Mr Ray Ryken-Rapp (Ray.Ryken-Rapp@uwa.edu.au)

Today's world is more than ever looking to science and innovation for sustainability in agriculture and food production to feed the increasing population.

Whilst population growth is fuelling the demand for food, rapid industrialization in major economies is increasing the demands on agriculture to produce fibre, fuel and industrial raw materials. Yet, at the same time, the world's finite supply of agricultural land and water are declining under the pressures of climate change, urbanization and human-induced degradation. Against this backdrop of rapid demand growth, changing climate, declining natural resources, restrictive trade policies, and regional disturbances, agriculture must respond by increasing its productivity.

This makes it even more pleasing to see a continued positive trend of students entering agricultural and environmental sciences at UWA to undertake that challenge. At the commencement of Semester One there were 62 new enrolments in agricultural and natural resource management sciences. The Faculty of Natural and Agricultural Sciences’ (FNAS) annual enrolment loads as illustrated in Figure 1 (expressed in Equivalent Full-Time Student Load (EFTSL)) shows the trend in faculty undergraduate student loads since 2004.

Figure 1

Undergraduate EFTSL in the Faculty of Natural and Agricultural Sciences 2004 – 2009

Student numbers grow in agriculture and environmental sciences at UWA

continued on page 2

In this issue  P3 Agriculture expert lauded  P4 Malaysian visit  P5 International collaboration  P8 Eureka prize  P11 Minister Redman
Director’s Column

Global economic growth is predicted to slow down during the beginning of the 2009-18 periods; however it will slowly recover after 2010.

Agricultural production, consumption and trade will provide new opportunities for investment and economic growth. Recent Australian Bureau of Agricultural Resource Economics (ABARE) outlook indicates that Australian farm exports will steer through global financial recession, rising by four percent to $32.1 billion next financial year. ABARE also predicts that Australian farm export earning would rise to $37.8 billion by 2013-14.

While addressing the Committee for the Economic Development of Australia (CEDA) WA’s Premier Colin Barnett highlighted agriculture’s increasing importance to the State’s economy.

Mr Terry Redman, Minister for Agriculture, Food and Forestry; and Minister Assisting the Minister for Education WA delivered a far ranging address to the Rural Media Association on 12th March, focusing on his new mantra “Making every hectare count” and five priorities are:

- Improving long term profitability of food and agriculture;
- Effectively manage land and water assets, climate variability and bio-security;
- Build capacity of industry to adapt and grow;
- Improving market access for WA products; and
- Promoting positive profile of WA agriculture and food sectors.

Hopefully both Federal and State Governments will increase the much needed strategic direction and funding for agricultural education, research and development to address some of the challenges and improve farm productivity, sustainability and profitability.

Each year provides one with a renewed opportunity to build upon the previous year. March 2009 marks the second anniversary of the reinvigoration of the Institute of Agriculture at UWA. We have made several achievements over the past two years, and our efforts are sharply focussed towards enhancing UWA’s contribution to agriculture and natural resource management in WA, and selected national and international settings.

Our partnership with International Crop Research Institute for the Semi Arid Tropics (ICRISAT) have strengthened further after a formal review of the Council of Grain Growers Organisation Ltd (COGGO) funded chickpea breeding and associated projects in India (more on page 5). Collaboration with Indian institutions was also strengthened early this year with the signing of a Memorandum of Understanding (MoU) between UWA and Punjab Agricultural University (PAU).

UWA prides itself on research excellence. In terms of scientific publications and its impact during 2001-07 period, UWA’s agricultural researchers have excelled both nationally and internationally in agronomy, agricultural economics and policy, agricultural soil sciences, plant sciences, and agricultural dairy and animal sciences (see page 9). Several researchers and students were recognised for their work. Ms Annalieze Mason received the Mike Carroll Travelling Fellowship award for her brassica research (see page 4).

Professors Lorenzo Faraone and John Dell won the Eureka prize for developing a colour near infra-red spectrometer that has potential application in agriculture (see page 6).

The School of Agricultural and Resource Economics academics (SARE) won the jackpot at The Australian Agricultural and Resource Economics Society (AARES) conference, taking home four prizes (see page 11).

Research priorities for agriculture, food production and sustainability will require inter- and multi-disciplinary approaches. Partnership on long-term strategic research and effective collaboration between universities, industry and government will be critical to address some of the global challenges facing agriculture.

IOA’s key role is bringing together UWA’s agricultural research, teaching, training and communication activities; integrating complementary activities across disciplines and organizational units, and provides a focus for leading-edge research and development.

Our emphasis is to foster national and international linkages and alliances that bring new knowledge and expertise to WA, and allow WA to share its knowledge with the world.

Student numbers grow in agriculture and environmental sciences at UWA

UWA graduates remain in high demand. Employment prospects in agriculture and related natural resource management areas are staying strong despite the world wide economic downturn. It is also pleasing to see the numbers of students that are returning to UWA to undertake postgraduate studies, for which the Faculty is highly regarded.

Sazwan, a first year student from Malaysia, said he chose to study agriculture at UWA because of the big emphasis the Malaysian government places on agriculture. “UWA has a solid international track record in agriculture teaching and research”, he said.

Another first year student, Helena from Western Australia, said that she chose agriculture because she believes, “It will open up a lot of opportunities to meet global challenges and pave a future career”.

Sustaining productive agriculture for a growing world
Recently, agricultural links between Malaysia and UWA strengthened, culminating in a visit by the Honourable Dato’ Mustapa Mohamed’, Minister of Agriculture and Agro-based Industry of Malaysia in December 2008.

The Minister met with Professors Alan Robson (Vice-Chancellor), Robyn Owens (Pro Vice-Chancellor (Research and Research Training) and Kadambot Siddique (Director, IOA) and Mr Dave Norman (International Centre).

Collaboration between UWA and the Universiti Putra Malaysia (UPM), in particular, commenced in 2006 when Professors Alan Robson (UWA Vice-Chancellor) and Alistar Robertson (former Dean FNAS) visited UPM. In return, a high level delegation from UPM visited UWA in February 2007 under the leadership of Prof. Dr. Nik Mustapha bin Raja Abdullah (Vice-Chancellor, UPM). This was followed up by a technical visit by Professors Kadambot Siddique and Graeme Martin to UPM in June 2007. These visits opened up collaborative opportunities in research and training of relevant UPM staff to PhD level especially in agriculture. Prof Siddique is currently a visiting Professor and an external examiner for the agricultural science degree program at UPM.

During the Malaysian Minister’s visit to UWA he also met six of the eight Malaysian PhD students in FNAS and reinforced the strong connection with UWA. The Minister pledged further continued support from the Malaysian Government on capacity building and collaborative research projects of mutual interest. This year already shows promising numbers from Malaysia, with four undergraduates commencing their agricultural science degree at UWA.

Mr Enrique Tapia visited CLIMA at UWA during December 2008 as part of a Crawford Fund training award.

Mr Tapia is an agronomist at the National University of the Altiplano, Puno, Perú. His visit is part of research into developing the Andean lupin or pearl lupin (Lupinus mutabilis) in Australia. Mr Tapia says that through this research they hope to assess the genetic diversity of the lupin species to learn more about the habitats that it is most adapted to, and also plant characteristics that are associated with increased harvest index and yield.

In a GRDC-funded research (with Dr Jon Clements and the Department of Agriculture and Food with Dr Bevan Buirchell), the Andean lupin is being bred for Australian conditions. It is hoped that the preliminary collaborative studies between Peru and Australia about genotype by environment interactions in the Andean lupin will lead to a larger project where more detailed work will be conducted on the very diverse germplasm within that lupin species and the approximately two hundred related lupin species from South and North America.

Huge crop diversity in the land of the Incas

Dr Jon Clements (clem@cyllene.uwa.edu.au)

Mr Enrique Tapia (National University of the Altiplano) and Dr Jon Clements discuss Andean lupin breeding in Perth.
Pioneering PhD research at UWA not only helped launch a major Australian export industry, it also won the researcher a prestigious award in India recently.

Professor Kadambot Siddique, Chair in Agriculture and Director of UWA’s Institute of Agriculture, was presented with a gold medal in February from the Indian Society of Pulse Research and Development by Dr APJ Abdul Kalam, a former President of India, at the Indian Institute of Pulses Research in Kanpur.

Professor Siddique began exploring the potential of chickpea adaptation when, after beginning agricultural studies in India, he started postgraduate work at UWA in 1981.

His work was the starting point for the Australian chickpea industry, now valued at more than $200 million annually. It also created research links that tie UWA to Turkey, Bangladesh, East Timor, Iraq, Oman, China, India, the US and Canada.

Professor Siddique said he was delighted to receive the award from Dr Abdul Kalam.

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Ms Annaliese Mason, agricultural science PhD student at UWA was awarded the prestigious 2008 Mike Carroll Travelling Fellowship.

She will spend six weeks in France researching how to combat potential problems of abnormal chromosome associations in Super Brassica plants.

R to L: Dr APJ Abdul Kalam (Former President of India) giving the Gold Medal and award to Prof Kadambot Siddique; Dr Mangala Rai, Secretary Department of Agriculture, Research and Education (DARE) and Director General of Indian Council of Agricultural Research (ICAR) and Dr Masood Ali, Director of the Indian Institute Pulse Research (IIPR) were also present at the occasion.

“I am humbled and honoured to receive this award,” Prof Siddique said. “It also recognises the important contributions made by a team of scientists and postgraduate students with whom I have had the privilege to work and collaborate.”
The final review of UWA/DAFWA/ICRISAT chickpea projects, funded by the Council of Grain Growers Organisation Ltd (COGGO), showed that not only are breeders and researchers in India and WA, on track, but these projects are excelling.

The project review team visited the International Crops Research Institute for the Semi Arid Tropics (ICRISAT) from 19 – 21 January to view project activities and discuss progress of the projects. The review party consisted of representatives from COGGO (Mr Geoff Smith, CEO and Michael Perry, Scientific Consultant), ICRISAT (Drs CLL Gowda, Pooran Gaur, Suresh Pande, Vincent Vadez and others), DAFWA (Drs Tanveer Khan and Mark Sweetingham), UWA (Professors Doug McEachern, Kadambot Siddique and Tim Colmer), University of Sussex (Prof Tim Flower) and Punjab Agricultural University (Dr JS Sandhu).

The formal review process started with opening remarks from Prof Doug McEachern, Deputy Vice-Chancellor (Research and Innovation). Project supervisors, Prof Kadambot Siddique and Dr CLL Gowda, presented an overview of achievements and addressed relevant “Terms of Reference of the Review”. This was followed by detailed presentations by the principal researchers, Drs Tanveer Khan and Pooran Gaur.

One of the projects, Accelerated Genetic Improvement of desi Chickpea is in its fifth and final year. COGGO called their International Partnership with DAFWA, UWA-CLIMA and ICRISAT “outstanding” and commended the team for their timely project outputs.

During the visit, the reviewers examined field experiments on screening against ascochyta blight, the chickpea germplasm, aimed at WA. Other chickpea breeding and agronomy experiments, including salinity tolerance, were also inspected.

According to Prof Kadambot Siddique, disease resistance work on chickpea is progressing extremely well both at ICRISAT and Punjab Agricultural University (PAU) and will enable importing the most desirable lines for evaluation in WA. “Related projects on salinity tolerance and chilling tolerance will help introduce valuable germplasm to the breeding program on chickpea; some of this application has already started”, he said.

Mr Mike Perry (COGGO) said that by any standards this has to be judged as an outstanding project because of the leadership, communication – internal and with COGGO, confidence building, reporting, and delivery against targets.

“I was a researcher for 15 years and a research administrator for 20 and I can think of few projects that have run so well and delivered so much in such a short frame of time”, he said. Mr Perry also pointed out some of the issues that needed attention and conveyed COGGO’s wishes to continue a new phase of the project.

At the conclusion of the review Dr William Dar, Director General of ICRISAT, met with the review team and offered ICRISAT’s full support to the existing and future projects. Dr Darr has agreed to visit UWA in 2009.

Ms Aprille Chadwick has won the RSPCA Humane Animal Production Scholarship 2008.

Through this scholarship she will focus her PhD research on the attitude of goat producers in Western Australia towards least stressful artificial insemination (AI) techniques.

Ms Chadwick featured in the 2008 Institute of Agriculture’s postgraduate showcase, “Frontiers in Agriculture”. Her Master’s degree looked at using less stressful methods for semen collection in AI.

Her RIRDC-funded research showed that clean, green and ethical methods improved animal welfare, reduced costs, improves accessibility to the animals, was more acceptable to society, and had an opportunity for greater adoption.

Ms Aprille Chadwick won the RSPCA Humane Animal Production Scholarship 2008.
Minister Redman visits UWA

The Honourable Terry Redman, Minister for Agriculture, Food and Forestry; and Minister Assisting the Minister for Education WA, visited the IOA and FNAS on 4 February, 2009. The Minister was welcomed by Professors Alan Robson, Tony O’Donnell and Kadambot Siddique.

The Minister had the opportunity to formally meet with IOA Program Leaders, and Heads of the Schools within FNAS. During the morning tea, Mr Richard Bennett, a PhD student, and Ms Tracey Gianatti, Project Leader of the Grower Group Alliance (GGA) were among a group of people who met with the Minister. Mr Bennett took the opportunity to explain the potential utilisation of native perennial grasses and legumes as pasture plants in the grainbelt.

Ms Gianatti said that she had highlighted the importance of farmer groups during her discussion with the Minister. “I had the chance to communicate to him the extent of the Grower Group network and their activities”, she said.

At the conclusion of the visit Minister said “It is particularly good to see the passion and commitment the staff within IOA and the Faculty has for their work”.

Eureka Prize winner offers agricultural value

Professors John Dell (right) and Laurie Faraone (middle) received the Defence Science and Technology Organisation Eureka Prize for Outstanding Science Award from Hon Mr Warren Snowden, Minister for Defence Science and Personnel.

The Development of an advanced colour near infra-red spectrometer, has won Professor Laurie Faraone, Professor John Dell, and the Microelectronic Research Group at UWA the Inaugural Defence Science and Technology Organisation Eureka Prize for Outstanding Science Award.

This technology is mainly intended for combat situations, but is good news for the agriculture sector. This sophisticated optics allows for calibration to measure grain moisture, and protein and soil nutrient levels. Another bonus is the size of the spectrometer’s package: fast, accurate, portable, robust and low cost.

The Microelectronics Research Group, led by Prof Faraone, developed a filter which enables creation of colour images. The filter enables scanning smaller areas. This means less data is required to generate images and improved real-time use of infrared.

This technology could be used in biopsy-free skin cancer testing, real-time soil monitoring and characterisation of grain during harvesting. This work has attracted $1.5 million funding from the Grain Research and Development Corporation (GRDC) to measure starch, protein and oil for sorting the grain and getting the best value for it. The original program was funded by the US Defence Department at the Defence Advance Research Projects Agency.

Future applications of this technology will include monitoring of soils for carbon sequestration.
Lupin-enriched bread can lower blood pressure

Dr Jonathan Hodgson (jonathan.hodgson@uwa.edu.au)

Bread enriched with lupin kernel flour, instead of wheat flour, reduced blood pressure in a group of overweight men and women with normal to high-normal blood pressures. This simple change in diet may help to reduce blood pressure and cardiovascular disease risk.

Lupins are an important grain crop in WA. This State supplies approximately 70% of total world lupin production. Most of the crop is sold for use in intensive animal industries, but there is potential for increased use for human food. An increase in demand for lupin and lupin ingredients for use in foods is likely to be largely driven by evidence for health benefits.

Our recent clinical trial investigated the potential for benefit of lupin kernel flour-enriched bread on blood pressure. The trial was conducted at UWA within the Centre for Food and Genomic Medicine – a State Government of Western Australia supported centre.

Available data from previous trials in humans suggest that replacing refined carbohydrate in the diet with either protein or fiber may benefit blood pressure. Lupin kernel flour is rich in protein and dietary fiber and contains very little starch (carbohydrate). “We anticipated an increase in both protein and fiber intakes, at the expense of refined carbohydrate, may benefit blood pressure”, Dr Jonathan Hodgson, (School of Medicine and Pharmacology, UWA) said. The aim of this study was to determine the effects on blood pressure of a diet moderately higher in dietary protein and fiber, where this is brought about by the substitution in bread of wheat flour with lupin kernel flour.

Eighty-eight overweight and obese men and women were recruited to a 4 month study. Most participants, like a large proportion of the Australian population, fell in the normal to high-normal blood pressure range.

Participants were randomly assigned to replace 15 to 20% of their usual daily energy intake with white bread or lupin kernel flour-enriched bread. The background usual bread intake in the participants was approximately 10 to15% of daily energy intake- a small change from their usual diet. Eating the protein and fibre-enriched lupin bread resulted in modestly higher protein and fibre intakes by about 14 g/d and 13 g/d respectively.

Blood pressure measurements were taken at the start and end of the study. Eating the lupin-enriched bread, compared to the white bread resulted in a 3 mm Hg lower systolic blood pressure.

Results suggest that a diet moderately higher in dietary protein and fiber can significantly reduce blood pressure. It confirmed lupin kernel flour’s potential as a novel food ingredient to bring about these outcomes. This approach may be a relatively simple and acceptable dietary measure to help reduce cardiovascular risk in overweight and obese individuals.

This research has recently been published in the American Journal of Clinical Nutrition (2009; Vol. 89).

WAHRI expertise in Orlando

Dr Roberto Busi, a Research Associate and Mr Sudheesh Manalil, a PhD student, both from WAHRI (Western Australian Herbicide Resistance Initiative, UWA), presented their work at the Weed Science Society of America’s (WSSA) annual meeting at Orlando, Florida from 9-13 February.

Dr Busi presented a paper on “Use of below-label herbicide rates can lead to evolution of herbicide resistant weeds”. He also presented a second paper in the main conference entitled “Response to selection with sub-lethal glyphosate doses in Lollum vs. Avena populations”.

Mr Sudheesh Manalil made two oral presentations at the conference entitled “Rapid herbicide resistance evolution in Lollum from recurrent selection at reduced rate of diclofop-methyl in a wheat crop (and lab), and “Shifting herbicide sensitivity towards susceptibility through recurrent selection at low rate of diclofop-methyl in a susceptible Lollum rigidum population”.

Dr Roberto Busi and Mr Sudheesh Manalil at the WSSA annual meeting in Orlando, Florida, USA.
Punjab Agricultural University (PAU), Ludhiana, India, and UWA recently signed a MoU.

PAU is a premier institution in India established in 1962 on the pattern of Land Grant Colleges of the USA. Over the years UWA has had several high quality postgraduate students from PAU complete their PhD’s in agriculture and related areas. Currently UWA is collaborating with PAU on four research projects on chickpea and canola improvements (disease resistance and salinity tolerance).

Professors Doug McEachern, Deputy Vice-Chancellor (Research and Innovation) and Kadambot Siddique (Director, IOA) participated in the MoU signing ceremony along with colleagues from COGGO, DAFWA and ICRISAT. Prof Manjit Kang, Vice-Chancellor of PAU welcomed the team and assured full cooperation with UWA and partners from WA.

Prof Doug McEachern said that UWA was keen to collaborate with key Indian Universities, especially with PAU in areas of mutual interest in agricultural research, education and technology exchange "Collaboration strengthens relationships, ensuring flow of people and science between universities", Prof McEachern said.

Engineering salinity solutions

Ms Georgina Holbeche (holbeg01@student.uwa.edu.au)

Salinity represents one of the greatest threats to agricultural production and the environment in Australia. An array of innovative new plant-based solutions and engineering options provide alternative approaches to salinity management in the grainbelt of Western Australia.

One of these promising engineering solutions comes from Ms Georgina Holbeche, a final year PhD student in the School of Earth and Environment working on deep drainage as an engineering option. This research is aimed at lowering the encroaching water table in order to reclaim salt-affected land. Ms Holbeche’s PhD is supervised by Prof Bob Gilkes.

Ms Holbeche works alongside researchers from the Department of Agriculture and Food Western Australia (DAFWA). However difficult, they are cutting deep drains into the landscape, penetrating the water table, allowing excess water in the profile to be drained.

“Deep drainage has proven highly effective in some areas, but it is an expensive technique”, states Ms Holbeche. She said that a greater understanding of the science related to deep drainage will make it more predictable. “I’m hoping that by understanding the fabric, geochemistry and hydrology of the materials associated with these drains, we can work towards a user-friendly predictive tool”, she said.

Ms Holbeche’s research will shed new light onto an alternative approach to salinity management. “With the salinity crisis only predicted to get worse, new research and technologies may be our best defense”, she said.

A deep drain in the northern agricultural region of WA.
Like a growing number of professions, universities are subject to internal and external scrutiny as they continue to seek ways to benchmark and assess their performance. Agriculture and agricultural research has long been recognized as a major strength at UWA nurtured over many years by a succession of innovative agricultural scientists.

The recent Operational Priorities Plan for the University (2009-2013) identifies Plants, Animals, Agriculture and Environment (including Management of Natural and Agricultural Systems) as one of the University’s six strategic research areas. As part of our strategy to grow agricultural and environmental research and teaching at UWA, we have analyzed the impact of our research publications over the period 2001-2007. The analysis compared UWA’s research performance with all other Australian universities listed in the Thomson Reuters University Science Indicators (36 universities) database and also with a group of four internationally recognized universities positioned above UWA on the Shanghai Jiao Tong University Rankings (http://www.arwu.org/rank2008/EN2008.htm). This international group included the University of Wisconsin Madison (US), the University of Toronto (Canada), the University of Bristol (UK) and the University of Sheffield (UK). For agricultural sciences our international benchmark was the University of Wisconsin Madison, which is widely recognized as one of the world’s leading agricultural universities.

Through the Institute of Agriculture, UWA uses advances in fundamental and applied science to inform its teaching and to develop collaborative research initiatives with industry and grower groups to deliver cutting edge technologies for farmers both regionally, nationally and internationally. The data presented in Table 1 clearly shows the strength of this research base and its standing nationally and internationally. In USI subject fields directly related to agriculture (Agriculture, Animal Economics & Policy, Agricultural Soil Sciences, Plant Sciences, and Agricultural Dairy & Animal Science) UWA produced more indexed publications than any other Australian university and in three of the five areas out-performed all of the international benchmark universities.

A measure of the impact of our research is provided by the number of times these publications are cited. Again, in Agronomy, Agricultural Economics & Policy and in Agricultural Soil Sciences our cited works rank #1 in Australia and against the international benchmark universities. In plant sciences our citations rank second to ANU in Australia with both Australian universities ranking behind the University of Wisconsin Madison. For Agricultural Dairy & Animal Science, UWA is ranked # 6 on both the number of outputs and citations and #8 relative to the international benchmark universities. All of the Australian universities are positioned behind the University of Wisconsin Madison and the University of Bristol in this field. This is an excellent performance that testifies to the standing of agricultural sciences at UWA. As the new Dean of FNAS, figures such as these testify to the quality of the research done at the University and make me excited about the future for agricultural and environmental science, teaching and research at UWA.

### Table 1

**UWA’s Research performance in agricultural and environmental research**

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</table>

*Publication impact of Australian Universities over the period 2001-2007. Data only presented for the top 5 Universities (# papers) in each of the subject fields. The top 8 are shown for Agricultural Dairy and Animal Science. Analysis prepared using the Thomson Reuters University Science Indicators database.

International benchmark refers to the performance of 4 international universities in each of the selected fields. All of the Universities, University Wisconsin Madison (US), University of Toronto (Canada), University of Bristol (UK) and University of Sheffield (UK) are positioned above UWA on the Shanghai Jiao Tong University Rankings.
Excellence in science rewarded

Adjunct Professor Karam Singh, Senior Principal Research Scientist and Research Program Leader in CSIRO Plant Industry, recently received an inaugural CSIRO Newton Turner award for science excellence.

Dr Singh has had a close association with researchers at UWA for the last 10 years, particularly with (CLIMA and members of the ARC Centre of Excellence in Plant Energy Biology) at UWA. His current research activities use model plant systems (Arabidopsis and Medicago truncatula) to analyse plant responses to stress.

Dr Singh will use his award to undertake study leave in Dr Giles Oldroyd’s group at the John Innes Centre (JIC) in Norwich (UK). Dr Oldroyd’s group has developed extensive platforms for reverse genetics in M. truncatula. Dr Singh plans to use these platforms to isolate mutations in genes that his team have implicated in plant defence to insects and pathogens. Dr Oldroyd’s group is also a leader in plant signalling pathways used for symbiotic interactions and a second aim of the study leave is to explore how plants distinguish between friends and foes. The JIC is the leading research centre in Europe for plant science. Dr Singh’s study leave should open up further opportunities for collaborative research that would benefit CSIRO and UWA.

Bringing science home

Ms Samantha Greene (sgreene@fnas.uwa.edu.au)

Science can be a bit “out there”. The Western Australian Primary Industry Centre for Science Education (PICSE) Activity Centre made sure that their 2008 action packed program really brought science “home” to student.

In August, the vacant role of the Science Education Officer was taken up by Ms Samantha Greene, formally a teacher at Mercy Catholic College. Ms Greene jumped straight in the deep end visiting 30 schools and 1500 students during term three to promote careers in agriculture and the PICSE Scholarship Camp.

In November, a highly successful teachers’ Professional Development was held at UWA with the theme Gene Technologies. The 24 attending teachers were very enthusiastic about engaging with an area that is marked for inclusion in future Biology courses for years 11 and 12.

In December, 19 successful scholarship applicants came to UWA for a Residential Camp. They were inspired in their studies of science by a number of academics from the FNAS team and visiting staff from research organisations like DAFWA, CSIRO and BGPA.

The camp was followed by the Industry Placement program in January, an incredible opportunity for the scholarship students to work with primary industry scientists to see what really happens in the field. The students expressed their appreciation for being selected to be a part of the program and for the experiences of their Industry Placement at the Reporting Back Session held at the end of January.

The program had the support of GRDC, UWA, DAFWA and DET to make these events possible. Currently, planning is underway for the expansion of the program as PICSE becomes a national body and for the many exciting activities to take place in 2009.

If you would like any further information about this program, or are interested in becoming involved as a sponsor or partner please contact: Ms Samantha Greene, PICSE Science Education Officer, Tel: (08) 6488 1788.
Success for UWA agricultural economists

The Australian Agricultural and Resource Economics Society (AARES) is a thriving organisation with 600 members. It held its annual conference in Cairns in February, and announced its latest round of prizes.

In the past, the School of Agricultural and Resource Economics at UWA has picked up an award or two from AARES, but this year was outstanding. Four prizes headed west, including two of the most significant ones.

Dr Graeme Doole, Research Fellow in the Centre for Environmental Economics and Policy, won the award for the best published article for 2008 in the Australian Journal of Agricultural and Resource Economics. His paper, “Optimal management of annual ryegrass (Lolium rigidum Gaud.) in phase rotations in the Western Australian Wheatbelt”, reported on work he completed during his PhD at UWA. Dr Doole also won the “Heading West” award, to cover travel costs to the conference.

ARC Federation Fellow, Prof David Pannell, won the award for Quality of Research Discovery, for a paper called “Public benefits, private benefits, and policy intervention for land-use change for environmental benefits”, published in the American journal, Land Economics. This describes a framework for choosing policy mechanisms to encourage land-use change by farmers for the benefit of the environment. It is being used by a number of environmental managers around Australia, and in The Netherlands and Canada.

Professor Pannell also won the award for Quality of Research Communication, for his paper, “More reasons why farmers have so little interest in futures markets”, from the international journal Agricultural Economics. This was co-written with Canadian colleagues and has generated a lot of interest from people involved in price risk hedging in agriculture.

In pursuit of research opportunities

Ms Bronwyn Crowe (croweb@are.uwa.edu.au)

Postgraduate students and staff of the School of Agricultural and Resource Economics (SARE) headed into the grainbelt of WA in pursuit of research opportunities and collaboration late last year.

The trip was one of the outcomes of the FNAS Postgraduate workshop held in June 2008, aimed at enhancing the postgraduate experience at UWA. “We thought a field trip would be more useful and practical than a retreat style event”, Ms Crowe said.

The group visited Curtin University’s Muresk Institute and their farm, the Avon Catchment Council, and Karakamia Sanctuary, a privately owned and managed wildlife sanctuary in Gidgegannup.

Local researchers and staff presented their work at the frontier of agricultural economics and extension to students, who in return shared their own work. For most of the SARE international students the visit to Muresk was their first opportunity to see the size of broad scale agriculture in Australia. Muresk Institute staff talked about their research about extension work with farmers in developing countries, which lead to a great exchange of ideas with our own extension enthusiasts.

“With my interest in agriculture extension, the trip to Muresk was very useful to me especially with Dr Roy Murray-Prior sharing about an agri-business approach to extension in the Philippines”, Ms Karen Baroga said.

The Avon Catchment Council demonstrated applying investment decision tools produced from research at the School’s Centre for Environmental and Economic Policy. Dr Maksym Polyakov, a newcomer to WA, said “It was very interesting to see WA broadacre agriculture. The presentation about current NRM issues in the WA wheatbelt delivered by the staff of Avon Catchment Council was an invaluable experience.

Karakamia Sanctuary is part of the Australian Wildlife Conservancy, a charity using tax deductable donations from the public to fund conservation, research and education programs on private land.

“We all had a great day of exchanging research ideas and findings as well as building networks for working together in the future”, Ms Crowe concluded.
The Aquaculture & Native Fish Breeding Laboratory at UWA’s Shenton Park Field Station is the largest recirculating aquaculture research system in Australia. It is a collaborative facility designed, constructed and managed by scientists from UWA and the Department of Fisheries.

Primarily, it provides world class facilities for students and scientists from UWA and Department of Fisheries that enable them to pursue leading edge aquaculture and aquatic science research projects.

The facility consists of over 100 aquariums and over 50 large tanks. Most of them hold 20,000 litres of water. The large number and capacity of research tanks enables scientists and students to conduct trials that replicate conditions found in commercial and natural environments. The facility also has water chemistry, microscopy, data logging, web cam and security monitoring equipment.

Currently researchers are working on aquaculture of a range of freshwater fish and crayfish species, breeding critically endangered species of fish and crayfish and producing native fish for restocking water bodies.

In the past students have worked on a variety of projects; for example, nutrition and diet development for fish and freshwater crayfish, reproduction and genetics of fish and freshwater crayfish and spawning and larval rearing of fish.

“We always encourage anyone who wishes to pursue aquatic science or aquaculture related projects and encourage strategic research partnerships with industry and the community”, Dr Lawrence said.

Mr Daniel Dempster was awarded a GRDC postgraduate scholarship in 2008, and he has now been awarded a GRDC postgraduate scholarship for research on biochar at UWA.

Biochar is the substance that remains from heat-induced anaerobic decomposition of organic matter. There is conflicting evidence as to the role of biochar as a soil amendment. When added to soil, biochar has been shown to affect microbial populations and associated plant nutrient capture.

Mr Dempster’s research will examine changes in microbial community composition and function and soil organic matter fractions associated with biochar addition to soil. Soil organic matter fractions will be assessed by examining differences in soil labile, recalcitrant and dissolved organic carbon fractions. “The aim is to evaluate the potential of biochar to enhance soil carbon storage and biological fertility in sandy soils and, in doing so, minimise nutrient leaching losses from soil organic matter decomposition and fertiliser application”, Mr Dempster said.

“The potential role of biochar in sequestering carbon in soil is a controversial topic and this study will provide scientific understanding of mechanisms that are involved in interactions between existing soil organic matter and biochar”, Mr Dempster said.
The 2009 cohort of Postgraduate Students from the School of Plant Biology went on the 10th Rottnest Island Postgraduate Summer School (RIPSS) from 8 – 11 February.

This annual event is designed to give postgraduates within the School a chance to get to know each other and learn about their area of research. The RIPSS is coordinated by the students themselves and hosted by the School at no cost to students.

“I have attended numerous retreats, conferences and peer reviewed workshops during my career in Agriculture, but this forum was very different to my other experiences. The RIPSS was an excellent environment for the postgraduates especially those in their 1st year”, Kevin Foster said.

Students presented their ideas and practiced their presentation “craft” to an audience with a broad scientific base. They received excellent feedback from fellow students and academic staff on their research and gained practice answering questions within a relaxed environment.

“This was a rare opportunity for students and supervisors to interact with and get to know each other outside the campus environment and ideal to network with the other postgraduates. It was also a great chance to corner one of the “guest speakers” or visiting scientists from other research institutions as a potential referee for papers or PhD theses!”, Mr Foster said.

The DAFWA/UWA Soil Quality website (www.soilquality.org.au) was transformed into one of the top soil quality websites, boasting new and better features following its relaunch in early 2009.

This website is the end product of a ‘Healthy Soils’ project conducted by UWA and DAFWA staff from 2005 – 2008. This benchmarked up to 25 soil properties across nearly 1300 sites throughout WA’s grain growing regions. Analysis of soils included basic physical and nutritional assessments to in depth biological measurements of labile carbon, microbial biomass and biological soil nitrogen supply. Dr Andrew Wherrett from UWA says, “Detailed analysis for a wide range of soil quality indicators provides a ‘snapshot’ of soil performance at a point in time. The long term aim of revisiting these sites will relate variations management and climatic to changes in soil quality.”

Website users can detect potential production constraints within a growing region by examining individual soil quality indicators. Users can enter in specific soil analysis data and compare these results to those obtained through the ‘Healthy Soils’ project. “Growers involved with the project can access individual results by entering a unique WebID, giving them a better understanding of soil biological functioning through the ‘relationships’ section”, Dr Wherrett said.

Users can now register with www.soilquality.org.au, allowing personal soil analysis results storage and claim sample sites from the ‘Healthy Soils’ project.

Access to information is a significant part of www.soilquality.org.au. A range of fact sheets available to view and download. These provide information on a range of soil issues – from potential management and production constraints, to interpretive guidelines and possible management solutions.

Another first is the ‘Organic Matter Biomass’ calculator. “Many don’t realise how much crop residue is needed to achieve significant changes in soil carbon levels. This calculator gives the growers a realistic idea of what is needed for a specific increase.”

Andrew believes www.soilquality.org.au is a top device for addressing soil based issues in Australian agriculture. “Access to good information allows growers to make more confident and profitable farm management decisions.”

Dr Andrew Wherrett

Sustaining productive agriculture for a growing world

The University of Western Australia

March 2009
Dr Bill Bowden
Principal Research Officer, DAFWA

Dr Bill Bowden began his career as a cadet with the Western Australian Department of Agriculture in 1961 and has worked for the Department ever since. He graduated with a BSc. (Agric.) from UWA, and returned in 1968, graduating with a PhD in soil chemistry in 1973. In 1980, Dr Bowden received a Reserve Bank Fellowship and worked on fertiliser dissolution, placement and effectiveness while on sabbatical at the New England University in Armidale. He was a Sub-program Leader in the CRC for Legumes in Mediterranean Agriculture (CLIMA) from 1992 to 1997.

In 2006, Dr Bowden was awarded the Donald Medal by Australian Society of Agronomy for his impact on the science and practice of agriculture in Australia. He recently received the 2009 Grains Research and Development Corporation (GRDC) Western Region Seed of Light award for his contribution to the development of agriculture, and the professional development of three generations of agricultural scientists.

Dr Bowden has over 40 year’s experience with plant and soil, research, development and extension in WADA. “I have deliberately placed myself in the gap between research and extension (what I call “development”). If research results are to be used widely by the industry, they must be put in a framework which extends them beyond the site, season and management specificities”.

Mr Richard Snowball
Research Officer, Department of Agriculture and Food Western Australia

Mr Richard Snowball completed his honours degree in 1982. He then spent a short time working on the dung beetle project at CSIRO, Floreat before taking up a research position with the Department of Agriculture in Albany working on harvesting technologies of field crops. In 1986, he joined the pasture science group at DAFWA head office where he continues to work in the area of genetic resources.

He took over the role of Curator of the pasture genebank from Bill Collins in 1996, and soon after began a period of germplasm exploration that took him to many overseas destinations. From the Azores to Israel and the Aegean Islands to Eritrea he undertook nine missions, adding significantly to the collection of pasture legumes. The genebank is now in an enhancement phase where the value of the collections is being improved. Mr Snowball works closely with CLIMA/UWA researcher Dr Kioumars Ghamkhar in the development of Core Collections to improve conservation and breeding outcomes.

Richard says, “Above all else, working in agriculture and genetic resources has allowed me to help others. From poor farmers in remote corners of the globe to our own farmers and fellow researchers, conserving and providing germplasm for the present and future has been particularly satisfying”.

Dr Richard Greene
Senior Lecturer and Graduate Advisor in the Fenner School of Environment and Society

Dr Richard Greene grew up in Perth, WA. He was a keen member of the army reserve and swimmer at Perth’s beaches during his university studies. After completing a BSc (with honours in Physical and Inorganic Chemistry) in 1970, he undertook a PhD in Soil Science (1971-1975), also at UWA.

He then joined the Victorian Department of Agriculture. From 1975 to 1985 Dr Greene worked as a soils research officer at the Irrigation Research Institute, Tatura. From 1985 to 1993 he worked as a Senior Research Scientist in the CSIRO Division of Wildlife and Ecology, firstly at Deniliquin, NSW, and later in Canberra, ACT. In 1993 he joined the Australian National University as a Lecturer in Soil and Land Management in the Geography Department.

Currently, Dr Greene is a Senior Lecturer and Graduate Advisor in the Fenner School of Environment and Society. Besides co-coordinating two courses in Soil and Land Management, he supervises several PhD, Masters and Honours students.

His fondest memories of UWA are his days as a postgraduate student in the Department of Soil Science and Plant Nutrition, conducting research and socializing with his fellow students and departmental staff, and the great discussions with his supervisors Professors Alan Posner and Jim Quirk. “My strongest advice to current postgraduate students is to get on with your research, and don’t get distracted by petty work politics; there is plenty of time for that later in the work force”, he said.

Dr Sue Hatcher
Senior Research Scientist, NSW Department of Primary Industries, Orange, NSW

Dr Sue Hatcher completed her Bachelor in 1989 and her PhD (Animal Science) in 1995. She then worked with the Australian Wool Research and Promotion Organisation (AWRAP)/International Wool Secretariat (IWS)/The Woolmark Company based in Fremantle as their WA Wool Grower Communications Officer. During those years opportunities became available to participate in various research projects involving early stage wool processing particularly consignment building and mill quality assurance.

In February 1997, Dr Hatcher left WA for a Livestock Research Officer position, specialising in Merino Breeding with NSW Agriculture based in Orange NSW. In the last 12 years her varied research program has included wool metrology and fibre identification, applied research of the genetic, economic and industry constraints impeding fine wool production across Australia and linking Merino breeding to wool processing.

“The focus put on science and its communication during both my undergraduate and postgraduate studies at UWA have been of enormous benefit in my career. There is no point in conducting science if the outcomes of the research aren’t able to be effectively communicated to the targeted end user of the work. The skills I gained in this area while at UWA have been invaluable in extending the outcomes of my work to the wool industry”, Dr Hatcher said.
Dr David Minkey

Dr David Minkey was appointed as Executive Officer of The Western Australian No-Tillage Farmers Association (WANTFA)

Dr Minkey possesses a broad background in the Western Australian cropping industry, together with extension skills and a wide-ranging knowledge about managing weeds in no tillage farming. He was most recently employed by the Western Australian Herbicide Resistance Initiative (WAHRI) where he specialised in herbicide resistance and weed management. His academic career includes undergraduate and postgraduate studies at UWA with a PhD in Weed Seed Ecology. He has a strong extension background, having assisted in the teaching of the national integrated weed management training for farm advisors.

“I hope to encourage the adoption of sustainable and profitable broad-acre cropping systems and look forward to a new role on the UWA campus,” Dr Minkey said.

Email: david.minkey@wantfa.com.au

Mrs Lisa Mayer

Mrs Lisa Mayer was appointed as Communications/Administration Officer with WAHRI

During the last five years she has worked within the Western Australian agricultural industry in the area of communication. Her recent work experience includes a role as Communications Officer with the GRDC funded Local Farmer Group Network and Grower Group Alliance projects, where she was instrumental in the development of extension and communication tools to deliver information to farmer groups.

Mrs Mayer has a BA (Applied Science, Agriculture) from The University of Western Sydney. She has experience across the meat, live animal and dairy industries, and the WA cropping community. She has worked for the Meat and Livestock Corporation, Dalgety Australia, and the Australian Poll Hereford Society. Lisa is delighted to be back at UWA and looks forward to further developing the communications role in WAHRI.

Email: lisa.mayer@uwa.edu.au

Dr James Fogarty

Dr James Fogarty is a lecturer in the School of Agricultural and Resource Economics

He was awarded his PhD in Economics from the UWA in 2006. Prior to joining the School of Agricultural and Resource Economics, Dr Fogarty was working as a private sector economist. His main research themes relate to investigating economic aspects of wine and food production and consumption. He is currently sharing the lecturing responsibilities for the third year unit Biometrics, where students learn about statistical methods such as ANOVA and linear regression.

Email: j.fogarty@acilitasman.com.au Tel: 6488 2539

Dr Chunbo Ma

Dr Chunbo Ma is a lecturer in the School of Agricultural and Resource Economics

He was awarded his PhD in Ecological Economics from the Rensselaer Polytechnic Institute (USA) in 2007. Prior to joining the School of Agricultural and Resource Economics, Dr Ma was working as an Alcoa Foundation research fellow at the Erb Institute in the University of Michigan (USA). His current research areas include energy economics, environmental policy and risk evaluation, and environmental sociology.

Email: chunboma@gmail.com Tel: 6488 2534

Dr Todd Gaines

Dr Todd Gaines is a Research Associate at the School of Plant Biology

Todd grew up on a dryland winter wheat farm in eastern Colorado, USA and received his BSc in Soil and Crop Science in 2004 and his MSc in Plant Breeding and Genetics in 2006, both at Colorado State University. He recently obtained his PhD in Weed Science from CSU.

Last year he received the Outstanding Graduate Student Award for an M.S. or Ph.D. candidate in weed science from the Weed Science Society of America (WSSA). His research experience includes pollen-mediated gene flow in wheat using herbicide resistance as a marker, and the molecular mechanism of glyphosate resistance in Palmer amaranth.

Email: tgaines@cyllene.uwa.edu.au

New Staff

The University of Western Australia March 2009 15
### Research and Industry Recognition

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<tr>
<th>NAME</th>
<th>AWARD</th>
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<tr>
<td>Prof Lyn Beazley</td>
<td>Made Officer of the Order of Australia for her work in scientific research, education and outreach</td>
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<tr>
<td>Ms Aprille Chadwick</td>
<td>Won RSPCA Humane Animal Production Scholarship 2008</td>
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<tr>
<td>Mr Daniel Dempster</td>
<td>Awarded GRDC Postgraduate Scholarship</td>
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<tr>
<td>Dr Todd Gaines</td>
<td>Received Outstanding Graduate Student Award from Weed Science Society of America (WSSA)</td>
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<tr>
<td>Adjunct Professor James Ridsdill-Smith</td>
<td>Appointed Principal Scientist of CRC National Plant Biosecurity (Feb 2008), Elected Secretary/Treasurer of the Council of the International Congresses of Entomology (July 2008)</td>
</tr>
<tr>
<td>Adjunct Prof Karam Singh</td>
<td>Inaugural CSIRO Newton Turner award for science excellence</td>
</tr>
<tr>
<td>Prof Kadamot Siddique</td>
<td>Gold medal from the Indian Society of Pulse Research and Development</td>
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<tr>
<td>Dr Helen Spafford</td>
<td>2008 FNAS Teaching in coursework teaching award (undergraduate or postgraduate)</td>
</tr>
<tr>
<td></td>
<td>2008 FNAS Excellence in postgraduate teaching award – PhD/Masters</td>
</tr>
<tr>
<td>Prof Zed Rengel</td>
<td>2008 FNAS Teaching in coursework teaching award (undergraduate or postgraduate)</td>
</tr>
<tr>
<td>Dr Michael Renton</td>
<td>2008 FNAS Excellence in postgraduate supervision – honours/4th year project</td>
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### Visitors to Institute of Agriculture

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<th>HOST DETAILS</th>
<th>DATES</th>
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<td>Assoc Prof Jorg Bohlmann</td>
<td>University of British Columbia</td>
<td>A/Prof Julie Plummer and Dr Chris Jones</td>
<td>April 2009</td>
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<tr>
<td>Dr Yiming Guo</td>
<td>Huazhong Agricultural University</td>
<td>A/Prof Wallace Cowling, Dr Sheng Chen</td>
<td>January 2009 – January 2010</td>
</tr>
<tr>
<td>Ms Chi Yingjun</td>
<td>Visiting student from China</td>
<td>Dr Patrick Finnegan</td>
<td>Nov 2008 – Jun 2010</td>
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<tr>
<td>Dr Qixian Wang</td>
<td>Institute of Agricultural Information at the Chinese Academy of Agricultural Sciences</td>
<td>Dr Megan Ryan, Dr Jiayin Pang and Prof Hans Lambers</td>
<td>January 2009 – January 2010</td>
</tr>
<tr>
<td>Prof Jianming Yang</td>
<td>Zheijian Academy of Agricultural Sciences, China</td>
<td>Dr Guijun Yan</td>
<td>January – April 2009</td>
</tr>
<tr>
<td>Ms Ana Luiza Muler</td>
<td>State University of Campinas, Cidade Universitarea, Brazil</td>
<td>Prof Hans Lambers</td>
<td>March 2009 – Feb 2010</td>
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<tr>
<td>Dr Roberta Marra</td>
<td>University of Naples (Visiting Scientist on Endeavour Award)</td>
<td>A/Prof Martin Barbetti</td>
<td>May – November 2009</td>
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<tr>
<td>A/Prof Ole Pedersen</td>
<td>Freshwater Biological Laboratory, University of Copenhagen</td>
<td>A/Prof Tim Colmer</td>
<td>August 2009 – February 2010</td>
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<tr>
<td>Made Pharmawati</td>
<td>Udayana University, Indonesia</td>
<td>Dr Patrick Finnegan</td>
<td>August 2009 – February 2010</td>
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<tr>
<td>Prof Yingnan Guo</td>
<td>Chinese Academy of Agricultural Sciences</td>
<td>Dr Guijun Yan</td>
<td>2009 – 2010</td>
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<tr>
<td>Dr Hulya Sipahi</td>
<td>Central Research Institute for Field Crops, The Ministry of Agriculture and Rural Affairs, Turkey</td>
<td>Dr Kioumars Ghamkhar</td>
<td>December 2008 – March 2009</td>
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### Upcoming meetings and events

- **IOA Events**
  - Frontiers in Agriculture: Postgraduate showcase 2009
    - **23 June 2009**
  - IOA Industry Forum 2009
    - **31 July 2009**
  - www.ioa.uwa.edu.au

- **National and International Events**
  - Dowelin Field Days: www.dowerinfielddays.com.au
  - 26-27 August 2009
  - OECD Co-operative Research Programme Sponsorship for the international conference Exploiting Genome-wide Association in Oilseed Brassicas, UWA
    - www.icpber.plants.uwa.edu.au
    - 9-12 November 2009

Sustaining productive agriculture for a growing world
## New PhD students

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<th>FUNDING BODY</th>
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<td>Ms Cathy Bondonno</td>
<td>Flavonoids and cardiovascular health</td>
<td>Medicine and Pharmacology</td>
<td>Dr Jonathan Hodgson</td>
<td>NHMRC, ARC and Department of Agriculture and Food, WA</td>
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<tr>
<td>Ms Aidilla Mubarak</td>
<td>Relationship of flavonoids to nutritional and antioxidant properties in fruit</td>
<td>Plant Biology</td>
<td>Dr Michael Considine</td>
<td>Malaysian Ministry of Higher Education, ARC and Department of Agriculture, WA</td>
</tr>
<tr>
<td>Ms Annissa Annisa</td>
<td>Molecular genetic diversity in oilseed Brassica rapa</td>
<td>Plant Biology</td>
<td>A/Prof Wallace Cowling and Dr Sheng Chen</td>
<td>AusAID</td>
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<tr>
<td>Miss Maheswari Jayakannan</td>
<td>Salinity tolerance and salicylic acid effects</td>
<td>Earth and Environment</td>
<td>Prof Zed Rengel, Dr Tissa Senaratna, Dr Olga Babourina and Prof Krishnapillai Sivasithamparam</td>
<td>IPRS and UPAIS</td>
</tr>
<tr>
<td>Ms Alexander Martin</td>
<td>Wine quality and soil terroir</td>
<td>Chemistry</td>
<td>Prof John Watling, Prof Zed Rengel</td>
<td>APA</td>
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<tr>
<td>Ms Frances Leong</td>
<td>Do reptiles benefit from hardwood profitable perennial farming systems?</td>
<td>Animal Biology</td>
<td>Dr Harriet Mills, Prof Dale Roberts and Dr Patrick Smith</td>
<td>Future Farm Industries CRC</td>
</tr>
<tr>
<td>Ms Kerrie Burns</td>
<td>The role of Bio-char in sustainable land management and the mitigation of climate change</td>
<td>Centre for Land Rehabilitation &amp; Earth and Environment</td>
<td>A/Prof Mark Tibbett</td>
<td>APA, FFI CRC and Carbon Crucible</td>
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<tr>
<td>Ms Shuhui Deborah Lin</td>
<td>Targeted adaptation of hydrocarbon degrading soil microbes to assist the remediation of petroleum hydrocarbon impacted Australian soils</td>
<td>Centre for Land Rehabilitation &amp; Earth and Environment</td>
<td>A/Prof Mark Tibbett</td>
<td>APA and Western Power</td>
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<tr>
<td>Ms Hazel Gaza</td>
<td>Characterization of Arabidopsis thaliana glycine-rich RNA-binding protein 8 (AtGRP8) gene under drought stress using knock-out and over-expression mutant lines</td>
<td>Plant Biology</td>
<td>Dr Patrick Finnegan, and Dr Martha Ludwig</td>
<td>SIRF, UIS</td>
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<td>Ni Luh Arpiwi</td>
<td>Improving oil yield in Millettia pinnata</td>
<td>Plant Biology</td>
<td>A/Prof Julie Plummer, Dr Gujun Yan and Dr Liz Barbour</td>
<td>Indonesian Department of Higher Education and Forest Products Commission</td>
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<td>Ms Christine Kershaw</td>
<td>Integrating economic methods into Natural Resource Management planning and policy</td>
<td>Agricultural &amp; Resource Economics</td>
<td>Professor David Pannell</td>
<td>APA, Future Farm Industries CRC</td>
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<tr>
<td>Mr Donkor Addai</td>
<td>Economic Analysis of Novel Perennial Costed Farming Systems</td>
<td>Agricultural &amp; Resource Economics</td>
<td>Professor David Pannell</td>
<td>APA, Future Farm Industries CRC</td>
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<tr>
<td>Mr Daniel Dempster</td>
<td>Viability of biochar use in agricultural soils</td>
<td>Earth and Environment</td>
<td>Dr Dan Murphy, Dr Deidre Gleeson and Prof Lyn Abbott</td>
<td>GRDC</td>
</tr>
<tr>
<td>Mr Rizal Ariffin</td>
<td>Soil carbon storage in agricultural ecosystem</td>
<td>Earth and Environment</td>
<td>Dr Dan Murphy and Professor Tony O’Donnell</td>
<td>Malaysian Ministry of Higher Education</td>
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<tr>
<td>Mr George Swella</td>
<td>Conservation cropping</td>
<td>Plant Biology</td>
<td>Professor Kadambot Siddique, Dr Ken Flower, &amp; Dr Phil Ward (CSIRO)</td>
<td>SIRF, IOA, FNAS and Plant Biology</td>
</tr>
<tr>
<td>Mr Luke Abatania</td>
<td>Technical efficiency in Ghanaian agriculture</td>
<td>Agricultural &amp; Resource Economics</td>
<td>Dr Atakelty Hailu</td>
<td>Vice Chancellor’s special scholarship to Ghana University</td>
</tr>
</tbody>
</table>

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**Sustaining productive agriculture for a growing world**

The University of Western Australia  
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## New research projects

<table>
<thead>
<tr>
<th>TITLE</th>
<th>FUNDING PERIOD</th>
<th>FUNDING BODY</th>
<th>SUPERVISOR(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantifying a prototype machine to destroy weed seeds during the grain harvest operation</td>
<td>2009-2011</td>
<td>GRDC</td>
<td>Prof Steve Powles and Dr Michael Walsh</td>
</tr>
<tr>
<td>SaltCap and SaltDecide</td>
<td>2008-2011</td>
<td>FFI CRC</td>
<td>Dr Ray George, Adjunct A/Prof Ed Barrett-Lennard and Dr SJ Bennett</td>
</tr>
<tr>
<td>Improving food and biofuel production in changing climates – development of new brassica polyploids in Australia and China</td>
<td>2009 - 2010</td>
<td>International Science Linkages (ISL) - Australia-China Special Fund for S&amp;T Cooperation Funding Agreement</td>
<td>A/Prof Wallace Cowling, Prof Kadambot Siddique, Dr Guijun Yan and collaborators from Huazhong Agricultural University and Zhejiang University.</td>
</tr>
<tr>
<td>Optimising biodegradation and removal of organic and inorganic pollutants in wastewater using constructed wetlands</td>
<td>2008-2011</td>
<td>Australian Research Council (ARC) Linkage</td>
<td>Prof Zed Rengel and Dr K Meney</td>
</tr>
<tr>
<td>Biofiltration of stormwater</td>
<td>2009-2010</td>
<td>Department of Water WA, Perth</td>
<td>Prof Zed Rengel</td>
</tr>
<tr>
<td>Strengthening the capacity of the counterpart organisation to both assess the flow of antioxidants and omega-3 fatty acids within the ecosystem of the Tibet Plateau and defining their protective roles in the health of Tibetan pastoralists.</td>
<td>2009-2010</td>
<td>AusAID</td>
<td>Dr Philip Vercoe and Dr Shimin Liu</td>
</tr>
<tr>
<td>Breakthrough methods for antioxidant research in grape: implications for nutritional quality</td>
<td>2009</td>
<td>British Council</td>
<td>Dr Michael Considine</td>
</tr>
<tr>
<td>Weed Seed Wizard</td>
<td>2008</td>
<td>CFC for Australian Weed Management</td>
<td>Dr Michael Renton</td>
</tr>
<tr>
<td>Modelling transplant growth in Posidonia species</td>
<td>2008</td>
<td>Cockburn Cement Ltd</td>
<td>Dr Michael Renton</td>
</tr>
<tr>
<td>Quantifying and predicting agricultural systems- protein in wheat</td>
<td>2008-2009</td>
<td>Department of Agriculture and Food WA</td>
<td>Dr Michael Renton</td>
</tr>
<tr>
<td>Development of conservation cropping systems in the drylands of Northern Iraq</td>
<td>2008-2011</td>
<td>ACIAR</td>
<td>Prof Kadambot Siddique</td>
</tr>
<tr>
<td>QBA – Animal welfare objectives measures research program – Qualitative behavioural assessment as an integrated measure of welfare</td>
<td>2007-2010</td>
<td>Murdoch University ex Meeat and Livestock Australia</td>
<td>Dr Dominique Blache</td>
</tr>
<tr>
<td>Drought tolerance of novel perennial legumes</td>
<td>2008-2010</td>
<td>Rural Industries Research and Development Corporation</td>
<td>Dr Megan Ryan</td>
</tr>
<tr>
<td>Greenhouse gas abatement and feed efficiency</td>
<td>2009</td>
<td>Sheep CRC Ltd</td>
<td>A/Prof Phil Vercoe and Dr Zoey Durmic</td>
</tr>
<tr>
<td>Water resources and freshwater biodiversity</td>
<td>2008-June 2013</td>
<td>Australian Federal Government (the Department of Climate Change)</td>
<td>Prof Peter Davies</td>
</tr>
</tbody>
</table>

## Publications 2008

(Not reported previously)

**Refereed journals**


Blache D, Martin GB and Maloney SK (2008). Towards ethically improved animal
Publications 2008
(not reported previously)


Christophersen CT, Wright ADG and Vercoe PE (2008). In vitro methane emissions and acetate: propionate ratio are decreased when artificial stimulation of the rumen wall is combined with increasing grain diets in sheep. Journal of Animal Science 86: 384-389.


Hawken PAR and Beard AP (2008). Ram novelty and the duration of ram exposure affects the distribution of mating in ewes exposed to rams during the transition into the breeding season. Animal Reproduction Science. doi:10.1016/j.anireprosci.2008.03.009


Husted SM, Nielsen BD, Blache D and Ingvartsen KL (2008). Glucose homeostasis and metabolic adaptation in the pregnant and lactating sheep are affected by the level of nutrition previously provided during her late fetal life. Domestic Animal Endocrinology 34: 419-431.


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Book chapters


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