

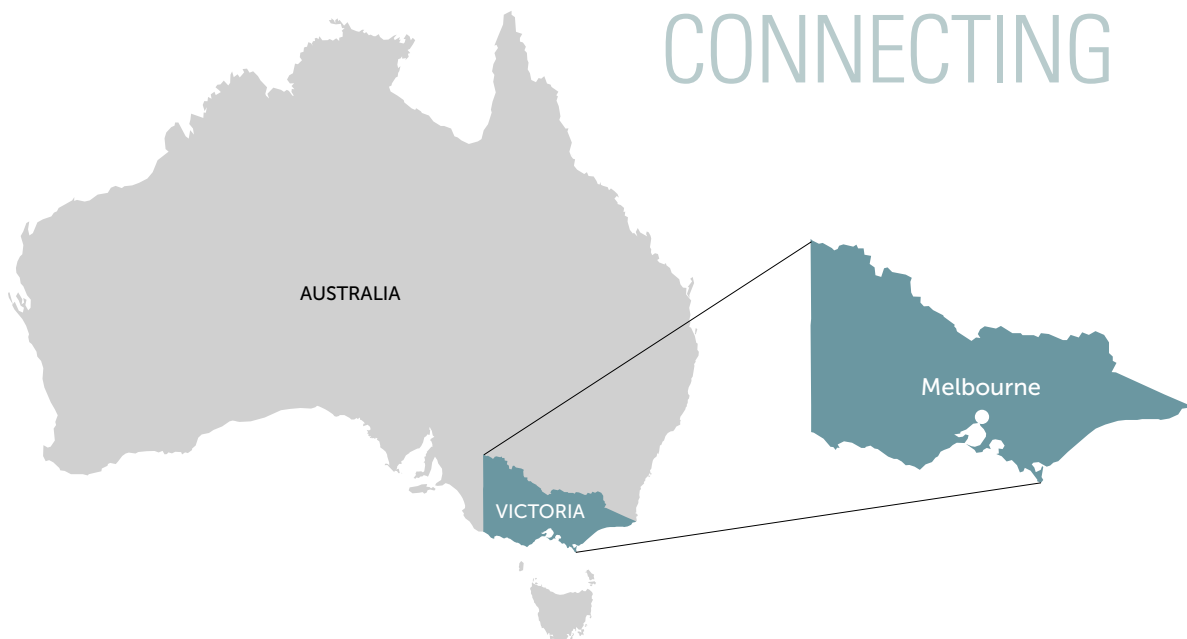
MELBOURNE

RESEARCH, EDUCATION AND TRAINING

ICT



MELBOURNE: LEADING INNOVATING CONNECTING





Melbourne and regional Victoria are a perfect blend of economic strength and dynamism, with a lifestyle that is envied around the world. Talented people, a world-class education system, supportive government and superior infrastructure make the state of Victoria a global leader in research, education and vocational training.

Victoria's research centres, universities and vocational training providers partner with industry, governments, non-government organisations (NGOs) and other educational institutions around the world.

They offer extensive opportunities for partnerships and program collaborations, including joint research initiatives, research and development services, licensing of materials, tailored curriculum development, joint program delivery, staff/student exchange, consultancy services and customised employee development programs.

For more information about Victoria's research, higher education and vocational training capabilities, contact your region's Victorian Government Business Office at: **invest.vic.gov.au/offices**.



INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) IN MELBOURNE

Melbourne, the capital of Victoria, is Australia's economic powerhouse and the national hub of information and communications technology.

Melbourne and regional Victoria offer world-class talent, state-of-the-art research and development (R&D) infrastructure, an innovative technology ecosystem, strong business opportunities, a robust economy, and a cost-competitive business environment.

Victoria's ICT industry is made up of over 8,000 companies, including 11 of the top 20 Australian technology companies, generating around A\$33 billion in revenue. Many international companies are located in Victoria including; IBM, Microsoft, HP, Motorola, NEC, Ericsson, EMC, Cisco, Intel, Thales, Fujitsu, Hitachi and Bosch.

Melbourne leads Australia's technology industry and accounts for 28 per cent of national revenue. It also has a robust export trade, with companies headquartered in Melbourne generating annual revenues of A\$2.23 billion from their overseas operations and export of technology equipment and services.

Melbourne is also the operations centre of Australia's National Broadband Network (NBN), the national high-speed broadband network currently under construction. Melbourne plays host to the NBN's National Operations Centre, Test Facility and Data Centres. Melbourne is also home to the Institute for a Broadband Enabled Society (IBES) which conducts world leading research into high-speed broadband technologies. IBES is based at the University of Melbourne, Australia's top ranked University.

Victoria's ICT industry is firmly supported by the Victorian Technology Plan for the Future, an A\$85 million Victorian Government plan to support growth, development, global competitiveness and innovation in Victoria's ICT sector.

A critical component of Melbourne's technology industry is its significant skills base. More than 145,000 people work in technology roles, which is around 31 per cent of Australia's total. Melbourne leads Australia in technology and engineering skills, accounting for more than 34 per cent of the nation's technology and engineering graduates and 38 per cent of technology and engineering masters and PhD students.

ICT RESEARCH

Melbourne has one of the largest ICT R&D clusters in the Southern Hemisphere, producing world-leading, commercially focused research. It has become known as the 'hatching' capital of Australia because of its strong R&D base, supportive start-up business environments and numerous cooperative working spaces around the city.

Research institutes include:

- **National ICT Australia (NICTA)** is Australia's ICT Research Centre of Excellence and the nation's largest organisation dedicated to ICT research. Located at the University of Melbourne, its Victoria Research Laboratory (VRL) undertakes important research in areas including Optimisation & Constraint Programming, Bioinformatics & Computational Genomics, Control & Signal Processing for large-scale system control, Text & Database Mining, Optical Networks, Micro/Nano-electronics, and Control & Signal Processing for imaging. The VRL's bioelectronics laboratory will play a lead role in the development of an advanced bionic eye.
- **IBM's Global R&D Laboratory** is one of 12 such laboratories established globally. The Laboratory's focus is on applying advanced computing to work towards better management of natural resources, diseases, and agricultural yields.
- The **Microsoft Centre for Social Natural User Interface Research** is an A\$8 million collaboration between Microsoft, the University of Melbourne and the Victorian Government; investigating aspects of Natural User Interface (NUI) technologies that combine voice, gesture recognition, eye gaze, body movements and touch.
- The **Centre for Technology Infusion** is based at La Trobe University and focuses on product realisation through the integration of complementary research expertise in Micro/Nanotechnologies, and Information and Communication Technologies.
- The **Centre for Advanced Internet Activities (CAIA)** at Swinburne University focuses research on broadband Internet Protocol (IP) architectures, IP Network Resilience and Security, Mobile and Vehicular Networking, and Energy Efficient Networking and Transformative Challenges of Information Systems.
- Victoria University's **Centre for Applied Informatics (CAI)** is a research group with an international reputation in the areas of Data Management, Web-service, Web/Data mining and E-Research, with applications in health care, environment studies, business process and legal information management.

- The **Victorian Life Sciences Computation Initiative (VLSCI)** is a A\$100 million high-performance computation facility enabling scientists to improve diagnostics, drug targets, treatments of cancer, genetic disorders and infectious diseases. This is the largest supercomputer facility devoted to the life sciences in the world.
- The **Centre for Energy Efficient Telecommunications**, one of the largest research efforts on green telecommunications in the world, is a partnership between Bell Labs (Alcatel Lucent), and the University of Melbourne.
- The **Cooperative Research Centre for Spatial Information (CRCSI)** is focused on spatial information applications, and is actively involved in IP Generation and broad sector spatial solutions.

INFRASTRUCTURE

Victoria has excellent high-speed broadband and wireless networks, secure data centres, intercontinental connectivity, university and corporate research labs, test beds and education facilities.

SKILLS AND TRAINING

Every year, Victoria's world-class universities educate a steady supply of ICT professionals, on a scale consistent with the United States and European development centres.

There are nearly 18,000 students in ICT university courses in Victoria – the highest number in Australia. An additional 9,300 students are enrolled in other IT-related post-secondary courses.

The high quality, high productivity and low attrition rates synonymous with Victoria's ICT workforce has led several international and local software companies to return their previously outsourced high-tech R&D teams to Victoria.

Victoria's vocational training institutes have designed and delivered vocational ICT training programs for a range of government and institutional partners in countries around the world, including Vietnam, Malaysia, Kuwait and China.

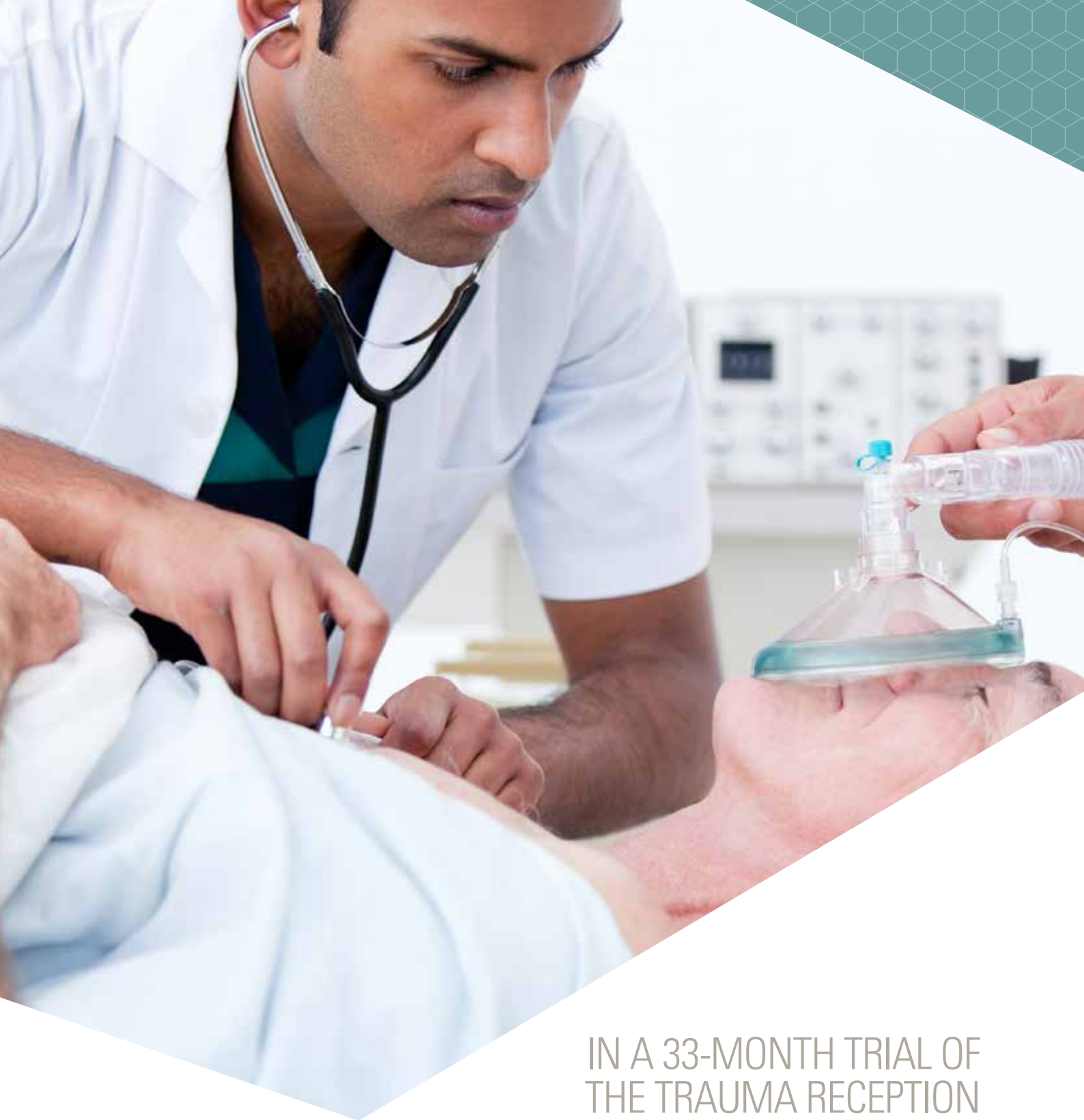
VICTORIA'S CLUSTERS OF EXCELLENCE

In order to encourage greater collaboration and innovation, the Victorian Government fosters the development of networks and clusters in next generation technologies.

Clusters include:

- Digital Games
- e-Health
- e-Learning
- Intelligent Transport Systems
- Open Source
- Spatial Victoria
- Women in ICT.





IN A 33-MONTH TRIAL OF
THE TRAUMA RECEPTION
AND RESUSCITATION
SYSTEM, THE SUPPORT
TOOL **REDUCED THE
NUMBER OF ERRORS
MADE BY EMERGENCY
STAFF BY 21 PER CENT.**

CASE STUDY



CRITICAL DECISIONS

Military personnel and rural communities may soon benefit from a trauma management system already helping to reduce medical errors at Melbourne's Alfred Hospital.

In a busy hospital trauma ward, victims of horrific accidents can be rushed through the doors at any time of the day or night with only minutes to spare. Emergency staff must make a decision every 72 seconds. Making the wrong decision – or not making the right one – could mean a patient dies.

This complex decision-making is being aided by a world-first computer system at Melbourne's Alfred Hospital created by software engineers at Swinburne University of Technology. In a 33-month trial of the Trauma Reception and Resuscitation System, the support tool reduced the number of errors made by emergency staff by 21 per cent, beating the five per cent reduction hoped for by Swinburne's software engineers.

The decision-support system works by feeding a patient's vital signs into a series of algorithms. For instance, a trauma victim's blood pressure could be dropping dramatically or their pulse could be soaring, indicating a possible haemorrhage. The system highlights the patient's status and suggests possible interventions.

Since 2006, Kon Mouzakis, head of the Swinburne Research and Development Software Group, and his team have worked closely with the Alfred to design and test the A\$1.8 million system. The program was the brainchild of Associate Professor Mark Fitzgerald, director of the Alfred Trauma Centre.

Professor Fitzgerald was acutely aware of how easy it is for medical staff, no matter how experienced, to make mistakes. Evidence from around the world shows that most preventable adverse outcomes, as well as about half of the lawsuits brought against emergency staff, arise from delayed or missed diagnoses.

When a patient arrives, their vital signs are monitored by standard hospital equipment. The system acts as an overlay, drawing the data together and running it through proven algorithms with results displayed on large 40-inch monitors in each trauma bay.

"At any point in time, the head clinician can quickly get a snapshot of what is going on," says Mouzakis.

Mouzakis sees a big future for the Trauma Reception and Resuscitation System. He says it could have applications across ambulance services, other hospitals and even the military.

Swinburne and the Alfred are already working with mobile device company Athena GTX and the University of Maryland on a military adaptation. "We're looking at making changes to the software that would allow it to be used in the field or for a first responder to soldiers critically injured in battle," Mouzakis says.

The trauma system could also lead to better survival rates for patients in regional areas. Many rural trauma patients need to be transported to major hospitals such as the Alfred, eating up critical time that they could be in trauma treatment. Rolling the system out into regional hospitals could aid doctors who are not emergency specialists to support patients and that time saved could make the difference between life and death.

CASE STUDY



TEACHER PROFESSIONAL LEARNING IN VIRTUAL ENVIRONMENTS

Researchers are exploring the feasibility of using a virtual environment to enable teachers in isolated areas to access professional learning.

Researchers at the University of Melbourne are designing, developing and trialling a proof-of-concept virtual environment as a new model of delivery of professional learning for teachers. The research team is creating a virtual environment where participants can observe and explore teacher and student thinking, through observation of a classroom containing scripted interactions between teacher and student avatars.

THE VIRTUAL ENVIRONMENT PROVIDES PREVIOUSLY UNAVAILABLE OPPORTUNITIES FOR PARTICIPANTS TO BE IMMERSED IN A RANGE OF CLASSROOM SITUATIONS.

The interdisciplinary research project is a collaboration between the University of Melbourne's Graduate School of Education, Department of Computing and Information Systems and Institute for a Broadband-Enabled Society.

Many teachers are currently unable to access professional learning due to distance from metropolitan areas and difficulty of release from classes at appropriate times. High-speed broadband provides the opportunity to rethink approaches for professional learning of teachers, increasing access to educational services for teachers, especially for those living in remote, rural and outer suburban areas.

The proof-of-concept virtual environment uses innovative features to deepen participants' understanding of issues associated with the teaching and learning of a particular topic, in this case mathematics. In the virtual environment, participants can view an individual student's work; hear the 'thinking' of a particular student to provide insight into their understanding; listen to a justification from the teacher for their choices; complete tasks to demonstrate understanding of student thinking; and ask an expert for more information.

The research will determine the effectiveness of the virtual environment for professional learning of teachers, including the ability to highlight pedagogical issues involved in teaching mathematics and the appeal of the environment for participants. The virtual environment incorporates extensive, well-researched resources to support effective teaching and provides previously unavailable opportunities for participants to be immersed in a range of classroom situations.

The technology has the capacity to support topics across a wide range of subject areas for both pre-service and in-service teachers, and to enable in-school and at-home professional learning.

For more information: broadband.unimelb.edu.au

MELBOURNE: IBM'S CHOICE FOR RESEARCH AND DEVELOPMENT

Opened in 2011, IBM's first research and development laboratory in Melbourne is a A\$100 million investment to progress towards a smarter planet.

The new laboratory will apply advanced computing to work towards better management of natural resources, diseases and agricultural yields. Set to employ some 150 people within five years, IBM has already commenced assembling a world-class team of research scientists. A number of research projects are underway with key partners, including the University of Melbourne.

Melbourne was chosen as the location for this innovative facility because of its access to world-class research institutions, strong pipeline of talented professionals and a stable and transparent regulatory environment. These factors make Melbourne one of the leading research and development environments in the world, a status strengthened recently by the introduction of the Australian Research and Development Tax Incentive which provides for up to a 45 per cent tax credit for eligible spending.

IBM Research Australia will focus on three key areas including:

- **Smarter Natural Resource Management:** the focus will be to innovate in a number of key areas related to resource discovery, production, supply chain and operations using the most advanced techniques in monitoring, analytics and automation. These techniques will be applied to resources such as oil and gas, minerals, water and food, and considered in various contexts including sourcing, management and use, and particularly their role in liveable cities.
- **Smarter Natural Disaster Management:** the focus will be to work on a number of projects that expand and integrate current expertise in areas such as real-time event (stream) processing, weather modelling, traffic management and mobility analytics to assist in the planning and management of evacuation, communication and emergency response.
- **Smarter Healthcare and Life Sciences:** the focus will be on the translation of life sciences research into clinical applications. Work has been underway since February 2010 through the IBM Research Collaboratory in Life Sciences – Melbourne in a number of areas including neuroscience, protein science and structural biology.

Dr. John E. Kelly III, IBM Senior Vice President and Director of IBM Research said, "The lab will work with Australia's top scientists and engineers from academia, government and industry to extend IBM's global R&D footprint and increase its impact on our clients and make the world work better. We look forward to working with the Australian technical and scientific community on some of the most pressing problems and greatest opportunities of our time."



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CASE STUDY

CASE STUDY



DEVELOPING INTELLIGENT TRANSPORT SYSTEMS

EXPECTED OUTCOMES INCLUDE **IMPROVED TRAFFIC FLOW FOR COMMUTERS, FEWER ROAD ACCIDENTS AND REDUCTIONS IN FUEL CONSUMPTION AND CARBON EMISSIONS.**

La Trobe University is collaborating with leading multinational company, HCL Technologies, on research and development of Intelligent Transport Systems.

La Trobe University's Centre for Technology Infusion is working in partnership with HCL Technologies (headquartered in India) to develop and commercialise intelligent transport systems that let vehicles 'talk' with other vehicles and transport infrastructure, with the potential to address traffic management problems, enhance driver safety and provide logistics support for transport operations.

Population increases globally have put considerable strain on transport infrastructure and transport management resulting in large social, environmental and economic costs. The Centre for Technology Infusion is developing innovative solutions for multi-modal Cooperative Intelligent Transport Systems that can improve drivers' commutes, provide better information to city planners, increase the productivity of businesses, raise citizens' quality of life, reduce congestion, shrink fuel use and cut carbon emissions.

The project with HCL Technologies will follow on from a system trialled by Professor Jugdett (Jack) Singh and his colleagues at the Centre for Technology Infusion aimed at reducing accidents at rail level crossings. Based on GPS and mobile-phone style dedicated short-range technology, it enables cars to receive warnings of approaching trains. Part of a A\$5.5 million rail safety crossing project, the trial of the technology in Victoria involved 100 vehicles fitted with special wireless communication systems.

HCL Technologies will also provide opportunities for students to undertake internships on community and government ICT projects. The company will recruit graduates from La Trobe who, after completion of training, will be allocated to projects in Victoria, or at other HCL locations globally.

MELBOURNE BECOMES HOME TO NEW HI-TECH RESEARCH CENTRE

The Microsoft Centre for Social Natural User Interface Research at the University of Melbourne, is an A\$8 million collaboration over three years between the founding partners, Microsoft, the University of Melbourne and the State Government of Victoria.

Opened in December 2013, the Microsoft Centre for Social Natural User Interface will be a focal point for researchers to undertake ground-breaking research on the social uses and applications of new Natural User Interface (NUI) technologies so that they are natural, intuitive and strengthen human relationships. Aspects of NUI technologies that combine voice, gesture recognition, eye gaze, body movements and touch are found in smartphones, tablets and devices like Xbox Kinect.

Microsoft said a partnership approach for the Centre was ideal given the University of Melbourne's status as a world-class institution with a well established reputation in IT research, and with the Victorian Government's commitment to innovation and attracting high quality IT research to the State.

"This is a world-class research centre, located at a world-class university in a forward thinking State," said Tony Hey, Vice President, Microsoft Research.

"Microsoft is passionate about creating amazing devices and services that can help people reach their full potential and I am confident the Centre will open the floodgates to innovative social uses of NUI. The potential for social NUI will only be limited by our imagination," he said.

Professor James McCluskey, Deputy Vice-Chancellor (Research) at the University of Melbourne, said that the University was proud to be a founding partner of the Centre and to be able to contribute to the development of new research discoveries in this state-of-the-art field.

Research at the Centre will explore how NUI technologies can enable new forms of social and collaborative behaviours, including how people communicate, play, learn and work together in different settings – in the home, the workplace, in education, health and public spaces.

Academics and PhD students in the Centre will undertake research alongside some of the leading Social NUI researchers in the world, and will have the opportunity to spend time at Microsoft's research centres in Cambridge (United Kingdom), Beijing and Richmond (United States).

In addition to its 28 dedicated positions, the Centre will also welcome researchers with an interest in social NUI from across the Asia-Pacific region and around the world.

"This Centre will foster Australian researchers to work closely with world-leading software company Microsoft to collaborate on new and exciting technologies that will ultimately change our lives," Professor McCluskey said.

The partners expect the Centre to play an important role in Microsoft's broader research and development efforts.

"THIS IS A WORLD-
CLASS RESEARCH
CENTRE, LOCATED
AT A WORLD-CLASS
UNIVERSITY IN A
FORWARD THINKING
STATE," SAID TONY HEY,
VICE PRESIDENT,
MICROSOFT RESEARCH.



CASE STUDY

CAPABILITY STATEMENTS







Key areas of expertise

- Java Programming
- Web Design
- Systems Analysis

Research/program delivery capabilities

Academia International offers a Certificate IV and Diploma in Information Technology.

The Institute's curriculum is developed with job-ready practicality in mind and is taught by industry-experienced staff. Students use the latest industry tools and undertake applied project work that connects them with industry wherever possible. Relationships with key employers ensures that students attain real-world experience to complement their classroom learning.

Students completing the Diploma of Information Technology can articulate directly into the second year at a number of higher education providers including, but not limited to, Australian Catholic University, Central Queensland University, Charles Darwin University, Edith Cowan University, Federation University Australia and University of Wollongong.

Academia International has recently established a sister school relationship with Kyungnam College of Information and Technology in South Korea.

ACADEMIA INTERNATIONAL

Academia International won the Excellence in International Education: Private Education and Training award at the Victorian International Education Awards 2013 and was the Australian Council for Private Education and Training (ACPET) International Provider of the Year in 2012 and 2013.

It is recognised for delivering training in skill shortage areas across the hospitality, personal care, community services, business and commerce, information technology and digital arts sectors.

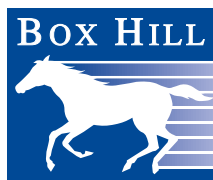
Academia International's English school is a full member of English Australia. Curriculum is developed with an industry and job-ready practicality in mind, utilising the latest industry tools and applications, with project work enabling the student to connect with industry wherever possible.

Key contact

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academia21.com



INSTITUTE

Global Educators

Melbourne - Australia

Key areas of expertise

- Virtualisation/Cloud Computing (VMware, Citrix, EMC, NetApps)
- Networking (Cisco)
- Operating Systems and Applications (Microsoft and Apple)
- Library and Information Services
- Network Security
- Telecommunications/National Broadband Network (NBN)
- Game Design and Development

Research/program delivery capabilities

In 2007 Box Hill Institute was appointed the Victorian ICT Specialist Centre by the Victorian Government in recognition of its training leadership within the ICT industry. In this role Box Hill Institute has led the development of training in such areas as Virtualisation/Cloud Computing, ICT Governance, Network Security, and Library and Information Services across the vocational education and training sector. Box Hill Institute works with industry partners to develop programs tailored to meet Victorian industry skills needs, and has recently worked with the emerging sectors of e-security and building management to develop training solutions to support the growth of these important sectors.

More recently Box Hill Institute has worked with the library industry to develop a range of short courses to meet emerging skill set demand. The most popular course is delivering Resource Description and Access (RDA) skills to library workers across the information industry sector. These skills are critical to ensure library services conform to national and international information standards.

BOX HILL INSTITUTE

Box Hill Institute is well regarded for its ICT industry-based training programs and the integration of industry certification training in its diploma and degree courses. Box Hill Institute recently became the first Australian VMware Academy and is the leader of virtualisation training in Victoria.

Box Hill Institute is also a Citrix, EMC and NetApps Academy providing the Institute with the capability to deliver training across all areas of virtualisation and cloud computing. These academies add to Box Hill Institute's already impressive list, including Cisco, Microsoft, Apple, and Oracle academies.

The Centre for ICT also delivers a strong program in Library and Information Studies, endorsed through the Australian Library Industry Association (ALIA). The Centre also offers on and off-campus (distance) programs, optical fibre and telecommunications industry training, and digital games courses focusing on animation, design and development.

Box Hill Institute has developed a strong capability around animation and games development, delivering programs at Certificate III and Certificate IV level, providing strong skill sets for those wanting to enter a career in games development or the many branch careers these skills support, such as gamification, web development and industrial design.

Box Hill Institute works with a wide range of industries that are strong users of ICT. The Institute develops short and long courses aimed at meeting key industry skills needs. Box Hill Institute is a registered NBN co-training provider and has developed several courses to support the NBN rollout in Victoria. It also provides specialised network training to the broadcast industry, supporting the transition to unified communications and the digitalisation of their services. Clients include Australian television networks ABC, Channel Seven, Network Ten and Channel Nine.

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Key areas of expertise

- Network Security, Distributed Systems and Clouds
- Information Security and Forensics
- Signal Processing, Computational Intelligence and Pattern Analysis
- Enabling Education
- Business aspects of information systems
- Social Informatics

Research/program delivery capabilities

The School of Information Technology undertakes teaching and research in the areas of IT security, computer science and software development, games design and development, network computing, mobile and applications development and information technology services. Strong relationships with industry provide students with opportunities for work experience, aligning curriculum with industry needs and developing collaborative research. The school hosts a Faculty Research Cluster on Big Data, and research laboratories for:

- Network Security and Computing
- Securing Cyberspace
- Service and Cloud Computing
- Information Processing and Computational Intelligence
- Information Technology for Future Education
- Parallel and Distributed Computing.

deakin.edu.au/sebe/it

DEAKIN UNIVERSITY

Deakin University is one of Australia's largest and fastest growing universities providing learning, teaching and research opportunities across multiple campuses and innovative use of online technology through Cloud Deakin. World university rankings evidence Deakin's well established reputation for excellent teaching, innovative course delivery, high level student satisfaction and world-class research aligned to industry and community needs.

Teaching and research in ICT is delivered through two Schools, related research clusters and a Strategic Research Centre: the Pattern Recognition and Data Analytics Research Centre (PRaDA). Extensive collaborations with industry ensure research and teaching is allied with industry requirements.

Deakin University offers relevant courses at both undergraduate and postgraduate levels including PhDs.

The Pattern Recognition and Data Analytics Research Centre (PRaDA), focuses on discovery of patterns in large-scale data. This research has driven the start-up iCetana's innovative anomaly detection software and the TOBY Playpad, a uniquely adaptive early intervention program for children with autism.

deakin.edu.au/research/src/prada

The School of Information Systems and Business Analytics undertakes research and teaching focused on how organisations can use information to improve their strategic and operational performance, and how society can better utilise information networks and technologies to enhance quality of life and community aspirations. A vibrant industry partnership program ensures academic programs are current and relevant. In addition to hosting the IBM Centre of Excellence in Business Analytics, the School hosts research clusters in:

- Enabling Education
- Business aspects of information systems
- Social Informatics.

deakin.edu.au/buslaw/information-business-analytics

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deakin.edu.au



Key areas of expertise

- Computing and Information Technology
- Networking
- Software Development
- Programming

Research/program delivery capabilities

Holmesglen is highly experienced in the provision of consultancy services, professional development and industry projects. Consultancy services include:

- Training needs analysis
- Teacher training
- Professional development for staff and managers
- Curriculum development
- Instructional design – face-to-face, blended and online delivery, work integrated learning
- Advice on facilities and equipment
- Quality assurance services
- Management of scholarship/fellowship programs
- Study tours
- English language training and support.

HOLMESGLEN INSTITUTE

Holmesglen is a leader in vocational and higher education and one of the largest providers of technical and vocational education and training in Victoria. Holmesglen delivers over 600 courses to nearly 50,000 students.

Holmesglen has a strong international profile with an extensive global reach built up from over 20 years' experience in the Asia-Pacific, Gulf States and Middle East regions.

Holmesglen's international activities range from working with industry clients, government and aid agencies to build the capacity of institutions, systems and staff in the private and public sectors, to collaborative partnerships with educational institutions in the delivery of award programs.

The Institute has a strong quality assurance framework in place so that clients can be assured of high quality outcomes.

As a public sector organisation, Holmesglen has extensive experience in operating within complex legal and regulatory environments and has developed the necessary systems (both IT and administrative) to ensure that these contracts are monitored within the required legal framework set out by the relevant authority.

Holmesglen's strong commitment to due diligence, quality assurance and risk management has ensured the sustainability of its partnerships and projects in countries where complex political, cultural and bureaucratic arrangements can provide many challenges.

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LA TROBE
UNIVERSITY • AUSTRALIA

Key areas of expertise

- Wired and Wireless Communications
- Bioinformatics and Biometric Security
- Computational Intelligence and Multimedia Technologies
- Databases and Information Systems
- Pervasive Computing and Network
- Software Engineering
- Biomedical Engineering
- Communications
- Mechatronics and Robotics
- Semiconductor Materials
- Signal Processing Algorithms

Research/program delivery capabilities

The Department of Computer Science and Computer Engineering has five main research strengths: Bioinformatics and Biocomputing, Computational Intelligence and Multimedia Technologies, Databases and Information Systems, Pervasive Computing and Networking, and Software Engineering. The Department collaborates with a range of research institutions and industries, both in Australia and globally. The Department participates in a number of collaborative research projects with government and industry partners.

latrobe.edu.au/computer-science-and-computer-engineering/research

LA TROBE UNIVERSITY

La Trobe University's Department of Computer Science and Computer Engineering focuses its research on pursuing developments and innovations in computer science and computer engineering for the decade to come. La Trobe University is committed to pure and applied research. Its strong industry-based research collaborations have resulted in successful partnerships, and have attracted support from business and external funding agencies.

The Department of Electronic Engineering operates closely with industry and continues to attract project/research collaboration from Australian and internationally recognised universities, companies and research facilities. The Department also operates the three high frequency radars (TIGER), which form part of an international network called Super Dual Auroral Radar Network (SuperDARN).

A visualisation lab with state-of-the-art visualisation technology for displaying scientific data and augmented reality is currently being built. The Department is also working very closely with large ICT corporations such as Microsoft and IBM to deliver the most relevant and up-to-date technologies.

The Department of Electronic Engineering has five research specialisations: Biomedical Engineering, Communications, Mechatronics and Robotics, Semiconductor Materials, and Signal Processing Algorithms (SPA). It also operates three high frequency radars (TIGER) as part of an international network. Each specialisation has various research interests and several high-calibre and industry-respected researchers.

latrobe.edu.au/electronic-engineering/research/specialisations

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latrobe.edu.au



MONASH
University

Key areas of expertise

- Intelligent Systems
- Distributed Systems and Software Engineering
- Organisational and Social Informatics
- Optimisation in Travel, Transport and Logistics
- Multimedia Computing, Communications and Applications
- Computer Vision and 3D Computer Modelling
- Grid and Cloud Computing
- Data Mining and Data Analytics
- Remote Access Monitoring
- Simulation of Complex Systems

Research/program delivery capabilities

Monash University's Faculty of Information Technology (FIT) has four flagship areas that reflect its research strengths and offer exciting opportunities at the interface between disciplines:

- Computational Biology addresses major challenges in Life Science and Medicine: from unravelling the structure and function of complex molecules to understanding the impact of climate change on the ecology.
- Data Science applies machine learning and other data mining techniques to extract knowledge from large complex data sets and inform decision-making.
- Modelling, Optimisation and Visualisation research helps decision makers to make better, more informed decisions to improve the quality and efficiency of their services.
- IT for Resilient Communities investigates ways to develop strong, healthy communities and cultures, and promote and support social inclusion.

MONASH UNIVERSITY

Monash University has become the largest university in Australia, renowned for its outstanding teaching, transformative research, international reach and extensive alumni network. Monash is a global university possessing the ambition and ability to address momentous global challenges. Monash University has campuses in Australia, Malaysia and South Africa and major partnerships with universities in China, India and the UK.

Recently published academic rankings showed Monash's Faculty of Information Technology (FIT) to be the leading Australian institution for computer science. It is ranked in the top 50 in the QS world ranking for computer science and information systems. Courses and research cover a broad range of ICT topics from the technical through to the social and art related.

Monash has world-class facilities that support these flagship research programs:

- In Immersive Analytics, Monash is pioneering new approaches to big data that allow users to interact with data via visualisation and other tools. The recently opened Computer Aided Virtual Environment (CAVE2) facility allows researchers to see and unlock complex data relationships in industries as diverse as financial services, mining and medicine.
- In partnership with NICTA, Australia's ICT Research Centre of Excellence, FIT has established an optimisation laboratory that leads the world in developing tools to solve difficult processes, including traffic congestion and document layout problems in electronic publishing.
- sensiLab is a radically new approach to foster cross-disciplinary research and innovation by harnessing emerging technologies in unconventional ways, for example, real-time prototyping using 3D printing to create new products from exotic materials.

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Key areas of expertise

- Software and Website Development
- Internetworking
- Business Analysis, Project Management
- Networking and Network Security
- Designing and building VoIP networks, planning and testing server-based security
- Building and creating dynamic websites
- Developing basic mobile applications using Android development system
- Developing IT business solutions

Research/program delivery capabilities

NMIT provides training to develop skills and knowledge in electrotechnology, multifaceted electronics, computer systems, information technology and communications. Courses include a number of industry certifications:

- IT Essentials
- CISCO CCNA 1 through to CISCO CCNA 4, CCNA Security
- Microsoft Technology Associate – Networking and Microsoft Technology Associate – Security.

Demand for professionals in the electrotechnology trades, telecommunications, data and voice communication, software and web development, business analysis and computer maintenance fields is growing.

NMIT's industry-experienced and trade-qualified teachers deliver training to ensure graduates reach their maximum potential in a realistic working environment using the latest industry technologies and methodologies.

NMIT has substantial experience in offering its information technology courses in China.

NMIT

NMIT has a range of ICT courses from lower level certificate through to Advanced Diploma and Bachelor of Information Technology. Courses have been designed to provide theoretical knowledge and high-level vocational skills in information technology and computer systems with a business and technical focus. Our Courses include a number of industry certifications such as IT Essentials, CISCO CCNA 1 through to CISCO CCNA 4, CCNA Security, Microsoft Technology Associate – Networking and Microsoft Technology Associate – Security.

nmit.edu.au/studyareas/information_technology

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Key areas of expertise

- Application Programming
- Business Applications
- Computational Mathematics
- Computer and Network Engineering
- Computer Science
- Database Systems
- Electronic and Communication Engineering
- Electrical and Electronic Engineering
- Embedded Systems
- Games Graphics and Digital Media
- Information and Knowledge Management
- Information Management
- Information Systems
- Information Technology
- Multimedia Systems
- Multimedia Design
- Network Computing
- Security
- Software Engineering
- System Administration
- Web Systems

Research/program delivery capabilities

RMIT is rated “above world standard” for research in Information Systems and in Artificial Intelligence and Image Processing (Australian Research Council), and is one of the top group of eight Australian universities for Computer Science and Information Systems (QS World University Rankings).

Research collaboration is extensive, covering national and global industry partners, state and federal governments, and Australian and international universities. Industry partners include Victoria Police, City of Melbourne, IBM, Microsoft and Fujitsu Xerox.

The School of Computer Science and Information Technology has internationally recognised strengths in both applied and theoretical research, and attracts leading academics in pursuit of a world-class research agenda.

RMIT UNIVERSITY

RMIT is a global university of technology and design with campuses in Australia and Vietnam, and international partners worldwide. At the forefront of computer science education since the early 1960s, RMIT pioneered some of Australia's first computing courses while forging a reputation for research excellence in ICT.

Research strengths are focused in four areas:

- Software engineering
- Distributed systems and networking
- Information storage, analysis and retrieval
- Intelligent systems.

Research is conducted in areas including:

- Bioinformatics
- Cloud computing
- Data mining
- Information retrieval
- Search engines.

The School of Business IT and Logistics has a strong record of achievement in PhD training with a current enrolment of 80 higher degree students. Research is focused on:

- Information Technology
- Information Management
- Information Systems and Logistics
- Supply Chain Management issues.

RMIT's Platform Technologies Research Institute brings together the best researchers from across RMIT's science and engineering areas to address large-scale trans-disciplinary research problems. The Institute encompasses a broad range of technology areas, from chemical, mathematical and physical sciences to computer science and engineering, nanotechnology, electrical, electronic, mechanical, aerospace engineering, and business IT and logistics.

The Institute's research programs are:

- Informatics and Networks
- Innovative Engineering Systems
- Nano Materials and Devices.

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Key areas of expertise

Swinburne focuses on outstanding ICT knowledge and research expertise in the following strategic areas:

Astrophysics and Supercomputing:

- Astronomy visualisation
- Big Bang cosmology
- Galaxy evolution
- Globular clusters
- Pulsars
- Star and planet formation
- Supermassive black holes.

Software Engineering:

- Cloud computing
- Databases
- Intelligent agents
- Software architecture
- Software services
- Software testing
- Visualisation.

Information Systems:

- Business analysis, business intelligence
- Business applications and value of social media and mobile technologies
- IS/IT governance, management, and enterprise architecture
- IT for social inclusion
- IT project management and IT implementation management.

ICT Education:

- Computer systems
- Digital media
- Information technology networking
- Information technology systems administration
- Software development
- Website development.

Analytical, simulation and empirical research expertise in data networking and telecommunications:

- Energy efficient networking/society
- Intelligent transport systems and mobility
- Seamlessly integrated broadband services.

SWINBURNE UNIVERSITY OF TECHNOLOGY

Swinburne is an internationally recognised research-intensive university. Its emphasis is on high-quality, engaged teaching and research in science, technology and innovation – teaching and research that makes a difference in the lives of individuals and contributes to national economic and social objectives.

In 2014 Swinburne University's new \$100 million Advanced Manufacturing and Design Centre opens. The centre will provide a purpose-built teaching and learning environment for engineering, design, business and information technology students.

In 2013, Swinburne was ranked in the top 200 in the field of computer science and info systems by the QS World University Rankings by Subject.

In the 'Excellence in Research for Australia 2012' national report, Swinburne was awarded an ERA 4 (above world standard) rating for its research in computer software.

Research/program delivery capabilities

Relevant research areas:

- **Centre for Advanced Internet Architectures (CAIA).** CAIA identifies, characterises and develops telecommunications solutions for a mobile and demanding internet user base. Research focuses on broadband internet protocol (IP) architectures, IP network resilience and security, mobile and vehicular networking, and energy efficient networking.
- **Centre for Astrophysics and Supercomputing (CAS).** CAS spans the entire electromagnetic spectrum covering computational, theoretical and observational astronomy. Since its establishment in 1998 CAS has run a supercomputing facility on behalf of Swinburne. The Swinburne supercomputers have proven to be excellent research tools in areas of astronomy ranging from simulations of structure formation in the universe to the processing of data collected from radio telescopes. They are also used by CAS staff to render content for

3D animations and are available for use by Swinburne researchers and their collaborators, as well as being available as a national facility for astronomy use.

- **Research into Information Systems in Organisations (RISO).** RISO conducts both high-impact applied research and fundamental research on the transformative effectiveness and benefits, and challenges and issues of information systems (IS) and emerging technologies on organisations and societies. Its research focuses on IS use, management and governance, IT-enabled enterprise and social interaction, implementing project-based IT innovation and organisational transformation.
- **Swinburne University Centre for Computing and Engineering Software Systems (SUCCESS).** The centre provides a supportive and vibrant research environment for computer science and software engineering research staff and students. Its principal focus is on software development.

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Key areas of expertise

- Information Technology
- Embedded Systems
- Distributed Software Systems
- Optical and Wireless Communications
- KnowledgeSystems
- Systems Engineering
- Information Security Management

Research/program delivery capabilities

The Melbourne School of Engineering is an international leader in Engineering and IT research. Its goal is research for the benefit of humanity. University of Melbourne is home to large scale research consortia such as Bionic Vision Australia. It also has close, ongoing partnerships with IBM, Bell Labs/ Alcatel Lucent and Ford and work at project level with many more private and public sector organisations in Australia and internationally.

Measured on research income, University of Melbourne is one of the largest engineering research institutions in Australia. It has a research staff of 288 with 490 graduate research students based in six major disciplines/departments and working across four interdisciplinary research themes.

The University of Melbourne has established an international reputation in Information and Communication Systems (ICS) with outstanding researchers and world-class facilities to support its research.

The ICS theme has nearly 200 PhD qualified researchers with a 'critical mass' that enables University of Melbourne to pursue large-scale research and development goals. For example, to address denial of service attacks on the internet which are being used by organised crime syndicates to blackmail online businesses, researchers have led a robust approach to defence that can filter this form of malicious traffic. They have devised a commercial solution and are undertaking ongoing work to cope with new types of attacks.

One leading area of research is wireless sensor network technology, which has been identified as one of the leading technologies that will shape and change our lives in the next decade. Researchers are developing the design tools of the next generation of wireless access networks and performing leading research in the areas of self-learning systems and handling enormous volumes of information.

UNIVERSITY OF MELBOURNE

The University of Melbourne is a public-spirited institution that makes distinctive contributions to society in research, learning and teaching, and engagement.

Ranked number one in Australia and 34 in the world for the quality of its research, the University of Melbourne harnesses interdisciplinary research to solve some of the most difficult problems facing the world.

Research across ICT is both discipline-focused and multidisciplinary in nature and includes collaborations with universities, governments, industry and communities worldwide to further developments cooperatively.

Students interested in ICT careers may undertake relevant bachelor, masters level and research degrees across the sciences, environment and engineering.

University of Melbourne has strong links with industry, and partnership arrangements with local and international companies in a variety of end-user research and development projects. Successful research activities have led to the commercialisation of products.

Institute for a Broadband-Enabled Society (IBES)

Founded in 2009, IBES conducts interdisciplinary research into high-speed broadband technologies, applications and services across four research themes: business and government, culture and community, education and learning, and health and ageing. University of Melbourne's aim is to become a leader in the development of broadband services and innovation for the benefit of Australian society. Integral to the success of IBES is fostering research collaborations across the University, other research institutes and industry.

The Institute for a Broadband-Enabled Society is supported by the University of Melbourne, the State Government of Victoria and industry partners, which include: Alcatel Lucent, Cisco, Google, Microsoft, Juniper, Huawei, Ericsson and Optus.

Health Solutions

The Telestroke solution to rural Thrombolysis: stroke is the second leading cause of mortality in Australia resulting in 11,000 deaths annually. The treatment of acute stroke has been revolutionised over the past 15 years through the use of early intravenous thrombolysis treatment known as rt-PA. However, a shortage of stroke specialists required to administer the treatment means that this treatment is poorly utilised in rural areas. The Telestroke system developed by a research team at the University of Melbourne uses real-time videoconferencing technology to provide specialist stroke advice to rural clinicians inexperienced in acute stroke care, enabling them to administer the thrombolysis treatment.

broadband.unimelb.edu.au/health/tele/telestroke.html

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Key areas of expertise

- Enterprise Resource Planning Systems and SAP software
- Artificial Intelligence and Image Processing
- Distributed Computing

Research/program delivery capabilities

In the Australian Government's 2012 Excellence in Research (ERA) ratings, Victoria University received ERA ratings of 3 (world standard) in distributed computing and artificial intelligence.

Victoria University's Centre for Applied Informatics (CAI) is a leading research group in computing and information technology, and IT applications. CAI has an international reputation in the research areas of data management, web service, web/data mining and e-research. CAI also has expertise in health informatics research, water resource management, services-oriented computing and privacy protection.

The centre undertakes multidisciplinary research in partnership with government, industry, not-for-profit organisations and other universities in Australia and overseas. It engages computer scientists, experts from industries (such as health), the community, business and government to develop innovative and relevant information e-technologies in health care, environment studies, business process and legal information management.

VICTORIA UNIVERSITY

Victoria University has more than 51,000 enrolled students, including 4,000 international students studying in Melbourne and Sydney, and 9,000 studying at offshore partner institutions.

Victoria University is recognised as a world education leader in integrated computer-based information systems – better known as Enterprise Resource Planning (ERP) systems. Victoria University also offers more subjects using SAP than any other course in Australia.

The College of Engineering and Science, College of Business and the University's Victoria Graduate School of Business deliver courses in ICT at campuses conveniently located in the central business district (CBD) of Melbourne and in Footscray, less than 10 kilometres from the CBD.

Current research projects include mining medical data for assisting disease diagnosis and prediction, accurate and online abnormality detection in multiple correlated time series, web mining and social computing, and sensor data stream mining.

Victoria University's collaborative research centres all use ICT to support their research collaborative projects. For example, current research projects by the University's Institute for Sustainability and Innovation include a system protection framework for cloud computing based on data mining techniques and a multi-criteria spatial decision support network based on web service for sustainable water development.

Victoria University has strong international links through teaching partnerships across Asia, including offering ERP-related courses at Litan Hall Academy in Singapore.

The Master of Business (Enterprise Resource Planning Systems) has professional accreditation with the Australian Computer Society.

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The Melbourne: Research, Education and Training series profiles the capabilities of Victorian education providers across 13 sectors:

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Produced by International Education Unit
Department of State Development, Business and Innovation

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