



THE UNIVERSITY OF
SYDNEY

Dairy Research Foundation

Newsletter, Volume 9 - Issue 1
July 2018



The Dairy Research Foundation welcomes feedback on its Facebook page. Please click the FB icon to the left to contribute!

In this Issue

2018 Symposium	<u>3</u>
Research, Development, or Extension? What does the NSW dairy industry need?	<u>6</u>
Industry engagement is the key to research success	<u>9</u>
Post Graduate updates	<u>10</u>
Scholarship	<u>18</u>
Publications	<u>19</u>

From the Director

Welcome to another edition of the DRF's newsletter!

Two very important announcements to make in this issue.

The first one is that the DRF has new authorities! We welcome dairy farmers Mr Michael Perich and Mr Gavin Moore as, respectively, President and Vice-President of the DRF since May 2018! Michael, follows on Mr Bill Inglis' 10-year presidency (2008 to 2018).

Over these years, Bill's contributions to the DRF, the University and the NSW dairy industry have been truly amazing. I will be always grateful for Bill's dedication to the DRF and support of the Dairy Science/ FutureDairy group and their research.

The second is that the 2018 Dairy Symposium (17-18 July) is just around the corner..! with a terrific program focussing on 'Revitalising Dairy Production', our traditional annual event will be held at Sydney University (Camden Campus) on Day 1 (17th) and at the impressive Perich's family-owned and operated 2,000-cow Leppington Pastoral Company in Bringelly on Day 2 (18th July). With a range of international and domestic speakers this is a not-to-be-missed event for anyone interested in dairying..! See program and more details in this issue...



2018 Symposium: 17-18 July

The 2018 DRF Symposium will be held in Camden on **17 and 18 July**. Our theme this year is 'Revitalising Dairy Production' and we have a brilliant line up of leading speakers.

Day 1: The Symposium will be held on 17 July and our keynote speaker is Dr Robert (Bob) James, Professor Emeritus Virginia Tech and President of Down Home Heifer Solutions. Dr James combines a vast experience in research and extension in dairy science at Virginia Tech with a hands-on approach to calf and heifer rearing, and the inclusion of advanced technologies such as automated calf feeding systems and on-farm pasteurisers



Our key speakers throughout the event include Cameron Renshaw (Heiferlink, VIC), Hope Bertram (RSPCA), Wayne Clarke (Robotic Farmer, NSW), Glen Herud (Happy Cow Milk, NZ), James Hills (Tasmanian Institute of Agriculture) and Russ Hovey (University of California Davis, USA).

Day 2: Our Farm Day will be held on 18 July and takes us to Leppington Pastoral Company in Bringelly. The dairy farm is run by third generation dairy farmers and attendees will be impressed by this modern dairy facility milking 2000 cows, one of the largest in Australia. Our focus on this day will be our Emerging Scientists - the best and brightest of our next generation researchers.

To view the Symposium Program or to register please click [here](#)

THE DAIRY RESEARCH FOUNDATION'S
2018 Symposium

Revitalising Dairy Production
17-18 July CAMDEN NSW

Venue
The University of Sydney
Camden NSW

Tuesday 17 July
NSW Farmers (Dairy Committee) Industry Session
Dairy Connect (Farmers Group) Annual Conference
NSW Dairy Industry Forum
Symposium
Symposium Dinner

Wednesday 18 July
Farm Day
Emerging Scientists Program

INCORPORATING DAIRY CONNECT, NSW FARMERS (DAIRY COMMITTEE) and DAIRY NSW

DAIRY CONNECT | NSW FARMERS (DAIRY COMMITTEE) | DAIRY NSW

EARLY BIRD PRICES AVAILABLE UNTIL 22ND JUNE

Thank you to the DRF 2018 Symposium Sponsors

Platinum Sponsor



Gold Sponsors



PGG Wrightson Seeds



Gold and Major Media Partner

Dairy News



Silver Sponsors



Westpac



Manildra



AB Vista

Thank you to the DRF 2018 Symposium Sponsors

Silver Sponsors continued



DeLaval



Lion

LION



Lely

Bronze Sponsors



LALLEMAND ANIMAL NUTRITION

Lallemand Australia



NSW Farmers



Scibus & Cows R Us



Davies Way



Parmalat



Saputo Dairy
Australia Pty Ltd

Dairy Science Award

Dairy Connect



Research, Development, or Extension?

What does the NSW dairy industry need?

Prof Sergio (Yani) Garcia

The answer is straightforward: we need all three, because each addresses different needs – but collectively all are vital for the future of our industry.

But who needs what?

Someone working in extension might think there is little justification for more research. After all, there is a huge bank of research data and plenty of evidence to show that productivity ceilings are well above current industry averages. All that is needed, they might think, are better ways or tools to disseminate existing knowledge and practices, but no new research.

Interestingly, the same argument could be put upside-down: why, if all the knowledge is already there, is the industry lagging behind the already-demonstrated higher potential?

The truth is that not all farms and farmers are the same. In fact, there are as many systems as there are individual farms, and with each there are also individualised needs.

We cannot address individual needs but we can group them to rationalise investment and efforts.

A simple categorization can comprise three groups: Average (and/or Below Average) farm, Top farms, and Emerging Systems. Each of these groups have different needs, both present and future, providing a 2x3 matrix shown in Table 1.

There is a present – and very pressing – need for the Average (and Below Average) farm in NSW to rapidly increase productivity and profitability. In most cases, this can be achieved by seriously addressing the big **inefficiencies** in the production system; namely setting economic goals, whole system planning matched to goals, and basic, well known, good management practices. This was one of the key messages that came out of the Strategic Action Plan developed by CIAG (Collective Industry Action Group) a few years ago. The knowledge and know-how already exist, so the role is clearly one for the national and regional organisations to roll out their excellent and effective D&E programs.

¹ Adapted version of the original article published on DairyNSW's publication "Milkflow"

Top farms, on the contrary, have all the basics covered. They already have systems and management practices in place to avoid any big 'inefficiencies' that could erode the profitability of their businesses. Their present needs are rather focused on how to fine tune **efficiencies** to achieve key marginal gains to produce more from less. This is the traditional –and never-ending – role of research: testing new options, tools, mechanisms and processes to chase marginal gains in efficiency.

Looking into the future, the top farms of today will be asking 'where to from here?' tomorrow. These are the farmers who will soon be taking on the outcomes of today's futuristic/blue sky research on Automation, Vertical Integration, Whole life productivity, and Data Science, among other areas. Tomorrow's needs are therefore the key driver of today's less traditional (e.g. blue sky) research.

New and emerging systems bring another dimension in research needs. These systems are examples of best industry practice, already achieving top productivity levels and heavily focused on obtaining a high quality, animal and environmentally-friendly product.

However, because of their larger size and degree of intensification, they are also complex, and bring new questions to the table in relation to scale of intensification (e.g. many proven 'best practices' may fall over when applied in these system); use of resources (feed, power, people); the possibilities of hybridization (TMR/pasture/PMR); disease risk management; public perception; among others. These questions call for new, cohesive, integrated multidisciplinary R&D strategies in NSW, and at the Dairy Research Foundation we are working with organisations like Scibus and others to co-develop them.

So all in all, out of 6 possible combinations in Table 1 (and considering that over 600 farms have been grouped in only 3 groups!), only two have needs that can be addressed largely by existing knowledge and practices. The rest, which represent a fewer number of farms but much larger amounts of milk, have more complex and challenging needs that would require advanced and innovative research programs to address them, both currently and in the future.

Vertical integration and de-commoditisation provides yet another layer of complexity in the future of the NSW dairy industry. And with them come additional needs and opportunities for multidisciplinary research.

The potential for the NSW dairy industry is huge; we haven't yet scratched the surface of what is possible...!

	Present needs	Future needs
Average (and below average) farm	Address key Inefficiencies (needs D&E)	Similar needs for the average farm (but will need innovative D&E programs)
Top farms	Fine tune Efficiencies (needs Research/R&D)	Where to next? (needs Research/Blue sky) Automation - Vertical integration - Whole life animal productivity (Genetics x Nutrition x Health) Data science (integration of sensing from the animal and environment)
Emerging & intensified systems	Intensification and scale – optimizing large herds- intensive rearing systems; Hybrid systems; disease risk management in large herds; public perceptions of housed/intensive systems; sustainability challenges (needs Research/R&D)	Where to next? (needs Research/Blue sky) Environmental challenges Biosecurity/animal health Technology and data/Automation

Industry engagement is the key to research

Dr Sabrina Lomax

The future of successful research relies on building and maintaining strong relationships with key industry and commercial partners.

Associate Professor Cameron Clark has harnessed this approach through a 5-year Meat and Livestock Australia Donor Company funded program of work. The program **“Objective, robust, real-time animal welfare measures for the Australian red meat industry”** will benchmark key performance indicators of animal welfare from birth to slaughter for red meat production. This project will leverage off work completed for dairy cattle to determine key performance indicators of welfare (benchmark) from birth to slaughter for red meat production utilising the latest Allflex-SCR ear tag technology to remotely monitor multiple behavioural states.

This research links with major red meat industry producers Consolidated Pastoral Company (CPC) and Australian Country Choice (ACC), and commercial

partner Allflex, to deliver a system that will identify and ultimately eradicate potential management practices that compromise animal welfare and identify early stage disease thus enabling early intervention. The initial phase of work validating ear tags in grazing and feedlot environments is complete, with ear tags performing well in both contexts.

Partnership with industry has been the key to success so far, providing access to invaluable livestock and facility resources in the initial phases of work. Future work will extend to ACC commercial feedlot and CPC extensive pastoral systems to evaluate the application of the ear tag system on a large scale. This approach to research ensures we are answering the right questions to provide value to farmers and industry. Through these relationships, we are able to keep up to date with the key issues industry is facing, which will drive new and innovative research in the future.

Post Graduate Updates

Momena Khatun

I am in my 3rd year of my PhD now! Recently my 2nd research paper entitled “Development of a new clinical mastitis detection method for automatic milking systems” has been accepted in the international Journal of Dairy Science (JDS).



Based on my 1st field trial another paper entitled “Comparison of cis-teral and alveolar milk for mastitis detection” is under preparation for submission to JDS shortly. I will present the preliminary results of that study in the upcoming DRF symposium (<https://www.ivvy.com.au/>

I am also working to apply cow's daily activity change recorded by SCR tag and electrical conductivity to predict mastitis in pasture-based automatic milking system. More insights about my research will be available in the upcoming newsletters.



Alexandra Green

I have now commenced the third year of my PhD and what a busy time it has been! I am in the process of analysing the vocal and behavioural data I collected last year, and results are promising! Features of the cattle vocalisations seem to indicate how excited or aroused the cattle are in response to feeding and social isolation contexts. To confirm this finding, I am now conducting an observational study where I record the vocalisations of cattle in the contexts of calving, calf bonding and calf separation.



While I have been busy on farm, I have also been given many great opportunities to showcase my research and further develop my skills as a young scientist. In May I was accepted as a mentee in the Loreal For Women in Science mentoring program. In June I attended the Ecoacoustics Congress in Brisbane where I networked with vocal scientists from all over the world. In July I will be presenting work on cattle vocalisation rates at the International Society of Applied Ethology (ISAE) conference in Canada. I can't wait!

Meaghan Douglas

My PhD is investigating how to optimise the supply of nutrients from pasture and supplements to feed grazing dairy cows to optimise milk production throughout the year. My focus is on perennial ryegrass pasture, and the nutritive and degradation characteristics of individual cultivars during each season. This information will be used to formulate supplementary grain rations that will complement the quality of the pasture consumed by cows.

I am a little over two years into my PhD, and all my experiments have now been completed! Over 200 perennial ryegrass samples have been analysed for their nutritive characteristics, and I have conducted experiments investigating the ruminal degradation characteristics of three cultivars during each season. This data informed two grazing experiments that tested grain rations to optimise milk production during late spring and autumn. I will discuss results from the late spring grazing experiment at the DRF Symposium Emerging Scientists Program next month!



I am currently in the writing phase of my PhD, and waiting for the last of my ruminal degradation data to come back from the lab. Some of my data sets are quite large, so fully comprehending the data has been a big task! I'm excited to get my thesis together and disseminate my findings into the dairy industry.

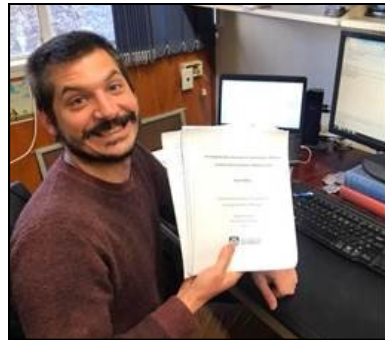


Juan Molfino

Very happy to announce that last week, and after four years of hard work, I submitted my PhD thesis!!! It was an invaluable experience! Now it will be evaluated by three examiners, so time for me to take a break and wait for the results. In the meantime I will be travelling to Argentina to visit family and friends, start thinking towards the future and look for new challenges!

The thesis was entitled 'Investigations on system and cow performance efficiency in pasture-based automatic milking systems'. The main objective of my research was to identify strategies on how to improve productivity in pasture-based Automatic Milking Systems operating with voluntary traffic. The thesis includes six research papers, of which one is published in a peer-reviewed journal, one was submitted and the remaining four research papers are planned for submission

I would like to thank my primary supervisor, Yani Garcia, the Dairy Research Foundation and The University of Sydney and Future Dairy for their support over my studies. I would also like to thank the dairy farmers who participated in some of the studies.



During my candidature I had the opportunity to participate in three DRF Symposiums as an Emerging Scientist, which was a great occasion to showcase my research to the industry. I am looking forward to seeing you all at the next DRF Symposium to be held here in Camden in a couple of weeks.

Patricia Colusso

I'm a new PhD student at the University of Sydney, who has just recently started with the Dairy Science group. My PhD research is focused on how we can optimise the Virtual herding technology for dairy systems.



In particular, a strong focus on how cow individuality and group interactions could impact the application of this technology in pasture based dairy systems. I am currently running my first trial with the new Virtual herding, animal mounted collar devices.

I am developing behavioural profiles of each animal and will compare the learning responses between individuals, and how this may change in a group setting. The results will help future research into developing training protocols and identifying any additional requirements needed for the application of this technology in dairy systems.



Mardhati Binti Mohammed

As part of my project to improve prediction of grazing dairy cows intake, I conducted a preliminary trial in October last year to evaluate and quantify sources of animal variation (in (feed and water intake) and out (urination and defecation) activities) on the BW and daily changes in BW in dairy cattle.

The result from the study led to another trial which was conducted last April to determine the realtime changes of BW which might be due to unknown noise related to movement of the animals while they were standing on the scale or due to normal fluctuation in live weight.

I am also in the process of preparing project protocols for my next experiment to validate data from previous study.



Visitors to Camden

Fernando Masia

My name is Fernando Masia, I'm from Argentina and I'm doing an internship at The University of Sydney as a part of my PhD. I'm working on the impact of reproductive and health event on the dairy cow lactations.



At this moment I am interested in describing the risk of occurrence of complete milkings. Thus I am working with a dataset that contains records of milking events for one year (July 2016 – June 2017) from AMS farms of three different countries. I used a proportional hazards survival model to describe the risk of a complete milking event happening as function of milk yield, and calving period.

The challenge is to find cows with high production, long milking intervals and that most of the milkings are complete events!

Juan Ignacio Gargiulo

Hi! My name is Juan Ignacio Gargiulo and I'm from Argentina.

Last year, I had the opportunity to carry out a four month internship with the Dairy Science group at The University of Sydney (Camden). It was a really interesting experience where I acquired both professional and personal skills. I specifically collaborated with Dr. Sabrina Lomax in the virtual herding project (an automated system to manage grazing of cattle without fences), trying to find out differences in animal responses to this technology. In addition, I worked with Dr. Nicolas Lyons from NSW DPI analysing data from a project that monitored performance of robotic dairies across four countries.

Also, working together with Dr. Lyons and Professor Yani Garcia, we analysed data from a national survey in order to figure out what is the current state of precision technology adoption and what technologies farmers thought would be most adopted in the future. We found that farmers with larger herds have adopted more precision technologies

than farmers operating smaller sized herds. In general, most of the precision technology currently installed on-farm is of the type that addresses labor issues, however by 2025 data capturing technology for monitoring farm system parameters will be increased. This research was published in 2018 in the Journal of Dairy Science, the most reputable international journal and with the highest impact factor for the field.

This year, I'm coming back to Australia to carry out a two years Masters at The University of Sydney. The area of study will be automation and robotics for dairy production and the project will be supported by NSW DPI. I'm really happy with this challenging opportunity, and enthusiastic to learn more about precision technologies and dairy science.



Congratulations

We would like to offer our congratulations to Dr Joanna Newton who recently won the Leadership Category in the Victorian Young Achiever Awards. Joanna won the Emerging Scientist's Award at the 2017 Symposium in Port Macquarie. Full details are available at the link below.

[Article](#)



Image courtesy of art4agriculture chat

Postgraduate Research Stipend and Supplementary Scholarship in Digital Agriculture Data61

Funded by the CSIRO through Data61, this Scholarship aims to support students undertaking a PhD within either the Faculty of Science, or Faculty of Engineering and Information Technologies, where the focus of their research is on information science relevant to the agricultural domain.

The Stipend Scholarship will provide an annual stipend allowance equivalent to the RTP rate (indexed to the RTP rate on January One each year) for up to three years, subject to satisfactory academic performance. The recipient may apply for an extension of up to 6 months.

The Supplementary Scholarship will provide an annual stipend allowance of \$10,000 per annum (indexed to the RTP rate on January One each year) for up to three years, subject to satisfactory academic performance. The recipient may apply for an extension of up to 6 months.

Applications are open until 29 July 2018, with further details on each scholarship available below:

[ADVANCED SENSOR AND DATA ANALYTICS IN PASTURE-BASED DAIRY SYSTEMS](#)

[REMOTE MONITORING SOLUTIONS FOR BEEF CATTLE WELFARE AND PRODUCTIVITY](#)

Recent Publications

Staff and students from the Dairy Science team have made a great start to the year with a number of publications in prominent journals.

Gargiulo, J. I., Eastwood, C. R., Garcia, S. C. & Lyons, N. A.. 2018. Dairy farmers with larger herd sizes adopt more precision dairy technologies. *Journal of Dairy Science* 101: 5466-5473. doi: <https://doi.org/10.3168/jds.2017-13324>.

Green, A.C., Johnston, I.J., Clark, C.E.F. (2017) Invited review: The evolution of cattle bioacoustics and application for advanced dairy systems. *Animal*, doi:10.1017/S1751731117002646

Green, A.C., Lomax, S., Tanaka, E., Johnston, I.J., Clark, C.E.F. (2018) Vocalisation rates of Holstein-Friesian dairy heifers subject to different farming contexts. *Proceedings of the Dairy Research Foundation Symposium, The University of Sydney, Camden*.

Green, A.C., Lomax, S., Tanaka, E., Johnston, I.J., Clark, C.E.F. (2018) Cross-contextual vocalisation rates and heart rates of Holstein-Friesian dairy heifers. *Proceedings of the International Society of Applied Ethology Conference, Prince Edward Island, Canada*.

Masia, F. M., Lyons, N. A., Piccardi, M., Balzarini, M., Hovey, R. C., Garcia, S. C. (2018) Milking intervals of cows with contrasting production. *Proceedings of the American Dairy Science Association (ADSA) Annual Meeting 2018. J. Dairy Sci. Vol. 101, Suppl. 2. P 14.*

Masia, F. M., Lyons, N. A., Piccardi, M., Balzarini, M., Hovey, R. C., Garcia, S. C. (2018) Milk yield has an impact of success of milking events in automatic milking systems (AMS). *Australasian Dairy Science Symposium (ADSS) 2018*.

Clark, C. E. F.; Kaur, R.; Millapan, L. O.; et al. The effect of temperate or tropical pasture grazing state and grain-based concentrate allocation on dairy cattle production and behaviour. *JOURNAL OF DAIRY SCIENCE* Volume: 101 Issue: 6 Pages: 5454-5465 Published: JUN 2018

Lee, J. M.; Clark, D. A.; Clark, C. E. F.; et al. A comparison of perennial ryegrass- and tall fescue-based swards with or without a cropping component for dairy production: Animal production, herbage characteristics and financial performance from a 3-year farmlet trial. *GRASS AND FORAGE SCIENCE* Volume: 73 Issue: 2 Pages: 340-354 Published: JUN 2018

Wildridge, Ashleigh M.; Thomson, Peter C.; Garcia, Sergio C.; et al. Short communication: The effect of temperature-humidity index on milk yield and milking frequency of dairy cows in pasture-based automatic milking systems. *JOURNAL OF DAIRY SCIENCE* Volume: 101 Issue: 5 Pages: 4479-4482 Published: MAY 2018

Wildridge, Ashleigh M.; Thomson, Peter C.; Garcia, Sergio C.; et al. The impact of fetching at night on milking parlour visitation for pasture based dairy cattle. APPLIED ANIMAL BEHAVIOUR SCIENCE Volume: 201 Pages: 25-30 Published: APR 2018

Ojeda, J. J.; Pembleton, K. G.; Caviglia, O. P.; et al. Modelling forage yield and water productivity of continuous crop sequences in the Argentinian Pampas. EUROPEAN JOURNAL OF AGRONOMY Volume: 92 Pages: 84-96 Published: JAN 2018

John, A. J.; Garcia, S. C.; Kerrisk, K. L.; et al. Short communication: The diurnal intake and behaviour of dairy cows when access to a feed of consistent nutritive value is restricted. JOURNAL OF DAIRY SCIENCE Volume: 100 Issue: 11 Pages: 9279-9284 Published: NOV 2017

Keeper, D. M.; Kerrisk, K. L.; House, J. K.; et al. Demographics, farm and reproductive management strategies used in Australian automatic milking systems compared with regionally proximal conventional milking systems. AUSTRALIAN VETERINARY JOURNAL Volume: 95 Issue: 9 Pages: 325-332 Published: SEP 2017

Khatun et al., 2018. Development of a new clinical mastitis detection method for automatic milking systems. Accepted in the journal of Dairy science.

Momena Khatun, Peter C. Thomson, and Sergio C. Garcia 2018. Electrical conductivity and daily activity to predict mastitis in pasture based automatic milking system. Accepted for presenting upcoming ADSS 2018 symposium in Palmerston North, New Zealand.

FACULTY OF
SCIENCE

Like Us On
facebook 

Dairy Research Foundation

For more information on any of our articles
or to become a member please contact

T +61 2 4655 0631

F +61 2 4655 2374

[http://sydney.edu.au/vetscience/
foundations/drif](http://sydney.edu.au/vetscience/foundations/drif)