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Cover photo: UWA medical student Adam Mossenson treats a young patient during his overseas elective with the Himalayan Health Exchange (HHE). See In Focus.

Getting smart on the farm
The family farm can meet the challenges of a drying climate by adopting innovative solutions and smart new technologies.
(Photo: David McFall, Oil Mallee Association)

Reading the rocks
For Mawson Medallist Peter Cawood, each rock he studies, each mountain he explores, tells a unique story of the forces that shaped our world.
When he invited the US Secretary of State to visit his hometown and the UWA campus, Australia’s Foreign Minister Stephen Smith was well aware that he and Dr Condoleezza Rice shared more than roles as their nation’s chief diplomats: both are passionate about the transformative power of education.

As the University’s high-profile visitor took her place among researchers, academics and key business identities at The University Club of Western Australia, guests were in no doubt that Dr Rice admirably reflects her message.

Her own journey began in Birmingham, Alabama, at a time when there was no guarantee her father, a high school counsellor and Presbyterian minister, could vote. She went on to become an authority on the Soviet Union, Professor of Political Science and Provost of Stanford University and Assistant to the US President on National Security Affairs, advising both the current and previous Bush administrations.

Vice-Chancellor Professor Alan Robson was delighted to welcome Dr Rice. “She was very interested in our links with Stanford and at the end of the dinner invited me to visit her there. We all appreciate that Dr Rice emphasises the importance of education and universities in an economically prosperous, socially inclusive and civil society,” Professor Robson said.

That was certainly the message resonating throughout her visit.

“The power of education and equality can open doors for any young woman or man, Australian or American,” said Dr Rice, who pointed out that two women had held the powerful post of US Secretary of State over the past 12 years.

Later, Dr Rice spoke of her early ambition to be a concert pianist, and told local high school students that she still plays with a chamber music group and her favourite vacation is to go “to the mountains and play Brahms”. However, by the end of high school she had “a very, very difficult revelation: I was pretty good, but I wasn’t great…”

Suspecting that she wouldn’t make Carnegie Hall, she looked for an alternative college major and found international politics – a first step towards her area of research: the Soviet Union.

“When you go to college, don’t try to determine what job you’re going to have,” she advised. “Try to determine what your passion is…and when you find it, don’t worry if it’s something that seems a little odd – because there is no reason that a black woman from Alabama should have been interested in the Soviet Union,” she said.

“Don’t let anybody define what you should be interested in. Your horizons should be limitless at this point. You have to find that special combination of what you’re good at doing and what you love to do. When you find that, life is going to work out. What you want to be and who you’re going to be is really up to you…”

Dr Rice admitted that at heart she was an academic: “I love the world of ideas. I love writing. I love teaching especially – and I miss teaching…”

“I believe very strongly that great multi-ethnic democracies like the United States and Australia have to be certain to provide educational opportunities for their people… That’s what I’d like to do, go back and make sure I do my part to secure that for America.

“I think education is important, first and foremost, because people really have to believe – and it has to be true – that it doesn’t matter where you came from; it matters where you’re going… And the only way to equalise different circumstances of birth is through education.”
Earthworks

This issue of UNIVIEW could well be subtitled ‘Earthworks’ because articles on the University’s award-winning scientists and impressive new research centres reflect the major research challenges posed by our extraordinary ancient landmass.

Mawson Medalist Professor Peter Cawood tells us about his quest to understand “the how, when and why” of ore deposits and mountain ranges – from Australia’s long-eroded Yilgarn to the mountains of Antarctica.

Premier’s Fellow, Professor Klaus Regenauer-Lieb, head of the new WA Geothermal Centre of Excellence, outlines the potential of a source of energy that has been too long overlooked: geothermal heat.

Mr Kevin Goss, who heads the UWA-based Future Farm Industries Cooperative Research Centre, carries the ‘earthworks’ theme into the realm of agriculture and asks how we can do things even smarter down on the farm.

And finally, exploring beneath the Kimberley’s red earth, UWA palaeontologist Dr Kate Trinajstic introduces us to the ‘earthworks’ theme into the realm of agriculture and asks how we can do things even smarter down on the farm.

To illustrate Getting smart – down on the farm we chose images from Abstract Earth by photographer (and State Living Treasure) Richard Woldendorp, whose aerial take on our landscape could well have been created on an artist’s canvas.

Earthworks

Producing cleaner energy, adapting agriculture, protecting biodiversity and securing our water future are just some of the high priority issues confronting the world – and UWA has been invited to join a coalition of leading universities in addressing them. Already a member of the Group of Eight research intensive universities in Australia, the University is now part of an international network of 16 research-focussed universities in Europe, North America, South East Asia and Australia. The Worldwide University Network is dedicated to making significant advances in knowledge and understanding in areas of global concern.

Forging international partnerships

The University’s extensive links within the region have been further strengthened by an important trilateral agreement between UWA, China’s Zhejiang University and Japan’s Kobe University. For the first time, the three institutions will forge collaborations that enhance educational programs and research capacity. Speaking at the signing of the agreement, Vice-Chancellor Professor Alan Robson said that the trilateral collaboration was based on Western Australia’s strength in medical research, Japan’s strength in bio-engineering (particularly in regenerative medicine and tissue engineering) and China’s access to clinical trials.

UWA research makes the cover of Cell

“Imagine a sound-studio mixing desk full of switches, sliders, knobs and dials – all set to specific levels to control the sound being produced by musical instruments. Now apply that picture to thousands of inherited genes and imagine each gene as an instrument…”

That’s how Professor Harvey Millar, Life Scientist of the Year in 2005, introduces you to research he is undertaking with UWA PhD student (and Hackett Scholar) Julian Tonti-Filippini. He goes on to explain that while many are aware that genes are inherited, few appreciate that the precise settings of some of the controls of the ‘mixing desk’ are also inherited.

This UWA research centres on the relatively new area of epigenetics and involved mapping some two million genetic switches in the plant genome for the first time – and it recently made the cover of the international science journal Cell.

The two UWA researchers co-authored the report with US researchers from the Salk Institute for Biological Sciences in San Diego, California.

Mr Tonti-Filippini designed and built software that enabled the study to map the epigenetic footprints across the plant genome. Sequencing the epigenetic code of plants provides new directions for research in plant breeding, food production and tolerance to environmental change. When the same can be achieved in humans, it will lead to improvements in disease diagnosis and control.

Both centres are focused on discovering and characterising the molecular components and control mechanisms that drive energy metabolism in plant cells. This is vital in determining the timing and rate of plant growth, the biomass and yield of grain, fruits and crops, the efficient use of water and mineral nutrients and tolerance to environmental stress.

Professor Harvey Millar and Mr Julian Tonti-Filippini (Photo: Paul Ricketts, DUIT Multimedia, and their cover of Cell)
Rewarding those ‘Eureka moments’

UNIVIEW regularly reports on ‘eureka moments’ in the lives of researchers – so it was satisfying when three UWA teams made it to the finals of the Australian Museum’s Eureka Prizes. Often described as ‘the Oscars of science,’ the prizes honour outstanding research and science communication.

Professor Lorenzo Faraone and his Microelectronics Research Group walked away with the inaugural Eureka Prize for Outstanding Science in Support of Defence or National Security. Their infrared imaging systems will dramatically improve threat and target recognition and will undoubtedly save lives.

Vice-Chancellor Professor Alan Robson hailed the technology as fundamental to Australia’s defence capability and a reflection of the innovative technology being developed at UWA. The team comprises Professor John Dell, Associate Professor Charles Musca, Dr Jarek Antoszewski, Dr Adrian Keating and Dr Kevin Winchester. Protected by international patents, this research (supported by Australian Research Council Discovery Grants) will ensure long-term benefits to Australia. The technology was also funded by contracts from the Australian Defence Science and Technology Organisation and a $3.5 million grant from the US Defence Advanced Research Projects Agency.

Professor Faraone said the drawbacks of current state-of-the-art infrared imaging systems included their large bulk, high cost, and the huge volume of data processing required. The new technology has the potential to deliver low-cost, mass-produced, spectral sensing modules, revolutionising sensing technologies in a wide range of defence and civilian applications.

“The technology addresses not only defence and security areas, but can be used for low-cost, unmanned autonomous surveillance of Australia’s large coastline,” said Professor Faraone. “There are also wide applications for near infrared and mid-infrared spectroscopy in agriculture, food science, environmental monitoring and medicine. Further applications of the technology will include monitoring of soils for carbon sequestration, biopsy-free skin cancer diagnosis and real-time environmental pollution monitoring.”

The other UWA Eureka finalists were Professor Mark Spackman, Associate Professor Dylan Jayatilaka and Dr Joshua McKinnon, whose work has the potential to revolutionise crystal structure analysis, and Federation Fellow Professor David Pannell and co-researcher Dr Anna Ridley from the Department of Primary Industries, Victoria. Their Salinity Science: From Complexity to Simplicity is reshaping the way communities respond to Australia’s dryland salinity problems.

Astronomy for beginners

With Jupiter making a spectacular return to our night skies, October will be a great month for getting to know our solar system’s largest planet. At the Gingin Observatory, leading astronomer Peter Birch will focus on the planet in his 15 October presentation, Journey to Jupiter. He will also conduct a four-week course Astronomy for Beginners from 29 October. A UWA graduate, Mr Birch was an astronomer at Perth Observatory for 35 years, specialising in solar system astronomy, planetary photography and cometary studies.

For more information, call 9575 7740 or email: stars@ginginobservatory.com

Global Google winners

UWA is creating some of the finest online marketing students in the world according to organisers of the 2008 Google Online Marketing Challenge, the world’s biggest in-class tertiary academic competition. This accolade came after a UWA team recently became Global Winner of the Challenge, which involved 1,620 students from 369 universities across 47 countries, including teams from Stanford University and London Business School. “It’s a fantastic result and I’m so proud of my students,” said Dr Fang Liu, a lecturer in Marketing at the UWA Business School, seen here with Victor Tsem and Lauren Bobridge and (on the ground from left) Amy Smith and Aaron Balm.

Spring into Extension

UWA Extension’s Spring School is brimful of bright ideas about making the most of spring – and while the program is well under way, there are still many courses and workshops to come. Of particular interest to those who plan to brush up on writing skills are courses ranging from the basics of essential grammar to getting to grips with “the devious art of plotting”.

The Spring School program is designed to entice you out of your home to enjoy a diverse program that, over the next few weeks, will include a guided olive oil tasting tour; a women’s health forum; green gardening tips and much more. Check out the full program at www.extension.uwa.edu.au or call 6488 2433.

Clinics in monasteries and schoolyards

When considering a location for his overseas elective, medical student Adam Mossenson was looking for “a unique environment as far removed from the tertiary hospital setting as possible”.

After trawling the Internet, he opted to go on the road in northern India with the Himalayan Health Exchange (HHE). This NGO responds to healthcare needs in isolated populations where tuberculosis is endemic, rheumatic heart disease is common and diverse mountain dialects make communication difficult.

HHE provides free medical care, runs cataract and heart disease programs, and supports two orphanages.

Young Tibetan monks receive healthcare at a monastery in northern India
At each clinic, the team enlisted the help of local health providers, nurses and volunteers.

Adam was among a team of mostly American medics, ranging from final year students to registrars and consultants.

“Our team travelled overland, trekking some stretches but largely travelling in 4WD convoy,” recalls Adam.

“We established over eight major and several minor clinic sites, setting up in monasteries and schoolyards.”

Medical students were given the responsibility of running the clinics under the guidance of consultants, with histories being taken with the help of interpreters and a mobile lab offering basic tests.

“Over the month, we provided medical and dental care to about 3,000 patients, a large proportion being children.

“A few had serious medical conditions that without our input would rapidly lead to significant morbidity and mortality,” recalls Adam. “At a single morning clinic, five young children were found to have congenital heart disease.”

At night, swags were unrolled in the prayer halls of monasteries or in camp sites in the shadow of mountains. “When the temperature dropped to -25ºCelsius, one could not but reflect on the creature comforts awaiting back home” recalls Adam.

The volunteer medics left with the overwhelming impression that were it not for services such as HHE, much of this population would have minimal or no access to medical care.

Describing his work as a volunteer to judges of the Alan Charters Elective Prize, Adam was awarded first prize for his presentation Doctors on Tour: On the Road with the Himalayan Health Exchange. Runners up were Stephanie Breen for A Little Bit Fine: A Zambian Perspective and Timothy Lin for Between borders: Slipping through the gaps on the Thai-Burma border.

The award honours Dr Alan Charters (1903 – 1996) who practised and taught medicine in East Africa and WA. He is fondly remembered by generations of WA medical students.

New network just what the doctor ordered

Federal Health Minister Nicola Roxon at the launch of the Great Southern Managed Health Network with Dr David Glance (left) and Dr David Tadj

Good communication is an essential element in the delivery of healthcare and a UWA initiative in partnership with Great Southern GPs is offering just that: a secure and efficient communications network.

The Federally-funded $2m Great Southern Managed Health Network (GSMHN) launched recently by Minister for Health Nicola Roxon is a first in Australia and is being rolled out across the State.

Watching the paperwork in his Albany practice steadily declining is clearly satisfying for GP David Tadj, Chair of the Great Southern GP Network.

“The network is a secure communications system that encourages health practitioners to switch from paper-based to electric communication. The result is more efficient lines of communication, better patient outcomes and easier access to patient information for health practitioners,” says Dr Tadj.

“I think GPs are leading the push to electronic-based health communications, because on the whole they’re more computerised than others in the health system. I believe the network is ground-breaking in Australia.

“A managed health network allows health professionals to be connected and coordinated by sets of agreed communication protocols,” says Dr David Glance, Director of the UWA Centre for Software Practice, which devised the mechanisms of the network. “It was relatively straightforward setting up the infrastructure by which doctors can communicate with other health professionals. The real challenge has been allowing this mode of communication to integrate into changed work practices at GP surgeries, hospitals and within allied health professionals’ offices.”

Offering secure encrypted connections, the network is hosted by a data centre at UWA. It is anticipated that this not-for-profit partnership will promote research collaborations and will become self-sustaining.

For more information visit: www.gsmhn.com.au or email: info@gsmhn.com.au

IN FOCUS

Opera treat for PIAF

One of the centrepieces of the 2009 UWA Perth International Arts Festival will undoubtedly be a new opera, A Flowering Tree, that has enjoyed successful seasons in the United Kingdom, Europe, the United States and Japan.

The John Adams work, commissioned to celebrate the 250th anniversary of Mozart’s birth, draws inspiration from The Magic Flute but is based on a South Indian fairy tale. It will be presented in a new semi-staged production directed by Australian Patrick Nolan.

PIAF’s Artistic Director Shelagh Magadza says the Concert Hall performances in March will be an acknowledgement of the depth of musical talent in Perth. Stefan Asbury will conduct the WA Symphony Orchestra and the WA Opera Chorus and the concert will feature international artists Rachelle Durkin, Russell Thomas and Sanford Sylvan.

“The 2009 Perth Festival program promises some Australian firsts, including this romantic new opera which is exclusive to the Festival,” says Ms Magadza.

“I am delighted to be introducing Perth audiences to works of such quality. Once again the beautiful UWA campus will feature largely in the program, with the Perth Writers Festival offering an expanded program of the very best in contemporary literature. And of course the iconic Somerville Film Season is another campus highlight.”

The PIAF 2009 program will be launched on 5 November and bookings open 10 November. Visit the website: www.perthfestival.com.au
Fathering: getting it right

Professor Bruce Robinson is known as a world leader in mesothelioma research, but also as a champion of good fathering. His book Fathering from the Fast Lane was a best-seller and now he has a follow-up publication that focuses on the father-daughter relationship.

The great thing about Daughters and their Dads is that the experiences related and advice given comes from such a wide variety of people – some 400, including prime ministers, test cricketers, Olympians, Nobel Laureates, presidents and White House staffers, musicians, media personalities and five Australians of the Year.

The author stresses the importance of a good father-daughter relationship in many aspects of a woman’s life, including the building of confidence. UWA graduate and ABC TV presenter and journalist Geraldine Doogue relates the experiences of her own girls and how they built confidence.

“I think if you grow up unconfident and then get married, have children and some success you can shed a lot of those insecurities. I know that I would have been different if my father had given me that confidence,” says the UWA graduate, who believes her own extremely confident daughter has been helped by “the two most important men in her life, her father and her stepfather”.

One of the many illustrations from Bruce Robinson’s Daughters and their Dads

WITH some 65 per cent of vets now being female, it’s little wonder that UWA graduate Adeleh Shirangi’s research on health risks for female vets has received coverage around the world.

Dr Shirangi hopes that her findings – that female vets are twice as likely to suffer a miscarriage if they don’t protect themselves during clinical practice – will raise awareness and lead to reforms.

“Using a cross-sectional survey on female veterinarians, the study showed that not all practices in Australia complied with safety guidelines. We found that many of the vets surveyed either didn’t have safety equipment or were not using it correctly,” says Dr Shirangi.

With UWA’s centenary celebrations being planned from 2011 to 2013 – the three years mark the statutory establishment of the University and the arrival of staff and students respectively – UWA is considering ways in which to highlight its contributions to the intellectual, cultural and economic development of the State and nation.

One initiative is a plan to produce a list of the top 100 contributions. Contributions from current and former students and staff are being sought. Suggestions could include research highlights, medical breakthroughs, works of scholarship, architectural designs and outreach programs. Follow-up research may be needed on your suggestion, so please include details of where your information was sourced. Suggestions for photographs are also welcome.

Please send your suggestions to: Virginia Rowland, Centenary Planning, Office of Development, The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009 or email: virginia.rowland@uwa.edu.au
UWA Press titles

Perspectives of modernism

that erupts when Muslims and born-again Christians confront one another across a courtroom in The Jihad Seminar; four of WA’s most prominent authorities on orchids (Andrew Brown, Pat Dundas, Kingsley Dixon and Stephen Hopper) provide a comprehensive resource for enthusiasts and initiates alike in Orchids of Western Australia; and finally Theo Kalogeracos – who runs the popular Little Caesars restaurant in the Perth hills – shares his best recipes, along with his story of how culture, family and friends transformed a shy Greek boy into a world title holder.

All these and more Press titles are available at the Co-op Bookshop and major bookstores. For more info, visit the website: www.uwapress.uwa.edu.au

UWA offers primary teacher training

UWA offers primary teacher training

Socialism is Great!, a Worker’s Memoir of the New China; Melbourne-based award-winning writer Hanifa Deen charts the unholy war of words

The Lawrence Wilson Art Gallery’s current exhibition demonstrates how nine Australian artists created unique variants of modernism. Style and Synthesis: nine Australian moderns runs until 22 October and features works by Ralph Balson, Elise Blumann, John Brack, Grace Cossington Smith, Roy de Maistre, Guy Grey-Smith, Margaret Preston, Godfrey Miller and Roland Wakelin. Melbourne-based guest curator Andrew Gaynor has selected over 100 paintings, prints and works on paper from the UWA collection and public, corporate and private collections in Perth.

All keyed up

Acclaimed Italian-born pianist, Victor Sangiorgio (who grew up in Perth and now lives in London) will present the final recital in the School of Music’s Keyed Up 08 series with a performance exploring both traditional works from the Western canon as well as a delightful repertoire from South America and Eastern Europe. Explorations features works from Beethoven to Piazzolla and will be held at the Octagon Theatre at 5pm on Sunday 19 October. Bookings through BOCS. For further information about UWA Music programs, phone: 6488 2054 or visit the website: www.music.uwa.edu.au

UWA Press’ Spring collection of titles is an intriguingly mixed bag: Lija Zhang chronicles her journey from Chinese factory worker and Tiananmen Square protester to leading international journalist in Socialism is Great, a Worker’s Memoir of the New China; Melbourne-based award-winning writer Hanifa Deen charts the unholy war of words

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UWA offers primary teacher training

Scholarship supporter Annie Fogarty, (then) Education Minister Mark McGowan with Gillian Morrell and Shami Wallis of North Cottesloe Primary School (Photo: Ron D’Raine)

Already acknowledged for the high calibre of the secondary school teachers it trains, this University is keen to ensure that a child’s first encounter with education is positive and that high-quality teaching is on offer at primary level. As from next year, UWA extends its commitment to the education sector by offering primary teacher education courses for the first time.

“UWA’s Graduate School of Education already attracts students of the highest quality who are destined to become leaders in education,” says Vice-Chancellor, Professor Alan Robson. “The School is rated the highest of all G08 universities in terms of student satisfaction, with a 100 per cent graduate employment record. Our new primary teacher program will ensure an increasingly high standard of teachers in Western Australian schools.”

Professor Bill Louden, Dean of the Graduate School of Education, says that primary teacher education has suffered nationally from a long-term decline in entry standards.

“Admission to the UWA program will be selective, requiring undergraduates to meet the University’s high entry standards,” he said. “Until now, for high performing students who choose their university first and their course next, primary teacher training was effectively excluded as an option.” Professor Louden is Chair of the Curriculum Council of WA and takes up the position of Senior Deputy Vice-Chancellor at the University at the end of the year.

The (then) WA Minister for Education Mark McGowan launched the Primary Teaching Program which will be available as a five-year combined degree for undergraduates or as a two-year course for graduates.

With the State suffering from a teacher shortage, the Fogarty Foundation, which has done so much to support high quality teacher education, is offering 10 inaugural Teaching Excellence Scholarships in 2009. This generous gesture will encourage prospective secondary teachers and raise the profile and status of the teaching profession.

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If you are a UWA student in Medicine or Dentistry who has grown up in rural Western Australia, chances are you will return to practice in one of many rural and remote centres facing critical shortages.

That is the experience of UWA’s Faculty of Medicine, Dentistry and Health Sciences, which aims to boost the number of students with a rural background. This year one in four medical students and one in ten dentistry students have a country background.

For Alice Waldron from Broome, studying Medicine has been her aim since living in Derby and meeting people involved in the local hospital. “I realised how important it is to have really good doctors in the region,” she says. “I’d like to specialise in oncology and make a real difference to cancer sufferers in the Kimberley who have to drive for two days or pay for an expensive plane trip to come to Perth for treatment.”

Professor Ian Puddey, Dean of the Faculty, says that UWA has seen a significant increase in the enrolment of country students: from four to 25 per cent in medicine, while ten per cent of dentistry students are from the country.

“You are making history!” Professor Puddey told undergraduates at an orientation seminar where students were assured of support for those living and studying away from home for the first time.

Further down the training track are medical students who, also for the first time, may be getting to know a regional centre. The Rural Clinical School of WA is currently training 67 medical students in ten locations around the State ranging from small towns to regional centres. While the School is located in Kalgoorlie, it has students from UWA and Notre Dame University studying in Esperance, Albany, Bunbury, Narrogin, Geraldton, Karratha, Port Hedland, Broome and Derby.

Medical students at Geraldton (Photo: Lauren Holt, Geraldton Guardian)

Boosting rural medicine

Chevron–UWA partnership

With energy needs high on the global research agenda, a Chair in Natural Gas and Process Engineering has been established at UWA. Global energy company Chevron has invited this University to join its worldwide university partnership program. The $6.9m program will fund the Chair along with postdoctoral appointments and PhD scholarships.

Vice-Chancellor Professor Alan Robson said the partnership cemented UWA’s place as a leading international university of excellence in the training of engineers and earth scientists.

“Our relationship with Chevron and its industry and academic partners will enable us to produce more job-ready graduates and allow Chevron to draw on our substantial research and teaching expertise.”

Advanced Management Program

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UWA’s Future Framework: Courses of Action

The report of the Review of Course Structures at your University has recommended exciting and far-reaching change, which provides us with a once-in-a-generation opportunity to ensure UWA continues to strengthen its position within the national and international higher education sectors.

The review – led by Professor Don Markwell, Deputy Vice-Chancellor (Education) – has engaged the University community and other interested parties in an extensive consultation and feedback process over the past two years. The contribution of alumni and friends of the University has been a vital part of the process and will continue to be so as we move towards a final decision informed by the report and its recommendations.

The changes recommended are designed to enhance the future educational needs of students and the student experience in the broad context of the University’s teaching, learning and research. They can also help our University strengthen its place as one of the leading universities in Australia, and build on its ambition of ‘achieving international excellence’.

A final decision informed by the report will be made in the next several months but it is fair to say that, if the recommendations are adopted, we will be implementing a distinctive set of reforms that integrate the University’s strengths as a research-intensive institution with our commitment to high-quality student-centred teaching.

The report indicates most strongly that research skill development should be a hallmark of all UWA degrees. It envisages a strengthening of the teaching-research nexus with an emphasis on research skills and inquiry-based learning in all courses. In addition there will be a new BPhil (Hons) degree, open to outstanding students in any discipline, with an especially intensive research focus and support for international study.

Tangible benefits will flow to students, staff and other stakeholders from the introduction of a much simpler, more flexible, more transparent and more consistent framework for every course. There will be fewer undergraduate courses but they will be more flexible. All fields of study that UWA covers at present will continue to be available, though in different forms.

Each new undergraduate course will include four broadening units. This includes a requirement to study aspects of the globalised and culturally diverse environment in which graduates will live and work. The broadening units will be chosen from subjects already taught in different parts of the University. Our existing range of offerings, if carefully structured, can provide wonderful opportunities for students to broaden their education.

Further, all undergraduate courses will incorporate an explicit focus on communication skills, and will also arrange for students to engage with the wider community through a service learning experience with a not-for-profit organisation.

The report recommends several other significant changes. One of these is that courses designed to meet professional accreditation requirements will normally be offered only at the postgraduate level. Another is that combined undergraduate courses leading to two Bachelor degrees will be discontinued. Instead, the University will provide sequential pathways for undergraduate and postgraduate course combinations in professional fields. This will enable suitably qualified applicants, at the point of initial undergraduate enrolment, to be offered assured entry into the postgraduate professional course after completing an appropriate first degree.

These and other proposed developments have the aim of producing high-quality graduates who are:

• Educated: provided not only with expertise in a chosen field but also with broader understandings.
• Enquiring: able to bring to new challenges an open but critical mind, trained in research methods.
• Eloquent: equipped with outstanding capability as clear, logical and powerful communicators.
• Engaged: linked responsibly to the wider community through service learning experiences.

The review report is available at: www.coursestructuresreview.uwa.edu.au and I commend it to all in the University community.

Alan Robson
Vice-Chancellor
Swimming
in stone
Australia boasts some of the Earth’s oldest landscapes and, locked within them, some of its most ancient fossils. And, as fossil finds go, they don’t come much more spectacular than those from the Kimberley’s Gogo Formation – an expanse of shales that offers the world of palaeontology exquisitely preserved three-dimensional fossils of fish that swam in long gone reefs some 375 million years ago.

One such fossil has stirred worldwide interest, and coverage in the prestigious journal *Nature*, on the ABC’s *Catalyst* and on Robyn Williams’ *Science Show*. It has also thrust into the media spotlight a somewhat reluctant UWA researcher, Dr Kate Trinajstic (School of Earth and Geographical Sciences) who co-authored the *Nature* paper with renowned palaeontologist Dr John Long of Museum Victoria.

The fossil that produced palaeontology’s most recent ‘Eureka moment’ is the planet’s oldest vertebrate mother – a placoderm fish in the process of giving birth, its embryo and umbilical cord intact. It was collected during an Australia Research Council-funded expedition led by Dr Long, a world authority on fish fossils, and author of *Swimming in Stone: The Amazing Gogo Fossils of the Kimberley*.

Dr Trinajstic, a UWA Research Associate who has worked with Dr Long for many years, says that the placoderm find has radically altered our understanding of fish evolution.

“We knew it was a good fossil because it was so well preserved, but it wasn’t until we had given it several acid baths – to reveal more of the skeleton embedded in the limestone – that we saw the embryo,” recalls Dr Trinajstic.

“The fact that we can see detailed anatomy is extremely exciting and the presence of the umbilical cord is rare given that soft tissue does not usually fossilise. Scanning electron micrographs at UWA have also revealed the path of blood vessels, indicating that this fish was providing nourishment to her young.”

Prior to the discovery of what the media dubbed ‘the world’s oldest mother’, little was known of the reproductive strategies of Gogo fish. Researchers assumed that placoderms, like most fish, laid eggs fertilised externally in water. However, the fossil proved that this primitive fish had evolved advanced reproductive systems: internal fertilisation, the nourishing of embryos and live birth – much like mammals. Clearly these strategies had advanced its survival and a dominance of ancient oceans, rivers and lakes that spanned millions of years.

The 25cm long fossil officially unveiled at Melbourne Museum amid much international media fanfare was named *Materpiscis attenboroughi* after the renowned naturalist Sir David Attenborough.

Top right: Placoderm fossil emerging from the limestone that has protected it for millions of years
Inset: Dr Kate Trinajstic. (Photo: Ron D’Raine)
During a launch event, Dr Trinajstic spoke via videolink to both Sir David and Queen Elizabeth at a Royal Institution of Great Britain function in London.

Sir David’s Life on Earth series attracted international attention to the fossil-rich Gogo Formation in 1979 and the naturalist still vividly recalls his sense of wonder when stepping out of a helicopter at the now famous Kimberley site. He was honoured to have the fossil named after him and commended the Australian scientists involved. “The skill with which you have revealed and identified the umbilical cord is really extraordinary,” he said.

Sophisticated equipment helped in that lengthy process of discovery, with the umbilical cord being spotted by the researchers using X-ray computer tomography (XCT).

“The scanner at the Australian National University is a hugely expensive piece of equipment, but it is fantastic because it allows us to see through rock to the internal structure of the fossil in a non-destructive way,” explains Dr Trinajstic. “Normally the only way you can see such internal detail is by sacrificing the specimen – slicing it up and putting it on a slide.”

UWA’s electron microscope also helped to reveal anatomical detail such as the cord’s spongy soft tissue. Since then, Gogo fish with several embryos intact have been identified.

Dr Trinajstic and fellow researchers at ANU and Museum Victoria are currently exploring different aspects of the now famous fossil – looking at collagen in the bone, the lipids (fats) present in its tissue and the chromatophores (pigment-containing and light-reflecting cells) that would have given this armoured reef fish its colour.

When you talk to the UWA researcher you get the feeling that, while this particular Gogo fossil has already provided a career landmark, there is much more she intends to learn from Materpiscis and the unearthed fossils that abound south-east of Fitzroy Crossing, an area that was once a 1400km barrier reef.

“We’ve only scratched the surface at Gogo,” she says with undisguised enthusiasm. “We’ve been going up there since the 1980s and there hasn’t been a single field trip when we’ve not found something incredible, something new. And once you have 20 samples of the same species you begin to get a picture of the growth patterns and variations of the fishes that swam in this ancient ocean.”

Placoderms were armour-plated fish that became extinct in the late Devonian period, some 380 million years ago. They ranged in size from large-skulled six-metre predators to agile bottom-dwelling carnivores that could sit in the palm of your hand. Known as ‘the dinosaurs of the seas’, Dr Trinajstic recalls that the Paris Museum required a fork lift to manoeuvre its specimen into a display space.

“Placoderms were the dominant fish of the time and they filled all the niches that modern fish occupy

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Helping Deliver a Healthy WA
– until their sudden decline at the end of the Devonian period. We don’t know what caused their mass extinction, but we do know that sharks quickly moved in to fill their niches."

When Dr Trinajstic taps a featureless limestone nodule with a hammer, it falls apart to reveal a fish skeleton with remnant tissue. It’s hard to conceive how it could have survived 380 million years and the restless reshaping of topography that split the supercontinent of Gondwana, a landmass that included what is now Australia, South America, South Africa, Antarctica and India.

As the UWA researcher explains, the fish we see in fossil form once moved through deep inner reef waters that were protected from volatile ocean currents. When it died, its body settled on the seabed and was buried by sand and other lime-rich marine material. Over time, this material hardened to form protective limestone nodules that preserved their delicate cargo for millions of years.

Meanwhile, tectonics plate movement had reconfigured Gondwana. The Earth shifted, sea levels fell and the long indentation of ocean that had once filled the Canning Basin retreated. When the land became tectonically stable, the basin’s muddy sediments continued to protect the fossils that are now helping us to understand the past.

UWA played a role in the initial recognition of the Gogo Formation, the fossils being identified by Russian-born Curt Teichert, a Geology Department palaeontologist. Teichert fled Nazi Germany in 1937 and a Rockefeller Foundation-funded program to resettle German scientists brought him to UWA. At the time, he was the State’s only palaeontologist and immediately began mapping and recording fossils in the Kimberley. However, specimens he collected languished after he left Australia to pursue a distinguished career in the United States.

The Gogo story is then taken up in the 1960s by Harry Toombs of London’s Natural History Museum who examined the Teichert collection and was hugely excited. He visited the Kimberley and shipped half a ton of material back to London. This material in turn awakened the interest of Dr John Long (formerly of the WA Museum) with whom Dr Trinajstic has worked for more than twenty years.

Dr Trinajstic’s PhD research at UWA focussed on identifying the ages of Canning Basin rock formations, using fish fossils. Her research was supervised by UWA’s Dr Annette George and her contribution to this area of research was later recognised by an Academy of Science award.

“Because we are starting to see more fossils from further back in time, we’re beginning to realise that right at the beginning of the evolution of jawed animals such as this Devonian fish, there was already incredible diversity,” says Kate Trinajstic. “We’ve also discovered that the origins of our own anatomical systems are present in primitive fish such as this. Devonian fossils have features seen in four-legged land animals, including the precursors of forearms in fins that, it is speculated, may have enabled fish to dart out of the reef to catch prey.

"On the evolutionary tree they’re the first jawed animal and we’re the last – so they’re our jawed ancestors."

Materpiscis is on display in the foyer of the Melbourne Museum, while another Gogo fish is on display at the WA Museum. You can also see Gogo fossils at UWA’s Edward de Courcy Clarke Geological Museum, which is open to the public and caters for school visits. Phone: 6488 2681; or visit the website: www.earthmuseum.segs.uwa.edu.au

Above: A Gogo fossil from UWA’s Edward de Courcy Clarke Geological Museum. (Photo: Ron D’Raine) Inset: Eastmanosteus fossil from Gogo

CONTACT

Dr Kate Trinajstic
School of Earth and Geographical Sciences
Phone: +61 8 6488 2679
Email: ktrinajs@cyllene.uwa.edu.au

THE ORIGINS OF OUR OWN ANATOMICAL SYSTEMS ARE PRESENT IN PRIMITIVE FISH
There are countless stories of pastoralists drilling bores to sustain livestock during droughts – and being astonished at the high temperature of the water that spilled out from artesian stocks. Little did they know that the Earth’s own heat – so effective at heating underground water – would be viewed as a potentially valuable source of clean power for the 21st century.

Western Australia is blessed with energy resources that are in demand around the world, but it also appears to be rich in an untapped source that could help to meet its own energy needs in a carbon constrained world.

Geothermal power has, of course, been put to good use since ancient times. The Japanese turned their volcanic hot springs – onsen – into places of communal bathing and religious ritual well before the Romans began building baths and using thermal spring water for cooking, bathing and heating.

Both were utilising water heated by molten rock that comes close to the Earth’s crust around the volatile edges of tectonic plates. Sometimes we become aware of this magma in the pyrotechnic eruptions of volcanoes; at other times it works unseen within the Earth, heating the waters of aquifers and creating geysers and hot springs.

While one of the world’s most spectacular examples of the Earth’s natural energy – the Old Faithful geyser in Yellowstone National Park – has become a major tourist attraction, other concentrations of volcanic geothermal energy power entire cities like Reykjavik in Iceland.

An Italian prince is credited with building the world’s first geothermal power generator in the first decade of the 20th century, but it was not until the 1950s that a second plant was built in New Zealand. Today, while geothermal power is used in over 70 countries, it is still considered an under-utilised resource in a world that has grown accustomed to the use of fossil fuels.

Previously hot volcanic rock was thought to be the only source of power for heating or electricity but, as the push for clean sources of energy has gathered momentum, artesian stocks are now engaging the

Above: Thermal Springs, Iceland (Photo: Icelandic Tourist Board). Inset: Professor Klaus Regenauer-Lieb, Director of the WA Geothermal Centre of Excellence

A new chapter in the State’s energy history

With greenhouse gas emissions, rising energy prices and talk of carbon taxes dominating headlines, an ancient source of carbon-free energy could open a new chapter in the State’s energy history. Premier’s Fellow, Professor Klaus Regenauer-Lieb, who heads the new WA Geothermal Centre of Excellence, thinks that it is a source of energy that has been too long overlooked.
interest of both scientists and energy companies around the world.

In Australia, this resurgent interest was spurred when geologists drilling for oil and gas in the north of South Australia found granite heated to 250 degrees four kilometres below the surface. This heat, locked beneath a blanket of sediment, was generated by the natural radioactivity of the granite.

While exploration in Australia has been limited, the nation appears to be rich in potential sources of geothermal energy, and Western Australia is now advancing its own exploration for what could be a clean source of power.

Earlier this year, the WA Government took a historic step towards exploiting the geothermal resources of the Perth Basin with the release of the first acreage for geothermal exploration. It is an initiative that marked the opening of a new chapter in the State's energy history.

"The potential benefits are huge," predicted (then) Premier Alan Carpenter, “and the end result could be a clean energy industry that provides for the future needs of Western Australians, while minimising environmental impact.”

Even before bids from nine different geothermal explorers were received, the Government had announced funding for a new $2.3 million WA Geothermal Centre of Excellence that brings together expertise from UWA, CSIRO Exploration and Mining and Curtin University of Technology.

Meanwhile, on the other side of the Nullabor, geothermal exploration companies are claiming that the Cooper Basin has enough hot granite to replace all of Australia’s coal-fired power stations for more than 250 years. The local pub in Innamincka is reportedly preparing to invite customers with the slogan: ‘Have a cold beer from the hottest rocks!’

“Sedimentary basins like the Cooper occupy a large portion of the Australian landmass and offer an ideal target to push forward new geothermal technologies,” says Professor Klaus Regenauer-Lieb, who heads the new UWA-based Geothermal Centre of Excellence.

“The Great Artesian Basin is one of the world’s largest groundwater basins underlying one fifth of the continent. Groundwater comes out at wellheads at temperatures up to 100°C.”

While volcanic rock has superheated water and steam for geothermal plants in Iceland, New Zealand and other countries for decades, only recently have scientists appreciated the exploitable heat and hot water lying right beneath their feet, right across the globe.

“Direct geothermal heat offers a sustainable solution for displacing large-scale electricity consumption and it has been largely overlooked,” says Professor Regenauer-Lieb who is a Premier’s Research Fellow in the School of Earth and Geographical Sciences.

Professor Regenauer-Lieb has spent much of his career combining geology with geodynamics in his studies of the forces at work deep within the Earth. He has explored the formation of minerals billions of years ago, and charted their subsequent fluid transfer from the interior to depths that are accessible to miners. His ground-breaking research on plate tectonics, as part of a team of Australian scientists, stirred international interest and was reported in the prestigious journal Nature in 2006.

Now he’s focusing his research on the area of ‘mining’ heat.

Back in his native Germany, where the use of geothermal energy is well-established, scientists have long been engaged in a quest to better understand the fundamental processes at work in the continental crust — from earthquake activity to ore deposit formation.

Germany is home to the world’s famous super-deep KTB Borehole, initiated by a geoscientific commission in 1978. The aim of this ambitious project was to drill to a depth of more than 9,000 metres (where temperatures approach 260°C) to provide scientists with a permanent, accessible site for researching temperature distribution, heat sources and flow, and the role of fluids.

Steam pipelines at Wairakei Power Station New Zealand. (Photo: Environment Waikato, Hamilton, NZ)

Turning heat into power

Rotorua’s unique thermal landscape is famous around the world, but New Zealand does far more than attract tourism with its geothermal resources. The Wairakei Power Station, an important ‘base load’ station near Taupo, was one of the first geothermal plants in the world to use very hot water as the source of steam used to drive turbines. The station produces 1550 GWH of electricity per annum, enough to supply Taupo, Rotorua, Napier and Hamilton. Geothermal energy supplies 12 per cent of New Zealand’s primary energy supply and seven per cent of its electricity supply. The Ministry of Economic Development forecasts that the amount of geothermal energy extracted per year will rise by 75 per cent by the year 2030.
The project required the construction of the world's largest land rig, plus special equipment to withstand the ultra-high temperatures and pressures. A big surprise for scientists – who expected the deep crystalline rock to be bone dry – was the discovery of water at such great depths.

Whereas water trapped underground at high pressure for millions of years is currently stirring the interest of scientists and geothermal companies in the Cooper Basin, Professor Regenauer-Lieb wants to focus on mining direct low-grade accessible heat right where it can be used, in the population centres that lie over shallow groundwater. No special drilling equipment would be needed – the drills used in mining would be adequate – and the Perth and Carnarvon Basins are prime targets.

“While hot, dry rock energy where water is pumped at depth and recycled has been much in the news as an alternative and supplement to fossil fuel-derived energy, hot, wet geothermal energy has not drawn the same degree of interest,” says Professor Regenauer-Lieb. “This is the niche we want to fill because research in this area has been neglected worldwide.

“Because we are pioneering research into the exploitable temperature range well below 100°C we won’t be looking at generating electricity from this heated groundwater, but we will utilise it for heat-driven air conditioning, geothermal desalination, aquaculture and other industrial uses. As such, it has the potential to displace a lot of the electricity we are currently using.”

The Perth Basin lies beneath a string of communities from Bunbury to Geraldton and extends from the Darling Scarp to offshore. It accommodates the Yarragadee aquifer, the region’s biggest shallow aquifer, and comprises a layer of up to 15km thick, highly permeable sandstone, siltstone and mudstone over a belt of granite that is the predominant source of geothermal heat.

“When I first looked at data from the Perth Basin, I was shocked! These Jurassic sediments have the same permeability as coarse gravel and a flow equivalent to an open garden hose,” says Professor Regenauer-Lieb.

“The natural temperature, porosity and permeability of our sedimentary basins may be sufficient to provide usable geothermal power without the requirement of stimulation. Permeability is the most important factor because it allows you to extract the heat – and many projects have failed because of lack of porous sediments.

“Stadium uses geothermal heat

Perth boasts several pools that are heated with geothermal energy, including Challenge Stadium which is considered one of the best aquatic facilities in the southern hemisphere. The venue’s managers are proud of the pool’s environmentally-friendly heat source that comes from some 700 metres underground. Pumps recycle the naturally-heated water. The Stadium has achieved a 47 per cent reduction of overall energy consumption in the last five years – enough to power 5,000 homes – and the installation of geothermal heating has contributed half of these savings.

Challenge Stadium, Perth
“By exploring for and utilising low-grade heat in a permeable sedimentary environment, we address an overlooked opportunity for broadening the footprint of geothermal energy utilisation.”

Temperature data used by researchers comes from numerous shallow and deep water bores and holes from on- and offshore oil exploration. However, these are only estimates. With his research colleagues, Professor Regenauer-Lieb is currently constructing 3-D geological models of the Basin’s underlying topography to chart the flow of cold water and upwelling of hot water.

The UWA researcher is confident that geothermal heat from the Perth Basin could soon drive chillers for air conditioners that are currently using vapour compression chillers. And air conditioning constitutes the bulk of peak electricity use in the world’s major cities.

To advance research in this area, Geoscience Australia has committed $100,000 towards an exploration geothermal drill hole that could be located on the UWA campus or at Technology Park. Researchers will collaborate with emerging geothermal industry leaders, and will supply modelling, geophysical know-how and PhD candidates to undertake projects.

A major partner in the Centre is the Australian geothermal exploration company, Green Rock Energy Ltd, which has applied for several geothermal tenements in the Perth Basin and has projects in South Australia and Hungary. Researchers will focus on developing multi-scale heat transfer models of the geothermal aquifers in the Perth Basin with the aim of identifying the most economic geothermal sources.

“With all the data we have on climate change, it is becoming clear that we need to do something right now – we can’t wait 10 years,” says Professor Regenauer-Lieb. “We already have provisional patents for new technology that is particularly suited for direct use of heat from deep sedimentary basins such as the Perth Basin.

“There are, of course, challenges and opportunities. The main opportunity is that the drilling costs can be reduced substantially because heat and topography-driven upwellings exist that provide natural transfer of heat to shallower levels.

“The main challenges are that natural convective upwelling zones need to be accurately targeted and new methods devised to harness the use of low-grade heat. Shallow geothermal sources may not reach the temperatures necessary for efficient electricity generation but they are ideally suited for direct heat-driven desalination, heating and cooling and dehumidification technologies.

“For 3-D modelling of these geothermal systems the Centre will harness the supercomputers now being set up in Perth. This will make it possible to drive geothermal research into computationally intensive directions that had previously been out of reach in Australia.

“The investment costs for this endeavour are not trivial. Drilling is always expensive, and, because of the boom, getting drilling equipment may be difficult. But the technology above ground exists and the potential is huge.

“With political will, within three years we could have the first geothermal air-conditioning units on campus or at Technology Park.”

The Centre already has 20 staff members with 10 more planned and funding exists for 10 graduate and postgraduate students. With the establishment of the UWA-based Centre, Australia now boasts three geothermal research centres, each approaching the exploitation of this valuable energy source from a different perspective.

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**A land of ice and heat**

Tiny Iceland boasts some 130 volcanoes – and very clean air! The capital Reykjavik obtains 100 per cent of its heat and 40 per cent of its electricity from geothermal power – and the rest from hydropower. Molten rock occurring close to the surface generates steam when it encounters water, and this is tapped to produce clean, renewable electricity. Geothermal power plants work day and night making them base load power plants.

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**CONTACT**

Professor Klaus Regenauer-Lieb  
Phone: +61 8 6488 7321  
Email: Klaus@segs.uwa.edu.au  
WA Geothermal Centre of Excellence website:  
www.geothermal.org.au
The clear and present danger of climate change poses a litany of challenges for agriculture – and for UWA scientists whose research has contributed to the sector’s impressive track record of productivity.

Agricultural scientist Kevin Goss heads the relatively new UWA-based Future Farm Industries Cooperative Research Centre (CRC) that is ushering in a new way of thinking down on the farm. And he’s convinced that Australia’s family farm – with its tried-and-tested mix of cropping and livestock and track record of innovation – will survive and thrive in the 21st century. It will do so by getting even smarter: with new technologies, precision farming, and a range of crops and pastures that use precious rainwater and nutrients more efficiently.

It is a testing time for Australian farmers. The drought has knocked their confidence. Coping with a drying climate is a big issue, compounded by the uncertainty of how agriculture will be dealt with by the Australian Government’s climate change policy. Salinity has degraded more than two million hectares of farm land, mostly in Western Australia. Can the family farm survive?

These new varieties – a mix of new and currently grown species – will be more productive and adaptable to drought and degraded soils. The new species will further diversify farm income, like the marvellous oil mallee that not only reduces water-logging and dryland salinity, and enhances biodiversity but also provides biomass for renewable electricity production, high-energy wood pellets (much favoured in Europe), bio oil and charcoal.

While some 20th century farming practices took a toll on the land, climate change and the loss of

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once-productive acreages demand that agricultural scientists work with farmers to come up with 21st century solutions.

Travel north or east beyond Western Australia’s capital city and the transition from the orderly patterns of farmland to the rangeland’s uncultivated terrain is as dramatic as Richard Woldendorp’s aerial images illustrating this article.

Back in 1919, UWA’s first Professor of Agriculture warned a Royal Commission that areas of the region later dubbed ‘the Wheatbelt’ were unsuitable for agriculture. The commission ignored John Paterson’s ‘scientific prejudice’ and began the long, economically beneficial but often damaging process of replacing salmon gum and mallee woodlands with wheat.

Dryland salinity now affects 1.1 million hectares of the WA Wheatbelt and threatens another 24 per cent of productive land, 30 regional towns and up to 400 plant species. Minimising further damage through a combination of water efficient farming systems, water control earthworks and replacing tree cover has become a top priority, along with revegetation of land already salt-affected.

Kevin Goss says over the past century the land release policies of successive governments have demarcated the South-west Land Division (stretching inland from the coast to a line from Geraldton to Esperance) that was deemed to receive sufficient rainfall to sustain agriculture.

“The recent run of droughts, supported by climate predictions, suggests this line is shifting to the southwest where there is more reliable rainfall closer to the coast,” explains Mr Goss. “What is left behind is a swathe of land at risk, some of which has suffered severe erosion in recent years. Such deterioration invites the question if this land should be retired from agriculture altogether. A notion I personally reject because there are options; exploring them, making them available to farmers and retaining sustainable practices for these areas is what this CRC is all about.”

The Future Farm CRC is a unique public-private joint venture that brings together the expertise of universities, state departments of primary industries, the CSIRO and conservation agencies within WA, Victoria, New South Wales and South Australia. Given its significant brief, it is not surprising that it is one of the largest CRCs with financial backing from the Australian and WA governments, along with major research and development corporations.

Apart from mapping out the way ahead for Australian agriculture, the CRC is offering training both to farmers and those influencing their business decisions – agronomists, government extension officers, farm management consultants and natural resource management coordinators.

“Australian agriculture has a strong track record of adopting innovative solutions and technological changes to overcome problems and increase productivity,” says Kevin Goss. “What often surprises people is that the productivity of this sector is second to none – due in no small part to the role of research and its uptake.”

Probably the most dramatic change Mr Goss has witnessed during a career spanning more than three decades has been the move to no-till and controlled traffic cropping that enables farmers to get their crops in quickly when weather conditions are right and extract the maximum yield from limited rainfall. Minimal soil disturbance improves soil condition, reduces erosion and saves on the fuel used to plant greater acreages.

When he began his career, the intricate patterns of ploughing – that Woldendorp’s aerial photography captures – would have been replicated across Western Australia. Today, tractors tow massive planting units that apply weed-inhibiting herbicides onto the undisturbed ground and slice into the earth to deposit seeds – all in a single operation with minimal disturbance.

This revolution in farming methods could not have been achieved without public-private collaboration.

“You needed a combination of publicly funded research and the ability of private enterprise to develop the herbicides and the agricultural machinery big enough to do the job.
“And it is that collaboration that makes this CRC the best way of tackling the challenges ahead.”

Kevin Goss’ wide experience made the UWA graduate an ideal candidate to head up the CRC.

“As a UWA student I was enticed by the idea of applying science to agriculture – if possible under the sun and in a green paddock!” says the third generation Western Australian. Having majored in animal science in the 1970s, he joined the Department of Agriculture and Food as an extension officer, bridging the worlds of research and farming. At that time, while farmers took advice from herbicide salesmen or livestock agents, they invariably double-checked it with a credible, unbiased source: the Department’s extension officers. More recently, governments have found it hard to justify extension work at public expense, so today that role falls to the private sector – farm management consultants, agribusiness companies, community-based land conservation groups – and to industry-funded farmer groups.

The Future Farm Industries CRC (which had its origins in the CRC for Plant Based Management of Dryland Salinity) is once again providing a link between researchers and farmers. It is also carrying forward the earlier CRC’s research focus of developing a range of perennial plants that will give farmers further options to adapt to future challenges.

Perennials are stirring interest across Australia. During the worst drought on record they supported livestock at stocking rates of up to 50 per cent more than annual pastures while controlling groundwater and maintaining ground cover to prevent erosion. Having feed available year-round is vital for livestock and currently perennial pasture plants such as lucerne and chicory provide that, while their deep roots intercept groundwater recharge. These perennials are also credited with lifting ovulation rates in Merino ewes. Already the CRC is working on the next round of even better, hardier perennial plants, some adapted to the more hostile soils.

“Perennials use rainfall very effectively,” explains Mr Goss. “This enables them to limit the rise of ground water and its dissolved salts to the surface. And in farms that are already salt-affected, salt-tolerant pastures are already keeping the land productive. CRC researchers have also made significant headway in creating a salt and water-logging tolerant wheat.”

Ask Kevin Goss what WA farms will look like in 2020 and he predicts that annual crops will remain the mainstay of farm income – wheat, canola and perhaps some pulses. But, through plant breeding, the varieties on offer will be adaptable to the seasonal variability of climate change. No-till farming will continue, and farmers will have more sophisticated predictive tools to tell them when and where to crop, all part of a precision agriculture revolution.

“Twenty years from now there will be much higher climate variability so farmers will need far better predictive tools to tell them how much to plant and where to plant, based on soil fertility,” says Mr Goss.

“The 2020 farmer will have different dry and wet year strategies and, yes, sometimes it may be better to leave the equipment in the shed and not plant a crop.

“Farmers in the Wheatbelt practising this opportunistic cropping will use ever more sophisticated tools for identifying the most reliable yielding soils.

“Will the corporate farms swamp the family farm? I think not.

“The family farms still dominate WA agriculture. They are bigger and more mechanised; their inputs are significant; their technology is sophisticated; they use a lot more contract services – but they are still run by a family unit.

“The limitation for corporate farms is labour, and the fact that a company structure is less responsive to the seasonal cycle. On a farm, decisions have to be taken tactically and continuously. You have to spray or get the crop in when conditions are just right.
and there needs to be someone on the spot to make those decisions. Local experience and attention to detail really counts.

“On the family farm you have people on the spot doing the job and it’s in their self-interest to do it properly. By using climate modelling and yield mapping from previous years, and relating it to soil types, you can plant crops precisely and opportunistically, according to seasonal outlook.

“However, you can’t sustain a family business on opportunistic cropping that might see your machines in motion one year, and in the shed the next.

“Our brief is to look at what else can grow on that farm apart from the cropping component. Traditionally, most Wheatbelt farms also have livestock and economic analysis tells us that mixed farms are still the State’s best performers. So we know that perennial pastures will play a role in 2020 when there will be more annual variability and an underlying trend to drier, hotter conditions.”

Agriculture’s likely inclusion in national carbon emissions trading and the rising cost of fertilisers are also being addressed by the CRC.

“We’re exploring the role of woody crops on farms for biomass energy supply and carbon sequestration and assessing ways of substituting organic nitrogen for fertiliser use. We already know, for instance, that drought-hardy perennial legumes fix nitrogen in the soil.”

Kevin Goss says agriculture has to do its bit in limiting greenhouse gases – and sequestering more carbon dioxide on farms will be an important contribution. “Plants take in carbon dioxide and lock it up securely as long as they live. Mallees are particularly good at this because they have an extensive root system. The important thing in all this is to give the farmer more options,” he emphasises.

These options include growing some of the promising perennials being developed or trialled at UWA’s Shenton Park facility, in laboratories at the University and CSIRO, and on farms. These varieties offer hope for farms dubbed unsustainable because of low or unreliable rainfall, or saline and waterlogged soils. Researchers from the CRC have already collected hundreds of native plants: 20 are now being trialled.

One such group of native legumes is known as Cullen, and PhD student Richard Bennett is currently assessing their ability to provide perennial pasture on acidic or waterlogged soils in low-rainfall areas. Collected in the wild and planted at trial sites, the plants were selected for their suitable traits and are impressing agricultural scientists.

“Where a paddock of Cullen is integrated with annual pastures, animals will most likely select the Cullen when green-feed becomes scarce,” says Mr Goss.

Related research is underway in the School of Plant Biology, where Research Associate Dr Jiayin Pang has...
Hundreds of young women lost!

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been selecting perennial legumes including Cullen that use phosphorus more efficiently, so that fertiliser use is reduced. “Phosphorus deficiency is one of the main constraints to agricultural production in WA. Although fertilisers containing phosphorus are efficient, global phosphorus reserves are being depleted while world demand is rising,” she says.

Another promising perennial has caught the eye of UWA researchers on a field trip to the Canary Islands off the coast of Morocco. *Bituminaria bituminosa* stays green and lush through the volcanic island’s long dry summers when there is less than 200 mm annual rainfall. Trial plots in the Wheatbelt survived one of the driest summers on record (2006) along with sustained locust attacks. Standing 30cm tall, the plant has proved palatable to sheep and it re-sprouts after heavy grazing. The drought-tolerant variety being trialled also fixes soil nitrogen.

The plant poses a low weed risk and provides a reliable seed supply. It is now available for inclusion in follow-up trials in a wider range of environments this year. International links with Spain, Portugal and Italy are being fostered to investigate the potential of this perennial, and agricultural scientists from Spain have spent time in Perth advancing this research.

Another plant genus that has the ability to flourish in extreme environments such as saline or waterlogged conditions also comes from the Canary Islands. Perennial species of *Lotus* are a group of herbaceous plants and small shrubs with fodder potential in dryland systems.

Determining what genes make a plant salt tolerant is a challenge being taken up by CRC student Natasha Teakle who is exploring genes in the perennial pasture legume *Lotus glaber*.

“So far, I have isolated and cloned a gene that protects the plant from the toxic sodium ions present in saline soils,” says Natasha. “But more work needs to be done to identify genes that restrict chloride ion transport to sensitive parts of the plant and genes involved in water-logging tolerance. This knowledge will help us select suitable varieties with more tolerance to these conditions.”

Another research initiative is focussing on perennial wheat. Researchers are crossing a perennial grass closely related to wheat with an annual variety of wheat and trialling the cross-bred progeny.

“We know we can achieve a cross but we still don’t know if we can produce a commercial wheat – this is a project in early development in collaborations with the Land Institute in Kansas and Washington State University in the USA,” says Kevin Goss.

“This is just one example, but there are huge opportunities for mixed dryland farming to make breakthroughs in climate change adaptation while maintaining productivity and reducing the environmental footprint of agriculture.”

The CRC’s researchers are not alone in appreciating the magnitude of the problems that lie ahead as the world struggles to maintain food supplies. There are many research hubs across UWA’s campus tackling these problems from dozens of different perspectives.

Professor Kadambot Siddique, Director of UWA’s Institute of Agriculture, sums up the challenges like this: “We need to double world food production output by 2050 using less land, far less water, and few nutrients – all against the background of increasing climate variability and change.”

What no one doubts is that bodies such as the Future Farm Industries CRC will play an invaluable role in meeting those challenges.
Local vegies coming your way

Shoppers seeking out fresh local produce at the Albany Farmers Market have sampled some truly local vegetables you won’t find in a fresh produce store or on a restaurant menu – yet!
UWA’s Centre of Excellence in Natural Resource Management (CENRM) has been conducting research to develop some native plant products that are indigenous to southern WA and that have potential as new vegetable crops. To initiate the local community to the products, raise awareness and develop local knowledge, a stall was established at the Albany Farmers Market on a regular market day, offering free tastings.

The three products were offered for tasting in their raw form and also prepared in a range of ways, including sauces, soups and dips. More than 150 people sampled the products and for most it was their first taste of Youlk, Meen and Kulyu – vegetables of significance to some of WA’s Aboriginal communities.

Youlk or ‘Ravensthorpe radish’ is a sweetish yellow tuber (related to the carrot and with similar nutritional value); Meen (or Bloodroot) is a bulb producing a vibrant red extract used as a colouring and hot spice; and Kulyu is a succulent tuber that is baked by Aboriginal people living in the arid inland.

A Research Associate at the Centre, Ben Boxshall says we’ve failed to systematically investigate the huge diversity of native plants in Western Australia. “There are some exciting edibles out there,” says Ben. “We want native foods to be seen by consumers as a healthy, nutritional and ethical alternative – and not, as has happened in the past, solely as tourist tucker.”

Dr Geoff Woodall, Senior Researcher at CENRM, says that native foods have fascinated us since the first decade of European settlement, when diarist G. F. Moore recorded his discovery of “a bulbous root like a dark potato” that he intended to cultivate.

However, since then we’ve largely ignored the potentially useful 150 species that form root tubers or similar storage organs, most of which occur in the State’s south-west.

Funding by the Rural Industries Research and Development Corporation, the Great Southern Development Commission and other sponsors could mean that this research marks the beginning of new rural industries and agribusiness developments. The big difference will be that the plants involved don’t require large amounts of water, and are adapted to the low nutrient environment and variable climate of southern WA.

Several farmers in the south west and at Carnarvon are producing trial crops of the plants. There are still many agronomic questions to be answered but the achievement of 35 tonne per hectare of product for one species after 12 months is very encouraging.

The species with the brightest future is Kulyu. The project has demonstrated that product derived from Kulyu would be enthusiastically embraced by the market and that the product could fit within existing vegetable processing, distribution and retail systems. Its nutritional value is broadly similar to that of sweet potato though some nutritional components differ. Unlike sweet potato, Kulyu remains firm and crunchy when cooked. The project has also developed a basic propagation and cultivation system capable of producing an economically viable product yield when cultivated under intensive horticultural conditions at Carnarvon in Western Australia. It can thus be justifiably concluded that Kulyu is well on the way to becoming a commercial reality.

“Agronomic systems developed for these new vegetable crops are likely to be less environmentally damaging than current horticultural practices,” says Dr Woodall. “They are also well adapted to low and variable rainfall, an important attribute to consider when adjusting to an altered climate.”

Native plant industries tend to be more labour intensive than broad acre farming, and would generate employment opportunities in rural communities and enterprise opportunities for Indigenous and non-Indigenous Australians.

CONTACT

Dr Geoff Woodall: +61 8 9892 8427

Left: At the Albany markets, the Centre of Excellence for Natural Resource Management offers locals a chance to sample the native vegetables that are being studied. Above: Kulyu
Mawson Medalist Professor Peter Cawood believes you can indeed ‘see the world in a grain of sand’ as the poet William Blake suggested. The UWA researcher tracks the movements of the Earth’s tectonic plates, but his global reconstructions of shifting continents depend on microscopic examinations of mineral grains half the width of a human hair.

“I wondered how I could work out what was going on in that landscape,” he recalls. “But by the end of that year I remember thinking that now I understood what that piece of land was telling us about the Earth and its behaviour.”

While the focus of geology in this State currently centres on mining and resources, Professor Cawood emphasises that the study of geology encompasses far more than our booming resources.

“My mission is to stress that the world is an amazing place not only today, but yesterday and the day before that – going back some 4.5 billion years ago, when the Earth first formed,” he stresses. “Geologists are interested in the way the Earth has behaved through time, including how we got to this fortunate situation – the only planet in the solar system that did – and what knowledge of the Earth we need...”
to maintain this position for ourselves and for future generations.”

“My work tends to be fairly fundamental in its approach. I always give the example of 15th century astronomer Copernicus who established that the Earth rotated around the sun. I bet at that time the average man in the street didn’t give a stuff about that discovery, but we now have satellites, GPS, telecommunications systems – all dependent on our understanding of that concept.

“You can’t always foresee the outcomes of research. My work is about understanding processes that created an ore deposit or the evolution of a basin. I don’t go out there looking for hydrocarbons or minerals, rather I provide the fundamental framework that allows us to understand how those deposits or energy resources formed.”

Professor Cawood points out that while 630 million years ago the equator ran close to the land on which our capital city stands, at that time it was blanketed by massive glaciers. The northern Yilgarn, that covers most of Australia’s south-west, has some of the oldest terrestrial fragments yet discovered on Earth – 4.4 billion year old zircon grains. The Pilbara also offers evidence of some of the earliest life on Earth – 3.5 billion year old stromatolites.

“Western Australia is a wonderful natural laboratory that unravels the story of how the Earth works and provides an unsurpassed record within its rocks,” explains Professor Cawood.

“Rocks are the only record we have of the Earth’s history. Everything we know prior to historical records is based on reading the rocks and the techniques being developed enable us to analyse smaller and smaller samples – it’s truly amazing! Today, not only the rocks, but each individual part of a grain reveal something: the age, the climate in which the rock formed, when the first water was recorded and when oxygen levels were sufficient to support life.

“What is both exciting and frustrating is that the record is incomplete. It’s like a detective novel with pages missing – so we have to extrapolate and interpret. One area of rock only gives us part of the story, so we have to ask ourselves whether a similar area is preserved elsewhere and, if so, whether it represents processes in general or something exceptional.

“In this sense, geology is an imprecise science – it’s not like maths where there is only a single right answer.

“In good science you must seek information that casts doubt on your model. You may not like seeing it shattered, but science advances through debate and communication, so your research must be validated by other scientists. Your peers must consider your theory and perhaps they will say, ‘Yes, I have made similar observations elsewhere, but you need to take this or that into consideration…’ – and so the debate and the shaping of a theory goes on.

“It is a long dialogue and what often happens is that an idea that seems valid eventually becomes shaky because the negatives begin to outweigh the positives. And so a new dialogue begins.”

As much as he is fascinated by rocks and mountain ranges, Professor Cawood is also attracted to the social and intellectual interactions that are part of geology fieldwork.

“I grew up in the city, so I liked the whole business of trading ideas with other lecturers or students around a camp fire, with a glass of wine. And then there was the travel! There’s a saying that the best geologist is the person who has seen the most rocks – in this job you have to get out there.

“In my area of research we are looking at big questions like why the supercontinent of Gondwana (of which Australia was a part) broke up and what were the implications of that amazing continental amalgamation.

“One model for break-up is that a plume of mantle from deep within the Earth uplifted and fractured the supercontinent. There was a lot of volcanic activity at the time, just as there is today along the East African Rift Valley and the Ring of Fire in the Pacific.”
“What we don’t know and is still debated is whether the plume came up by itself, or whether there was a cause and effect scenario: for instance, did the massive size of the supercontinent sitting over the interior of the Earth for such a long time impact on the super-heated material beneath it?

“In the modern world we know that continents and mountain ranges impact on climate and we are trying to see how these features affected the Earth’s climate millions and hundreds of millions of years ago. For example, Gondwana was covered by massive glaciers, many times larger than the glaciers of the last Ice Age, but a sudden warming of the Earth melted them.

“One reason, I think, is that during that volatile period, major mountain ranges formed on the margins of Gondwana and moisture that had previously moved into the interior – replenishing and maintaining the glacier – could not do so.”

Professor Cawood is currently working with Chevron and ARC Energy in the Canning Basin looking at the detailed stratigraphy of an area that is under-explored in terms of oil deposits.

“Chevron is interested because elsewhere in the world it is looking at oil deposits in a similar environment. In the Canning, rocks are very well exposed which allows us to get a better handle on the scenario that led to a mass extinction event during the Devonian period, perhaps 350 million years ago.”

Most of Professor Cawood’s research is supported by grants from the Australian Research Council. He acknowledges that Western Australia is a great place in which to pursue such research.

“We are blessed to have several ion probes – in fact this State is unique in the world with the range of such instruments available for research, with an additional instrument arriving at the end of the year. These machines let you look at material that measures just a fraction of the width of a hair – 20 microns – and to analyse both radiogenic and stable isotopes, and are widely used by the geological, biological and medical sciences. We’re also fortunate in WA to have university support that allows us to establish truly world class facilities,” he says.

“The Earth today is a snapshot of a dynamic planet in which continents are still on the move. Australia is moving northward and will eventually collide with Asia; the Pacific is closing and as it does, the Americas will embrace and cocoon Australia. When next you are at the beach, remember that at some summer in the relatively near geological future that sand between your toes will be forming dunes within a sandy desert in the middle of a much larger continent that some are already calling Amasia (derived from the words America and Asia – with Australia to be the meat in the sandwich between these two colliding continental masses). Luckily that’s not for another 60 million years – only the day after tomorrow in geology speak!”

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**Contact**

Professor Peter Cawood: +61 8 6488 3422
Email: pcawood@fas.uwa.edu.au

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Above: Professor Peter Cawood, Mawson Medalist and President of the Geological Society of Australia
By the time he enrolled at UWA, Iain (Fred) Smith had called India, Israel, the Philippines and Hawaii home – in addition to Perth and Canberra. The children of diplomats get to see the world and are adept at acclimatising and absorbing a spectrum of cultures.

For Fred, a constant companion was his trusty guitar and the music he made in far-flung High Commission and Embassy lodges. Clearly he liked the diplomat's 'on-the-move' world so, after graduating in Economics, he followed in the career footsteps of his father Ric, a UWA graduate who was Australian Ambassador in China and Indonesia and, until recently, Secretary of the Department of Defence.

Joining the Department of Foreign Affairs and Trade (DFAT), Fred worked in the Indonesian, South Asia and Human Rights sections in Canberra and then did a stint with the Australian High Commission in Port Moresby. And his guitar came too.

By this time, singing and song-writing had become an integral part of his life. On assignments as a member of Australian peace monitoring teams in Bougainville and the Solomon Islands, he found he could effectively weave together the pleasure of making music with positive diplomatic goals.

“When the civil war in Bougainville ended in 1998, Australia sent in peacekeepers – mostly army, but with a few civilian advisors to report on the peace process,” recalls Fred. “When we arrived, there was a real sense of suspicion of Australians because locals had essentially been waging what they saw as a war of independence – and in the early 90s, the PNG army was using Australian helicopters against ‘the rebels’. At the centre of the dispute was a very productive Australian-owned copper mine that had unsettled land owners,” says Fred. “So there was suspicion about Australia’s motives and for that reason we went in unarmed – probably the first peace-keeping group to do so.”

Fred completed tours of duty in Bougainville in 1999 and 2003, and in that time saw a radical shift in mood to the point where “they didn’t want the peacekeepers to go!”

“Music became a useful way to communicate a message, to make our presence felt in the community,” says the graduate. “When we went on patrol, my guitar was packed into the 4WD, and after we had conducted our official business we’d set up under a tree, near a church or in a school yard and locals would gather – to listen and to perform.

“The notion of ‘pay back’ is part of PNG culture, so our message was about breaking that cycle of violence. There had been a loss of traditional roles during 10 years of conflict when kids had been unable to go to school. So there were a lot of confused young men – it was a powder keg. “At the time I wrote a few comic songs that I performed and the army’s public relations people heard about this and sent in sound recording equipment so we could record local bands.”

That resulted is Songs of Peace, a CD featuring songs in pidjin and some 20,000 copies were distributed around the province. A similar initiative was adopted in the Solomon Islands, and two further CDs Bagarup Empires and Independence Park were produced.

“For the Australian army, which naturally likes to work towards objectives and goals, this sort of thing – going in unarmed and relinquishing some control to a group of civilians – is very counter intuitive. But there is a real wisdom in this approach and it played well.”

In 2006 Fred took leave from DFAT to perform and tour across the United States. Now back in Australia, he works four days a week on the Pacific Island Section, then takes his guitar off to folk festivals, coffee shops, clubs and cabarets.

Teaming up with Liz Frencham, he produced the album Love Thongs and the pair performed at the last Fairbridge Festival.

Above: Iain (Fred) Smith performing for children in Bougainville
Committed to education and gender equity

Professor Lesley Parker, guest speaker at Convocation, the UWA Graduates Association’s 50th Reunion Luncheon, speaks to Rita Clarke about her career.

Emeritus Professor Lesley Parker, AM, FTSE, formerly Senior Deputy Vice-Chancellor of Curtin University (1997-2004), graduated from UWA with a BSc in 1958. That same year she married chemistry graduate Jim Parker and like many wives of that era she at first packed away her degree and followed the yellow brick road of her husband’s burgeoning career. But a back seat was never really on the cards for the young girl who used to get into trouble for asking too many questions, and would take up tertiary science when most women were expected to choose other pursuits.

A girl who had gained a scholarship to Perth Modern School, who had an older sister who’d become a dentist, and who had not only a graduate father (Engineering) but also a graduate mother (Arts), must, inevitably, return to further her own scientific studies. Besides, Lesley had become very aware of the gender divide. “Science was not a level playing field. It wasn’t quite the same as in other careers, where women had to leave when they got married, but you were mostly on contract work and couldn’t get superannuation, or a permanent position.” Something had, obviously, to be done about that.

“In recent years I have often reflected on my time at UWA in the mid-1950s. It was quite a small and relatively unsophisticated environment compared with UWA today and many of us took our studies for granted back then. We finished high school and were confident about further study (in the pre-HECS days at very little cost) and job opportunities. We had a wonderful time – gathering in Whitfeld Court for lunch and using Winthrop Hall for everything – exams, and functions, and all the many balls we seemed to have … they were very formal.”

Lesley made the Australian University Hockey team, travelling with the players to New Zealand in 1956, and became Secretary of the Science Club, with Bob Fels as President and Philip Best as treasurer.

Life after UWA was exciting. Residing first in the USA after Jim completed his PhD, they then moved to London, living close to the British Museum, surrounded by the ghosts of the Bloomsbury set. But, 16 years after graduating and four sons later, Lesley came back to her studies, completing a B.Ed (Hons) in 1976 and subsequently a PhD at Curtin. Jim’s death in 1982 was a terrible blow to the family. Lesley’s UWA education and many friends and family members sustained her during that time.

In 1997 Lesley became not only Foundation Chair of the WA Curriculum Council and a member of Council of the National Science and Technology Centre (holding both posts until 2003), but also the...
first woman to hold a senior executive appointment at Curtin University of Technology, “I saw enormous changes during my time at Curtin. There were no women in senior posts before me. When I left another woman was appointed to my job, and now there are four women in senior positions, including Vice-Chancellor.”

In 1998, Lesley was awarded the Order of Australia, for services to higher education and to gender equity in education, particularly in science and mathematics.

Upon leaving Curtin she became the Inaugural Director of the national Carrick Institute of Learning and Teaching in Higher Education (2005-2006), with responsibility for planning the Institute (now called the Australian Learning and Teaching Council). In 2007, she was elected to a Fellowship of the Academy of Technological Sciences and Engineering.

Unlike many, Lesley remains optimistic about Australian education and training. She has more than 25 years’ experience in leadership, research, teaching and policy in all sectors of education, at State, national and international levels, and has published extensively in areas of curriculum reform and gender equity in education. She has just completed more than 10 years as chair of the Board of Directors of education.au limited, the national company for providing on-line support to Australian education and training.

Lesley speaks glowingly and gratefully of her many supportive colleagues and family members (including 14 grandchildren). Now married to Graeme Reynolds, she maintains a commitment to science and mathematics education (including at the Science and Mathematics Education Centre at Curtin) and to the education of girls (as Chair of the Council of Methodist Ladies’ College). She has also launched a consultancy business, working on educational projects in Australia and overseas.

Professor Lesley Parker will speak at the 50th Reunion Luncheon on Sunday 23 November in Winthrop Hall. Information and bookings: 6488 3006.

50th Anniversary Reunion Luncheon

Coming soon – Convocation’s famous annual 50th Reunion Luncheon, to be held this year in Winthrop Hall on Sunday 23 November 2008. Graduates who have already celebrated their 50th Anniversary with us (or who couldn’t get to earlier functions) are welcome. Any volunteers who would like to help organise the event are invited to join a small sub-committee.

We are still searching for a few lost graduates and list those below (maiden names in brackets). If you have an idea of their whereabouts, please let us know.


Please contact the Office of Convocation on +61 8 6488 3006 if you have information or if you would like to help organise this year’s event.
I took up the position as Warden of Convocation in March this year following the annual elections to Council. My recent attraction to this rather unique body with its long history and impressive list of previous office holders was triggered a few years ago through attendance at an Ordinary Meeting of Convocation in the then brand new UWA Club. My knowledge of Convocation however predated that event, reaching back to student days.

Convocation represents graduate interests on campus and is charged to provide links between graduates and the University, and to the community. The founding legislation for UWA enshrines a role for graduates in the governance of the University, partly through the election of graduates to the UWA Senate but also through the task of reviewing all amendments to the University Statutes.

During 2007 the Council established a Strategic and Operational Plan which provides an overview of the Council’s activities and their alignment to the governing statutes. While a few new activities are proposed, the plan provides a strong framework for the organisation to review its current program and guide future development. The working group which undertook this task comprised myself (as Warden of Convocation Simon Dawkins with Immediate Past Warden Dr Suzanne Baker, guest speaker Dr Sara Macliver and accompanist Carolyn Badnall at the First Ordinary Meeting of Convocation for 2008).
Deputy Warden), David Hodgkinson (current Deputy Warden) and Roderick Cooper (currently a Senator).

The statement of vision for the Council, adopted through this plan, states that Council is ‘to be universally recognised as the representative voice of the graduate body in the governance and affairs of the University and in its interaction with the broader community’.

The plan proposes that Convocation enhance its governance roles and ensure these representative and review functions are well understood across the campus. In particular the Council will seek to ensure preservation of this key feature of Convocation in the ever changing environment of national policy debate on university governance. In this context Council sees a difference between graduates elected to Senate (and to boards and committees) and the appointment of eminent persons who happen to be graduates. The founders of the University understood this too. The elected senators do not carry a mandate from Council but they create a formal link between the graduates and the University’s peak governing body.

Council also intends to establish ways in which graduate views can be polled and these views relayed to the University and the broader community. In doing so, the Council will become a recognised partner with the University and ‘encourage members to contribute to the intellectual and cultural prosperity of the university community’ and ‘promote professional and social links’, as stated in Statute 9.

The plan recognises a need to focus activities in a way that Council and Convocation as a whole achieve a higher profile and is better understood as an important and enduring aspect of UWA.

Implementation of the plan requires all committees to look at their activities and the core functions of Council. As the university responds to the constantly changing business and policy environment, Convocation needs to do the same.

Indeed, through this plan Convocation will maintain its reputation for innovation and prescience in regard to encouraging graduate-university relationships and provide even greater assistance to the University endeavours to achieve its goal of ‘achieving international excellence’ and an appropriate international ranking within the top 50 universities in the world. Graduates like nothing better than an association with a highly successful alma mater.

It is easy to be an enthusiastic graduate of UWA and even easier to get excited about the forthcoming centenary celebrations. Convocation will be playing its part through its participation on several senior committees related to this event, through its commitment to look closely at all University statutes over this period leading up to 2011 and through its financial support for centenary initiatives.

The Council has determined it will make a significant contribution to the centenary program and is keen to seek graduate views on what might be appropriate. In the meantime we are supporting the establishment of the UWA Historical Society and expect through that body to investigate a number of exciting ideas to recognise student and graduate engagement with UWA over the years.

I believe Convocation is the logical reference point for graduate engagement in the University. The Operational and Strategic Plan is enabling a cautious but progressive review of activities and the adoption of new approaches to the enhancement of opportunities for graduate contact with the University community. Convocation has performed this role successfully over many years but changing circumstances and have placed additional opportunities and challenges in our path.

Convocation is positioned ready to identify and interpret issues of real value and concern; avoid the pitfalls facing similar, largely voluntary, representative bodies; and focus on how to best represent graduate opinion and interests across all areas of the University and outwards to the WA community.
John Marum (MB BS 1963) writes that he is now retired from anaesthesia, so it’s quite OK to have an anaesthetic now! He found it hard to stay warm in Melbourne so he moved to Midura, which has a climate similar to Perth. He does volunteer work now and sends his regards to all those thinning (well, their hair, that is!) ranks of colleagues who are now the doyens of their profession. Former classmates can contact John at dmrsun@bigpond.com

Nicholas Di Lello (BA 1973) retired after 40 years teaching Italian, French, English and Religious Studies in both State and private schools. In retirement, he is kept busy baby-sitting his three grand-children, gardening, emailing friends and being a mentor to a UWA student! He still enjoys being creative and writing poems in Italian and English. Former classmates can contact him at ndilello@westnet.com.au

Leslie Smith (LLM 1978) retired from service as a US Magistrate Judge this month. He has served almost 20 years as both a State and Federal Judge and will continue to teach in the US, Eastern Europe and Russia. He also plans to participate in Human Rights activities worldwide and is hoping to return to WA in the near future.

1980s

Margaret Lindley (née Ashworth) (BA(Hons) 1989) has been appointed Media Advisor to the Tasmanian Government. Margaret previously lectured in History at the University of Tasmania.

Greg Barnes (BPE 1980, MPE 1984) established his first business in Hong Kong before returning to Perth to help train the Australia II, III and IV Americas Cup yacht racing syndicate. In 1987, he founded the Australian Management Group Pty Ltd where he is Managing Director helping to build high performance teams and conduct conferences for corporate clients. He was a member of the first WA team to complete a double crossing of the English Channel and runs the Macau Marathon/ Half Marathon each year with running mates. He has written and published two books. The Genie Within (a book dedicated to his son which raises money for charity) and Click! (Why you click with some people and others drive you crazy? Greg is also on the Fundraising Committee for the MS Society and lives in Perth with his wife and two children. He can be contacted at click.greg@bigpond.com

Jonathan Sedgwick (BS(c)Hons) 1981; PhD 1985) worked for four years at Eli Lilly Corporate Headquarters in Indiana, USA, and now relocated to Singapore for the next three years. He will expand the activities of the Lilly-Singapore Centre for Drug Discovery as Managing Editor and Chief Scientific Officer. Jonathan is married with three children.

1990s

Greg Wark (BE(Hons) 1964) returned to Australia in 2003 after 16 years overseas, mainly in Europe with the Mobil Corporation. He also managed Mobil’s downstream business in Africa. Kerry is now involved in investment financing and is the owner of Meka Station, in the Murchison District of WA.

Kerry Wark (BE(Hons) 1964) has moved to Mildura, which has OK to have an anaesthetic now! He found it hard to stay warm in Melbourne so he moved to Midura, which has a climate similar to Perth. He does volunteer work now and sends his regards to all those thinning (well, their hair, that is!) ranks of colleagues who are now the doyens of their profession. Former classmates can contact John at dmrsun@bigpond.com

Dirk Hos (BS(c)Hons) 1973) works as a consultant palynologist and hydro-geologist as well as assisting in his B&B at Loring Place, Margaret River. Former classmates can contact Dirk at dhos@barach.net.au

1970s

Robert Johnston (BA 1972) taught at WA primary schools for several years before joining the ABC as an Education Producer. After 21 years (11 years as Supervisor) he took redundancy and did volunteering at UWA and the Electoral Commission, as well as operating as a Tour Guide for overseas and interstate visitors to Perth. He writes that with three children now living in Melbourne and a family home much too big for two, he and his wife set off on a belated “seachange adventure” to join the rest of the family in Melbourne. However, he remains a firm Eagles supporter and says he will watch with interest developments at UWA and Perth in general.

Helen Chappell (née McLagan) (BA 1977) and her husband moved last July and now live in Dunedin, NZ. Helen had previously lived in Canberra for 31 years, looking after her family, studying languages and linguistics at ANU as well as working as an archivist in manuscripts at the National Library of Australia. Former classmates can contact Helen at Picplacehelen@gmail.com

Leanne Coggins (née Darlow) (BA(Hons) 1989) has moved to mainland Tasmania.

1960s

Alex Scarr (BEd 1960) moved from Geraldton to Shoalwater, and finally into his new house in Safety Bay. He writes that packing-up, unpacking and then repeating it all is not easy for an octogenarian!

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Margaret Lindley (née Ashworth) (BA(Hons) 1989) has been appointed Media Advisor to the Tasmanian Government. Margaret previously lectured in History at the University of Tasmania.
1990s

Priscilla Campbell-Wilson (BA 1990) worked in publishing in Perth and London before taking a job as a journalist for the Sydney 2000 Olympics. She writes that journalism gave her the opportunity to launch into a corporate public relations role. She is now Marketing Manager for Mencer’s Investment Consulting across the Asia Pacific, based in Sydney and says that she has found her Arts degree a great advantage in her career.

Richard Pestell (MB BS 1982; HonDMed 2006) met with Prime Minister, Kevin Rudd, during his visit to Washington DC and participated in the Plenary of the 20/20 Summit in Canberra. Richard is Vice-President for Oncology Services and Director of the Kimmel Cancer Centre, in Philadelphia.

Jessie Ee Leong-Choo (BA 1984; DipEd 1985; BE 1986) is Associate Professor with the Psychological Studies Academic Group in the National Institute of Education (NIE), Nanyang Technical University, in Singapore. She completed PhD studies at the University of Newcastle. Jessie co-authored Educators need to know. Former classmates can contact her at jessie.ee@nie.edu.sg

Sharon Smedley (née Robless) (MB BS 1994) is an anaesthetist in private practice in Perth. She is married with four beautiful children and writes that she is enjoying training for the City to Surf and attending an Italian cooking class. Former classmates can contact her at jssmedley@diggond.com

Joseph Fleming (BSW 1995) is working as a lecturer in Social Work at the University of Tasmania and is completing his PhD in Social Work at Monash University.

Christine Oldmeadow (née Bone) (LLB 1996; BSc 1998) writes that she works for Wojtowicz Kelly Legal, and became a partner three years ago. She is currently on maternity leave and is enjoying spending time with her infant daughter. Former classmates can contact Christine at oldmeadow@knet.net.au

Daniela Stehlik (PHD 1998) is the Director of Ailcoa’s Research Centre for Stronger Communities at Curtin University. She was an attendee at this year’s Australia 20/20 Summit in Canberra and in August delivered the Clare Burton Memorial Lecture Series.

2000s

Gautham Muthukumara Ramalingam (BCom 1993) writes that he has successfully turned around a loss-making company into a profitable one purely by restructuring its finances. The company operates two hotels in Southern India. He is currently promoting the company’s involvement in a shopping mall of international standards at Tirupur, Tamil Nadu, India.

Andrew Homden (MEI 1994) is now Principal of the Dubai British School and previously held the position as Head of School at Patana School in Bangkok. Former classmates can contact Andrew at homdena@hotmail.com

Engineering aviation

Reece Lumsden (BE 1998) in Everett, Washington State, USA

Reece Lumsden’s career has scaled impressive heights since graduating in 1998. Today, as Project Manager for Boeing’s 787 Dreamliner program, he sees the rollout ceremony at the airline’s assembly factory in Everett, Washington, as a career highlight. The mid-sized, twin engine jet airliner scheduled to enter service in early 2009 is reputed to be the fastest-selling wide body airliner in history. Creating the 787 is a global operation and Reece’s role is to interface with the Boeing partners contracted to complete the aircraft’s wiring. This has taken him around the world to supplier sites in France, Mexico, India and throughout the US.

He urges fellow engineers to adopt a holistic rather than a narrow technical view of their engineering experience. “Set goals, but realise there may be more than one path to achieving them,” he says. “This means that while one path may close, others will open up.”

His own career illustrates this maxim. “Initially I wanted to study Aerospace Engineering, which meant going to RMIT after a year of Mechanical Engineering at UWA,” he recalls. “This was part of my larger goal of becoming an RAAF test pilot; however, during that first year at UWA my application to become a pilot was unsuccessful. After taking a year off and re-evaluating, I decided to change focus and move from Mechanical to Electrical and Electronic streams.”

He followed studies at UWA with a Master of Space Studies at the International Space University in Strasbourg, France, and an MBA at La Trobe. He is currently studying for a PhD (sponsored by Boeing) in Lean Systems Engineering at Missouri University of Science and Technology.

After graduating from UWA, Reece served as an Engineering Officer in the RAAF (1997-2002) and spent time at NASA completing a master’s thesis at the NASA Johnson Space Centre in Houston. In 2001 he was invited to be a member of the Space Policy Summit at the Institute for Public Policy at Rice University in Texas. In 2002 he was awarded the Young Engineer of the Year for the ACT Division of Engineers Australia.

Another career highlight was becoming a crew member on one of the two-week rotations at the Mars Societies Mars Desert Research Station in Utah. “One of my longer term goals is applying for Astronaut candidacy with NASA after obtaining US citizenship,” he says.

Reece, who lives with his wife in Washington State, is a keen marathon runner, and aims to qualify for the Boston Marathon.

Harun Harun (MSc 2004) is a PhD student at Waikato Business School, The University of Waikato, NZ. He previously worked as a lecturer in Accounting at Tadulako University, Central Sulawesi, Indonesia. The paper for his Master’s dissertation has been published in the Bulletin of Indonesian Economic Studies (December 2007). Harun is married with one daughter and lives in Hamilton, NZ. Former classmates can contact Harun at harunahu2007@yahoo.com

Sven De Jonghe (BE(Bens)) 2001) won the Property Council of Australia National Future Leader Award in May this year. Sven previously won the WA Property Council Young Achiever Award in June 2007. Former classmates can contact him at s.dejonghe@bassett.com.au

Marcello Cabrera (MBA 2004) writes that he is busy starting up an international trading/sourcing business of manufactured goods, mainly dealing in textiles, paper and plastics.
The challenges of resettlement

Shane Boladeras (BScNRIM Hons, 2002; DipModLang (Chinese) 2001)

As a Project Manager for the international consulting firm URS, Shane Boladeras is putting knowledge acquired at UWA to good use in the rugged highlands of Papua New Guinea. The UWA graduate is dealing with the complexities of relocating indigenous communities from traditional lands that now accommodate a joint venture gold mine.

“I’m working on a Resettlement Action Plan to meet international best practice standards for resettling landowners physically and economically displaced by the mining operations. We need to ensure that appropriate infrastructure is provided at the relocation sites and that the people have access to services, social organisations and livelihood opportunities,” says Shane.

“Some of the major challenges will include obtaining land use planning, crop production, and biodiversity management,” says Shane. “In addition, I apply skills such as project and time management and client liaison acquired during my final year Honours studies. Having an external supervisor for these studies taught me the practical realities of working in a corporate environment which has been invaluable to my career as a Social Impact Assessment Consultant.”

“While at UWA, I completed work experience at the Argyle Diamond Mine, working with Indigenous stakeholders in mine site rehabilitation. In my penultimate year, I studied Mandarin Chinese in China for six months and the cross cultural skills built during these two experiences prepared me well for working in PNG.”

Shane has worked with URS for over five years and has returned to work on her family farm in Woodanilling, WA.

Philip Shanhun (BE 2005) was recently promoted to High Voltage Integrity Electrical Engineer at BHP Billiton’s Kalgoorlie smelter. Philip married Melissa Okely, a former UWA Records staff member in May, 2007. Former classmates can contact him at Philip.Shanhun@bigpond.com.

Boning Li (PHD 2008) writes that he is currently working on the design of City Square, which will be the tallest building in Perth.
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