Research highlights 2007
The Magazine of the Office of Research & Development

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Individual achievements in 2007 include recognition of Professor Jonathan Majer’s pioneering research in entomology by the Australian and New Zealand Association for the Advancement of Science with the award of the prestigious Mueller Medal. Also, Professor Dong-ke Zhang’s outstanding contributions were recognised by the University honouring him with the well-deserved title, Distinguished Professor.

I congratulate Curtin’s researchers on the widespread excellence of their research.

Professor Linda Kristjanson
Deputy Vice-Chancellor
Research and Development

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The impact and relevance of Curtin’s research, and the success of the University’s commercialisation program, was highlighted at the recent Western Australian Inventor of the Year Awards. MillMapper, a technology of the Curtin spin-out company Scanalyse, was the winner of the Ready for Market category. MillMapper is a tool to capture the internal conditions of large grinding mills on mine sites, increasing safety and increasing mill throughput and resulting in millions of dollars of extra revenue for mine sites. Runner-up in the same category was the CryoCell Technology from another Curtin spin-out company, Cool Energy. CryoCell Technology extracts carbon dioxide from natural gas, making it available for geosequestration or industrial applications. Finally, runner-up in the early stage category was the Virtual Observer system, developed by Dr Stewart Greenhill and Professor Svetha Venkatesh.

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Curtin’s Centre for Fuels and Energy (CFE) is working to develop clean technologies that enable WA lignites to be converted into fuel oil, as well as value-added products such as eco-friendly fertiliser and carbon materials. CFE’s research began in 2007 with a precommercial characterisation of the lignite and the specific properties that show that lignite is well suited for oil production. The team was successful in verifying the various technology components of their lignite-to-liquid (L2V) process with bench-scale laboratory research, and completed a preliminary process cost analysis.

The primary product of the L2V process is liquid fuel, however the CFE team is confident that work could realise technologies that enable lignite to be cleanly and efficiently provide electricity, and possibly even top the fresh water supply. WA’s only oil refinery.

The Jurassic Lignite Reserves in Western Australia, for example, have the potential to provide a consistent liquid fuel supply for transport and electricity generation. However, development of the reserves was halted in 2004 due to the boom in Australian coal mining.

IN THE BOOM CLIPBOARD

The Centre for Fuels and Energy aims to develop technologies that will enable lignite to contribute to energy services for regional communities, and eventually lessen the reliance on imported petroleum.

The national event was held in November in Perth (rightly, the resources capital of Australia – and examined the various facets of the phenomenon, predicted to drive the nation for the next two decades. Titled Resources Boom: Opportunities and Consequences, the symposium’s topics included why this boom is different; the social, economic and infrastructure pressures created, and how the boom should now be managed.

As the national think-tank for major scientific and technological issues, ATSE periodically brings together researchers, industry leaders and governments to debate critical topics for the formulation of public policy. The 2007 symposium – the Academy’s third – was convened by Professor Dong-ke Zhang, Director of Curtin’s Centre for Fuels and Energy.

“We need to kick-start strategies for the formulation of public policy that will drive the nation for the next two decades,” said Professor Zhang. “We must address the true impact on this environment, then strive for balance.”

Professor Zhang was part of a Curtin team that visited China in 2007 to establish high-level, strategic collaborations with Chinese energy research organisations – agreements designed to hasten the uptake of clean coal technologies.

Curtin’s initiatives resulted in formal agreements with Tsinghua University – China’s most prestigious university – and the Institute for Coal Chemistry within the Chinese Academy of Science.

The groundwork also realised a five-way collaboration with China’s Institute for Coal Chemistry and the Thermal Power Research Institute of China, and the Energy Technology Division in Australia.

“Clean, Curtin’s strength lies not only in its expertise in coal chemistry and technology development, but also in its ability to engage organisations in countries like China that have rapidly expanding coal use, to encourage cleaner coal use.”

Universities have a particular role to play in addressing coal-use issues with fundamental research. We should also contribute to long-term strategies for industry – helping to define the role of coal within sustainable economic development,” said Professor Zhang.

“More research endeavours must aim to help Australia maintain its competitive coal-based advantages while controlling greenhouse gas emissions.”

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ould Australia slow down its resource boom? More than once, this question was raised during debates on the dominant and the covert effects of the boom, at the recent annual symposium of the Australian Academy of Technological Sciences and Engineering (ATSE). The national event was held in November in Perth (rightly, the resources capital of Australia – and examined the various facets of the phenomenon, predicted to drive the nation for the next two decades. Titled Resources Boom: Opportunities and Consequences, the symposium’s topics included why this boom is different; the social, economic and infrastructure pressures created, and how the boom should now be managed.

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LIGNITE TO LIGHTEN THE LOAD

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Researchers from the Chemistry Centre (WA) and Curtin want to ensure emergency personnel have the capabilities to manage the deliberate release of toxic chemicals in public buildings.

The two-year project has begun with the team selecting iconic facilities where large groups gather, such as passenger facilities and sporting venues, then constructing the geometrical layout of the selected buildings, and dividing the layouts into manageable computational volumes. The Chemistry Centre team will conduct tracer experiments under real conditions for validation of mathematical models. The experiments will comprise harmless tracer gases released at five or six locations within each building, and the dispersion monitored with sophisticated chemical detection equipment. Data will be analysed to estimate air-flow distribution models, and the Curtin team will then develop new models that simulate dispersion of airborne chemicals and toxins.

“Catastrophes result not only from dispersed toxins, but also from the ensuing panic,” said Associate Professor Pareek. “We want the project to realise a better detection system for chemical agents and toxins, and to identify generic areas in buildings that offer safe zones and safe routes.”

The National Security Science and Technology Unit has jointly funded the study, via the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) in which Curtin is a research participant.

Associate Professor Pareek commended the national support, delivered under the CRC’s “Fire Assessment” Research program, for recognising that the Chemistry Centre–Curtin research combination would produce valuable outcomes for emergency response and counter-terrorism agencies.

“The project called for the Chemistry Centre’s expertise in air flows and investigations and the Chemical Engineering team’s renowned capabilities in process simulation and design – it’s exemplary of a multi-disciplinary research initiative,” said Dr Gaye Kneale, Principal Researcher from the Curtin team. “The ultimate aim is for livestock managers to be able to submit faecal samples for analysis, and then receive both test results and a feed recommendation. Based on results, the group will develop universal calibration equations that can be used to predict the nutritive value of all diets, including tannin-rich diets.”

New DNA-based research in assessing the nutritional value of grazing cattle will help Australian livestock producers work more productively and more profitably.

Researchers from the Chemistry Centre (WA) and Curtin have begun collecting more than 1000 faecal samples from animals in WA, on which the Chemistry Centre will run a series of analytical tests. Based on results, the group will develop universal calibration equations that can be used to predict the nutritive value of all diets, including tannin-rich diets.

The technique includes identifying specific plant species, and then receiving both test results and a feed recommendation based on results. The group will develop universal calibration equations that can be used to predict the nutritive value of all diets, including tannin-rich diets.

New DNA-based research in assessing the nutritional value of grazing cattle will help Australian livestock producers work more productively and more profitably.

The quality of the diet of grazing animals is paramount to their productivity and profitability. Because of the large size of pastural stations, Australian grazing livestock depend almost entirely on nutrients derived from natural browse and pasture. In many situations, it is not possible to determine exactly what animals are consuming and is therefore difficult to determine the exact nutritive value of the diet. Recently, analysis of animal faeces using Near Infrared Spectroscopy (NIRS) has proven to be a quick and reliable predictor of feed intake and diet quality. However, calibrations with this method are specific for each type of pasture, and the procedure has typically been used where the diet consists of only a small number of grass species. In Western Australia, plant species are diverse and the tannins, in particular, that are found in many shrubs and herbs invalidate many NIRS predictions because they affect nutrient uptake in the body of grazing animals.

In collaboration with the Chemistry Centre (WA), researchers from Curtin’s Muresk Institute are developing a non-invasive, universal tool that will be valid for any type of feed. It could become widely used not only across Australia, but also internationally.

The three-year research project aims to combine a new method of DNA fingerprinting with current NIRS procedures for identifying specific plant species. This will enable researchers to measure the exact composition of livestock faecal matter, and hence feed.
A team of internationally regarded theoretical physicists has established a new research institute at Curtin, to underpin a core science’s renaissance as an academic discipline.

Australasian Geosciences was quoted as having a good tradition of training theoretical physicists, with activity in the area peaking during the 1950s and 1960s. According to Professor Andy Stolovits, Curtin’s Pro Vice-Chancellor of Science and Engineering, since the 1970s Australia’s international reputation in physical science has diminished due to a worldwide downsizing of physical science disciplines such as physics and chemistry. One result of the shrinking trend has been the merging of theoretical physics into physics.

“Theoretical physics provides the basis of understanding; it supplies the predictions that lead to experimentation by physicists who acquire and interpret data, then explain where existing models and theories must be changed,” Professor Stolovits said.

“For example, the existence of black holes was only a theory in the 1950s – evidence wasn’t being acquired until the 1960s. Now there is so much evidence that black holes are considered a common cosmic occurrence.”

Curtin’s determination to reinstate theoretical physics as a discrete discipline began in 2007 with the key appointments of Professor Stolovits and Professor Igor Bray, as part of the goal to build a world-class teaching and research centre within the Faculty of Science and Engineering.

An Australian Research Council (ARC) Discovery Grants, the Curtin project has facilitated, and continues to benefit from research links with the Laboratory for Glaciology and Geophysics of the Environment, in Grenoble (France), the Korea Ocean Research and Development Institute, the University of Venice and the Australian Antarctic Cooperative Research Centre.

Their research collaboration, in the 1960s resulted in a new computational method known as the ‘Convergent Close-Coupling’ theory, work which was recognised with the 1966 Boas Medal for their research contribution to physics in Australia.

Work at the new Institute, which now has a core team of five theoretical physicists, will encompass the areas of electronic, positron, or photons scattering from atoms, ions and molecules, at velocities higher than and atom-surface interactions. The applications are wide-rangiing, including astrophysics, lasers, plasma processing and the lighting industry. A current focus of the research team is antimatter-matter collisions that have applications in both medical and materials science.

The work involves modeling positron-molecule collisions that are utilised in Positron Emission Tomography (PET) scans to detect cancers. When positrons enter the body, they can bounce off atoms, slowly decay, and eventually find an electron. The resulting collision produces two gamma rays that provide the image. The team is also looking at developing the use of PET to detect stress fractures in building materials, whereby positions are attracted to and fill gaps, resulting in a gamma ray image of the defect.

“Professor Rosman explained.

“The research is pioneering in its development of sensitive measurement techniques for lead isotopes, performed at the recently constructed Advanced UltraClean Environment (ACE) – the world’s most advanced facility for decontaminating ice and processing ultra-clean samples. The new techniques are enabling the measurement of lead isotopes in dust contained in the ice at very low concentrations.

“We measure the isotopic fingerprint in as little as two picograms of lead. By comparison a small grain of soil might typically contain about 5000 picogram of lead,” Professor Rosman explained.

“Analyses of ice-cores stretching back over almost one million years of deposition can provide baseline data showing climatic fluctuations in the ancient past, for comparison with more recent studies of climate change.” he said.

“Values are changing at a rate of 2 billion years old, the 12 billion years old than any diamond previously found in terrestrial rocks. According to Dr Nemchin, the supports the view that the Earth at the time was much hotter and more evolved than previously thought.

“Diamonds require unique environments to form when carbon-bearing material is exposed to extremely high pressures, but at comparatively low temperatures,” he said.

“These conditions can occur when you have big, heavy continental masses moving around and colliding with each other, or if they can occur deep beneath stable continents, which is the source of most of today’s commercially mined diamonds.

“They can also be created during meteoric impacts where the high temperatures are only short-lived, but our analysis of these diamonds shows that they are likely to have been caused by meteoric impact, so we are more inclined to believe that they were formed as the result of the Earth’s crust being recycled deep within its mantle.”

The findings were recently published in the prestigious journal Nature.

At Curtin’s Department of Imaging and Applied Physics, the Isotope Science Research Group has been determining sources of pollution through major civilisation and industrialisation episodes, by analysing lead in ice-cores from Antarctica and Arctic regions. Led by Professor of Isotope Science Kevin Rosman, the Curtin team has, since 1993, been measuring the isotopic ratios of lead in ice-core samples, which provides a fingerprint of the pollutant’s presence and its origin.

Air samples from around the globe have shown that lead in the atmosphere varies isotopically depending on its origin. Lead-containing particles can travel thousands of kilometres, be collected in snowflakes and then deposited onto the ice sheets of Greenland and Antarctica. The Curtin research team has been analysing ice-core samples, and identifying the source of the lead in the samples by using a lead isotope ratio (which is being continually expanded), thereby tracking the Earth’s pollution history.

“Lead never goes away – once released it’s forever, and by analysing the elemental and isotopic patterns of the lead we obtain a fingerprint of the pollutant’s origin,” Professor Rosman explained.

“For example, the Antarctic ice sheet was free of lead pollution until just over a century ago, when lead mining and processing began in eastern Australia. The pollution record also shows the impact of lead use in the Southern Hemisphere from the 1950s.”

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“We measure the isotopic fingerprint in as little as two picogram of lead. By comparison a small grain of soil might typically contain about 5000 picogram of lead,” Professor Rosman explained.

“Tracing the dust back to its source, and measuring the changing ‘isotopic tracer’ in the ice, analysing the changing climatic conditions at the source regions to be interpreted and could, Professor Rosman believes, simultaneously signal the timing and location of past episodes of climate change.

“Analyses of ice-cores stretching back over almost one million years of deposition can provide baseline data showing climatic fluctuations in the ancient past, for comparison with more recent studies of climate change.” he said.

“We’re trying to establish what events were linked to climate change by providing another measure of change – and the development of highly sensitive techniques is the key to it all. Without them nothing can be done.”

**FREEZE FRAME: ISOTOPE SCIENCE STUDIES CLIMATE CHANGE**

**CLIMATE CHANGE** is the latest focus for the Isotope Science Research Group; their work on pollution has been extended to exploring aspects of climate change by analysing lead isotopes, and isotopes of other trace metals such as strontium, in ice-cores.

Analysis of the ice record is a rapidly advancing field, and the potential for using lead and strontium isotope variations as proxies for climate changes is essentially unexplored. All Curtin’s world-class John de Lattin Centre of Mass Spectrometry, the team is now analysing lead and strontium isotopes within Greenland and Antarctic ice stretching back over six complete glacial cycles and almost 700,000 years.

“Permametals cosmic rays can trap comprehensive samples of the atmosphere. More recent ice provides evidence of human impact, while ancient ice reflects climatic changes,” Professor Rosman said.

“Using this, we may be able to establish a record of environmental changes caused by natural phenomena, and in helping our understanding of past climate change.”

The work aims to determine whether there is a link between temperature and isotopic composition (and the identified source regions), that could provide knowledge about the extent of glaciation, changing vegetation cover, desert formation and other factors that may have played a role in the character of dust reaching polar regions.

A team of internationally regarded theoretical physicists has established a new research institute at Curtin, to underpin a core science’s renaissance as an academic discipline.

The findings were recently published in the prestigious journal Nature.
Professor Zheng-Xiang Li joined Curtin in 2007, adding world-class expertise in palaeomagnatism and tectonics to Curtin’s earth sciences research groups that focus on Earth evolution and improving mineral and energy resource exploration targeting.

Professor Li’s research is concerned with global palaeogeographic history and how the Earth’s geodynamic system works, with a focus on the tectonic history of the Asian-Pacific region. Based at the Institute of Geoscience Research (TIAG) at Curtin, his work typically involves testing new hypotheses through combining field studies with analytical work. His current projects also include those that are elucidating relationships between tectonic and major mineralisation events, and applying magnetic methods to both the petroleum industry and environmental and climatic studies.

After receiving his PhD (on palaeomagnatism and tectonics) from Macquarie University in 1989, Professor Li turned his attention to “the Rodinia hypothesis”, which suggests an ancestral supercontinent whose break-up resulted in an explosion of life on Earth, remarkable glaciations at sea-level near the palae-equator, and the eventual birth of the supercontinent Gondwanaland. The long-standing research interest saw Professor Li’s return focus on the development of software correlators for VLBI (Very Long Baseline Interferometry) – techniques that involve an array of telescopes linked in order to detect signals from space and produce high-resolution images. VLBI software correlators will be a critical component of the SKA project that will link thousands of radio telescopes across 3000 kilometres, enabling astronomers to observe large tracts of the sky with unprecedented resolution of 100 times finer than current technology. Design is one of the many achievements of the SKA project, and Professor Li’s current research is in Europe collaborating with astronomy institutes in Netherlands, Germany and the UK, as aspects of the SKA design. On his return to Australia he will focus on the further development of VLBI techniques, including software correlators for the SKA, and apply his Curtin’s expertise in this area.

Joining Curtin was a unique opportunity to build on my previous research and to play a significant role in Australia’s future,” Professor Tingay said. “By helping Australia secure the SKA is one of my key goals, and I am looking forward to demonstrating these long basic techniques.

In addition to ASKAP there is the development of the Murchison Widefield Array (MWA) project led by the Haystack Observatory at Massachusetts Institute of Technology. The MWA will be a next-generation telescope comprising an array of 10,000 radio telescopes on the Murchison site, which is one of the most promising candidates for the SKA, but they are also continuing an exciting area of Australian science and technology excellence.” Professor Tingay said.

At the same time, Curtin’s Faculty of Science and Engineering has been building its expertise in radio astronomy. The research expansion program set up by the University to focus world-leading radio astronomer Professor Steven Tingay from the Murchison Radio-astronomy Observatory (MRO). Curtin’s newly appointed Professor of Radio Astronomy Steven Tingay has a particular research focus on high-resolution radio astronomy. He is internationally known for his team’s development of high-performance software correlators for VLBI (Very Long Baseline Interferometry) techniques that can handle data from linked radio telescopes. Fortunately, the expansion in radio astronomy that Professor Tingay will oversee at Curtin will be aided by access to a new level of high performance computing being installed at the MDC supercomputer facility at Curtin’s Technology Park.

Curtin’s Faculty of Science and Engineering has also played a key role in the development of a new academic discipline, radio astronomy, requiring high-powered data processing and computer modelling.”
Perth's aquifers are, geologically speaking, among the best in the world. Highly porous and relatively close to the surface, they are potentially very suitable for storing large volumes of water – which may help address Perth's enduring water crisis.

Severe water restrictions in Perth have been avoided by increasing water extraction from deeper confined aquifers while, at the same time, reducing the draw in environmentally sensitive areas. This strategy has been very successful and the Water Corporation is looking to secure it for the future by developing a form of groundwater banking.

With funding from the Premier's Water Foundation, a joint research team is looking at improving well design and injection processes that will allow water to be stored in large quantities underground. The aim is for water, when it is available, to be injected into confined aquifers and stored in readiness for drought periods.

A pilot project at Grangara has been established to identify and study critical physical, biological and chemical processes associated with the injection process. The research team involving Curtin’s Department of Exploration Geophysics – along with the Department of Chemical Engineering, CSIRO Land and Water, and the Water Corporation – has been awarded a Premier’s Water Foundation Grant to support a project that will develop technologies and management strategies for safe, economical and sustainable use of aquifer storage and recovery (ASR) techniques within Perth’s aquifer systems.

The Exploration Geophysics team will use innovative time-lapse logging technologies for monitoring of spatial distribution of flow around the injection well, and of spatial distribution of near-well clogging. The Chemical Engineering team will look at particle transport and entrapment issues, and de-clogging strategies. CSIRO researchers will carry out geochemical studies of the aquifer, and develop biogeochemical transport models that quantify these processes.

“This work will give us an improved understanding of important ASR processes such as well clogging, dispersive mixing and the biogeochemical reactions between injected and aquifer water,” said Brett Harris, Research Fellow at the Department of Exploration Geophysics.

“Our results will clarify the potential and the practical limits of ASR as a tool to bank potable water in Perth, and will support the further development of tools required for robust well design that would be necessary for full-scale production of ASR in the future.”

A Chemical Engineering researcher is working to develop the unique potential of Australian mallee as a biomass resource.

Fossil fuels are finite resources, and research that promotes the uptake of renewable energy technologies will become increasingly important for the nation’s energy security and sustainable development. Biomass is a potential major source of renewable energy; however, it has a number of issues relating to economic competitiveness, particularly the high cost of collecting or harvesting and transporting the raw material.

At Curtin’s Department of Chemical Engineering, Associate Professor Hongwei Wu is working on a new international project to develop a flexible biomass gasification technology for distributed power generation.

“With smart system design, biomass production has the potential to be almost carbon-neutral. Biomass is the most economical of renewable sources. Solar energy, for example, needs a far bigger footprint to provide the equivalent energy,” Associate Professor Wu said.

“However, we need to work at addressing collection/harvest and transport costs with new biomass gasification technologies. Currently, the biomass gasification process is typically based on coal gasification technologies, which is not efficient for biomass.”

To address these key issues, Associate Professor Wu is working to develop innovative gasification technologies, which is not efficient for biomass. With smart system design, biomass gasification can be a potential alternative to coal gasification technologies, which is not efficient for biomass.

A short harvest cycle therefore makes it ideal for biomass, and as a byproduct of dryland salinity control, its production achieves superior efficiency and collateral environmental benefits.

“Mallee represents a potentially continuous biomass source for power generation and a future direct source for carbon materials supply over the very long term.”

“Compared with other dedicated energy crops, mallee has unique qualities. After three or four years it can be harvested, leaving the mature root system and enough coppice to regenerate growth,” Associate Professor Wu explained.

“A short harvest cycle therefore makes it ideal for biomass, and as a byproduct of dryland salinity control, its production achieves superior efficiency and collateral environmental benefits.

“Mallee represents a potentially continuous biomass source for power generation and a future direct source for carbon materials supply over the very long term.”
IN THE PIPELINE

Emerging disinfection by-products (DBPs) are drawing increased attention as water purification standards increase and lower quality water supplies begin to be accessed. Lower-quality water supplies have a higher propensity to produce DBPs, many of which have not yet been studied.

The Curtin Water Quality Research Centre (CWQRC) – an alliance with Water Corporation WA – has been selected to be part of an international team looking at emerging DBPs. The research is being led by the University of Alberta in Canada, and is being funded by the influential American Water Works Association Research Foundation.

The Curtin component of the research will examine the occurrence and formation of one of the target classes of novel DBPs, and determine how they may be formed under realistic conditions in source waters from North America and Australia disinfected by chlorination and chloramination.

The research will combine toxicological studies with existing knowledge of water chemistry to determine whether target compounds exist and whether they are predicted to be harmful to human health. Solid phase micro-extraction, gas chromatography or high-performance liquid chromatography separation coupled with advanced tandem mass spectrometry will be used.

Director of the CWQRC Associate Professor Anna Hatz and Associate Professor Cynthia Joll will conduct the research and contribute to the final report, which will be published and made freely available online by the researchers organisations around the world.

“Increased water quality regulations and the presence of emerging DBPs is putting pressure on water utilities to better understand water chemistry,” said Associate Professor Hatz. “The report, and our contribution to it, will have a high international impact. We are very excited to be participating in a project with such an significant international profile.”

THE GOLDFIELDS PIPELINE In Western Australia is the focus of further top-level collaborative research involving the CWQRC. The project, involving researchers from Curtin, CSIRO and the Water Corporation, is looking at alternative water disinfection in the 7000-kilometre pipeline, which has been described as the world’s most geographically expansive single distribution water supply system – and one that poses a unique set of challenges.

Chlorine is the most commonly used disinfectant for potable water supplies in Australia and in many other countries. As chlorine works well in standard systems, it poses challenges over long distribution systems, decaying too rapidly for effective results to be maintained over thousands of kilometres of piping and in excessively hot climates.

Because most of the Goldfields Pipeline sits above ground, and often reaches temperatures of around 50°C, in the 1980s the Water Corporation changed the pipeline’s disinfectant to chloramine, which is more stable than chlorine and produces lower concentrations of disinfection by-products (DBPs). However, chloramine too will decay rapidly in challenging water distribution systems, especially as a result of microbial processes – one of which is riftingation.

Recent trials by the Water Corporation have used copper as an inhibitor to riftingation in the Goldfields Pipeline. While indications show some positive effect, copper too disappears, and ongoing work is being conducted to maximise the benefits of using copper.

In 2007, CWQRC was awarded an Australian Research Council grant to conduct investigations into the chemical and microbial aspects of the disinfection process where copper is used. Members of the team include Lead Chief Investigator Dr Sathaa Sathavanan, from Curtin’s Department of Civil Engineering, Associate Professors Anna Hatz and Cynthia Joll from CWQRC, Dr Jason Plumb from CSIRO and Mr Laszlo Koska from the Water Corporation.

Using an integrated three-way approach, the team will determine the different species of copper that may form in a chloraminated water distribution system, determine the impact of microbes on these different species of copper, and develop a suitable inhibitor that minimises microbial activity responsible for chloramine decay. The project will involve laboratory work undertaken at Curtin, and a pilot field study at Mundaring Water.

“We hope that our research will allow for more widespread use of chloramine, which in many instances is a preferred disinfectant,” said Dr Sathavanan. “Effective use of chloramination should contribute to better management of Australia’s expansive single distribution water supply systems, minimise the formation of DBPs, and reduce maintenance costs and instances of pathogen detection.”
Indigenous education

Education plays a vital role in the personal and professional development of any person. For many Indigenous Australians, education can provide a means of breaking a vicious cycle of poverty and exclusion. Yet engagement by Indigenous Australians with mainstream educational and, consequently, employment institutions remains low. Government policy relating to Indigenous employment objectives acknowledges that Indigenous cultural preservation and self-determination must be achieved along with integration into the economic mainstream. Yet evaluations of those policy outcomes have measured only the latter, and there remains little understanding of the extent to which cultural preservation has been achieved and, perhaps more importantly, the role that culture plays in determining Indigenous engagement in the mainstream labour market.

To address this, a research project led by Dr Mike Dockery, Research Fellow in the Centre for Labour Market Research at Curtin, is exploring the role of culture in the Vocational Education and Training (VET) system. The study is based on the notion that "cultural capital" should be considered along with other forms of capital recognised in economic models, such as physical, human and social capital. In the literature on this issue, cultural capital is presumed, for the most part, to have positive effects on economic outcomes such as employment status and income. However, Dockery says that networks through which the benefits of social and human capital are realised.

However, Dr Dockery and his team will consider whether the values and preferences inherent in Indigenous culture, as a minority group, are too dissimilar to those of the mainstream, and have negative effects on economic outcomes because Indigenous people cannot bridge the gaps between their own networks and those of mainstream Australian society.

The researchers will use data from the National Aboriginal and Torres Strait Islander Social Survey, conducted in 2005 by the Australian Bureau of Statistics. They will look at a number of cultural drivers, including social and family culture of valuing education; social, family and individual resources available to support participation in VET; access to "social capital" networks that link to employment and training opportunities; access to VET institutions, both geographically and in terms of entry requirements and attendance modes; and whether VET is delivered in a culturally appropriate manner.

"This will contribute to the limited evidence that we have for understanding the role of culture in determining Indigenous participation in post-school education and training, and should allow us to address both cultural preservation and mainstream participation as equally important factors," said Dr Dockery.

"The results should enable VET to more adequately address Indigenous disadvantage by formulating effective policies and programs that meet the needs of Indigenous people conditional upon their cultural attachment."
INNOVATION 2007

Curtin has long had a commitment to excellent, industry-relevant research. Over the years, this has led to many technologies being developed with real commercial potential and of considerable value to the community. With the help of a $5 million pre-seed fund approved by the Curtin Council, many of these technologies are now being successfully commercialised on the global stage. During 2007, four of the seven Western Australian Inventor of the Year Awards were won by companies spun out of Curtin. Innovation 2007 provides a snapshot of these promising ventures.

Scanalyse Pty Ltd
Scanalyse has developed 3D laser scanning technology for wear management and improved process control in mineral processing applications and has unique, world-leading, patented products. MillMapper™, the company’s most advanced product, has attracted clients in Australia, Indonesia, Papua New Guinea and Canada, including industry majors BHP Billiton, Rio Tinto and Xstrata.

Virtual Observer Pty Ltd
Virtual Observer makes use of images captured by cameras on mobile assets – such as buses or taxis (or, indeed satellites) – in such a way that it can recreate video of activities at any point in space and time covered by those assets. It does this by stitching together individual frames from a multitude of source cameras. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The company has been formed as a joint venture with DTI Group Ltd.

Glycan Biosciences Pty Ltd
Glycan Biosciences has taken its inspiration from natural products to develop novel pharmaceuticals based on particular sugar (carbohydrate) structures. The company’s unique biological analysis and carbohydrate chemistry technologies provide the ability to produce new classes of drugs that are user-friendly, effective, and provide therapy solutions for a number of diseases that are currently difficult to treat. A number of therapeutic products are currently under development for the respiratory diseases market, the first targets being allergic rhinitis and asthma. The company recently took its most active compounds into animal models of the targeted diseases and results have been positive. It has also demonstrated that an existing, approved drug is effective against the target diseases, providing a greatly simplified path to market.

Sensear Pty Ltd
Sensear’s technology enables people to both wear hearing protection and clearly hear face-to-face speech communication in very high noise environments ranging from industrial plants to nightclubs. Packaged in an ear muff or ear plug format, it solves the problem of people having to remove hearing protection to communicate.

TheBuzz Corp Pty Ltd
Years of research at the Western Australian Telecommunications Research Institute (WATRI) have resulted in a new technology that allows for phone calls made over landlines to be channelled via the Internet – availability regardless of broadband or not. This means that cheap, Internet-based phone calls will now become an option for everybody, not just for those with a broadband connection. Despite the broadband roll-out in many markets, the majority of phone calls are made through pre-existing landlines. This massive infrastructure will now be leveraged in a highly effective way, allowing many consumers to lower their call costs in a truly user-friendly manner. TheBuzz was launched in Australia on 27 November and is currently conducting a pilot operation, building up to 5000 clients over the next three months.

The company’s flagship product, Beta Mentor, has been fully integrated with that of a NASDAQ-listed corporation and is currently conducting a pilot within its market, with some of the world’s largest financial institutions underway in New York, London, Singapore and Tokyo.

eXotiX
Conceived and developed by Kurt Smith, a lecturer and researcher in the School of Economics and Finance at Curtin, eXotiX (formerly Trader Model) is a novel algorithm for accurately pricing exotic options in financial markets. It has distinct competitive advantages over existing models that rely heavily on arbitrary constants and do not provide the trader with an understanding of the market risks and, therefore, how to hedge appropriately. Exotic options are among the most complex instruments traded in the financial markets; they are a major component of structured products used by hedge funds, portfolio managers, and financial planners in wealth creation, and by institutions and corporations in hedging exposure to market risk. The algorithm has been licensed on attractive terms to a leading NASDAQ-listed corporation and is now fully integrated with that company’s flagship product. Beta trials with some of the world’s largest financial institutions are underway in New York, London, Singapore and Tokyo.

MillMapper
MillMapper is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed. The result is a continuously roaming wide-area surveillance network that is easily interrogated and analysed.
Followers of twenty-first century geopolitics are watching Russia restate its naval power in the Pacific. Why is a continental power, one with numerous domestic issues, re-investing in a maritime presence far from home?

Dr Alexey Muraviev of the Faculty of Media, Society and Culture at Curtin’s Faculty of Humanities has completed a major research project on Russian naval power in the Pacific. Dr Muraviev is one of a number of Australian academics in international relations and strategic affairs who are watching Russia’s progress to building military and economic power in the Asia-Pacific region (APR) and beyond. Russia is the leading exporter of weapons to Asia, and continues to market its military hardware—from fighter aircraft to artillery—to countries such as South Korea, Indonesia, Malaysia and Myanmar, with attractive sales terms.

“However, the Kremlin is not immediately setting arms—a strategy that deliberately creating a useful client state that can later be transformed into a larger relationship,” Dr Muraviev said.

The region is a new gateway for the booming Russian economy and its proximity to the Asia-Pacific powers will become increasingly vital to Asia’s energy security as Russia exports powerful resource sector; and Russia wants the security of exclusive economic zones and key maritime communications,” Dr Muraviev said. “Control over sea-based natural resources and maritime communications could ensure growth and prosperity”, Russia wants the security of exclusive economic zones and key time communications,” Dr Muraviev said.

Australia’s policy-makers must pay more heed to the increasing Russian military presence in the APR that is supporting Russia’s economic ambitions and shifting the strategic balance in Russia’s favour.” As one of Australia’s leading scholars in maritime and naval affairs, Dr Muraviev was recently commissioned by the Department of Defence to participate in a major study of Non-Western Thinking on Sea Power. A successor to a number of influential reports by the Strategic Studies Centre at Australian National University and the University of Sydney, the report will support the development of a new maritime strategy as well as high-accuracy GNSS positioning, the need for which will continue to grow in line with the increasing demand for high-accuracy positioning applications.

“Issues such as the potential for multi-functional GNSS, which was described as the ‘next generation of Global Positioning System (GPS)’, have been discussed in recent decades. One such example is the potential for multi-functional GNSS, which was described as the ‘next generation of Global Positioning System (GPS)’, to provide a range of services, including geospatial positioning to within a few metres—a number that are being discovered in the developing countries of the United States, modernised GPS, the European Union’s Galileo, Russia’s GLONASS, Japan’s QZSS and India’s IRNSS. To obtain the most accurate and reliable results from GNSS, a procedure known as corner-phase ambiguity resolution (AR) is essential.”

In 2007, the Australian Research Council (ARC) funded a Curtin-led project to extend current AR theory for next-generation GNSS. “We sought Professor Teunissen’s advice on the development of AR in next-generation GNSS systems, as part of the broader research project,” he said.

Teunissen—a specialist in mathematical geodesy and an expert in geospatial positioning—was an expert in mathematical geodesy, and the inventor of the LAMBDA method that revolutionised GPS—known as the “Dutchman’s technique” because it used carrier-phase ambiguity resolution (AR) to Australia from Delft University, Netherlands. In 2007, the ARC funded a Curtin-led project to extend current AR theory for next-generation GNSS. "We sought Professor Teunissen’s advice on the development of AR in next-generation GNSS systems," he said.

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Professor Tanya Packer has a particular interest in the self-management of people with chronic health conditions. Self-management — defined as ‘the individual managing their health condition, its emotional consequences and their daily life’ — is being supported as a way of reducing the impact of chronic diseases and disability on individuals, families and health care systems.

Professor Packer’s research aims at determining programs, strategies and policies to achieve this. She recently drafted the WA Department of Health’s scoping document on self-management, following the Council of Australian Governments identifying self-management as a priority area for Commonwealth-State cooperation. Underpinned by rigorous research framework, the document presents a comprehensive strategy that includes developing patient services and education, along with the training and support for primary health care providers.

Professor Packer is also working closely with the non-government sector, jointly developing and testing the effectiveness of disease specific self-management programs. Her ‘Fatigue Management’ protocol is now widely used internationally. In addition, based on collaboration with the Centre for Cerebral Palsy and the Multiple Sclerosis Society of WA, Professor Packer and her research team have developed the first on-line self-management program in Australia; more than 100 Australians are now enrolled in a research trial of the program. As Director of Research for the Association for the Blind of WA, Professor Packer is also helping to establish self-management programs for people with vision impairment, aided by funding from the Commonwealth Department of Health and Ageing, under its Eye Health Demonstration Grants Program.

The Vision Self-Management in Practice Project aims to embed self-management into the Association’s existing services, and will develop a novel approach to monitoring health service outcomes of vision self-management interventions.

Professor Packer joined Curtin’s School of Occupational Therapy in 2001, following three years at Hong Kong Polytechnic University and 10 years at Queen’s University, Canada, where she received her doctorate.

Professor Packer began working in the area of motor development 15 years ago, focusing on the motor, psychological and social-cognitive development in children with developmental disabilities, in particular, Developmental Coordination Disorder (DCD) and Attention Deficit Hyperactivity Disorder (ADHD).

The physical activity program provides a link, from her line of Professor Peter’s recent projects funded by the Australian Research Council, which focused on the development of coordination, and the role of early fine and gross motor development on later motor and cognitive ability.

The relationship between motor ability and cognitive and language abilities is particularly strong for children at risk of development disabilities such as ADHD and language disorders, Professor Piek said.

“Want we to improve the physical and social skills of those children who are struggling with these, so we’ve designed a program that can be easily incorporated into the school curriculum, via a series of modules that cover a range of activities to improve skills from balance to hand skills, to social-emotional development.

“At universal a program for all children within the class, because by being inclusive it reduces the stigma associated with being placed into a ‘special program’.

Healthway has provided initial funding for the program being piloted in a number of Western Australian primary schools in 2007 and 2008. This will determine whether the program is effective in improving movement skills for children with motor coordination issues.

It has a positive effect on the child’s self-perceptions of their motor and cognitive ability, and whether it impacts positively on social and emotional development.

One of the key research findings was that while women contribute greatly to the cohesiveness of the communities, it is important to understand how the role of women in the families has changed, what inter-generational differences have arisen, and what are the current priorities of the farm,” Associate Professor Rola Rubzen said.

The Australian research component, being undertaken cooperatively, began with focus group discussions in rural areas in Australia, followed by a nation-wide survey of more than 600 households to determine the extent research, and the number of women involved in farm work, financial capitalisation and restructuring.

To ensure the sustainability of farming communities, it is important to understand how the role of women in the families has changed, what inter-generational differences have arisen, and what are the current priorities of the farm,” Associate Professor Rola Rubzen said.

The research is identifying the various challenges facing women on farms, and the intervention strategies that can help women contribute to the survival of their farming communities,” Associate Professor Rola Rubzen said.

“The project is unique because it is combining research with policy making — not just in Australia, but in the participating Asian countries as well. Each year over the four-year period the international research team has been meeting to discuss their findings,” Associate Professor Rola Rubzen said.

To this end, training is being offered in communication and enhancing farm business—enterprise managerial capabilities and rural leadership skills — an initiative that has been approved by the skills that assist rural women in the broader community, as well as in their business and personal lives.

The project has thus given rise to the ‘Women in Rural Leadership’ (WRL) program which is enabling women to develop essential skills that lay the foundation for leadership roles in their own business, communities and in significant organisations.

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**NEW RESEARCH WILL HELP SMALL-TO-MEDIUM Sized WINERIES DEVELOP BEST PRACTICE FOR WINERY WASTEWATER TREATMENT AND DISPOSAL.**

Western Australia’s Margaret River region is one of high natural resource value, and its waterways are crucial to the overall health of the environment. Viticulture is the major primary industry, stringent environmental regulations are in place to monitor the impact of large winemaking operations on surrounding land. But while larger vineyards must comply with strict licensing and reporting requirements, small-to-medium wineries – those in the sub-500 tonne category – are not required to be licensed under the Environmental Protection Act. These wineries, however, are widely dispersed throughout the landscape.

A new research and development group, Winewatch, has been established to help the small-to-medium sector improve its current practices in wastewater treatment and disposal. The initiative is a collaboration between Curtin, the Margaret River Wine Industry Association, Cape to Cape Catchments Group and GeoCatch.

As the first stage in its research, Winewatch has completed a survey of current wastewater handling practices of these wineries. It found that the level of scrutiny of wastewater systems is low, as is the level of knowledge about regulatory requirements. Many wastewater systems being used are rudimentary and are rarely engineered specifically for the purpose of managing this aspect of the wine-making process. This survey also found that wastewater received minimal treatment, and respondents had little knowledge of how to manage its potential environmental impact. Very little data is available to test this impact. Very little data is available to test this impact. Proper treatment and disposal is crucial to maintaining the health of the water, however, can significantly reduce the oxygen demand, which may cause adverse effects if released into the environment. Proper treatment of the water, however, can significantly reduce the oxygen demand of wastewater.

“The project will help smaller wineries be prepared for the introduction of environmental regulations or market access guidelines that require wineries of all sizes to be able to demonstrate minimal environmental impact,” said Assistant Professor Mark Gibberd, Head of Curtin’s Department of Viticulture and Enology.

“However, an overall goal is to stimulate innovation and the development of new skills and techniques in the industry.”

**WINEWATCH: KEEPING THE WINE SCENE CLEAN AND GREEN**

On the positive side, the survey found the industry is “knowledge hungry” and has a strong interest in accessing information about ways in which to reduce the environmental impact of operations – which reflects the overall ambition of the industry to retain its “clean and green” image.

With an $87,000 Natural Resource Innovation Grant – made available by the Department of Agriculture, Fisheries and Forestry’s National Landcare Program – researchers are now able to move to the second stage of the process. This involves identifying and implementing current best practice systems for effectively monitoring wastewater treatment and disposal for sub-500 tonne wineries.

When systems have been identified, they will be tested and made suitable for small-to-medium wine operations. Once in place, the appropriate methods will be recommended for purchase and will enable wineries to conduct their own tests on site, getting results in an immediate and cost-effective way.

For example, the wastewater tests will be able to detect organic compounds that have high biological oxygen demand, which may cause adverse effects if released into the environment. Proper treatment of the water, however, can significantly reduce the oxygen demand of wastewater.

**For every person who takes their own life, it is estimated that 15 people, mostly family and friends, are directly affected. When you measure the number of people who are indirectly affected – colleagues, neighbours and sports mates, for example – the number increases dramatically.**

The costs of bereavement are high. Personal despair and depression can skyrocket after a loved one dies by suicide, putting the bereaved themselves at greater risk of ill-health. The way in which this trauma negatively impacts people’s social relationships and working life – often confusing government or business-related support – means that the social and economic costs are not insignificant.

In the 1990s, Western Australia’s Ministerial Council for Suicide Prevention (MCSP) produced an Information and Support Pack for those bereaved by suicide. Now, a Curtin group is looking to build on that initial effort, Curtin’s Centre for Developmental Health (CDH) has received funding from the Department of Health and Ageing to establish and evaluate an outreach service aimed to connect with people newly bereaved just want to talk to others who have experienced the same trauma.

The project is currently being trialled in South Metropolitan Perth. We will be continuously assessing the benefits of this kind of outreach service and if it proves as successful as we expect, than our hope is that it will expand to other communities over the next few years.”

**ARBOR REACHES OUT**

Every year about 200 Western Australians take their own lives – on average, more than the number of people who die in road accidents. A new program in WA offers support for those bereaved by suicide, and aims to have a significant social impact.

**Mental Health**

**Community**

**Social Work and Social Policy**

Researchers at Curtin are looking at how therapeutic communities for abused Indigenous children can best be developed.

The WA Ministerial Advisory Council on Child Protection (MACCP) has had an urgent need to increase accessible, culturally appropriate, community-based therapeutic services and responded to address this high levels of violence and child abuse that exist in many indigenous communities.

In collaboration with MACCP, Curtin has partnered with the Kulunga Research Network, part of the Telethon Institute for Child Health Research – to look at how universities can collaborate with practitioners to enhance current practice and policy regarding the treatment of abused Indigenous children. Project leaders want to bridge the gap between on-the-ground knowledge held by practitioners, on the one hand, and government on the other. Key objectives of the initiative are to offer both brief and ongoing intervention models for enhancing work in three areas: community and inter-agency partnerships; State and Federal government policy; and education and training programs for prospective practitioners.

The first stage of the project brought together practitioners, researchers and policy-makers at a three-day research summit held in Perth, in May 2007. Using a coping intervention framework, facilitators worked alongside Aboriginal nurses, social workers, psychologists, community engagement workers and parents to work together with Curtin researchers from Aboriginal Studies, Social Work, Social Policy and Human Rights Education.

The summit revealed an urgent need for therapeutic intervention to assist long-term well-being of children and their families. There was also a recognition that clinicians needed forensic and legal interventions which, while necessary, were not in themselves sufficient to ensure effective responses to the personal trauma associated with abuse.
Higher Degrees by Research

Graduate Studies Overview 2007

The Graduate Studies team at Curtin works hard to promote a quality research training experience for our higher degree by research students.

The majority of Curtin’s HDR students are part-time and many study off-campus; therefore we strive to ensure they feel included in Curtin activities. To this end, we have continuously improved our website and the resources available on it to cater more effectively for the needs of external students. There are comprehensive guidelines to assist in preparing their application for candidacy, managing their research project, and structuring and submitting their thesis. There are also guidelines for students who wish to submit their thesis in the form of publications or as an exegesis with creative works. To assist in the maintenance of positive working relationships between students and their supervisors, we have also updated the sets of guidelines on roles and expectations for students and the members of their Thesis Committees.

In 2007 the Best Practice Frameworks for the Facilitation of Postgraduate Research was rewritten into the more accessible Facilitating Excellence in Research Training document. This describes the seven key principles that define quality in our administrative processes and support for supervisors and students. To help put these principles into effect we offer regular seminars in the Enriching Postgraduate Teaching and Learning series and the seminar notes are available on the web. In 2008 we plan to begin using the Institute of Technology to enhance the opportunities for distance students to ‘attend’ a seminar. Another effective initiative has been the HDR Information Updates, with 72 issues published to the end of 2007.

Curtin research students can choose to be involved in two significant programs to enhance career opportunities beyond their degree. The first program is the fully online Graduate Certificate in Research Commerce, offered under the auspices of the e-Grad School, an initiative of the Australian Technology Network (ATN). During 2007, this one-semester coursework award was completed by 30 students who obtained scholarships from the Department of Education, Science and Training’s Commercialisation Training Scheme. The second is the ATN’s Learning Employment Atitudes Program (ATN-LEAP), which won a prestigious 2007 Curtin Award for Programs that Enhance Learning. Since 2003 there have been almost 2700 entrants in the six online modules that aim to enhance students’ generic skills. Building on the success of the ATN-LEAP project, the five ATN universities have now launched the ATN’s Modules Online for Research Education (ATN-MORE). These five, short web-based modules are designed to assist students, both on and off-campus, in managing and writing up their research.

More than 100 international students have been given the opportunity to pursue their research studies with a Curtin International Research Tuition Scholarship. The success of this scheme has led Curtin to decide to continue it into 2008 and beyond. In further recognition of the importance of research students to the university, 80 Curtin Research Scholarships will be available to top-up Australian Postgraduate Awards and Curtin University Postgraduate Scholarships from 2008.

The University uses the Curtin Annual Student Satisfaction survey and the national Postgraduate Research Experience Questionnaire to provide indicators of the quality of the research student experience. The 2007 results for both of these measures have indicated high levels of student satisfaction and, due to the committment of the Graduate Studies team, we expect that this pleasing trend will continue into 2008.

Professor Leonie Rennie
Dean, Graduate Studies

Hui Jun Chih

Hui Jun Chih’s doctoral research will focus on improving the yield and quality of Western Australian olive oil through innovative biotechnology. Her study into the yields of olive oil is the first of its kind, and in response to the world-wide increase in demand for olive oil – a demand based primarily on a potential to lower the risk of heart diseases and cancer.

At Curtin’s Department of Food Science and Technology, Jun will use grapes from the 2007 growing season to investigate the influence on yield and quality of maturity levels, cultivation, environment, olive variety, and processing techniques.

The olive oil industry is keen to exploit and enhance the oil’s health benefits but current techniques used to increase yields tend to decrease the concentration of bioactive compounds. Processing confers an oil recovery percentage of less than 80 per cent, while more than 90 per cent of the bioactive phenolic compounds are lost during the process.

Supported by the Western Australian Olive Council, Jun’s research will explore the intricate nature between the various processing techniques and oils, to determine which method results in the optimal extraction of bioactive compounds and increased yield. A range of complex chemical tests will determine the quality of the oil to confirm the effectiveness of the proposed novel novel antioxidant, flavonoid sensory panelists will then test the sensory acceptability of these olive oils according to the International Olive Council method.

Scott Hollier

Scott Hollier experienced what he terms the ‘disability divide’ while working as a vision-impaired person in the information technology industry. He then spent seven years undertaking postgraduate Internet Studies research into why people with disabilities were not embracing computing and internet-related technologies at the same rate as the able-bodied population.

Hollier’s initial investigation into this ‘disability divide’ examined the historical significance of the social construction of disability, the developments of computing and internet-related technologies and the evolution of associated government and corporate policies. Interviews were conducted with the policy-makers, IT developers, IT providers and people with disabilities; and a national survey with blind and vision-impaired people determined their computing and internet experience.

He concluded that many people with vision disabilities, including those with a high level of computing and internet expertise, continue to encounter specific barriers that prevent access to new technologies. These include issues relating to the perception of disability in society, government policies, corporate policy, mainstream computing products, poverty and a lack of educational opportunities.

As the Coordinator of Public Education with the Association for the Blind Western Australia, Hollier’s aim is to now translate his research into practical solutions. While working mainly on the establishment of the Woodside Guide Dog Discovery Centre, his direct assistance and support has helped six legally blind students enter Curtin’s Electrical and Computer Engineering Program.

Graduate Profiles

Scott Hollier
Media and Information Faculty of Humanities

Hui Jun Chih
Public Health Faculty of Health Sciences

Scott Hollier experienced what he terms the ‘disability divide’ while working as a vision-impaired person in the information technology industry. He then spent seven years undertaking postgraduate Internet Studies research into why people with disabilities were not embracing computing and internet-related technologies at the same rate as the able-bodied population. Hollier’s initial investigation into this ‘disability divide’ examined the historical significance of the social construction of disability, the developments of computing and internet-related technologies and the evolution of associated government and corporate policies. Interviews were conducted with the policy-makers, IT developers, IT providers and people with disabilities; and a national survey with blind and vision-impaired people determined their computing and internet experience.

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Social Work with Indigenous Communities

Linda Briskman
The Federation Press, 2007

Indigenous issues including health, access to services and violence are among the most important and difficult currently facing Australian society. In this book, Professor Linda Briskman, the Dr Haruhisa Handa Chair in Human Rights Education at Curtin, challenges past social work practice and urges all human service practitioners and students to be more effective and more informed when working with Indigenous people or in Indigenous communities.

Professor Briskman investigates the use of critical reflection in social work practice and places at the forefront the need to understand and facilitate the strengths of Indigenous communities and culture. The resilience and achievements of their rich cultural heritage are explored. Professionals should address the historical, political and cultural context for much established practice before devising a way forward.

Specific fields of practice are covered, especially areas of particular concern; children, youth, family violence, health and criminal justice. Professor Briskman uses case studies and literature to highlight contemporary policy debates and reactions from government and media. Pointers for future directions are offered. It is a thought-provoking text for any professional working or studying with Indigenous peoples.

Asian Management in Transition – Emerging Themes

Edited by: Samir R. Chatterjee and Alan R. Nankervis
Palgrave Macmillan, 2007

Asia is the world's most dynamic region and is attracting considerable attention with rapidly increasing potential for investment, trade and entrepreneurial development. A strong position, however, comes from in-depth understanding of the countries in the region and the historical, political, economic and social contexts within which Asian business management is conducted.

The editors, Samir R. Chatterjee, Professor of International Management at Curtin, and Alan R. Nankervis, Associate Professor of Human Resource Management at RMIT, aim to present an understanding of Asian management with a broad-based, integrated perspective that considers Asia from an insider's point of view. Each chapter is written by an academic with considerable experience in their chosen country.

The text compares eight nations in Asia, all differing in population size, stage of development and experience, and discusses how each tries to balance global competition with local social and cultural heritage. The effect is a comprehensive source of knowledge and insight into current Asian management practices within a consolidated, analytical framework.

The book is suitable for undergraduate and postgraduate, specifically MBA, courses directed towards the Asia-Pacific region. It provides a valuable reference for students and practitioners alike.

Voices on the Inside – The Women of Boronia

Edited by: Danny Heggen and Ian Fairnie
Curtin Print and Design/Advance Press, 2007

Voices on the Inside – The Women of Boronia collects the stories of nine women serving the remainder of their prison sentence in Boronia Pre-Release Centre, Bentley, Western Australia. A unique concept in Australia, the Boronia Pre-Release Centre accommodates up to 70 women and their children in a community-style setting, with a program structure and daily activities to mirror the responsibilities faced in everyday life.

The editor, Curtin service abroad student Danny Heggen, has captured the women's individual voices, allowing each to tell their very personal tale in an engaging and enlightening way. They highlight the success of Boronia and the way in which this new and innovative concept in rehabilitation is helping women rebuild their lives and dramatically reduce the rates of recidivism.

The book serves as a tool: for other women in the prison system to derive strength from common circumstances; for teachers, students and those working in criminal justice to learn from Boronia's achievements; and for the public at large to gain insight into the lives of a group of women not often represented in a positive way.

Jean Beadle – A Life of Labor Activism

Bobbie Oliver
UWA Press, 2007

In the introduction to Jean Beadle – A Life of Labor Activism, Dr Bobbie Oliver asks the following questions: “Who was Jean Beadle? Why did John Curtin regard her as being truly great? Why was her work for the Labor movement of such value? Why today is she virtually unknown, with only one memorial to her name?”

Dr Oliver, a Senior Lecturer in Politics and History at Curtin, uses primary sources from public and private papers, interviews with her granddaughters and photos to answer the above questions and provide long overdue recognition for the life-long work and dedication of Jean Beadle.

Throughout the early 20th century Jean Beadle played a prominent role in Western Australian politics, agitating for reform and the rights of women and children. She not only founded a number of Labor Women’s Organisations but also worked as a Justice of the Peace, voluntary Children’s Court Magistrate and tireless charity worker.

The biography examines her commitment to Labor causes, in particular its relationship with women, her perceptions of the injustices and struggles faced by women of the time, her motivations and philosophy in both her public and, as far as possible given Jean Beadle’s private nature, her home life.
Centres + Institutes

UNIVERSITY RESEARCH INSTITUTES

Australia Research Institute
Culture, Locality and Change: Australia and the Asia-Pacific
Digital Ecosystems and Business Intelligence Institute
Institute for Multi-sensor Processing and Content Analysis
Institute for Theoretical Mathematics & Physics
John Curtin Institute for Public Policy
Nanochemistry Research Institute
National Drug Research Institute
Science & Mathematics Education Centre
The Institute for Geoscience Research
Western Australian Biomedical Research Institute

GOVERNMENT-FUNDED INSTITUTES AND CENTRES

Centre for High Definition Geophysics
John De Laeter Centre of Mass Spectrometry
Western Australian Nanotechnology Research Institute
Western Australian Telecommunications Research Institute

INDUSTRY RESEARCH CENTRES

ALCODA Research Centre for Stronger Communities
Curtin Water Quality Research Centre
Environmental Health Impact Assessment WHO Collaborating Centre
Housing and Urban Research Institute of Western Australia
Western Australian Biomedical Research Institute

MULTI-INSTITUTIONAL RESEARCH CENTRES

Australian Housing & Urban Research Institute
Australian Centre for Geomechanics
Centre for Exploration Targeting
Institute for Coal Strategies
iVEC – The Hub of Advanced Computing in Western Australia
Nanoscale Characterisation Centre
Planning and Transport Research Centre
WA Energy Research Alliance
Western Australian Centre for Cancer and Palliative Care
Western Australian Centre for Urban Design
Western Australian Marine Science Institute
Western Australian Satellite Technology and Applications Consortium

COOPERATIVE RESEARCH CENTRES

Core Participant
Australian Biosecurity CRC
CRC for Coal in Sustainable Development
Australian Seaweed CRC
CRC for Construction Innovation
CRC for Greenhouse Gas Technologies
CRC for Landscape Environments and Mineral Exploration
CRC for Sustainable Resource Processing
CRC for Water Quality & Treatment
CRC for Mining
CRC for Sustainable Tourism
Desert Knowledge CRC
Parker CRC for Integrated Hydrometallurgy Solutions
Spatial Information CRC

Supporting Participant
CRC for Contamination Assessment and Remediation of the Environment
CRC for Innovative Grain Food Products
CRC for Integrated Engineering Asset Management (CIEAM)

Co-located

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Applied Physics explores
THE ICE CORE OF CLIMATE CHANGE

THE SKY IS NOT THE LIMIT

Radio Astronomy is set to soar
AT THE COALFACE
Fundamental research for coal-use issues