



THE UNIVERSITY OF
SYDNEY

Dairy Research Foundation

Newsletter, Volume 9 - Issue 2

December 2018



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From the President

I would like to welcome everyone to our DRF newsletter.

As I take up the new role as President of the DRF, I would like to firstly thank Bill Inglis for his contribution. Bill has been president for the last 10 years and has been a great supporter of the DRF. Bill has been, and still, is very passionate for the dairy industry which is evident in his continued push for research within the region and Australia.

2018 has been a challenging year for Agriculture, especially the dairy farming community. The dry season has made it quite tough for farmers as they procure feed for their herds. Unfortunately, as the dry continued through the



Michael Perich, President DRF

grain belt, 2019 looks like it is going to be difficult as well.

There has been some potential support offered through

processors and retailers but it maybe too late for some farmers. With the DRF we continue to push to attract more research into the region, to assist our region, to ensure farmers have the best tools to prosper into the future.

Directors Report

Welcome to another issue of our DRF Newsletter!

This year sees the retirement of Mr Bill English as President of the DRF, after 10 years of uninterrupted leadership! I would like to sincerely thank Bill for his contributions and support of the DRF and the Dairy Science Group all these years! Bill continues as DRF member while growing dairy heifers at his family farm in The Oaks with wife Elizabeth.

I look forward to working with new

President, Michael Perich to revitalise dairy R&D in NSW and the contributions of the DRF.



Prof. Yani Garcia, Director DRF

2018 Symposium

The 2018 Symposium was held at Camden NSW this year on 16 – 17 July. It was a huge success with attendance rate exceeding expectation. The Tuesday session saw 185 delegates pack our Conference Centre and on Wednesday 131 delegates attended the farm day at the Leppington Pastoral

The DRF team and delegates enjoyed 2 days of beautiful weather and a wonderful program.

Keynote speaker, Dr Robert James, Professor Emeritus and President of Down Home Heifer Solutions. Dr James combines a vast experience in research and extension in dairy science at Virginia.



Near 200 people attended this year's Dairy Symposium at the University of Sydney, Camden Campus.

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Dairy Science Award

The Dairy Science Award was presented to Bill Inglis at the DRF Symposium dinner. Bill recently stepped down from the presidency of the Foundation after 10 successful years in the chair. He considered it a privilege to have had the opportunity to preside over this successful foundation.

He however believed that it was time to hand over the rein to someone with a fresh approach to the challenges facing DRF and the Dairy industry in general.

Graham Forbes, President of the Dairy Connect Farmers Group presenting Bill Inglis with the Dairy Science Award, pictured below with his wife Elizabeth Inglis.



Emerging Scientist Program

The real focus of the farm day of the 2018 Symposium was the presentations given by our young and talented Emerging Scientists in the form of a competition. The intent behind this encounter was to offer our young scientists an opportunity for professional development and to introduce them to and assimilate them with our industry. The sessions were very well

attended and the audience had the pleasure to cast their votes for the Best Presentation.

*A student from Curtin University, Jolly Gogoi Tiwari (picture below) won the title of Best Presentation for her research on an effective vaccine against *Staphylococcus aureus* mastitis.*



Runner up for Best Presentation was John Gardenier (picture right) from The University of Sydney, for his research on object detection



Best Paper was awarded to Patricia Colusso (picture below) also from The University of Sydney, for her research on the effect of group size on dairy cow response to a virtual fence.



The Emerging Scientists Program is enthusiastically attended each year by delegates and it is inspiring to see the level of young researchers coming through in Australia!

Symposium Gallery



Cameron Renshaw, from Heiferlink, speaking at the Symposium



Dr Bob James, Director of Down Home Heifer Solutions, giving his keynote speech at the Symposium

Left: PhD Students Md Ashraf and Mardhati Mohammad helping at registration table



Below Left to right: Dr Ian Leon (Scibus Director), Prof Yani Garcia, Director DRF). Bill Inglis (retiring DRF President)



Above: Delegates mingling outside at the Belgenny Farm before the Symposium dinner.

Left: Symposium dinner at Belgenny Farm

Symposium Farm Day Gallery



Farm day at Leppington Pastoral Co, Bringelly, NSW



Back row
L to R:
John Gardener, Trish Eats, Pablo Alvarez, Meghan Douglas, Fernando Masia, Alem Gebre



Front row
L to R:
Patricia Colusso, Alexandra Green, Crystal Espinoza, Jilly Gogoi & Momena Khatun



Above left: Crystal Espinoza presenting at Fam Day. Right: Dr Rafiq Islam and PhD student Mardhati Mohammad. Below: Dr Russ Hovey (UC Davis; upper photo) and Dr Bob James (Down Home Heifer Solutions) speaking at Farm Day.



Virtual Herding Experiments Underway

Dr Sabrina Lomax and A/Prof Cameron Clark



Dr. Sabrina Lomax and A/Prof Cameron Clark, alongside PhD candidate Patricia Colusso have been using the Agersens eShepherd automated collars since July 2018. The aim of the current experiments is to assess the role that individuality and feed motivation play in dairy cow learning of, and response to, VH cues.

The first experiment assessed the learning and behavioural response of cows trained to VH cues individually or in groups. The aim of this experiment was to determine how learning transferred across settings, to inform future work for herding individuals and sub-groups within a herd.

Twenty-four Holstein-Friesian dry cows were fitted with the Agersens eShepherd collars. Cows were trained as individuals or in groups of 6 to access a feed attractant of lucerne cubes at the end of a 100m paddock. A virtual fence was then

set halfway down the paddock, and cow learning and response to the VF cues was tested either individually or in groups. Each test was 5 mins, and cows were only tested once per day. After daily tests on 4 consecutive days, treatments were crossed over, so that individuals were then tested in groups, and the groups as individuals. An additional two tests were conducted after the crossover.

The number of audio cues and pulses that each cow received were recorded by the collar, in addition to visual observation of whether an individual reached the feed attractant or not.

Preliminary results show no significant difference between individual or group learning on cows crossing the VF line to reach the feed attractant. These results indicate that training in a group setting should not affect individual learning of VF cues, and vice versa.

The second experiment is being run in three blocks, and aims to evaluate the effect of hunger on cow response to VF cues. The first block was recently completed.

Two groups of six cows (within each block) were fitted with the Agersens eShepherd collars.

Cows were trained to VF cues in a 1ha paddock for 6 days. The virtual fence was set at 1/3 of the paddock for days 1-3, and 2/3 at days 4-6. From our anecdotal observations, the majority of animals remained inside the inclusion zone during this training period. Pasture measurements were made on both sides of the fence, and will be combined with the location data to determine pasture utilisation. We noted that most cows learned the location of the new fence within an hour and by day 4 all cows remained inside the inclusion zone.

For the experiment we evaluated

two feed treatments - one group was fed a maintenance ration of lucerne/oaten cubes, and the other provided unlimited access to the cubes prior to testing. Cows were then tested in their treatment groups. For testing, cows entered a mown paddock (100m), with a lucerne cube feed attractant at the end and were left there for 30 mins. Cows were tested 4 times over 3 days. Initial observations indicate that hunger may increase the likelihood of cows crossing the VF to reach the feed, however this may be more an effect of individuality, as some individuals were more motivated than others to reach the feed. Further work to evaluate the effect of individuality and group dynamics is necessary to make recommendations around herd management.

For more information – contact
Sabrina Lomax by email at

Sabrina.lomax@sydney.edu.au

*Experimental cows
grazing in the
inclusion zone for
Experiment 2*



Post Graduate Updates

Juan Molfino

I have now received the great news that my thesis has been approved by all 3 examiners with very few corrections. The feedback from all 3 examiners was very positive. They highlighted the quality of the research and the innovative approach. It is a great personal achievement, I feel extremely happy and lucky to have had the opportunity to conduct my studies in the Dairy Science Group.

I would like to again thank my primary supervisor, Yani Garcia and my co-supervisor Kendra Kerrisk. I also wish to acknowledge the support that I received from the Dairy Research Foundation, The University of Sydney and Future Dairy over my studies.

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. From now on I will be focusing on publishing a few more papers in order to make all the findings of my research available for the scientific community.

In the last couple of months I have been busy teaching whilst working at Corstorphine (University of Sydney AMS Dairy farm). I also had the chance to host a group of Argentinian farmers, who visited several farms in NSW and New Zealand. It was great to see how resilient farmers are and the different strategies they adopt to manage drought.

Amid all this I found the time to pay an overdue visit to my family in Argentina, which I enjoyed immensely.



Fernando Masía



I am now in my 2nd year of my internship and the truth is that I have enjoyed my first year here!

In the last semester I did a trial in Tararee. The objective of this research is to determine if there is an impact on milk yield and quality when access to pasture is or not restricted immediately after milking. At the moment I'm analysing the data.

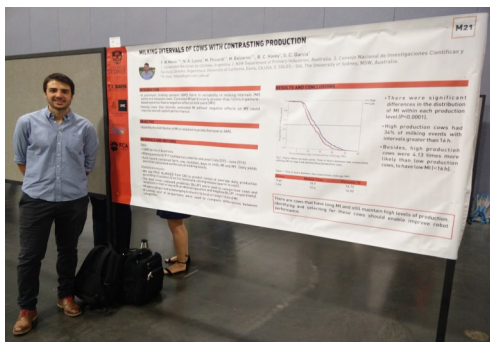
Furthermore, I presented a poster in American Dairy Science Association (ADSA) that was held in Knoxville, USA.

Fernando presenting at the American Dairy Science Association (ADSA) Knoxville, USA.

In this study we aimed to describe milking intervals of cows with contrasting production milked in pasture-based AMS. It was an experience that allowed me to learn a lot and meet some of the top scientists in my field.

I am currently analysing a dataset from AMS farms and I'm trying to identify if there are cows that have long milk interval and still maintain high production.

I presented some results at the Australian Dairy Science Symposium (ADSS) in Palmerston North, New Zealand. The title of the paper is *Milk yield has an impact on success of milking events in automatic milking systems*. In this research we are interested in quantifying the likelihood of complete milking events in relation to milk yield level and calving period.



Juani Gargiulo



My name Juan Ignacio and I recently started a Masters at Sydney Uni with the Dairy Science group.

This is my second experience in Australia. In 2017 I visited the country for a four months internship where I worked primarily on understanding the adoption of precision technologies on dairy farms. I came back this year in August to start a postgrad degree that is supported by NSW DPI and the DRF. My work will be mainly related to an important project called “Milking Edge” that aims to support the industry to invest and operate Automated Milking Systems (AMS).

My research will be particularly focused on investigating the applications and impacts of automation in pasture-based dairy systems

The objectives will be to determine the current state of AMS in Australia and study how key physical performance indicators interact with the financial performance on those farms.

I am really excited about this project. I am quite certain that the outcome of this research could help both farmers milking with AMS and conventional farmers, who may consider investing in this technology to improve the efficiency and profitability of their businesses of their business.

Patricia Colusso

I am Patricia Colusso and I am in my 1st year of my PhD with the dairy science group. My PhD focuses on how we can optimise virtual herding technology for pasture based dairy systems. Currently I am involved in trial work, which that has two main components. The first is looking at training dairy cows in a group to the technology in a grazing paddock setting. The second then uses these pre-trained

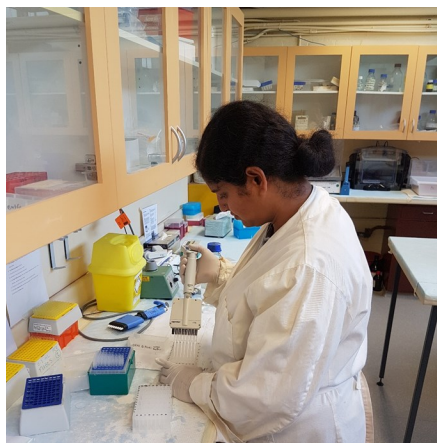
cows to assess their responses over time with different levels of hunger. This work will help future research in better understand dairy cow response and developing training protocols.



Momena Khatun

I am in the final year of my PhD now! After getting promising results from my field trial and submitting the 3rd paper from my PhD study in the JDS, I am now in the process of investigating the relationship of Q fever (caused by *Coxiella burnetii*) with somatic cell count and mastitis in the milk samples. I will be attending the Australasian dairy Science Symposium (www.adss2018.co.nz/) next month and will present how daily activity and rumination change could add values with electrical conductivity in automatic mastitis detection in AMS.

Exciting! Keep an eye in the upcoming newsletters to know more about my findings!



Alexandra Green



What a year it has been! In August I had the opportunity to present some of my research at the International Society of Applied Ethology (ISAE) conference in Prince Edward Island, Canada. While it was a bit daunting at first, it was a great way to mingle

with other behavioural scientists. I really learnt a lot.

I have also just finished four months of field work looking at cattle vocal behaviour during parturition, calf bonding and calf separation.

I am very excited to start analysing this work as the cattle seem to have different call types during each of these contexts. Right now, I am writing up two behavioural and vocal experiments with the hope of publishing them later this year. I will then focus on writing up my thesis. Bring it on.

Mardhati Mohammad



I am now in the second phase of my study. At the moment, a study to investigate and quantify known factors contributing to fluctuations of daily

bodyweight (BW) of dairy cattle is being conducted. Hopefully positive and comprising findings can be obtained from this trial. The findings will be used to develop BW model to improve estimation of dry matter intake (DMI).

I also had the opportunity to present my preliminary data entitled Diurnal energy requirement of lactating grazing dairy cows at 18th Asian-Australasian Animal Produc-

tion (AAAP) Congress in Malaysia last August. The AAAP Congress is one of the biggest animal science conference that features a multidisciplinary animal fields involves symposium, numerous scientific session theme and technical visits.

Participating in this conference allowed me to share my research work and immediate feedback on my current project be made available!



Stewart Scott

Stewart is a highly experienced large animal vet who has enrolled in a part-time PhD last year. He is looking at the effects of early postpartum milk production on long-term health and reproductive performance in dairy cattle. Stewart is supervised by Prof. Yani Garcia,

Dr Jennie Pryce (Ag Vic) and A/Prof Peter Thomson (USyd)



Md Ashraful Islam



I am from Bangladesh and have started my PhD candidature with

the financial support of Australia Award- Endeavour Scholarship at The University of Sydney under the supervision of A/P Dr Cameron Clark. My PhD project is entitled 'Monitoring and Mitigating Heat Stress in Cattle'.

Global environmental temperature is rising and its possible adverse effect on animal production is becoming increasingly important. Estimates of environmental heat stress are required for heat stress relief measures in cattle. The thermal stress indices have been in use for years, but require environmental/ weather (e.g., temperature, humidity, solar radiation, wind speed etc.) and physiological (e.g., body temperature, respiration rate etc.) data to work, which make them impracticable for the farmers. My research focuses on validation of sensor based heat stress monitoring method for individual cattle. Once the method is validated, nutritional

mitigation strategy for heat stress will be applied to susceptible animals isolated by using the validated method.

During the last year of my PhD candidature, I have completed preliminary review work on literature available in my research field and also I have done my first fieldwork last summer in a feedlot facility in Queensland. We got some interesting results on visual and sensor based monitoring of heat stress responses of cattle, and on feed selection.

Meaghan Douglas



Meaghan is in the last phase of her PhD. She has completed all experiments at Ellinbank working with co-supervisors Drs Bill Wales and Martin Auld from Agriculture Victoria. She is now working towards submitting manuscripts to journals. Meghan presented her work at the DRF Symposium in July and more recently at the Australasian Dairy Science Symposium in Palmerston North, NZ.

New arrivals

Since the last newsletter there has been a few new recruits..!

Andrew Carlyon



Andrew studied a Bachelor of Animal Science at the Charles Sturt Uni-

versity in Wagga Wagga.

He worked as a Research Assistant for 2 years at the University of Melbourne in the Animal Welfare Science Centre before starting at the University of Sydney as a Technical Officer with the Dairy Research Group.

What Andrew enjoys most about his current position is his interaction with the research students and assisting them in resolving their research issues..

Liselle Heap

Liselle started with the Dairy Research Foundation on 3 July of this year as an administrative officer on a 5-day fortnight roster. She comes with university experience as she had previously worked full time at the Western Sydney Uni-

versity for over 15 years in a similar role. She is really enjoying her work at the foundation and the added bonus of the shorter working weeks gives her the opportunity to pursue her favourite pastimes such as cycling, running, swimming and playing golf.



Visiting Scientists

Dr Indunil Pathirana

Dr. Indunil Pathirana, started with the Dairy Science Group at University of Sydney in October as an Endeavour Research Fellow from Sri Lanka. He holds a BVSc (Honours) from the University of Peradeniya, Sri Lanka and a PhD in Reproductive Physiology from the Osaka Prefecture University (OPU), Japan.



He currently holds a position as a Senior Lecturer in Animal Science and is also

the Postgraduate Coordinator in the MSc program in Animal Science at the University of Ruhuna in Sri Lanka. His expertise in establishing rapid and sensitive enzyme-linked immunosorbent assays (ELISA) to measure various hormones in different body fluids of various animal species was utilized to investigate sexual maturity in male animals of many domestic animal species such as cattle, buffaloes, sheep, pigs, goats and dogs, and was also extended to wild animal species such as elephants.

During his fellowship program with us, he will focus on developing an assay to measure heat shock Protein (HSP) in non-invasive samples such as milk and urine from dairy cows. Current studies support the notion that HSP70 is elevated in response to thermal stress in many domestic animal species. The assessment of heat stress in high-producing dairy cows is of prime importance and individual variations must be studied to identify heat-tolerant animals. A potential link

between HSP70 and genetic markers would allow selection of heat-tolerant animals, in the long run.

Professor Daniel Weary



Daniel Weary is Professor and NSERC Research Chair at The University of British Columbia, Canada, and is visiting scientist to the Dairy Science Group with the Nancy Roma Paech Visiting Professorships in Agriculture, through the Sydney Institute of Agriculture.

His research focusses on developing behavioural measures for the objective assessment of animal welfare and developing practical methods to improve the welfare of animals. During his visit, Dan will be involved with A/Prof Cameron Clark and Dr Sabrina Lomax's research projects.

Our newest PhD student

Sarah Mac



My name is Sarah Mac. I was born and raised in the United States, but my dad is Australian. I didn't grow up on a farm or had much experience outside of a high school friend with horses. I went to the University of Kentucky for undergrad. I started as a Pre-Med student and then started working for the UK Dairy and fell in love. My family was very supportive, especially my grandpa who grew up on a dairy. In college I had a research project under Jeffrey Bewley and Joao Costa : "Evaluation of a calving detection technology that monitors tail movement". I used a calving detection technology called Mocoall

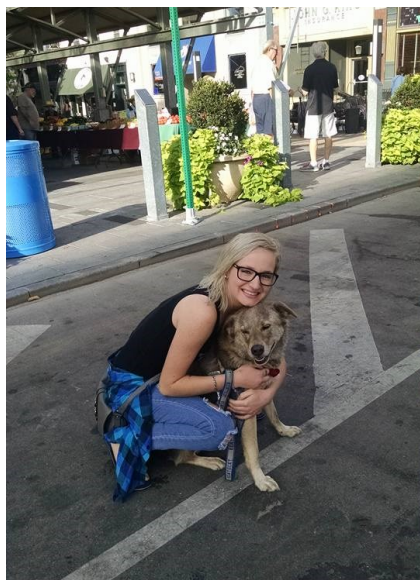
from Dublin, Ireland. I presented my research in Greece, Canada, and all over the US.

I have a dog named Princeton! He has been my best friend for his 6 years of life. He is a big old' mutt

(lab/chow/German Shepard), but he is perfect. Princeton is a medical alert dog for my low blood pressure.

I am a little quiet at first, but I have a big personality! I usually show it through my clothes and hair. I figured I will keep my hair blonde for a while to let people get to know me and then I will resume my list of hair colors.

I am excited to meet everyone and get started!



**Next DRF Dairy
Symposium**

10-11 July 2019



THE UNIVERSITY OF
SYDNEY



Robotics and technology in the dairy industry

Dr Nicolas Lyons, NSW

milking | edge

Milking Edge is a 3-year flagship training and extension project for robotic milking in Australia. The project is run by NSW Department of Primary Industries, through a joint agreement with Dairy Australia and DeLaval. It aims to develop tools, resources and support for farmers (and service providers) built on a decade of successful R&D through FutureDairy. It will enable better decision-making around the consideration, purchase and implementation of AMS, as well as help build industry capacity in AMS through innovative training and engagement.

It is great to be leading this national collaborative industry-funded project! This is a flow on from my PhD with FutureDairy at The University of Sydney, and the four years at NSW DPI actively engaging and communicating with farmers, service providers and industry around technology adoption and optimisation of robotic dairies. Also, on this project is Ms Jessica Maloney, as Project Officer Dairy – Robotic Milking at NSW DPI and Mr Juan Gargiulo, a postgraduate student based at University of Sydney who is supported by NSW DPI and the Dairy Research Foundation. It is great to have such a high calibre and enthusiastic team in place

working hard to accelerate the uptake of technology as an enabler to build a productive and sustainable dairy industry into the future.



Milking Edge team: Left to right: Jessica Maloney, Juan Gargiulo & Nico

As part of Milking Edge we are calling out for expressions of interest to participate in an online AMS Community of Practice. Get in touch with us if you have skills and experience in AMS and would like to be part of this exciting journey!

I have also been collaborating with TechKISS, a project supported by the NSW Dairy Industry Fund.

The project focuses on technologies that can assist with day-to-day animal health and management tasks,

with a particular interest in how these technologies can work together. The aim is to identify and share the key things that lead to success – how farms achieve the outcomes they want.

For more information or updates on precision farming and robotic milking please follow the [NSW DPI Dairy Facebook Page](#) or email Dr Nicolas Lyons (nicolas.lyons@dpi.nsw.gov.au)

Congratulations to 3 new Doctors..!

Big congrats to Alex, Ash and Juan who have been awarded their PhD Degree this year...! We wish them the very best for their careers...!



Dr Alex John, PhD



Dr Ashleigh Wildridge, PhD



Dr Juan Molfino, PhD

Recent Publications

Staff and students from the Dairy Science team have been very busy in 2018 with many publications in prominent journals.

Khatun, M.; Thomson, P. C.; Kerrisk, K. L.; Lyons, N. A.; Clark, C. E. F.; Molfino, J.; García, S. C. (2018) Development of a new clinical mastitis detection method for automatic milking systems *Journal of Dairy Science* Volume 101, Issue 10, pages 9385-9395

Ojeda, J. J.; Pembleton, K. G.; Caviglia, O. P.; Islam, M. R.; Agnusdei, M. G.; Garcia, S. C. (2018) Modeling forage yield and water productivity of continuous crop sequences in the Argentinian Pampas *European Journal of Agronomy* Volume 92, Pages 84-96

Lee, J. M.; Clark, D. A.; Clark, C. E. F.; Waugh, C. D.; Roach, C. G.; Minnee, E. M. K.; Glassey, C. B.; Woodward, S. L.; Woodfield, D. R.; Chapman, D. F. (2018) 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

Clark, C. E. F.; Kaur, R.; Millapan, L. O.; Golder, H. M.; Thomson, P. C.; Horadagoda, A.; Islam, M. R.; Kerrisk, K. L.; Garcia, S. C. (2018). 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

Wildridge, Ashleigh M.; Thomson, Peter C.; Garcia, Sergio C.; Jongman, Ellen C.; Clark, Cameron E. F.; Kerrisk, Kendra L. (2018) The impact of fetching at night on milking parlour visitation for pasture-based dairy cattle *Applied Animal Behaviour Science* Volume 201, Pages 25-30

Wildridge, Ashleigh M.; Thomson, Peter C.; Garcia, Sergio C.; John, Alex J.; Jongman, Ellen C.; Clark, Cameron E. F.; Kerrisk, Kendra L. (2018) 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

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* Volume 101, Issue 6, Pages 5466-5473

Lomax, Sabrina; Hall, Evelyn; Oehlers, Lauren; White, Peter, (2018) Topical vapocoolant spray reduces nociceptive response to ear notching in neonatal piglets. *Veterinary Anaesthesia and Analgesia*, Volume 45, Issue 3, pages 366-373

Van der Saag, Dominique; White, Peter; Ingram Lachlan; Manning, Jaime; Windsor, Peter; Thomson, Peter; Lomax, Sabrina; (2018) Effects of Topical Anaesthetic and Buccal Meloxicam Treatments on Concurrent Castration and Dehorning of Beef Calves. *Animals* Volume 8, Issue 3, Article Number 35

Green, A. C.; Johnston, I. N; Clark, C. E. F. (2018) Invited review: The evolution of cattle bioacoustics and application for advanced dairy systems *Animal* Volume 12 Issue 6, Pages 1250-1259

Van der Saag, Dominique; Lomax, Sabrina; Windsor, Peter Andrew: Taylor, Casey; White, Peter John. (2018) *Evaluating treatments with topical anaesthetic and buccal meloxicam for pain and inflammation caused by amputation dehorning of calves.* *Plos One*, Volume 13, Issue 6, Article Number e0198808

Lazzarini, B.; Lopez-Villalobos; Lyons, N.; Hendrikse, L.; Baudracco, J. (2018) *Productive, economic and risk assessment of grazing dairy systems with supplemented cows milked once a day* *Animal* Volume 12, Issue 5 Pages 1077-1083

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* Volume 101, Issue 6, Pages 5466-5473

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Recent Publications (cont'd)

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**Date claimer:
DRF Dairy Symposium
10-11 July 2019**

Dairy Research Foundation

We thank all DRF members and supporters. For more information on any of our articles or to become a member please contact:

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