



THE UNIVERSITY OF  
WESTERN AUSTRALIA

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# The UWA Institute of Agriculture

Number 10 **March 2010**



Some first year Agricultural Science students  
at UWA studying growth of wheat plants.

## Into the next decade: Providing for tomorrow's agriculture

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**As we prepare for the next decade it is timely to reflect on the future of agriculture and the agricultural sciences.**

Reflection and review enable us to anticipate and manage change at a time when world agriculture is in transition to diversification of agricultural production from essentially food and fibre to an industry where crops may also be grown for fuel and other high value products. All of this comes at a time when the global population is expected to reach around 9.5 billion by 2050.

Fears over a global food crisis are firmly based on concerns that we are facing a situation where

the world's demand for food is starting to outstrip supply. Maintaining food supplies is even more daunting as the per capita area of land available for food production is expected to decrease by 50% over the same period.

Agricultural productivity on existing land needs to double over the next 40 years. Meeting these demands requires more than just increased productivity from existing land, and recognises that 'agriculture' embraces all natural and social science disciplines needed to understand, manipulate and manage integrated natural and socio-economic systems.

Understanding, manipulating and managing these integrated systems will remain an important aspect of the Faculty of Natural and Agricultural Science's

(FNAS) research and development programmes over the next five years.

Sustaining agriculture and ensuring it continues to meet society's needs means that 'agriculture' at UWA will continue to build research and teaching capacity in the interdisciplinary sciences; with a clear focus on effective integration of the biophysical with the socioeconomic sciences. The UWA Institute of Agriculture takes the lead in these areas.

Agriculture is an applied science, requiring both scientific knowledge and an understanding of markets and behaviours. Without application and socioeconomic understanding the concept and development of interdisciplinary agriculture is fundamentally flawed. FNAS has both the capability and a proven track record in delivering teaching,





## Director's column

**Winthrop Professor Kadambot Siddique**  
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The UWA Institute of Agriculture's objective is to enhance the University's contribution to agriculture, and to the management of natural resources in WA, and in selected national and international settings. The Institute's objective is achieved through implementation of its key strategies: communication, resourcing, integrating and connecting.

This year the IOA has already hosted several excellent public lecturers at the IOA Food and Agriculture Lecture Series. One of the timely topics, "Will there be enough water in future?" was addressed by Dr Don McFarlane (CSIRO). Read more about the findings on page 7.

Some of WA's prominent families continued to show their commitments to UWA agriculture. The Mike Carroll Travelling Fellowship is awarded each year to a promising PhD student to travel abroad to gain experience, and return to WA to spread the knowledge. Read about the 2009 winner, Ms Parwinder Kaur, on page 9.

The Hector and Andrew Stewart Memorial Lecture is another testimony of support to the UWA Institute of Agriculture. This year's lecture was delivered by Prof Louw Hoffman who tackled the issue: "Game: more than meat". Read how families are showing continued support to agriculture at UWA (page 3).

The UWA Institute of Agriculture gives greater emphasis on national and international collaboration. Australia currently produces 3 percent of the world's research papers. The remaining 97 percent are produced outside Australia; thus we need to develop meaningful collaboration with relevant international players in order to advance Science and Technology in Australia.

Internationally renowned plant researcher, Winthrop Professor Karam Singh, joined IOA in February this year to head a joint UWA-CSIRO program on plant biotic stress and crop genomics. Professor Singh's appointment will strengthen CSIRO-UWA research group's ability to address some of the major issues facing Australian agriculture, in particular those related to crop disease management.

The IOA is looking forward to productive months ahead. On June 9, selected postgraduate students will present their research findings at the 2010 Postgraduate Showcase entitled "Frontiers in Agriculture". In July, the IOA is hosting the 2010 Industry Forum; an excellent opportunity to interact and network with agribusiness, industry and researchers.

**For more information on IOA activities go to**  
[www.ioa.uwa.edu.au](http://www.ioa.uwa.edu.au)

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research and extension programmes of particular relevance to farming and the rural community.

We are distinctively placed to integrate across the scientific and socioeconomic disciplines and will continue to work closely with stakeholders in industry and government to ensure a seamless transition of research outcomes from the University through to market. To do this successfully requires not only cooperation and collaboration between scientific disciplines but also between the different agencies responsible for delivering research outcomes to the agricultural industry and to society.

This means developing a new paradigm for agriculture at UWA where research and teaching, especially at the postgraduate level, are fully integrated. It provides students with a deep understanding of complex agricultural systems. This will necessitate a re-examination of existing teaching and learning portfolios and a re-evaluation of what and how we teach.

The University's plans (New Courses 2012) will provide graduates with the life and learning skills needed to contribute to a changing and increasingly complex world. Undergraduates will be able to study two majors as part of their three year BSc degree.

Some students are expected to choose two science majors providing an opportunity to combine Agricultural Science with a second major in areas such as Conservation Biology, Environmental Science, Natural Resource Management, Botany or Zoology. Others will be able to select Agricultural Science from the BSc degree and combine this with, for example, a major in Commerce or in Arts. Thus, the new course structure will help broaden the learning experience of our undergraduates and help develop their interdisciplinary skills. These skills will be developed further during the students fourth (Honours) and fifth (Masters) years of study.

Although we are still finalising our Masters programmes, these will offer students an opportunity to develop a discipline specific focus enabling them to develop expertise in areas critical for agriculture such as plant, crop and animal science, integrated pest management, soil and water science and agricultural economics and social science.

UWA is well advanced in transforming its education provision for the next generation of graduates. Agriculture and the skills needed by tomorrow's agriculturalists are also changing. This is both welcome and necessary. As noted by Lord May (President of the Royal Society, 2002): "We couldn't feed today's world with yesterday's agriculture and we won't be able to feed tomorrow's with today's".

At UWA we intend to remain at the forefront of developing tomorrow's agriculture.



UWA School of Plant Biology postgraduate students at Rottneest Island.

## Work and play at the Rottneest Postgraduate Summer School

2010 marks the 10th year of the UWA School of Plant Biology's Rottneest Postgraduate Summer School. The very fruitful three-day retreat at Kingstown Barrack's Youth Hostel gave postgraduates a great opportunity to network, understand each other's research projects, and receive invaluable feedback from both supervisors and students.



# Game on for meat

**As South African and Namibian game meat exports to Europe increase, there are growing consequences on wildlife numbers.**

Pressures from first-world consumers dictate how meat is to be harvested and processed, with added demands to ensure that sustainable, ethical and eco-friendly production is maintained.

Professor Louw Hoffman of the Department of Animal Sciences at Stellenbosch University, South Africa, presented the 2010 Hector and Andrew Stewart Memorial Lecture, "Game: more than just meat", at The UWA Institute of Agriculture (IOA), addressing the history behind game farming and how it might move forward in the new world.

First-world consumers expect safe, wholesome and nutritious meat. These expectations have caused an increase in game numbers, with most producers now following a holistic production and marketing strategy.

Professor Hoffman noted that in 1933, the International Conference for the Protection of Flora and Fauna of Africa was introduced. He said the 1990 World Parks Commission's goal was to protect 10% of the planet's surface, however principal national parks only resulted in moving people off ancestral grounds and turning them into 'poachers'.

In South Africa about 6% of land is located in protected areas. In 1999, 17 million hectares of land in South Africa was made up of private game ranches. Professor Hoffman said that this is 2.2 times the amount of protected areas and

three times the amount of land needed to reach the World Parks Commission's goal of 10%.

Freehold farmers in Namibia have had ownership rights over land and livestock since the early 1900s. There were approximately two million head of game, with 90% located outside formally proclaimed conservation areas and more than 80% of the larger game species found on privately owned farms.

Professor Hoffman said both Namibia and South Africa have seen an upward growth in game farms during the past 20-25 years and there was potential for game farming to represent 20% of South Africa's surface area. Game farmers now play a key role in the conservation of many game species and their capture and sale is a lucrative business, representing millions of Rand.

Addressing a packed UWA Agriculture Lecture Theatre, he said common species were marketed in alternative ways to ensure appeal. The main consumers of game meat are tourists whose perception is that it is harvested in an ethical, sustainable and eco-friendly manner. On the other hand, he said the South African game meat consumer expected lower quality than traditional red meat species, but still expected consistent quality.

Maintaining quality depended on physical attributes such as colour, toughness, sensory attributes, shelf-life, chemical composition, residues and microbiology.

Professor Hoffman discussed the stringent factors influencing cropping practices, including humanity, economy, efficiency, low wounding percentages,

low disturbance and scattering, terrain, selectivity of correct ages and sexes, minimal damage to meat, ability to bleed carcasses and no association with humans. Legislation covering meat export is extensive and adhered to the South African Standard for the Export of Game Meat. He said game meat numbers would only continue to increase and the free range image must be maintained to hold international appeal.

According to Winthrop Professor Kadambot Siddique, Director of The UWA Institute of Agriculture, Professor Hoffman is "a man very much on top of his game".

"His research and insights into this industry will continue to assist in harnessing the potential for productive game farming practices. After all, he concluded that game farming is here to stay".

W/Prof Siddique said "During Professor Hoffman's visit we discussed strategies to enhance collaboration between UWA and Stellenbosch University in agriculture, water, health engineering research and postgraduate training"

Professor Siddique also thanked Dr Andrew Stewart and his family for their attendance at the 2010 Hector and Andrew Stewart Memorial Lecture at UWA and their continued support.

The Hector and Andrew Stewart Memorial Lectureship is given in memory of the late Mr Hector J. Stewart, MLC and the late Mr Andrew Stewart, a member of the teaching staff in Agriculture at UWA from 1937 to 1959.

Winthrop Professor Tony O'Donnell Dean, Faculty of Natural and Agricultural Sciences and Professor Louw Hoffman (University of Stellenbosch).





# UWA mentored Shenton College students take top WA biotechnology honours

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Two year 10 Shenton College students, Miss Emily Phillimore and Miss Frances Harvey, are joint winners of the sanofi-aventis International BioGENEius Challenge of Western Australia, coordinated by the WA Department of Commerce.

This success further validates the Shenton College/UWA partnership 'learning links' coordinated by Mr Warwick Matthews (Academic Talent Program Coordinator), which enhances science education and encourages young people to follow science as a career path.

The BioGENEius Challenge provides an opportunity for motivated and talented high school students to undertake outstanding research in the field of biotechnology. Participants work with a professional scientist who mentors them through the development of a biotechnology research project.



L-R: Mr Warwick Matthews (Shenton College), Asst/Prof Kathy Heel (CMCA, UWA), Mr Mike Morgan (Principal, Shenton College), Asst/Prof Janine Croser (CLIMA, UWA), Ms Emily Phillimore (Shenton College), Ms Francis Harvey (Shenton College), Ms Janine Wojcieszek (Centre for Evolutionary Biology, UWA) and Dr Michael Rix (Terrestrial Zoology - Invertebrates, WA Museum), and Prof. Mark Harvey (WA Museum).

Ms Phillimore's project 'Fuelling our Future – unlocking the potential of an ancient oil crop – *Camelina sativa*' was jointly mentored by Assist/Prof Janine Croser from the Centre for Legumes in Mediterranean Agriculture (CLIMA), UWA and Assist/Prof Kathy Heel from the Centre for Microscopy, Characterisation and Analysis (CMCA), UWA.

Ms Phillimore characterised a diverse germplasm collection of high quality oilseed and potential biofuel feedstock *Camelina sativa*. Her research determined the genome size of the species and variability for key biochemical, morphological and agronomic traits. She identified accessions with very high levels of Omega-3 fatty acid and others with profiles suited to use as a biofuel. These accessions will now be included as elite parents in breeding efforts.

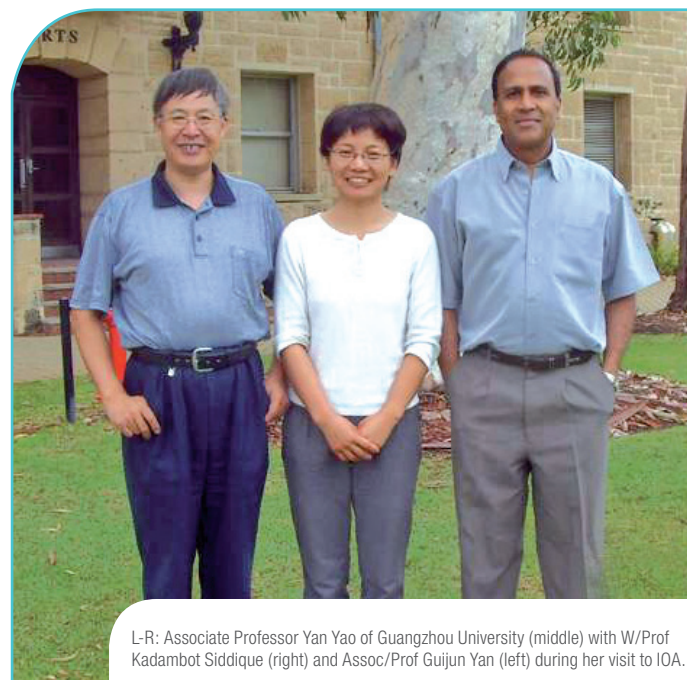
Ms Harvey's research project was undertaken under the guidance of her father, Prof Mark Harvey, Head of the Department of Terrestrial Zoology at the Western Australian Museum. Her goal was to determine the genetics of isolated populations of trap-door spiders from the Pilbara region. Researchers from Plant Energy Biology, School of Faculty of Life and Physical Sciences, and School of Animal Biology, UWA also

contributed their expertise to this project. Ms Harvey's research showed the spider populations are genetically and geographically isolated. This finding has important implications for improving future infrastructure development to conserve ecosystem biodiversity in the region.

The Challenge was judged by high-profile science and industry leaders Dr Robin Warren (Nobel Laureate), Mr Alan Brien (CEO Scitech), Dr Kristen Nowak (WAIMR; WA Science and Innovation Council) and Ms Vanessa Guthrie (Vice-President Sustainable Development, Woodside).

A research project report, laboratory journal and scientific poster were used to determine the ten state semi-finalists from a field of 19. Emily and Frances were then chosen as the WA Regional Finalists based on the oral presentation of their research.

In May 2010, Emily and Frances will compete against students from USA and Canada at the Sanofi-Aventis International BioGENEius Challenge in Chicago.



L-R: Associate Professor Yan Yao of Guangzhou University (middle) with W/Prof Kadambot Siddique (right) and Assoc/Prof Guijun Yan (left) during her visit to IOA.

## Guangzhou University Researcher at The UWA Institute of Agriculture

Associate Professor Yan Yao from Guangzhou University (GZU), China, visited the UWA Institute of Agriculture (IOA) in February, 2010.

Assoc/Prof Yao specialises in genetics and breeding of crop plants. This is one of the areas that the IOA is collaborating with GZU. UWA has already established a good working relationship with GZU. A memorandum of understanding (MOU) was signed between the two universities in 2007. IOA Director, Winthrop Professor Kadambot Siddique and Deputy Leader of Plant Production Systems Program, Associate Professor Guijun Yan, visited GZU in 2009. Both were made Guest Professors of the University. As a result of continued collaboration, a joint centre focusing on crop drought resistance research is being established.

Assoc/Prof Yao has applied for a Guangdong provincial government grant for a project to work on the breeding of medicinal plants in collaboration with Assoc/Prof Guijun Yan of IOA.





W/Prof Stephen Powles.

## Powles receives GRDC Seed of Light award

Ms Lisa Mayer ([lisa.mayer@uwa.edu.au](mailto:lisa.mayer@uwa.edu.au))

One of UWA's pre-eminent plant scientists, Winthrop Professor Stephen Powles, Director of the WA Herbicide Resistance Initiative (WAHRI), received the 2010 Grains Research and Development Corporation (GRDC) Western Region Seed of Light award at the recent GRDC-supported 2010 WA Agribusiness Crop Updates.

W/Prof Powles received this award for the significant contribution that he has made in the field of herbicide resistance in agriculture, in Australia and internationally.

"It's due to the work done at WAHRI, led by W/Prof Powles, that WA farming systems have been led back from the brink of a disaster they were facing due to widespread herbicide resistant weeds overwhelming WA farming systems," Mr Young, GRDC Western Panel Chairman, Member of the The UWA Institute of Agriculture's External Advisory Board and Kojonup farmer said.

"The Seed of Light award is presented each year to someone who makes a significant contribution to communicating the outcomes of research. Over the years, W/Prof Powles has made sure knowledge is available and can be applied in a practical manner so farmers are able to manage herbicide resistant weeds, Mr Young said.

W/Prof Powles' career began with a BSc and MSc from Michigan State University and a PhD from Australian National University.

W/Prof Powles' leadership is evident in the success of his large research team which is focused on herbicide resistance in weeds and crops. After nine years of GRDC funding, WAHRI continues to lead research into resistance in Australian cropping.

W/Prof Powles adds to his expertise with extensive knowledge of GM crops, and has widely published (150 research papers) on glyphosate sustainability.

## World class plant scientist joins UWA

Internationally respected plant researcher, Winthrop Professor Karam Singh, joined the UWA Institute of Agriculture (IOA) in February this year to head a joint UWA/CSIRO program on plant biotic stress and crop genomics.

W/Prof Singh is a Senior Principal Research Scientist with CSIRO leading a plant biotechnology group of researchers. He is program leader and officer in charge for the Plant Industry group in Perth. Whilst still retaining his CSIRO links, the appointment of W/Prof Singh provides the perfect opportunity to combine the research strengths in plant pathology and crop genomics from both CSIRO and UWA.

UWA Vice-Chancellor, Professor Alan Robson, said the appointment would increase the opportunity for



W/Prof Karam Singh (left) in the glass house with Research Fellow Dr Jonathan Anderson (CSIRO).

both institutions to conduct cutting-edge research into molecular plant genetics and pest management.

"Professor Singh's work at UWA will enhance our University's international reputation for research excellence in plant science, as well as the teaching of undergraduates and training of honours and postgraduate students in plant/crop genomics," W/Prof Robson said.

CSIRO Plant Industry Division Chief, Dr Jeremy Burdon, said that "The collaboration between CSIRO Plant Industry and UWA will strengthen

the research group's ability to address some of the major issues facing Australian agriculture, in particular those related to crop disease management."

Professor Singh's research group primarily works on plant disease problems with a focus on legumes, a new research area initiated in Perth about eight years ago. Legumes are important crops; vital for the sustainability of the large cereal crop based farming systems in southern Australia, worth billions of dollars in export earnings.





Mrs Helen Carroll and her daughter, Ms Marie-Louise Carroll, with the 2009 winner of the Mike Carroll Travelling Fellowship, Ms Parwinder Kaur.

PHOTO: BRENDON CANT AND ASSOCIATES

## Families dedicated to UWA agriculture

**Ms Erika von Kaschke (Erika.vonKaschke@uwa.edu.au)**

**Some of WA's prominent families are committed to The UWA Institute of Agriculture (IOA).**

The Hector and Andrew Stewart Memorial Lecture, Brian Carlin Memorial Lecture, and the Mike Carroll Travelling Fellowship keep the memories of these great agronomists alive, and help further agriculture in WA. The Hector and Andrew Stewart Memorial Lectureship, re-instated in 2008, is in memory of the late Mr Hector J. Stewart, MLC, and of the late Mr Andrew Stewart, a member of the teaching staff in Agriculture from 1937 to 1959.

Mr Hector Stewart, a civil engineer, and later farmer, was involved in the Farmers' and Settlers' Association. He played a prominent role in the establishment of the Wagin Co-operative Society. In 1921 he was elected to represent the Southern Provinces as a Country Party Member of the Legislative Council. In 1920 he was one of several parliamentarians who opposed an increase in members' salaries. The Bill was passed but Mr Stewart, and several colleagues, refused to accept the increase and his additional salary accumulated at the Treasury. In 1923 it was given to the UWA where it continued to accrue until it was used in part to establish these memorial lectures.

Mr Hector Stewart's son, Andrew, enrolled in the Faculty of Agriculture in 1926 and in 1929 gained his Bachelor's degree at UWA. In 1937 he was invited to join the teaching staff at the University and for 20 years "students found him a friend and adviser as well as a limitless source of knowledge on all branches of agriculture". In 1943 he was appointed Senior Lecturer and Assistant Director of the UWA Institute of Agriculture and in 1949 Reader in Agriculture. He was twice Dean of the Faculty. His research interests were related to nutrition and breeding of wool sheep. He also played a prominent part in the investigations of our north-west pastoral environment which constituted a major research interest of the Institute in its early years.

The Mike Carroll Travelling Fellowship is fast becoming one of the sought after awards at UWA. It honours the late Dr Mike Carroll, former Director-General of the WA Department of Agriculture. He was devoted to agriculture, working

tirelessly to improve the lot of the WA farming sector, the wider community and his scientific colleagues. The Fellowship reflects the value he placed on international relationships.

During March this year, the UWA Institute of Agriculture reinstated the Brian Carlin Memorial Lecture. Mr Brian Carlin was an exceptional agriculturalist who obtained his BSc (Agric) from UWA in 1951. After completing his studies, he joined the Department of Agriculture as an extension officer stationed at Wongan Hills, Mt Barker, Moora and finally at Bridgetown. His most important contribution to agriculture was introducing developing experimental ideas on set-stocking in the South West of WA. After his untimely death in 1966, his colleagues and friends started a memorial fund to honour his work. The main objective of the Fund was the perpetuation of the memory of Brian Carlin through an appropriate activity towards the benefit of WA farmers. The inaugural award was made in November 1990. This was granted on a biennial basis. The award is in the form of citation together with a travel grant.



Members of the Stewart Family at the Hector and Andrew Stewart Memorial Lecture: L-R: Dr Don Stewart, Prof Louw Hoffman (University of Stellenbosch), Mrs Rosemary Stewart, and Dr Andrew Stewart.





Dr Don McFarlane.

## Will there be enough water in future?

**Ms Erika von Kaschke** ([Erika.vonKaschke@uwa.edu.au](mailto:Erika.vonKaschke@uwa.edu.au))

Dr Don McFarlane, South-west Western Australia Sustainable Yields Project Leader, CSIRO, and member of the UWA Institute of Agriculture's External Advisory Board, and Agriculture WA's Food South West Steering Group, recently gave a talk at UWA to unveil the findings of a CSIRO study on possible impacts that future climate change may bring for surface and groundwater yields in the region. Reports and presentations on the study can be downloaded from: <http://www.csiro.au/partnerships/SWSY.html>

The study, costing \$5.2 million and involving multiple Commonwealth and State agencies and consultants, also compared these yields with water demand scenarios. The study was one of four 'Sustainable Yields' projects undertaken by CSIRO. The other three covered the Murray-Darling Basin, Tasmania and Northern Australia.

What makes south-west WA unique is that it is both isolated from other food producing areas and its water resources are impacted by what may be early indications of climate change. To add to this, this region is undergoing rapid economic and population growth; putting further pressure on water resources.

Over the last thirty five years south-west WA has experienced a climate shift, which research has indicated includes a component of climate change. Over this period rainfall has declined by 10 to 15 % and runoff in northern catchments by more than half. Compared with this dry baseline, climate models predict that rainfall could drop by about 7% more by 2030 and possibly by as much as 14% under an extreme case.

In future surface water yields could decrease by about 24% more (up to 49% under extreme conditions). Interestingly, the Harvey and Collie catchments are higher yielding and their decrease could be less, but stream flows are projected to drop the most in southern catchments.

Groundwater levels are projected to fall most under areas of perennial vegetation.

Levels are least affected in areas with high water tables such as sandy coastal areas under dryland agriculture. In these areas a reduction in winter rainfall may be offset by reductions in drain flows and evaporation over summer.

Water dependent ecosystems have already been impacted and these impacts could worsen. Overall, there is enough water to meet all except high demands under a median future climate. If there is a dry extreme climate and a high demand there will be a region-wide deficit of about 250 GL per annum.

The study also estimated the current and 2030 yield of water for catchments and aquifers in the south-west of WA considering climate change and development (plantations, farm dams, groundwater abstraction). Dr McFarlane's talk covered the main findings but concentrated on water for irrigated agriculture especially. The south west is unusual in that over 70% of all water used is self supplied, three quarters is groundwater and most irrigation is used on high value crops.

"The study took into account all fresh, marginal and brackish surface water catchments between Gingin Brook and the Hay River, all aquifers within the Perth and Collie basins, plus the western Bremer Basin", Dr McFarlane said.

"Because of the high population and development growth rate in south-west WA, aspects of water use and irrigation are different, so there is a need for different solutions in some cases", Dr McFarlane said.

For full details of Dr McFarlane's talk, go to [http://www.ioa.uwa.edu.au/papers/food\\_and\\_agriculture\\_lectures/2010](http://www.ioa.uwa.edu.au/papers/food_and_agriculture_lectures/2010)



# CBWA and UWA partnership develops world's first high-throughput ploidy analysis for plants

Assist/Prof Matthew Nelson  
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**Breeding good quality varieties and getting it ready to go to growers quickly is becoming increasingly important. The Canola Breeders Western Australia Pty Ltd's (CBWA) canola breeding programme and UWA have developed a way to speed up the process.**

According to Assistant Professor Matthew Nelson and UWA School of Plant Biology Senior Technical Officer, Ms Anouska Cousin, researchers use microspore (immature pollen) culture for rapid generation of inbred lines known as doubled haploids. Both doubled haploids (i.e. diploids) and haploids are produced during this process but these cannot be readily distinguished until plants reach the flowering stage where diploids have normal fertility whereas haploids are sterile. Thus time and glasshouse resources are wasted on nurturing haploids which are useless for breeding purposes.

Flow cytometry is an established method for early determination of ploidy but existing protocols

were too slow to measure the 7000 microspore-derived lines produced every year by CBWA. In collaboration with Assist/Prof Kathy Heel at the UWA Centre for Microscopy, Characterisation and Analysis, CBWA developed the first high-throughput ploidy analysis protocol for plants. "With this protocol, one person with four hours of hands-on work can determine the ploidy of 192 plants. This equates to just over one minute per sample – a drastic improvement on the 5-10 minutes required previously," Assist/Prof Matthew Nelson from the UWA School of Plant Biology said.

This innovation has enabled CBWA to improve the efficiency of the breeding programme by discarding sterile haploids early (saving labour and glasshouse costs) and by identifying very quickly which specific culture conditions suit each genotype. The same protocol can be used for other applications e.g. investigating ploidy series in taxonomy or cell cycle analysis in plant development studies. This protocol was published in the premier flow cytometry journal in late 2009 (Cousin A, Heel K, Cowling WA, Nelson MN (2009) An efficient high-throughput flow cytometric



Ms Anouska Cousin, UWA School of Plant Biology, Senior Technical Officer.

method for estimating DNA ploidy level in plants. Cytometry Part A 75A:1015-1019).

Assist/Prof Nelson joined UWA as a Research Fellow in crop molecular genetics in 2002. He divides his time equally between academic and commercial genetic research. His academic research focuses on understanding and using genetic diversity within Brassica species; genome evolution in legume species; and basic understanding of the meiotic process. This role involves a strong research training component including co-supervision of postgraduate students. In his commercial research, he manages the molecular marker and doubled haploid components of CBWA, located at, and co-owned by, UWA.



L-R: Mr Don Burnside (Committee member, AIAST WA branch), Ms Genevieve Simpson, Ms Stacey Plug, Hon Terry Redman (Minister of Agriculture and Food WA), Ms Courtney Rose, Ms Amy Lealiifano, and Mr Rob Delane (Director General, DAFWA).

## UWA Agricultural graduates do it again!

**The University of Western Australia and its students were recognised for its excellence in tertiary agriculture and natural resource management.**

Students studying agriculture and related subjects at WA universities were invited to participate in the forum by submitting an overview of their final year project objectives.

The finalists then submitted a 3,000 word paper and delivered a 15 minute oral presentation.

UWA Animal science student, Ms Stacey Plug, has earned the Young Professionals in Agriculture Forum's top award.

WA Agriculture and Food Minister, Hon Terry Redman, praised the work of Ms Plug while presenting the award to her at a function in Perth, hosted by the Department of Agriculture and Food WA (DAFWA) and the Australian Institute of Agricultural Science and Technology (AIAST).

"Encouraging the skills development of young people in agriculture and food through forums such as this is critical to the future success of the industry," Mr Redman said.

Interestingly, all the finalists were women, and many were from metropolitan Perth. Originally from Rockingham, Ms Plug, accepted top honours for her work on the effect of drenches on ovarian function in Merino ewes.

Following the completion of her honours project at UWA she has commenced further examination of sheep reproduction through a PhD.

Second prize went to Murdoch University graduate Ms Amy Lealiifano, for her work on growth performance and vaccination of pigs. UWA came in third with Ms Courtney Rose, of Wickpin, who is completing an agriculture and commerce degrees at UWA and spoke on crop end point royalties.

The award for best presentation went to UWA graduate Ms Genevieve Simpson, who spoke on the functioning of community landcare groups in WA.





Prof Carol Mallory-Smith

## Visiting US scientist reveals latest weed research

**Prof Carol Mallory-Smith from Oregon State University, USA, visited UWA's Western Australian Herbicide Resistance Initiative (WHARI) to share knowledge and information on herbicide resistance.**

Prof Mallory-Smith's visit forms part of the Department of Agriculture and Food WA's visiting specialist program. She addressed gatherings in Albany, Perth and the Agribusiness Crop Updates and Geraldton Regional Crop Updates.

Prof Mallory-Smith said the scientific community had gained a greater understanding about why some herbicides no longer kill some weeds, and that there are now more complicated forms of herbicide resistance.

"This includes a decreased uptake of herbicide that does not reach the active site in the plant, an altered target site and a change in the plant's ability to metabolise the herbicide."

Prof Mallory-Smith said that in the US they are seeing that mutations could also make a plant resistant to more than one class of herbicide.

According to her, identifying the problem early and integrated weed management were essential to minimise the impact of herbicide resistance.

She believes that farmers need to be prepared to change their practises. "We have had people applying herbicides to resistant fields because the herbicides used to work in the hope that they will again – but they won't," she said.

PHOTO: BRENDON CANT AND ASSOCIATES

## Brassica researcher received Mike Carroll travel award

It is the second consecutive year that a Brassica researcher was awarded the prestigious Mike Carroll Travelling Fellowship. Ms Parwinder Kaur, a PhD student in the School of Plant Biology received the 2009 Fellowship.

Fellowship winners usually travel after the award is presented but Ms Kaur has already spent seven weeks in India attending the 5th International Conference on Plant Pathology, meeting leading scientists and conducting experiments at Punjab Agricultural University.

She is researching how the pathogen *Albugo candida* causes white rust disease in *Brassica juncea*, Indian mustard. Her research will also help determine whether white rust disease is a threat to Australian mustard and canola production.

Born and educated in India, Ms Kaur won an international postgraduate research scholarship to study at UWA, through the School of Plant Biology.

Ms Kaur said she had spent many school holidays in rural northern India, where she enjoyed milking cows and buffaloes and learning about farming through her uncles.

"Since then I've had a passion to do something for the farming industry because farmers feed the whole world," she said.

"I've seen how disappointing it is for them at the end of the crop season if they have not earned enough income to feed their own family."

While completing a Bachelor of Agricultural Science with Honours at Punjab Agricultural University in India, Ms Kaur decided to target the plant protection area.

The UWA Institute of Agriculture Director, Winthrop Professor Kadambot Siddique said the Mike Carroll Travelling Fellowship honoured the late Dr Mike Carroll, former Director-General of the WA Department of Agriculture.

"Dr Carroll's devotion to agriculture and his tireless and selfless efforts to improve the lot of farmers, the wider community and his scientific colleagues is well recognised. The Fellowship also reflects the great value he placed on international relationships," W/Prof Siddique said.

"Recipients of the fellowship are chosen on their academic abilities, relevance of studies to an important area of Australian broad acre agriculture, their potential to benefit from the experience and their enthusiasm to impart the findings of their travels to the scientific, farming and wider community on their return to WA."

The 2008 Mike Carroll Travelling Fellowship winner, Ms Annaliese Mason, also gave a presentation at the award ceremony. She travelled to France last year.

L-R: Mrs Helen Carroll, Ms Parwinder Kaur and her husband Mr Amit Dhir with W/Prof Kadambot Siddique (Director, IOA).





# Kerala Agricultural University and UWA challenge climate change

Associate Professor Karl-Heinz Wyrwoll ([karl.wyrwoll@uwa.edu.au](mailto:karl.wyrwoll@uwa.edu.au))

Climate and climate-related issues are recognised as being of on-going concern for India, and governments at both the national and state levels have shown an awareness of this through supporting a range of climate-related initiatives.

Last year, UWA and Kerala Agriculture University (KAU), India signed a Memorandum of Understanding (MoU) to facilitate a collaborative effort on the development of a five year MSc degree in Climate Change Adaptation and Mitigation at KAU. Dr Karl-Heinz Wyrwoll, Associate Professor, School of Earth and Environment, was invited to visit KAU in January this year to work with Professor Prasada Rao (Course Co-ordinator, KAU), in designing the structure of the proposed MSc degree. Professor Rao visited UWA last year, and delivered an Occasional Lecture entitled, "Climate change adaptation initiatives in Kerala (India) under the humid tropics".

The degree structure developed at KAU, with its focus on agriculture, places this within a wider environmental framework – involving issues including biodiversity, natural resource management and environmental chemistry.

A core element in the proposed degree is the suite of compulsory courses in climate science ranging from a study of atmospheric processes and their wider climate context, agro-meteorology, to an understanding of global climate models. These core courses will equip students with the necessary scientific competence in climate science, often missing from this type of degree.

"The degree will be challenging, demanding an understanding of climate change processes, the veracity of future climate projections and likely impacts on agriculture and related environmental issues," Assoc/Prof Wyrwoll said.

The final two years of the degree provide the opportunity for specialization in areas such as agronomy, animal science, fisheries and forestry. It is anticipated that the MSc in Climate Change Adaptation and Mitigation at KAU should start in the latter half of 2010. Active cooperation in both research and teaching, with an exchange of staff and students between UWA and KAU, is envisaged for future years.



W/Prof Bob Gilkes talking to farmers about the latest in soil research.

## Farmers return to the university for more

Mrs Erika von Kaschke ([Erika.vonKaschke@uwa.edu.au](mailto:Erika.vonKaschke@uwa.edu.au))

The Holt Rock Grower Group visited The UWA Institute of Agriculture and Grower Group Alliance (GGA) during February.

This is the second time since the group has been to UWA to gather knowledge that could help them improve their agricultural enterprises. Their previous visit was in February 2008.

Ms Clare Smith, who coordinated the Holt Rock Group's visit, said that the farmers were particularly interested in Herbicide Resistance, Canola variety development and soil research being done at UWA.

The visitors listened interactively to presentations by W/Prof Bob Gilkes (Subsoil Constraints), Dr Andrew Wherrett (Soil quality website), Assoc/Prof Susan Barker (GM Legumes), W/Prof Steve Powles and Dr Roberto Busi (Herbicide Resistance), Dr Ken Flower (Use of herbicides in disc seeding systems), Prof Wallace Cowling (Canola breeding), Assist/Prof Rachel Standish (Carbon sequestration potential of trees/restored vegetation), Adj/A/Prof Ed Barrett-Lennard (Salinity tolerant wheat development), and Prof Ben White (What you should know about agriculture resource economics and carbon taxes).

The IOA also announced that from 2010 recordings of all Food and Agriculture Lecture Series will be available on their website at [www.ioa.uwa.edu.au](http://www.ioa.uwa.edu.au)



Photo: Assoc/Prof Karl-Heinz Wyrwoll (middle) during his visit to KAU. Hr KR Viswambharan, Vice-Chancellor (KAU) (second from left) and Prof Prasada Rao, Co-ordinator, Centre for Climate Change Research (KAU) (back).



# Does good personnel management practice give agribusiness firms a competitive advantage?

**Assist/Prof Amin Muger**  
(mugeraam@cyllene.uwa.edu.au)

The agricultural landscape in North America is characterised by a decline in farm numbers, increase in average farm size, and general shortage of sufficient and skilled workforce.

As farms grow beyond the labour capacity of the immediate families, hired labour becomes necessary but farm managers often lack skills in prudent labour management practices. Agricultural producers can either look at their employees as a cost factor to be kept minimal or as a strategic resource that can be managed to achieve a competitive advantage.

According to Assistant Professor Amin Muger within the School of Agriculture and Resource Economics and The UWA Institute of Agriculture, how a producer looks at his or her hired employees

determines how employees will be managed and what role labour will play on a farm. Assist/Prof Muger uses insights from the resource-based theory to argue that farm labour can effectively be managed to achieve farm performance above the industry average.

"Case studies from six dairy farms in Michigan, USA, illustrated that combining the capabilities of farm labourers with effective labour management practices could boost farm performance," he said.

Assist/Prof Muger warns that achieving this competitive advantage hinges on understanding the interconnection between farm business strategy, labour management practices, and the people being employed (their knowledge, skills, and abilities).

The broad agricultural landscape in WA is also facing declining farm numbers, increasing size of



Assist/Prof Amin Muger

operations, aging farm operators, and less family members returning to farms. This suggests that on some farms demand for hired farm labour will increase in the future.

"In spite of further substitution of capital for labour through labour saving technologies, the implication of this study for some WA producers is that hiring labour could boost their farm profit, if labour is managed as a source of competitive advantage rather than simply as a cost to be minimised," Prof Muger argued.

## Tracing food to farm

**Prof Garry Lee** (garry.lee@uwa.edu.au)

The ability to determine the geographical origin of food or food ingredient has become a very important issue in today's global marketplace.



Prof Garry Lee researching trace elements in pork.

New trade agreements, deregulation and sophisticated logistics systems has meant that produce from all over the world is now available at local supermarkets. Similarly, exports of Australian produce routinely populate overseas supermarket shelves. For the Australian agricultural industries, the ability to determine the geographical origin of a product means that in the case where an issue is raised over the integrity of the product, they will have a rapid robust tool to confirm the source of that product allowing the rest of the industry quick entry back into the marketplace.



Ms Jenna Valentin and Mr Chris May processing reference samples of pork.

This is the objective of the UWA's new Professor of Food Science, Professor Garry Lee's research into chemical methods to trace food. The project entitled Physi-TRACE works by collecting reference samples of pork at the time of slaughter and conducting a trace element profile of the meat.

The principle of the technology is that the trace element profile of the animals reflects the environment, i.e. host rock and/or soil and precipitation, in which they have grown. As the geology of a country can be highly variable and that certain rock and soil types have a limited spatial distribution, the trace element profile of pork grown on different areas will have measureable differences that will allow geographical origin determination. Thus a pig grown in Western Australia will have a trace element profile quite distinct from one grown in New South Wales.

Similarly pigs grown on different farms within the state will inherit subtle differences from their immediate surrounding environments. The results so far have shown that by using trace element profiles, a piece of pork sold at a supermarket can be traced back to its farm of origin.

The next stage of the project is to follow a pork carcass through the international supply chain and to involve all Australian pork producers in a large Australian wide traceability program.





Assoc/Prof Megan Ryan.

## Top notch pasture legume researcher

**Mrs Erika von Kaschke (Erika.vonKaschke@uwa.edu.au)**

When looking for a top notch pasture legume researcher, one name quickly pops up: Assoc/Prof Megan Ryan. This Frank Ford Associate Professor in Pasture Science is back at UWA after a short parental leave absence. Her focus is on development of new perennial pasture legumes for challenging environments such as those prone to stress from low soil phosphorus and drought.

"Much work is focused on Australian native species which show promise for development as pastures, in particular species in the genus *Cullen*," Assoc/Prof Ryan says. Several PhD students are focusing on *Cullen* species, including *C. australasicum*, *C. cinereum* and *C. graveolens*. These students are undertaking a range of activities including identification of germplasm best adapted to the WA wheatbelt, assessing tolerance to both acid soils and alkaline soils with subsoil constraints, and determining feed value, drought tolerance and how best to include these novel species in farming systems.

A small RIRDC-funded project of Assoc/Prof Ryan and Dr Daniel Real (DAFWA) examines optimal plant density and cutting frequency at three wheatbelt sites of *C. australasicum* and the new exotic pasture legume *Tedera*. In a recently concluded ARC-linkage project (with DAFWA, Heritage Seeds Facey Group, Mingenew-Irwin Group and the WA Chemistry Centre) the phosphorus nutrition of promising native and exotic species was focused on and species with high P-use and P-uptake efficiencies identified.

Assoc/Prof Ryan is also a participant in a RIRDC project assessing the potential of native species to be developed as grain legumes for drier regions. She is planning an open workshop for mid-year to communicate results from this project.

"I am looking forward to 2010 ... A lot of exciting results are coming in from PhD students and it's time to begin to plan new research and put together new funding applications to build on the work already completed," she said.

## Free high tech teaching resources

Responding to demand from science teachers, the Primary Industry Centre for Science Education (PICSE) has developed a new 3D online and CD resource for biology and chemistry students.

The Organic Chemistry Teaching Resource and MoleculeVisualiser provide classroom ready activities that will engage students and teachers – and the focus is on Australian science.

"Students will be amazed at the science and technology, industry are excited and we are promoting new, relevant science," said National PICSE Director, Associate Professor David Russell.

"The resources allows users to investigate derivative chemicals in poppies and their implications for human health, alkaloid chemicals in almonds, cheese making, fermentation in beer, and pesticides used in the cotton sector," said Associate Professor David Russell.

But it's not just the research topics that make The Organic Chemistry Teaching Resource and MoleculeVisualiser unique. MoleculeVisualiser uses new 3D rotational technology that allows students to see molecules in a whole new light – making chemistry fun!

With this program students simply enter the name of a molecule and hit submit. The program will bring up the molecules physical properties, its 2D and 3D image which is fully rotational plus practical information on how this molecule is relevant and used in the primary industries sector.

PICSE's New Resource Coordinator, Ms Samantha Greene, located within FNAS UWA said, "Until now, the technology used in MoleculeVisualiser has only been used by working research scientists and PhD students. We are proud to now have the transformed technology in a suitable format (and free!) for secondary school students and teachers."

The PICSE team worked with scientists and industry representatives to ensure the resource included the latest research and information.

They also worked with teachers to ensure the activities link with the curriculum and provides practical, easy to understand teaching activities.

## Organic Chemistry its role in industry

Find out about carbon chemistry in the primary industries in this interactive resource aimed at Chemistry, Biology, and Environmental Science classes. Use **MoleculeVisualiser** to engage your students with three dimensional representations of organic molecules.



Australian Government  
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Ms Sarah Panizza.

## New face representing agriculture

Mrs Erika von Kaschke (Erika.vonKaschke@uwa.edu.au)

Agricultural prophets of doom often warn against the decline in the number of young people in agriculture. One person who's passionate about making a difference is the new face representing agriculture at UWA: Ms Sarah Panizza.

Ms Panizza, the new agriculture representative of the SNAGS club (Society of natural and agricultural science) or the Agriculture Club is a country girl who spent the first couple of years of her life in Southern Cross, and later Williams. As a farmer's daughter it wasn't always that obvious that she would go on to study agriculture.

"I've always like science, but didn't consider agriculture science. After one semester studying commerce, I switched to do a double degree in Agriculture Science and Economics," she said.

"I changed my mind, because I thought: the world always needs food. The latest technologies open up new possibilities like breeding frost tolerant wheat, and I'd like to be a part of that," she said.

Now in her third year, Ms Panizza is most interested in the cropping side of agriculture.

"Being a part of SNAGS made me try to go to all my classes," she laughs.

According to her, one of the highlights of studying agriculture at UWA is that classes are always interesting. "My pasture systems class is particularly challenging. At the moment we are doing a project where you are a farm consultant and need to propose different approaches," Ms Panizza said.

She recommends getting involved in SNAGS: "It makes uni life even more enjoyable; you meet people from all the other years; and get good advice". SNAGS organises a quiz night, Industry night, sundowners and an agriculture rally each year.

## Herbicide gurus gather

Mrs Lisa Mayer (lisa.mayer@uwa.edu.au)

**Herbicide resistance is becoming a growing concern world wide. Winthrop Professor Stephen Powles, Director of the WA Herbicide Resistance Initiative (WAHRI), was invited as keynote speaker at the Bayer Pan-American Weed Resistance Conference in Miami in January 2010 on glyphosate resistant crops (GM crops).**

Bayer brought together researchers, rural media and Bayer staff to address sustainability issues for GM crops in the Americas. Over the years farmers have adopted glyphosate resistant soybean, maize and cotton in the USA, Argentina and Brazil en masse. This has meant very high reliance on glyphosate for weed control. W/Prof Powles believes glyphosate has the potential to become redundant due to increasing resistance.

"In the US cotton, corn and soybean belt, glyphosate will be driven to redundancy as a result of its massive over-use," said Powles. He urged his fellow weed scientists to do everything possible to preserve the efficacy of glyphosate.

"Farmers are called upon to feed more people, and glyphosate is a powerful tool which could help meet these challenges," he said.

The US, Canada, Brazil, Argentina and Australia export the vast majority of grain around the world – it is these regions where herbicide resistance is becoming an increasing concern.

"Glyphosate resistant crops provide easy, economical and efficient weed control, but in terms of evolution, they provide an ideal environment for the development of glyphosate resistant individuals," he said.

"Glyphosate resistant pigweed is now widespread throughout the US cotton industry, where 95 percent of the six million hectare crop is glyphosate resistant."

W/Prof Powles repeated his message to the American audience. "With herbicides, when you're on a good thing don't stick to it and that is also true for glyphosate resistant crops."

Bayer Crop Science in Frankfurt, Germany, recently sent Dr Harry Strek, Group Leader and Head of Integrated Weed Management and Resistance Biology and his colleague, Mr Craig White, WA Market Development Manager, on a visit of WA Herbicide Resistance Initiative (WAHRI) at UWA.

"Dr Strek's visit gave WAHRI researchers the opportunity to explain current WAHRI research and learn of activities underway at Bayer," W/Prof Powles said. This follows a visit to Frankfurt by W/Prof Powles in July 2009. I hope that a collaborative research project will be developed through these exchanges," W/Prof Powles said.



L-R: Dr Heping Han, Dr Yu Qin, Ms Mechelle Owen, Mr Craig White (Bayer), W/Prof Stephen Powles, Dr Harry Strek (Bayer) and Dr Roberto Busi.





L-R: Dr Pierre Le Neindre (INRA), Assoc/Prof Dominique Blache (UWA), Dr Elize van Lier (Universidad de la República Oriental del Uruguay), W/Prof Graeme Martin (UWA), Assist/Prof Jo Sneddon (UWA), Prof Fred Provenza (Utah State University), and Assoc/Prof Paul Kenyon (Massey University).

W/Prof Graeme Martin ([graeme.martin@uwa.edu.au](mailto:graeme.martin@uwa.edu.au))

Late last year, the Animal Production Program of the UWA Institute of Agriculture (IOA) ran a seminar on Clean, Green and Ethical (CGE) Animal Production in Tacuarembó, Uruguay.

The CGE Concept began at UWA with the realisation that consumers are increasingly demanding production systems that are animal friendly, safe and reliable – trends in demand in markets of high purchasing power. International and local experts gathered over two days at the seminar to present and discuss the CGE Concept, to define a common international vision on the type of animal production best suited for the Pampas Region in South America, and to formulate a strategy for Uruguayan research and development. Dr Elize van Lier (Universidad de la República Oriental del Uruguay) organised the overall event.

W/Prof Graeme Martin, Assist/Prof Joanne Sneddon, and Assoc/Prof Dominique Blache (all from UWA), Dr Paul Kenyon (Massey University, NZ), Dr Pierre Le Neindre (INRA, France), Dr Fred Provenza (Utah State University, USA), Dr Carlos Nabinger (UFRGS, Brazil), Dr Stella Huertas (Universidad de la República Oriental del Uruguay) and Dr Caroline Viñoles (INIA, Uruguay) presented on day one. This resulted in an enriching exchange of ideas and background information on the second day.

The workshop on the second day connected all protagonists of the national agro-industrial chain, to discuss and build a common vision to guide education, research and action by farmers and industry. Dr Fabio Montossi (INIA, Uruguay) coordinated the workshop. The proceedings were published in a special edition (volume 13) of *Agrociencia* <http://www.fagro.edu.uy/agrociencia/>

## Spreading the clean green and ethical word in Uruguay

## Heywire winner chooses UWA to study Agricultural Science

Ms Bonnie Hargreaves receives her award from Hon Tony Burke (Minister for Agriculture, Fisheries and Forestry, Australia).



**Ms Bonnie Hargreaves who hails from the small coastal town called Binninygup, near Bunbury, WA, and winner of the 2009 Heywire competition chose to study agriculture at UWA.**

Heywire is an initiative of ABC Radio. Successful entries are produced either by ABC Radio and broadcast nationally on ABC Radio and/or online at [heywire.abc.net.au](http://heywire.abc.net.au). Now in its twelfth year, Heywire is an online platform for creative young leaders from rural, regional and remote Australia to create, blog and share their stories.

Through Heywire, young people in regional, rural and remote Australia are given a chance to have their say across ABC radio, TV and online about what life is like for them. This competition is open to 16-22 year-olds. Regional youth 'tells it like it is' through short stories in text, pictures, video or audio about life in Australia outside the major cities.

Ms Hargreaves' submission was entitled "What it's like to be in favour of a desalination plant in a small coastal town".

"I have to say that Primary Industry Centre for Science Education (PICSE) at UWA has been the MAJOR influence in getting me to where I am now (and I'm loving it!)," Ms Hargreaves said.

"It gave me a direction at the end of Year 11, which helped me to achieve an excellent result in the 12 exams. It led me to experiences and I have learnt so much from and cherish deeply," she said.

Her entry to Heywire came after a PICSE trip to Canberra for the RIRDC forum. "The forum was fast-paced and a big learning curve. It introduced me to Bryce Ives who encouraged me to enter Heywire," she said.

Through PICSE Ms Hargreaves has done things that many school students could only dream about: work placement at Kings Park Botanical Gardens and two trips to Canberra in six months, all paid for and meeting heads of various departments and ministers.

"I've just commenced first year studying agricultural science at UWA, and am already enjoying it. I can't wait to get fully stuck into university because I know I am going to love it," she said.





W/Prof Kadambot Siddique and KSU grain legume researchers inspecting Faba bean experiments on water use efficiency at Dirab Agricultural Research and Experimental Station near Riyadh, Kingdom of Saudi Arabia.

## Linking with Kingdom of Saudi Arabia

The UWA Institute of Agriculture (IOA) has been working with several universities in the Middle East. During a recent trip to King Saud University, Kingdom of Saudi Arabia, W/Prof Kadambot Siddique (Director, IOA) strengthened links to the Middle East and Arabian Peninsula.

Riyadh University was established in 1957 and in 1982 it was renamed King Saud University (KSU). KSU is responsible for higher education, promoting scholarly research, and advancement of sciences and arts in the country. It is a comprehensive university with teaching and research in humanities, science, engineering, community matters and health.

In 2008 the total student numbers in 2008-09 were 36,109 FTE. The academic staff number (both senior and junior) at KSU during the same period was 4,628 FTE (including 1,529 FTE international).

In recent years KSU has given greater emphasis to excellence in teaching and research. KSU is making huge investments in higher education with the aim of uplifting the university to a world-class institution that delivers real benefits (economic,

environmental, social and cultural benefits). KSU has commenced initiatives in attracting world renowned scientists to its campus as visiting Professors including Nobel Laureates.

W/Prof Siddique's visit mainly focussed within the College of Food and Agricultural Sciences at KSU (formerly College of Agriculture). This College was established at KSU in 1965 and its main thrust is teaching and research in agriculture, food and environment. The College has eight departments (Plant Production, Animal Production, Plant Protection, Agricultural Engineering, Soil Science, Agricultural Economics, Food Science and Nutrition, and Agricultural Extension and Rural Society) offering 6 BSc, 19 MSc and 5 PhD programs, in addition to two joint programs in biological diversity and environmental studies.

During his visit, W/Prof Siddique accepted a visiting Professorship for one year at KSU within the College of Food and Agricultural Sciences. He also initiated a Memorandum of Understanding (MoU) between KSU and UWA. W/Prof Siddique met senior members of KSU to discuss potential research collaboration and postgraduate training opportunities between KSU and UWA.

UWA and KSU wishes to enhance relations between the two universities by developing academic and teaching, research and other activities. Within the framework of the regulations applying in each university, and subject to the availability of resources, both institutions will be encouraging the exchange of staff, joint research activities, joint conferences and other academic meetings, exchange of academic materials and information, and exchange of students.



W/Prof Kadambot Siddique accepts a visiting Professorship from Prof Dr Ahmad Al Khazim Al Ghamdi, KSU.



# Alumni



## Emeritus Professor David Kemp

**Foundation Chair in Farming Systems, School of Agricultural & Wine Sciences, Charles Sturt University**

E/Prof David Kemp arrived in WA in 1975 to start his PhD at UWA. After completing his postgraduate studies, he returned to Orange, NSW, where the then NSW Department of Agriculture was building up a major Research Institute. After 20 years doing cropping, weed and pastoral research he was appointed to the Foundation Chair in Farming Systems at the University of Sydney (1999) and to the same position at Charles Sturt University in 2006, when the Orange Campus was transferred between the two Universities. He is now an Emeritus Professor of the University of Sydney, and Professor of Charles Sturt.

E/Prof Kemp has a background in pasture and crop agronomy, plant physiology, applied ecology and the management of livestock grazing systems (dairy, beef, sheep and others). His research aims to develop the applied discipline of sustainable farming; the management and integration of soils, plants, animals, economics and sociology into viable, sustainable enterprises. He has worked in the subtropics and temperate zones on pastures, grasslands, (wheat) crops, forage and livestock production

systems. Recent work involved devising more cost-effective, sustainable management practices for livestock production from degraded grasslands in both north-western China and Australia. His research was published in over 300 papers (Australian and international journals, books, local and major international conferences). Currently, he is writing a book with others, on the Sustainable Development of Grasslands in Western China and editing another on the Grasslands of China. E/Prof Kemp chairs the Committee organising the 2013 International Grassland Congress in Australia. He is a member of the Continuing Committee for the International Grassland Congresses representing Oceania. He is establishing the China – Australia Network for Grassland Farming Systems, to foster collaboration between the two countries.

## Dr David Cook

**Research Economist, CSIRO, Division of Entomology, Black Mountain ACT**

Dr David Cook completed a BEc(Hons.) degree at Murdoch University in 1995, and between 1996 and 2004 worked as a Regional Economist for the Department of Agriculture Western Australia in Bunbury.

Here he researched a wide range of issues related to invasive species and biosecurity, from incursion response and impact assessment to trade modelling and quarantine. During this period Dr Cook received an ARC-SPIRT grant to complete a PhD (Agriculture) with UWA's School of Agricultural and Resource Economics (1999-2001). Two of these memorable years were spent at the Nedlands campus where he was supervised by Prof Rob Fraser and Prof Michael Burton. His dissertation looked at social welfare effects resulting from sanitary and phytosanitary measures imposed on goods traded interstate to prevent invasive species from entering WA.

Dr Cook returned to the Department of Agriculture for a period before taking up a postdoctoral position at Imperial College London's Wye Campus (2003-2004) profiling UK Biosecurity risks. He then returned to Australia to take up a Research

Economist position with CSIRO Entomology, and a Visiting Fellowship with the Fenner School of Environment and Society at The Australian National University. Dr Cook thoroughly enjoyed the time he spent at UWA.



## Dr Nura Abdul Karim

**Plant Records Manager, Singapore Botanic Gardens, Singapore**

Dr Nura Abdul Karim completed her Bachelor of Science (Horticulture) (Hons) in 1999 from the University of Western Australia. In 2000, she received the International Postgraduate Research Scholarship to undertake her PhD and in 2004, she successfully completed her study on "Molecular and enzymic groupings of fungi from tropical orchids of Western Australia and their patterns of tissue colonisation".

Currently, Dr Abdul Karim works at the Singapore Botanic Gardens, Living Collection Division, heading the Plant Records Unit. She oversees the database of the Gardens' plant collection and ensuring the proper use of the collection for research and display. She is also a member of the Scientific Committee of the newly formed Pha Ta Ke Botanic Garden in Laos and along with other international researchers will assist in training and aid in an advisory capacity for the staff there.

Dr Abdul Karim says: "Studying at UWA was a memorable and great experience because of the environment, good resources, experienced staff and the friends made over the years. The knowledgeable lecturers were always willing to spend extra time to discuss topics that students had problems or disagreed with and this enhanced the learning experience for all. The group projects carried out with course mates and my own PhD research were rewarding."

## Dr Surmsuk Salakpetch

**Director, Post harvest and Processing Research and Development Office, Department of Agriculture, Bangkok, Thailand**

Dr Surmsuk Salakpetch completed her MSc (Horticulture) at the then School of Agriculture, UWA in 1989. She went on to complete her PhD (Horticulture) at the University of Hawaii at Manoa, USA. Her dissertation was entitled, "Flower Bud Formation in Carambola (*Averrhoa carambola* L.) as Affected by Temperature, Day length, Water stress and Girdling". During her study at UWA she was supported by ACNARP (Australian Cooperation National Agricultural Research Program) grant, the collaborated project between Australia and Thailand. Before going for further study at UWA, she worked as an agricultural scientist, tropical fruit physiology, at the Department of Agriculture, Thailand. Dr Salakpetch returned to the same position after graduating from UWA. She enjoyed working with tropical fruit in the eastern region of Thailand. At the moment, she is focusing on administration and takes responsibility on post harvest and processing research.

"I had a great time at UWA. The buildings, landscapes and the whole environment of the University are still in my memories," she reminisces.



# New staff



## Professor Garry Lee

**Professor Garry Lee joined the UWA Centre for Forensic Science as the Professor of Food Science.**

He has a background in chemistry. His research spans the food, water and environmental fields. He has managed both domestic and international research and development projects including projects funded by Australian Pork Limited, Geoffrey Gardiner Dairy Foundation, Horticulture Australia Limited and Zespri Innovation. Most recently, he was the Coordinator of the Australian and New Zealand consortium Provenance of the Origin of Foods (PROOF), and Chair of the PROOF steering committee. Prof Lee has served on many food advisory boards and national and international science bodies. He is involved with Codex Alimentarius as an expert member and has been a consultant and advisor to parliamentary and industry bodies.

Prof Lee has successfully delivered commercial outcomes through his research. Two examples are Physi-Trace, a livestock traceability validation system based on isotope and trace metal profiles which is currently under consideration for implementation; and Rejuvenating Water, a water-based drink with Australian bush fruit flavours. Prior to this appointment, Professor Lee held

a number of managerial and executive positions at CSIRO Food Science Australia and The Australian Nuclear Science & Technology Organisation (ANSTO). He has also worked at the University of St Andrews (Scotland), National Research Council (Canada) and the University of Technology, Sydney. His current research interests include food provenance; food contamination, safety and authenticity; Phytochemistry of Australian indigenous bush foods; and developing electronic sensors for food impact volatiles.

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## Dr Liz Barbour

**Dr Liz Barbour is the Research Development Officer for the Faculty of Natural and Agricultural Sciences (FNAS).**

The position provides a strong link between Research Services and the Faculty to provide greater support for research funding and publication opportunities. Originally from Zimbabwe, she undertook her training at the University of Natal, South Africa. Her primary research focus was post harvest physiology and native plant propagation but moved into genetic deployment working for one of the largest pulp and paper companies in South Africa. On migrating to Perth, after a brief period lecturing at Murdoch University, she moved to Conservation and Land Management (CALM) to assist with the commercialization of Blue Gum and Oil mallees plantations in the south-west of Western Australia. With the separation of CALM and move into the Forest Products Commission, Dr Barbour assumed management of Seed Technologies, supervising the development and deployment of genetic products for the Western Australian forestry industry. In 2006, she took over management of the Tropical Forestry program and through collaboration with UWA, was a part of the team to discover and commercialise sandalwood oil biosynthesis genes.

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## UPCOMING MEETINGS AND EVENTS

### The UWA Institute of Agriculture Events

#### Postgraduate Showcase 2010

9 June 2010  
[www.ioa.uwa.edu.au](http://www.ioa.uwa.edu.au)

#### Industry Forum

16 July 2010  
[www.ioa.uwa.edu.au](http://www.ioa.uwa.edu.au)

### National and International Events

#### 5th International Food Legume Research Conference and 7th European Grain Legume Conference

26-30 April 2010  
Antalya, Turkey  
[www.iflrc-ecgl.org](http://www.iflrc-ecgl.org)

#### Australian Summer Grains Conference

21-24 June 2010  
Gold Coast, Queensland  
[www.australiansummergrains.com.au](http://www.australiansummergrains.com.au)

#### The 2nd International Workshop on Ecosystem Assessment and Management (EAM)

July 19-22 2010:  
Lanzhou University, China  
(Academic presentations  
+ Field excursion)

July 23-25 2010:  
Minqin County, Gansu Province  
(Field excursion +  
Specific presentations +  
Roundtable Discussion)  
[www.ioa.uwa.edu.au/events](http://www.ioa.uwa.edu.au/events)

#### Dowerin Field Days

25-26 August 2010  
Dowerin, WA  
[www.dowerinfielddays.com.au](http://www.dowerinfielddays.com.au)



## New PhD Students

NAME	TOPIC	SCHOOL	SUPERVISOR(S)	FUNDING BODY
Ms Aanandini Ganesalingam	The application of factor analytic models with correlated genetic relationships to multi-environment trials to improve the efficiency of hybrid rice breeding for international environments	Plant Biology	Assoc/Prof Wallace Cowling, Hon Res Fellow Dr Cameron Beeck and Dr Alison Smith (NSW DII)	APA Scholarship and Bayer Crop Science Scholarship
Mr Eduardo Oliveira	Grain growth of wheat under elevated Co2 and high temperatures	Plant Biology	W/Prof Kadambot Siddique, Adjunct Assoc Prof Jairo Palta (CSIRO) and Assistant Prof Helen Bramley	UWA SIRF and CSIRO

## New Research Projects

TITLE	FUNDING PERIOD	FUNDING BODY	SUPERVISOR(S)
Identifying Genes for Salt and Waterlogging Tolerance in Pasture Legumes Towards Sustainable and Profitable Saltland Pastures for Australian Farming Systems	2010	Bureau of Rural Sciences	Dr Natasha Teakle
Soil Carbon Storage in Western Australian Soils	2009-12	CSIRO ex DAFF & GRDC	Assoc/Prof Daniel Murphy
Spatial and Temporal Modelling of Water and Nutrient Flows in Australian Dairy Catchments	2009-10	Dairy Australia	Dr Mark Rivers, Dr Neil Coles and Mr Simon Clarendon
CIM/2009/038 Crops Bangladesh	2009-12	Department of Foreign Affairs & Trade – ACIAR	Prof William Erskine
ARC NWC Co Funded Centre for Groundwater Research & Training. Discussions with ARC	2010 14	Flinders University Ex Arc Nwc Co Funded Centre For Groundwater Research And Training	Assoc/Prof Alexander Gardner, W/Prof David Pannell
Enrich Phase 2 – Building Functional and Resilient Systems with Forage Shrubs	2009-11	Future Farm Industries CRC	Assoc/Prof Philip Vercoe and Assist/ Prof Zorica Durmic
Evaluation of Soft Leaf Buffalo Cultivars – Renovation Mowing Heights & Water Use	2009-11	Horticulture Australia LTD Research & Development Program	Prof Tim Colmer and Assoc/Prof Louise Barton
Wheatbelt Timber Capacity Research	2009-10	Wheatbelt Development Commission	Assist/Prof Patrick Beale
Web Interface for Soil Potassium Calculator	2010	DAFWA	Assist/Prof Michael Renton
Web Interface for PestFax	2010-2012	GRDC	Assist/Prof Michael Renton and Dr Art Diggie
RootMap	2010	GRDC/UTas	Assist/Prof Michael Renton
Climate change ready wheat cultivars for China and Australia	2010-11	Australia China Council	Assoc/Prof Guijun Yan
Intercross Pea Lines in Preparation for a Future ARC Linkage Research Project and Variety Release	2010	Council of Grain Grower Organisations Ltd (COGGO), NPZ, Germany	Professor Wallace Cowling, Professor William Erskine, Winthrop Professor Kadambot Siddique
Simulation Modelling Using ROOTMAP for Assessing the Potential Contribution of Different Nitrogen and Phosphorus Sources to Crops in South Eastern Australia	2010	University of Tasmania ex Grains Research & Development Corporation	Assistant Professor Michael Renton
Physiological and Genetic Basis of Salt and Waterlogging Tolerance in Hordeum Marinum Accessions Wheat and Their Amphiploids	2009	DAFWA	Dr Natasha Teakle



## Research and Industry Recognition

NAME	AWARD
<b>W/Prof Stephen Powles</b>	GRDC Seed of life award
<b>Assist/Prof Pieter Poot</b>	FNAS Excellence in coursework teaching award (Early career Teacher)
<b>Assoc/Prof Susan Barker</b>	FNAS Excellence in coursework teaching award (undergraduate or postgraduate)
<b>Assoc/Prof Dominique Blache</b>	FNAS Excellence in research supervision award (honours/4th year project)
<b>W/Prof Hans Lambers</b>	FNAS Excellence in postgraduate supervision award (PhD/Masters)
<b>W/Prof Kadambot Siddique</b>	Visiting Professorship at King Saudi University, Riyadh
<b>Ms Stacey Plug</b>	IAST First Prize Young Professionals in Agriculture Forum 2009
<b>Ms Courtney Rose</b>	IAST Third Prize Young Professionals in Agriculture Forum 2009
<b>Ms Genevieve Simpson</b>	IAST Best presentation Young Professionals in Agriculture Forum 2009

## Visitors to The UWA Institute of Agriculture

NAME OF THE VISITOR	VISITORS' ORGANISATION AND COUNTRY	HOST DETAILS	DATES
Prof Louw Hoffman	University of Stellenbosch, South Africa	W/Prof Kadambot Siddique and Assoc/Prof Irek Malecki	16 Mar 2010
Dr Miguel Garcia-Winder	Agribusiness Competitiveness at the Inter-American Institute for Cooperation on Agriculture, USA	W/Prof Kadambot Siddique and W/Prof Graeme Martin	1-5 Mar 2010
Dr Colin Piggitt	International Center for Agricultural Research in the Dry Areas (ICARDA), Syria	W/Prof Kadambot Siddique	1-5 February 2010
Professor Yanfei Li	Northeast Agricultural University, China	A/Prof Philip Vercor, Asst/Prof Zoey Durmic and Assist/Res Prof Shimin Liu	4 Dec 2009 – Apr 2010
Mr Zeng Yun-chao	Triticeae Research Institute, Sichuan Agricultural University	Assoc/Prof Guijun Yan and Dr Nader Aryamanesh	1 Dec 2009 – 30 Nov 11
Mr Takahashi Hirokazu	University of Tokyo	Prof Tim Colmer	1 Feb 2010 – 1 Jun 2010
Mr Rosado Bruno	Brazil	Dr Steve Burgess and Assoc/Prof Pauline Grierson	6 Feb 2010 – 5 Aug 2010
Dr Saito Takami	University of Tokyo, Japan	W/Prof Hans Lambers	25 Feb 2010 – 3 Mar 2010

## Publications (2009)

(not reported previously)

### Refereed journals

Anderson WK (2009). Closing the gap between actual and potential yield of rainfed wheat. The impacts of environment, management and cultivar. Field Crops Research doi:10.1016/j.fcr.2009.11.016.

Borger CPD, Scott JK, Renton M, Walsh M and Powles SB (2009). Assessment of management options for *Salsola australis* in south-west Australia by transition matrix modelling. Weed Research **49**: 400-408.

Borger CPD, Scott JK, Walsh M and Powles SB (2009). Demography of *Salsola australis* populations in the agricultural region of south-west Australia. Weed Research **49**: 391-399.

Busi R and Powles SB (2009). Evolution of glyphosate resistance in a *Lolium rigidum* population by glyphosate selection at sublethal doses. Heredity **103**: 318-325.

Dilmaghania A, Balesdent MH, Didier JP, Wu C, Davey J, Barbetti MJ, Li H, Moreno-Rico O, Phillips D, Despeghel JP, Vincenot L, Gout L and Rouxel T (2009). The *Leptosphaeria maculans* – *Leptosphaeria biglobosa* species complex in the American continent. Plant Pathology **58**: 1044-1058.

Duke SO and Powles SB (2009). Glyphosate-resistant crops and weeds: Now and in the future. AgBioForum **12**: 1-12.

Gaines TA, Zhang W, Wang D, Bukun B, Chisholm ST, Shaner DL, Nissen SJ, Patzoldt WL, Tranel PJ, Culpepper AS, Grey TL, Webster TM, Vencill WK, Sammons RD, Jiang J, Preston C, Leach JE and Westra P (2009). Gene amplification confers glyphosate resistance in *Amaranthus palmeri*. www.pnas.org/cgi/doi/10.1073/pnas.0906649107.

Goggin DE, Steadman KJ, Emery RJN, Farrow SC, Benech-Arnold RL and Powles SB (2009). ABA inhibits germination but not dormancy release in mature imbibed seeds of *Lolium rigidum* Gaud. Journal of Experimental Botany **60**: 3387-3396.

Llewellyn RS, D'Emden FH, Owen MJ and Powles SB (2009). Herbicide resistance in rigid ryegrass (*Lolium rigidum*) has not

led to higher weed densities in Western Australian cropping fields. Weed Science **57**: 61-65.

Owen MJ, Owen RK and Powles SB (2009). A survey in the southern grain belt of Western Australia did not find *Conyza spp* resistant to glyphosate. Weed Technology **23**: 492-494.

Owen MJ, Powles SB (2009). Distribution and frequency of herbicide-resistant wild oat (*Avena spp.*) across the Western Australian grain belt. Crop & Pasture Science **60**: 25-31.

Vila-Aiub MM, Neve P and Powles SB (2009). Fitness costs associated with evolved herbicide resistance alleles in plants. New Phytologist **184**: 751-767.

Vila-Aiub MM, Neve P and Powles SB (2009). Evidence for an ecological cost of enhanced herbicide metabolism in *Lolium rigidum*. Journal of Ecology **97**: 772-780.

Vinale F, Flematti G, Sivasithamparam K, Lorito M, Marra R, Skelton BW, and Ghisalberti EL (2009). Harzianic Acid, an Antifungal and Plant Growth Promoting Metabolite from *Trichoderma harzianum*. Journal of Natural Production **72**: 2032-2035.

Walsh MJ and Powles SB (2009). Impact of crop-topping and swathing on the viable seed production of wild radish (*Raphanus raphanistrum*). Crop & Pasture Science **60**: 667-674.

Walsh MJ, Maguire N and Powles SB (2009). Combined effect of wheat competition and 2,4-D amine on phenoxy herbicide resistant *Raphanus raphanistrum* populations. Weed Research **49**: 316-325.

Yu Q, Abdallah I, Han H, Owen M and Powles SB (2009). Distinct non-target site mechanisms endowing resistance to glyphosate, ACCase and ALS-inhibiting herbicides in multiple herbicide resistant *Lolium rigidum*. Planta **230**: 713-723.

### Book chapters

Blache D and Martin GB (2009). Focus feeding to improve reproductive performance in male and female sheep and goats – how it works and strategies for using it. In: Options Méditerranéennes, Série

A (Séminaires Méditerranéens) No. 85 – Nutritional and foraging ecology of sheep and goats (Eds: T.G. Papachristou, Z.M. Parissi, H. Ben Salem and P. Morand-Fehr) pp. 351-364. Zaragoza: Centre International de Hautes Etudes Agronomiques Méditerranéennes/Food and Agriculture Organization of the United Nations/National Agricultural Research Foundation, Greece.

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### Publications (Jan – Mar 2010)

Bramley H, Turner NC, Turner DW and Tyerman SD (2010). The contrasting influence of short-term hypoxia on the hydraulic properties of cells and roots of wheat and lupin. Functional Plant Biology **37**: 183-193.

Garg H, Kohn LM, Andrew M, Li H, Sivasithamparam K and Barbetti MJ (2010). Pathogenicity of morphologically different isolates of *Sclerotinia sclerotiorum* with *Brassica napus* and *B. juncea* genotypes. Eur J Plant Pathol **126**:305-315.

Glaszmann JC, Kilian B, Upadhyaya HD and Varshney RK (2010). Accessing genetic diversity for crop improvement. Science Direct DOI 10.1016/j.pbi.2010.01.004

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Vinale F, Ghisalberti EL, Flematti G, Marra R, Lorito M and Sivasithamparam K (2010). Secondary metabolites produced by a root-inhabiting sterile fungus antagonistic towards pathogenic fungi. The Society for Applied Microbiology, Letters in Applied Microbiology **50**: 380-385.

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