From the Director

Welcome to the winter edition of the Innovator. As I write, seasonal conditions across much of the region have been favourable, with widespread rainfall and mild temperatures being recorded, and long-term rainfall patterns looking good. This has translated to a positive mood in many of the industries we serve, and it is encouraging to see optimism. Our researchers have also been celebrating being awarded recent grants, including major grants from GRDC in grain quality, and from the Rural Research and Development for Profit Scheme in biosecurity. Congratulations to all those who contributed to these grant applications.

In March we held a workshop to discuss the vision and mission for the Graham Centre, as a key component of developing a new strategic plan. The workshop was attended by over 40 people from CSU, DPI and industry. It was an extremely productive workshop, and thank you to all who participated. The general consensus from the day was that the Graham Centre provides significant benefits to our region and beyond through our activities (research, communication, capacity building), provides benefits to members (enhanced collaborative opportunities, internal grants to support activities), and the owners of the centre (NSW DPI and CSU) through increased capacity (facilities and staff expertise and higher degree training) that enables larger initiatives to be developed. In terms of the future, it was agreed we need to be more focussed in what we do, work on larger collaborative projects, and avoid competition/duplication of activities between partners, and consider what structure best supports these objectives. As part of strategic planning, I have also met with a number of RDCs, industry representatives and others to understand their strategic plans, to ensure alignment of our strategic plan. A draft strategic plan will be available for comment shortly, and I look forward to broad input and comment.

NSW DPI and CSU have now signed off on a new Alliance Agreement, which details stronger governance arrangements, including the establishment of a Centre Board. Their role will be critical in addressing many of the issues identified in the strategic planning and re-accreditation process. I am looking forward to working closely with the new Board to deliver on our strategy.

Professor Michael Friend

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Testing out agricultural careers

Since the first Graham Centre Science and Agriculture Enrichment Day in 2006, high school students have received an insight into the work of agricultural and veterinary scientists. The day gives student’s hands-on experience working with researchers from Charles Sturt University and NSW Department of Primary Industries in four 45 minute workshops.

With the current skills shortage in agriculture escalating, this day provides a great opportunity for students to see the science in action, encouraging them to consider a future career in the agricultural supply chain.

Almost 200 agriculture, primary industries and science students from across the Riverina converged on the Graham Centre on Friday 10 and Friday 17 June for the Centre’s annual Science and Agriculture Enrichment Days.

This year students participated in hands on workshops looking at lamb production and management; the rise of superbugs (antimicrobial resistance); the health benefits of rice, and insights into careers in agriculture.

Contact: Ms Toni Nugent, T: 02 6933 4402, E: tnugent@csu.edu.au

PhD student Esther Callcott presented research on the health benefits of rice (top left); Dr John Harper gave an insight into agricultural careers, in particular botany and agronomy (top right); PhD student Shafi spoke about the rise of superbugs - antimicrobial resistance (bottom right), while students examined the amount of bacteria on their hands before and after washing their hands as part of the workshop (bottom centre); and students learnt how to body condition score and mouth sheep with PhD student Lucy Watt (bottom left).
Irrigated weeds workshop

Herbicide resistance, especially to Roundup, is a major threat to the sustainability and productivity of irrigated farming systems in Australia. Rapid weed spread and impacts on farm and along roadsides and irrigation channels is a major threat to agricultural production and access to markets. A recent workshop organised by the Graham Centre’s Deirdre Lemerle and Toni Nugent, scoped the needs for weed management research, development and extension in the irrigated systems of southern Australia. The workshop at Griffith, NSW in June, was attended by invited representatives of land managers of the irrigated landscape, including farmers, government (councils), research development corporations, irrigation companies and other private sector partners. It was agreed there is a critical need for capacity building (for farmers, advisers, researchers, policy makers) to develop effective weed control tactics and strategies. A coordinated collaboration is required across the irrigation landscape that produces a diverse and valuable range of commodities (cotton, rice, grains, pastures and forages for lamb and milk, tree fruit and nuts, vines - prunes and grapes) to effectively address the weed problems. The identified weed problems, management needs and mechanisms of spread are specific and unique to irrigated systems. Research, development and extension is urgently needed combining both chemical and non-chemical control tactics for the future viability of irrigated agriculture. A consortium of partners will develop a proposal to seek funds to address this issue.

Contact: Prof Deirdre Lemerle, M: 0419 816 267, E: dlemerle@csu.edu.au

Science meets Parliament

Graham Centre member Dr Shokoofeh Shamsi, School of Animal and Veterinary Sciences, CSU and Professor Barbara Nowak, University of Tasmania were nominated by the Australian Society for Parasitology to attend the 2016 Science Meets Parliament gathering, held in March. Shokoofeh met The Hon Warren Entsch who was specifically interested in the field of Parasitology and also had the opportunity to talk to The Hon Christopher Pyne, Minister for Industry, Innovation and Science and The Hon Bill Shorten MP, Leader of the Opposition during the dinner at Parliament House. Shokoofeh is looking forward to working with local members of Parliament from NSW and the Riverina Region to promote Science, in particular parasitology, among key policy and decision makers.

Contact: Dr Shokoofeh Shamsi, T: 026933 4887, E: sshamsi@csu.edu.au
Antimicrobial resistance a hot topic at Pan Pacific Pork Expo

PhD student Sahibzada Shafiullah (Shafi) was sponsored by Australian Pork Limited (APL) to attend the 2016 Pan Pacific Pork Expo on the Gold Coast in May. The conference was attended by over 600 people from Australia and around the world. The Pan Pacific Pork Expo combines a pork industry trade show and exhibition with information sessions supported by Australian Pork Limited (APL) and the Pork Cooperative Research Centre. The expo provides a platform for researchers, academia, producers and retailers to discuss and debate the adoption of new technologies and innovations.

On the first day of the conference over 20 Higher Degree by Research students from across Australia, including Shafi, presented their research. The next two days were plenary and concurrent sessions covering topics including production, technology and pig health.

Antimicrobial resistance was a hot topic at the conference. Dr Peter Davies, University of Minnesota, Dr Darren Trott, University of Adelaide and Dr Pat Mitchell, Australian Pork Limited presented their research on antimicrobial resistance. Antimicrobial resistance is a global issue that has become a major clinical and public health problem, however, it is also growing in the animal sector. It was concluded that the Australian pig industry is better positioned compared to other countries, but there is a need to further scale up and improve monitoring and surveillance systems to understand the epidemic scale of antimicrobial resistance and associated risk factors.

Contact: Shafi Shafiullah, E: sshafiullah@csu.edu.au

Pig emergency animal diseases under the spotlight

Delegates from the School of Animal and Veterinary Sciences, CSU and the Graham Centre, Dr Jane Heller, Sahibzada Shafiullah (Shafl) and Nicholas Evans (final year Bachelor of Veterinary Biology/Bachelor of Veterinary Science student) attended the Pig Emergency Animal Diseases Symposium 2016 in Geelong, Victoria on 26-27 April. The symposium was organised by Australian Pork Limited (APL) with collaboration with CSIRO at Australian Animal Health (AAHL), Geelong. The aim of the symposium was to establish a forum for pig veterinarians and related experts, to facilitate discussion around pig health related issues, but also to play a role in recent innovations and challenges in pig emergency animal disease (EAD) surveillance, diagnostics, and management. Dr Jane Heller, Senior Lecturer in Veterinary Epidemiology and Public Health, currently has an APL funded project looking at MRSA in pigs.

Contact: Dr Jane Heller, T: 02 6933 2839, E: jheller@csu.edu.au

Keep up to date with the Graham Centre on social media …

Don’t forget to follow the Graham Centre on Twitter www.grahamcentre.net
Bridging distance and building relationships between women farmers in Australia and India to sustain and develop rural communities

A project that is attempting to bridge the distance between women farmers through sharing cross-country perspectives on developmental issues has been boosted with a recent visit by Australian project collaborators to villages in India to meet with women farmers.

The project aims, in particular, to build conversations between women farmers in Australia (Central West Farming Systems) and India (Self Help Groups) through the virtual space. In doing so it will enable experiences to be shared and learning to occur.

As an initial step, Australian project collaborators Gavin Ramsay and Toni Nugent, Graham Centre and Diana Parsons, Central West Farming Systems met with two groups of women from the villages of Churinsora and Berada, West Bengal, India.

“The project will explore potential approaches to the process and how challenges such as language differences can be diminished while using internet based communication tools,” said Gavin Ramsay.

“The conception of distance is not just the physical distance that has to be overcome, but includes social and intellectual distance.”

Initial project activities include an exchange point for building capacity and an understanding of the agricultural role of both groups of women and where and how it is similar and the differences between the two countries. Project activities will be developed in the spirit of deriving and understanding what transformation means for each group, and will focus on establishing connections between countries.

Contact: Dr Gavin Ramsay,
T: 02 6933 4795, E: g Ramsay@csu.edu.au
Ms Toni Nugent,
T: 02 6933 4402, E: tnugent@csu.edu.au
Update from the animal endocrinology lab, CSU Wagga

This year has begun on a high note with new Honours and Masters students joining the team based on the CSU Wagga Campus. A number of competitive funding proposals have been submitted through the AMPC and Australian Wool Innovation for innovative research based on the optimisation of pre-slaughter meat quality indices in livestock.

Current Honours students include Mark Harrison, whose research aims to determine the relationship(s) between meat quality traits and stress in Alpacas. This is a collaborative project with NSW DPI and the University of Sydney. Greg Sawyer from the Australian Wool Network will commence his MPhil from July, looking at the non-invasive detection of ewe reproductive quality. Greg is supervised by Dr Edward Narayan, Professor Michael Friend and Dr Gordon Refshauge (NSW DPI). Simone Parisella won the Australian Wool Education Trust Scholarship (AWET) to do a meta-analysis on the impacts of stress factors on ewe reproduction traits for her Masters research.

In February, Dr Narayan visited SARDI in Adelaide to deliver an invited seminar on stress physiology at the School of Animal and Veterinary Sciences, University of Adelaide Roseworthy Campus, and discussed new collaboration opportunities. The Wagga laboratory is presently working with SARDI researchers on two new research projects looking at monitoring stress physiology and welfare of poultry and sheep (funded through the Graham Centre’s New Initiative Grants Scheme).

Dr Narayan will present a paper on non-invasive stress endocrinology technology at the upcoming Australian Society for Animal Production Conference in Adelaide in August.

The Animal Endocrinology team thank the Graham Centre and CSU colleagues for their support.

Contact: Dr Edward Narayan, T: 02 6933 2034, E: enarayan@csu.edu.au

Long-term impact of methane mitigation feeding strategies on productivity in sheep

Methods for mitigating enteric methane emissions from production livestock have been extensively investigated but few have practical applications or are easily implemented. A recent study by Graham Centre member Dr Mark Barnett, School of Animal and Veterinary Sciences, Charles Sturt University and Dr Roger Hegarty, University of New England, investigated the impact of long-term feeding (70 days) of four known methane reducing feed additives, which can be easily implemented, on methane yield (MY; g CH4/kg DM intake), methane emissions intensity (MEI; g CH4/kg DM intake), and productivity in sheep. The study found that the additives significantly reduced methane emissions and improved feed conversion efficiency.

Contact: Dr Mark Barnett, T: 02 6933 2034, E: mbarnett@csu.edu.au
live weight gain), bodyweight gain (BW), wool production, voluntary feed intake (VFI), feed conversion ratio (FCR) and fat deposition in sheep.

Thirty Suffolk x Merino SAMM hoggets weighing about 41 kg were randomly divided into five groups of six animals each. All animals received 2000 g mixed lucerne and wheaten chaff daily plus treatment (Group 1 (Control), chaff + 2 % urea; Group 2, chaff + 2 % nitrate; Group 3, chaff + 3 % sodium bentonite; Group 4, chaff + 5 % canola oil; Group 5, chaff + 80 mg/kg BW cysteamine (CSH)).

Bodyweight increased for animal’s receiving canola oil (30 %, P<0.01) and CSH (36 %, P<0.01) and improved FCR (Canola 24 %, CSH 28 %; P<0.01) compared to the other diets but fat deposition was greatest for canola oil (P<0.05). Methane yield was only reduced in the group receiving nitrate (P<0.01) but MEI improved for the animals receiving nitrate (P=0.01), canola oil (P<0.01) and CSH (P<0.001). Canola oil and CSH also tended to grow wool longer and at a faster rate than the other diets (P=0.10).

These results show that while some methane mitigating supplements are effective short-term, very few are capable of sustaining significant reductions long term with only nitrate being effective after 70 days. Canola oil and CSH show promise by sustaining increased growth long-term with improved FCR and MEI.

Contact: Dr Mark Barnett, T: 02 6933 2450, E: mbarnett@csu.edu.au

Networking with the world’s leading scientists

Graham Centre PhD student Clare Flakelar recently returned from the 107th American Oil Chemists Society (AOCS) meeting in Salt Lake City, Utah. More than 1400 delegates attended the meeting from 46 different countries.

Clare commented on her trip saying it was the largest conference she had attended and was a fantastic opportunity to see where the world’s most current lipid research and industry is sitting, and also where her research sits in a global context.

The program included divisions from many areas of lipid research including, analytical, surfactants, phospholipids, processing, industrial oil products, health and nutrition, lipid oxidation and quality, cannabis extraction and analytics, edible applications technology, imaging techniques, protein and co-products and society of cosmetic chemists.

Clare was fortunate to present an oral presentation in the analytical division, presenting findings from her work on applying a multiphase-design to field and laboratory analyses of canola seed and oils samples.

Contact: Ms Clare Flakelar, M: 0400 608 957, E: cflakelar@csu.edu.au
Research Interests: My research interests are in epidemiology and animal health. I really enjoy looking into the impacts diseases have on animal industries as well as how they develop and spread.

A typical day for me includes: Some exercise, feeding the cat and dog, a visit and maybe a ride of my horse, checking and replying to emails, reading papers, writing my literature review and/or research proposal, organising and planning my project, cooking dinner, watching some TV and finally finishing off the day by reading a bit of my book.

My main project at the moment is: Determining the current prevalence and risk factors of hydatid disease in Australia’s beef industry.

My favourite part of my studies is: Working with a great group of people and knowing that I am working on something that will improve a part of the beef industry. I love the opportunities that arise whilst completing a PhD. I have already travelled to Melbourne for a course and will be travelling to different towns and cities for data collection and conferences in the future.

When I am not studying I like to: In beautiful sunny weather I like to ride my horse, spend time in my veggie garden or go camping and bushwalking (I can’t stand to waste time indoors on beautiful days!). In the colder months I enjoy snowboarding. I also love to enjoy a glass of wine and cook yummy food either for myself or for family and friends.

When I am driving I like to listen to: many different types of music. When driving it’s usually whatever is on Triple J or my audiobook. I’ve never had one favourite band but at the moment I love Peking Duk, Flume, Disclosure and SAFIA as well as some alternative electronic music. I’m not a huge fan of country music or heavy metal but other than that I’m entertained.

Spring Edition of the Innovator

The Spring Edition of the Innovator will be available September 2016. Submission of articles for this edition close on Friday, 19 August 2016.

Please email articles to Toni Nugent.
Dr Guangdi Li

Position: Principal Research Scientist

Organisation: NSW Department of Primary Industries

Career Brief: I obtained my Bachelor (1982) and Master degrees (1985) at Gansu Agricultural University, China. I did my PhD on Response of Chicory (Cichorium intybus L.) to defoliation at Massey University, New Zealand in 1993-1997. Since joining the NSW Department of Primary Industries in 1997, I have run a long-term liming experiment, known as ‘MASTER’ for 15 years. More recently, I have successfully acquired more funding from GRDC to combat acid soils in the southern grain region in Australia. I also have extensive research experience in crop and pasture agronomy, pasture species evaluation and greenhouse gas emission.

Research Activities:

- Innovative approaches to managing subsoil acidity in the southern grain region (GRDC, 2015-2020)
- Options for reducing nitrous oxide emissions from the NSW dryland grains industry (Federal Department of Agriculture, 2012-2015)
- Facilitating increased on-farm adoption of broadleaf species in crop sequences to improve grain production and profitability (GRDC, 2010-2015)

Professional Links:

- Adjunct Professor - Charles Sturt University, Australia
- Adjunct Professor - University of Tasmania, Australia
- Adjunct Professor - Gansu Agricultural University, China
- Australian Society of Soil Science
- Australian Society of Agronomy

A typical day for me includes: Early morning Tai Chi before breakfast, then a stroll to work accompanied by audio books; keeping my inbox under control (I don’t like more than 10 emails in my inbox!) and going through various work software to keep everybody happy. When I am not out in the field, I play with data in Excel, read manuscripts, and write my own papers. After work I walk home and enjoy the company of family over dinner, before catching up on WeChat (equivalent to Facebook). I also make the decision whether to play with the computer or watch Chinese TV series, particularly historic or kungfu types.

My main project at the moment is: Setting up the long-term field experiment. The experiment is designed to run at least two crop rotation cycles (4-years per cycle), or one soil amendment cycle (8-years per cycle), funding permitted. There are four crops in the crop sequence, wheat-canola-barley-fababean, arranged in a fully phased design. Each crop will appear once at any given year to assess responses of different crops to different soil amendments, and to compare underline treatment effects taking account of seasonal variation. The main treatment contrasts are surface liming versus deep liming, and inorganic amendments versus organic amendments.

My favourite part of my job is: Writing a macro, then enjoying watching it running without any bugs.

When I am not in the office I like: Fixing things, gardening, playing with nature and travelling,

When I am driving I like to listen to: Chinese folk songs,

Outside work, Guangdi Li enjoys spending time with his family including his pet magpie.
### EVENTS CALENDAR

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<th>Date</th>
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<th>More information</th>
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<tr>
<td>8 July</td>
<td>Graham Centre Sheep Forum</td>
<td>Convention Centre, CSU</td>
<td>Toni Nugent</td>
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<td>28-29 July</td>
<td>2016 Agribusiness Forum</td>
<td>Blayney, NSW</td>
<td>Karl Behrendt</td>
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**Graham Centre Sheep Forum**

**Friday, 8 July 2016**

Charles Sturt University Convention Centre, Wagga Wagga

The Graham Centre Sheep and Beef Forums have become key events in the diary of sheep and beef producers across the Riverina and surrounding regions. The forums showcase the latest research from the Graham Centre and industry.

Register Now: **$25 per person** (includes morning tea and lunch)

NO PAYMENTS WILL BE TAKEN ON THE DAY

Pre-pay at:

- **Sheep forum** - www.trybooking.com/LLRC
- **Beef forum** - www.trybooking.com/LLRK

or mail cheque (made out to CSU) to:

Graham Centre, Locked Bag 588, CSU, Wagga Wagga, NSW 2678

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