions and information exchange that would encourage significant future collaboration between the participating universities and organisations. The Invited Keynote presentations delivered by Professor Richard Liew Jat Yuen (National University of Singapore), Professor Ian Gilbert (University of New South Wales), Professor Mike Xie (RMIT University), Dr Gerard Van Erp (Queensland) and Mr Peter Bowtell (Arup) were a highlight focusing on sustainable practice guidance in the areas of steel structures, concrete structures, structural optimisation, fibre composite materials, and contemporary multipurpose stadium design. These papers complimented the other 147 session papers on various topics in the broad structural mechanics and materials area.

Victoria University had significant representation by Executive Management. The audience was welcomed at the pre-conference conference function by Professor Richard Thorn and officially by Professor Chris Perera at the opening ceremony the following morning. The Gala Dinner held at the MCG had both Professor Linda Rosenman and Professor Michelle Towstoless as key speakers. Guest dinner speaker Professor Yew-Chaye Loo (Griffith University) gave a very humorous and thoughtful historical account of past conferences in the ACMSM series.

The conference was highly successful and created excellent exposure for Victoria University particularly to the international structural mechanics and materials community.
8TH ASIA-OCEANIA SYMPOSIUM ON FIRE SCIENCE AND TECHNOLOGY

Melbourne, 7–9 December 2010

The 8th Asia-Oceania Symposium on Fire Science and Technology (AOSFST) was held in Melbourne, Australia in December 2010 organised by Victoria University’s Centre for Environmental Safety and Risk Engineering (CESARE).

This symposium was held under the auspices of the International Association for Fire Safety Science (IAFSS) and is held every three years. The conference brings together expert practitioners, scholars and students in the broad area of fire safety science and engineering such as the spread of smoke, the response of structure to fires, combustion, human behaviour in fires and so on.

PAPERS

Papers on any aspect of fire science and technology were presented at the symposium. Full papers were published with at least two independent peer reviews. Papers accepted for presentation were delivered by an author at the conference. This prestigious international conference was being hosted by Victoria University under the Chairmanship of Professor Ian Thomas of CESARE.

All accepted and presented papers included in the symposium proceedings were electronically published by IAFSS.

AUSTRALIAN CONFERENCE ON OPTICAL FIBRE TECHNOLOGY

Australian Institute of Physics Congress co-located with the 35th Australian Conference on Optical Fibre Technology, Melbourne, 5-9 December 2010.

VU was the name-badge sponsor of this conference held in Melbourne’s stunning new Melbourne Convention and Exhibition Centre, and attracted 800 delegates.

The conference marked the 50th anniversary of the laser through the ‘Laserfest’ session “Lasers in Australia: Technology, Applications and Future Directions”, along with two internationally prominent plenary speakers: Professor Margaret Murnane, University of Colorado, an expert on ultrafast laser science who spoke about “Attosecond light and science at the timescale of the electron”; and Professor David Payne, University of Southampton, one of the pioneers of the optical fibre laser and the erbium-doped fibre amplifier (EDFA) who spoke about “High Power Fibre Lasers: The EDFA on Steroids”.

First held in 1977, the annual Australian Conference on Optical Fibre Technology (ACOFT) is the second oldest conference series in the world in this topic area and in 2010 Stephen Collins (Director, CTME) was the ACOFT Chair. This was a good opportunity for the latest optical fibre research from CTME to be presented by students Harpreet Bal and Huy Nguyen and staff Associate Professor Stephen Collins, Dr Nicoleta Dragomir and Dr Fotios Sidiroglou.

Co-location with the 19th Australian Institute of Physics Congress allowed attendees to sample research progress in many other areas such as gravitational waves, climate, cosmology, condensed matter theory, quantum information science and developments at CERN. Another CTME staff member, Ajay Tikka presented his work in a biophysics and biomedical physics session.