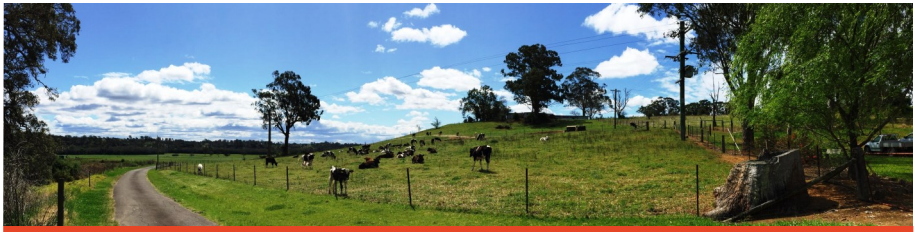
THE UNIVERSITY OF SYDNEY

Dairy Research Foundation

DRF NEWSLETTER

Volume 7 – Issue 2, September 2015



In this Issue

FACULTY OF VETERINARY SCIENCE

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

E vetdrf@sydney.edu.au

Directors Report

Professor Yani Garcia, Director

It is hard to believe that we are heading for October already…!
A lot has happened during this year including another very successful Dairy Symposium; the formation and consolidation of a NSW Collective Industry Action Group that is driving the development of the industry action plan for the next 10 years; the nomination of FutureDairy as finalist for the 2015 Rural Innovation Australian Museum Eureka prize; and as always, plenty of new and interesting research from our FutureDairy team and postgraduate students…!

In August we completed 1 year of operating with the new Robotic Rotary DeLaval AMR™….!
Although the initial year of such a massive change from conventional to automatic is never easy (for humans more than for cows..!), we are increasingly confident in the technology that our FutureDairy team has co-developed with DeLaval, which allows University Farm Manager Kim McKean to milk 360 cows without actually having to milk them..!
Read more inside and as always please do send us your valuable feedback.

Regards, Yani

From the President

I would like to congratulate the Future Dairy Team on being selected as finalists for the Eureka Prize for Rural Innovation.

This nomination marks their excellent work around dairy robotics and technologies that will help the Australian Dairy industry advance well into the future. Yani Garcia and Kendra Kerrisk deserve great credit for the team that they have put together and for driving its vision and energy.

It was great to see the dairy industry being acknowledged at the Eureka awards and shown to be forward looking and research driven.

Bill

Bill Inglis, President

NSW Strategic Action Plan keeps moving forward

The Collective Industry Action Group (CIAG) keeps moving forward to advance the Strategic Action Plan for growing the NSW Dairy Industry into the next decade.

This plan has emerged from a sense amongst key industry stakeholders within NSW that there is a need to - *collectively* - grow the NSW dairy industry for the benefit of industry participants and the NSW economy and its citizens.

The CIAG

After several industry workshops, a collective industry action group (CIAG) was formed in February 2015 to drive the development and implementation of this plan.

This group will take a collective approach to enhance the impact of the interventions that they will design to drive growth in the industry.

The aim of the group is 3-fold:

- Promote existing work which is addressing the imperatives set through existing strategies
- Collectively advocate for the enhancement of investment in strategic action areas identified.
- Drive new investment in strategic action areas where gaps exist

Latest news:

Recently, an application by the CIAG group to the NSW Dairy Industry Fund was successful and the Group now has seed funding to develop the Strategic Action Plan.

A Victorian-based consultant, Sean Kenny, who has worked extensively in NSW has been contracted as facilitator.

Previous work by the CIAG had identified 4 key priority areas:

- Grow markets for NSW Milk
- Build industry confidence to Grow
- Support strategic farm business transition
- Improve farm productivity

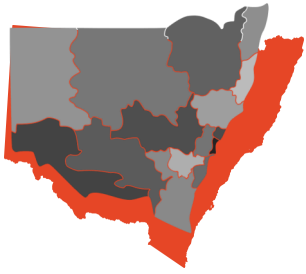
Further discussions on each of the above areas were held by teleconference in Small Working groups in August.

The whole CIAG met again in early September with representatives from Dairy Australia, Dairy NSW, Subtropical Dairy, Dairy Connect, NSW Farmers, Parmalat, Norco, SBScibus and the Dairy Research Foundation.

At the latest workshop, initial actions in all these 4 areas were outlined.

The plan is envisaged to be complete by the end of 2015. From that point, the real work - ***to put the plan into action*** - begins…!

For further information please contact Professor Yani Garcia at sergio.garcia@sydney.edu.au



In Search of the dream cow

By Juan Molfino

She'd be a dairy farmer's dream: a cow that yields more milk from fewer milking sessions. This is just the cow that the FutureDairy team has been looking for; and automatic milking systems (AMS) collect the information needed to track her down.

In a preliminary study, researcher Juan Molfino found that this sort of dream cow does exist, at least on Grant and Leesa William's robotic milking farm at Hallora, West Gippsland, Victoria. The Williams' 240-cow, spring calving herd is milked by four robots. The couple also has a neighbouring farm which milks 300 cows through a 40-unit rotary.

With an AMS automatically collecting detailed records about every cow's milking sessions, Juan was able to analyse data from 226 cows in the Williams' herd over four seasons. Juan identified two small groups of cows, which he refers to as 'efficient' and 'inefficient' cows. The efficient cows produced 28% more milk from 11% fewer milkings than the inefficient cows, after allowing for the effects of stage of lactation, age and other factors that are known to influence milk production. Because the efficient cows visit the robots less often they spend less time and energy walking around the farm. Juan said this was important for large herds in pasture-based systems where some paddocks may be more than 1km from the dairy. "Efficient cows create the opportunity to increase the production per robot by freeing up time to milk more cows," he said.

With such exciting initial findings, the FutureDairy team is keen to investigate further. Juan is now examining data from more commercial AMS farms to see if they too have groups of efficient and inefficient cows. 'We really want to better understand who those efficient cows are and what influences their milking behaviour.

FutureDairy researcher, Juan Molfino identified a small group of cows that dairy farmers dream of: those that produce more milk from fewer milkings.

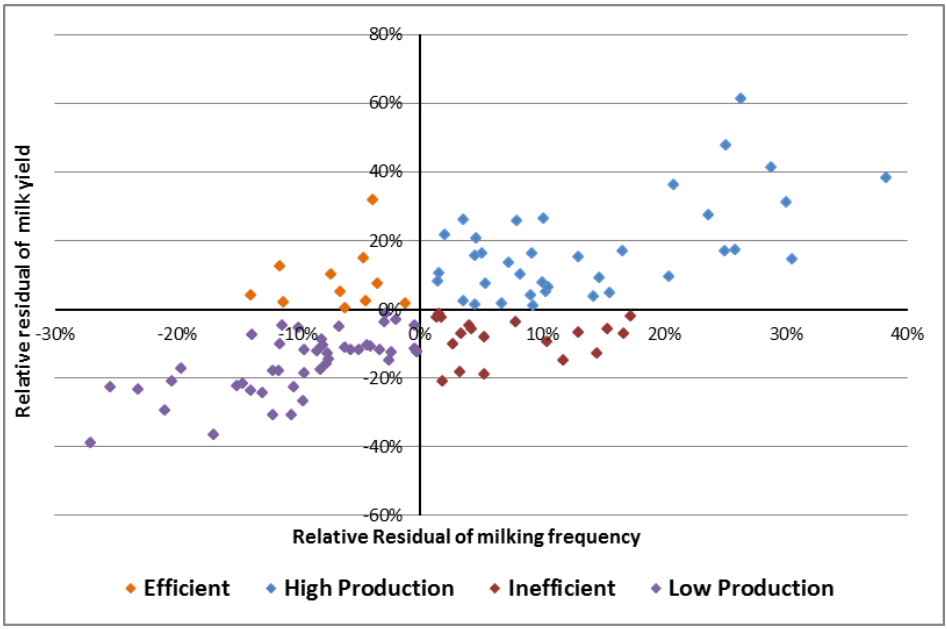


Figure 1: *Mean relative residuals (%) of milking frequency and milk yield for each group. The* ***relative residual*** *was calculated in order to estimate how much a cow produced or was milked in relation to her expected value after removing the effects of stage of lactation and parity number. Cows with a positive relative residuals for milk yield and a negative relative residuals for milking frequency were classified as* ***Efficient*** *(top left quadrant) and Cows in the opposite quadrant (bottom right quadrant) were classified as* ***Inefficient****.*

Efficiency is likely to be influenced by a combination of genetics, management and animal behaviour'. If we can unravel that we may be able to develop better ways to manage them. Even better would be to develop management practices to improve the efficiency of inefficient cows." Juan will use modelling to look at the economic impact of increasing the proportion of efficient cows up to say 30% or 50% of the herd. Grant Williams is keenly awaiting the findings. After six years of robotic milking his AMS is running smoothly and he is always on the lookout for refinements to improve the efficiency and profitability of robotic farming.

'The beauty of AMS is that you collect lots of data which can give a lot of insight into individual cows and the overall system. We'll be interested in testing management adjustments that could give us more dream cows.'

For more information, contact Juan on juan.molfino@sydney.edu.au.

Understanding the factors influencing grazing behaviour

By Alex John

Automatic milking systems (AMS) allow cows to choose when they graze, so understanding the factors influencing grazing behaviour in such systems is fundamental to unlocking their full potential.

An initial feeding trial has recently been completed looking at the natural grazing behaviour of dairy cattle when fed a consistent feed throughout 24 h (Figure 1.)

Cows were offered lucerne hay cubes ad-lib in three treatments: 24h feed access, day feed access (0600-1800 h) and night feed access (1800-0600 h), with feed access split into four equal periods throughout 24 h starting at 0600 h. The aim of the

experiment was to determine the natural diurnal eating pattern of cattle and also if cows would compromise eating or resting time when restricted to feeding only at night.

Results show that 70% of intake occurs during the day for the 24 h feed access treatment, with the highest intake period between 1200-1800 h. Whilst only 10% of intake occurs between 2400-0600 h, the period where robot utilisation in pasture-based AMS is typically lowest.

Comparing day and night access treatments showed the cows split intake between the two six hour periods relatively evenly for the day access treatment, but when on the night treatment preferred to consume the majority of their feed during the first six hour period, presumably so as not to impact resting time between 2400-0600 h.

Further analysis of behaviour data will help to confirm this theory.

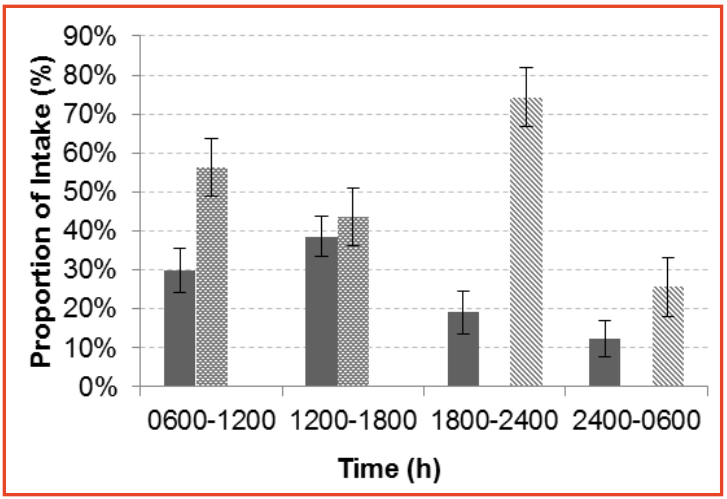


Figure 1. Proportion of daily intake occurring in each period for 24 h access ( ), day access ( ) and night access ( ) treatments.

Trial layout with individual pens & feeders.

Intake was significantly greater in the 24 hour treatment compared to the day and night access treatments, with total daily intakes of 23.0, 20.4 and 19.0 kg.DM respectively.

No difference between day and night treatments suggests reduced intake for the day and night access treatments was due to less access time and restricting cows to feeding of a night, when they wouldn't normally, doesn't compromise daily intake.

The next step is to use the 24 h feed intake data above to formulate a variable allocation feeding strategy which will be tested against feeding at a constant rate throughout 24 h. I hypothesize matching pasture allocation to the diurnal grazing behaviour of dairy cattle will result in feed being depleted at a constant rate in all feeding periods and result in consistent post grazing biomass.

In contrast, feeding at a constant rate will result in varying depletion rates in the different periods of the day, resulting in overgrazing during periods of high grazing activity and under-grazing during periods of low grazing activity.

Furthermore, if it turns out that cows do not modify their grazing behaviour to match a constant feeding rate and overgrazing does occur during the daytime periods in an attempt by the cows not to compromise total intake, feed quality would be compromised as result.

In either case, if cows do not change their diurnal grazing habits, total intake or quality of intake must be compromised. This has implications for voluntary cow traffic and thus robot utilisation, as well pasture utilisation and thus productivity for commercial farms.

It could be theorised that in a commercial situation, feeding at a constant level throughout the day could result in cows trafficking earlier than desired during the day (high grazing activity) and a lack of traffic occurring during the night (low grazing activity), and is the mechanism behind poor cow traffic and hence poor robot utilisation at night.

AMS Milking in Australia - What is the current status?

Robotic milking is only one example of many technologies that are now available to dairy farmers in Australia. At the moment there are 34 robotic milking farms in Australia (with at least another 7 being installed).

This represents a total of 136 robots milking around 9,250 cows, producing almost 50 million litres of milk per year. A small proportion of the Australian dairy industry, but definitely growing (in interest and adoption). The average AMS farm has 270 cows milked through 4 robots (range of 110 and 2 robots to 550 and 8 robots).

These AMS installations cover every commercially available type in Australia (two brands offering single box robots, two brands offering multi box robots and one brand offering the robotic rotary).

The AMS operate across a range of farming system types: Grazing with variable levels of supplementation (82% of farms), feedlot/corral systems (6% of farms) and indoor housed systems (12% of farms). Every dairy state in Australia has farmers that are currently operating with AMS and discussion groups are already established in VIC and TAS.

Currently a proportion of my work is focused on capturing data from commercial AMS farms. I am driving the national AMS KPI Project with 9 participating farms from all over Australia. Although farmer name and state remain anonymous, information about milk production, AMS utilisation and farm demographics will be monitored on a monthly basis for a 12 month period (1 July 2015 – 30 June 2016).

This will help understand what is achievable for AMS under commercial conditions in Australia. The other big question is also around economics and financial performance and we are working together with Dairy Australia and AMS farmers to be able to capture the information through **DairyBase**.

Nicolas Lyons
Development Officer Robotic Milking Systems, NSW Department of Primary Industries

Calling the Cows Home

FutureDairy researchers have discovered that cows can be trained to respond to sound, opening up possibilities for teaching cows to come to the dairy in response to a particular call.

Researcher, Dr Cameron Clark, said that while there was plenty of anecdotal evidence from farmers that cows could be called to the dairy, this study paved the way for farmers to use cow calling as a powerful management tool.

“It’s given us the confidence for further research on the best way to train cows and to look at the potential to train individual cows to respond to their own unique sound. It has potential application on farms with both conventional milking systems and robots,” he said.

“Dairy farmers can spend more than seven hours a week herding the cows up to the dairy for morning and evening milking sessions. The use of automatic gates and calling sounds could eliminate this daily task,” he said.

The concept has even greater potential application in voluntary milking systems where cows move by themselves from the paddock to a robotic dairy and back to the paddock. In this system there’s no defined morning and evening milking period; milking occurs throughout the day and night.

One of the challenges with voluntary milking systems is that there is always a small group of cows that are less motivated to move around the farm; for example, cows in late lactation.

Currently, these cows need to be ‘fetched’ from the paddock for milking.

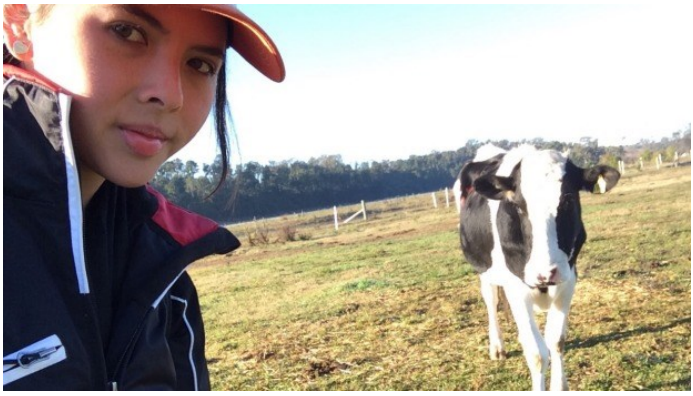
Although it is a small task, it must be built into the routine to avoid these unmotivated cows having milking intervals which extend beyond about 16 hours. Left any longer, these cows are at risk of reduced production and mastitis.

“We are interested to know whether we can train these cows to respond to their individual sound and walk to the dairy to be milked by the robots.”

Amazing response to a maze

The ‘cow calling’ study was the first step in understanding how cows respond to sound.

To test the concept, University of Sydney student Alexandra Green (pictured below) designed a maze in a paddock using electric fencing, following similar principles that researchers use with studies of rats or mice in mazes.
The t-shaped maze had feed bins at both sides of the T.



Calling the Cows Home

cont…..

The 3-week study involved six dairy heifers aged about 20 months. Recognising that young heifers are shy, the team started with a few days training to familiarise the animals with the maze.

Alexandra trained heifers to respond to sound, opening up possibilities for teaching cows to come to the dairy in response to a particular call.

"We used the Pavlov's dog principle to teach the cows to associate the sound with a feed reward," Alexandra said.

"Initially we played a sound when the heifers put their head in a feed bin. Eventually we put the sound only with the feed bin that had feed in it.

We started playing the sound as soon as each cow entered the maze to see if we could teach them to follow the noise instead of going to the side they preferred."

The team was amazed at how quickly the heifers picked up the signals. "Initially the cows guessed their way through the maze but they quickly started to turn their heads to where the sound was; they would really think about it," she said.


The Sydney Morning Herald
New South Wales
NSW News | Sydney Traffic | NSW State Election 2015 | Quizzes
Get your city news feed. SYDNEY N
Cows master maze, making mice look like dimwits
July 24, 2015
Julie Power
Reporter

Heifer 4 at the feed bin, having made the correct choice in response to sound

"One of the heifers was hilarious. She got every single test correct from day two onwards. She'd kick up her heels in what looked like sheer delight as though she knew she'd chosen the right way!"

Four of the six heifers got a perfect score four times a day for four days in a row. The other two got it right 75% of the time.

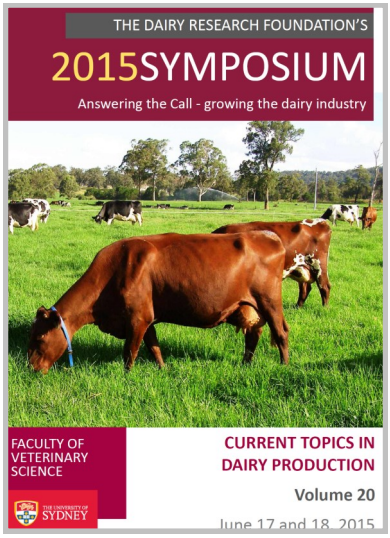
Although this was a small, introductory trial, the FutureDairy team is keen to continue the investigations given such promising results. A follow up study is underway with cows wearing a collar that generates a sound.

"Ultimately we hope we can develop a system where individual cows respond to their own sound by moving from the paddock to the robotic dairy for milking," she said.

For more information contact Dr Cameron Clark on Cameron.clark@sydney.edu.au

Read an article on Ali Greens work as it appeared in the Sydney Morning Herald recently

2015 Symposium



The 2015 DRF Symposium held in Camden brought together various members of the Dairy Industry.

Dairy Connect held their 2015 AGM and NSW Farmers Association (Dairy Committee) held a morning meeting with members. After lunch, Dairy NSW held their bi-annual Members' Council in the Liz Kernohan Centre with an introduction to the extension team and the Dairy NSW operational plan for 2015/16 and the winners of the Australia Dairy Conference who spoke about their learnings .

Late afternoon was the stage for the inaugural 'NSW Industry Forum'. John Macarthur-Stanham opened the forum which included four guest speakers; the Honourable Niall Blair MLC Minister for Primary Industries, Land & Water, Bruce Christie, Deputy Director General Biosecurity and Food Safety, NSW DPI, Charlie McElhone, DA Trade & Strategy Group Manager and Julie Iommi, DA Issues Manager.

The Conference Day included a brilliant line-up of speakers, headed by Professor Ephraim Maltz from the Institute of Agricultural Engineering, Israel. Professor Maltz is an internationally acclaimed expert in technology application in systems that push the boundaries in terms of productivity per cow and per farm.

His talks were amongst the highest rated of the conference.

Whilst Professor Maltz extended our imaginations to the industry growth potential by seeing what is achieved by Israeli cows, Mike Logan (CEO Dairy Connect) and Michael Perich (Leppington Pastoral Co.) put an Australian context into the growth potential discussion.

Everybody loves to hear the farmers speak and this year was no exception. Farmers from around the country shared their stories of a variety of pathways to growth with the audience and later formed a discussion panel hosted by Neil Moss (Scibus and Cows R Us).

The farmers (pictured below L-R) included Rob Hortin (Torbay WA), Ian Hindmarsh (Cowra NSW), Greg Heffernan (Bega NSW) and Wayne Clarke (Casino NSW).

2015 Symposium cont....

Turning science into milk was the perfect session title for a focussed presentation by Professor Maltz on the potential for technology to allow large scale farming operations to have the attention to detail achieved by smaller scale farms – essentially growing the business with industrialising our dairy farms.

This was followed on by Ben Hayes (Dairy Futures CRC) who took us through the latest developments in both co and pasture genetics. There was a real sense of optimism generated by his presentation allowing delegates to see how the future might look at we push towards the next level of productivity and efficiency gains.

Basil Doonan from Tasmanian based company Macquarie Franklin, once again captured the audience's attention on an always relevant topic – knowing your financial position and using it to grow your farm. It was the perfect lead in to two farmer speakers who heralded the importance of financial literacy and its role in the success of their businesses.

Off on a tangent from dairying, Longreach QLD farmer, James Walker, who runs a cattle and wool sheep station, spoke to the audience

about the journey of developing financial metrics and forecasting literature in agriculture.

He showed how the use of a variety of tools has managed to take the 'crystal balling' out of his management decisions. Ruth Kydd followed with a very down-to-earth account of the complexities of a large scale operation and the importance of keeping a finger on the 'financial pulse' of the operation.

The conference day finished up with a very engaging and thought-provoking session on connections with consumers. Forcing us to look at our operations from a consumer's point of view can be confronting but the audience appeared to take the challenge in its stride. It would be fair to say that we probably needed another hour for discussion, indicating the high level of engagement.

The Annual Symposium Dinner, sponsored by Dairy Australia, was a change from tradition with a real focus on showcasing local produce in relaxed atmosphere that really nurtured networking opportunities. The above businesses provided their produce at cost for incorporation into the menu for the cocktail style standing dinner and had beautiful stands set up on the night.

2015 Dairy Science Award

Each year the Dairy Science Award, sponsored by Dairy Connect, is presented to a most deserving member of the dairy industry. This year was no different with Camden Farms Manager Kim McKean (below)

being the highly deserving recipient. Kim has a career spanning almost 50 years with the University of Sydney and his dedication to the farms and teaching has never wavered.

Always a field day highlight, the Emerging Scientist Program again created the opportunity for our youngest generation of scientists to share their work with a very attentive crowd.

Regardless of the complexity of their research the Emerging Scientists truly engaged the audience and were committed to sharing the value of their work to the audience – all clearly articulated the impact their research could have on farm or at an industry level. This was no 'mean feat' given that they showed that they were tackling some of the big challenges likely to face the industry in the coming years including climate change, fertilisers, animal health and welfare.

Sponsored by Howard Australia, the program involved the students preparing a written paper and presenting their findings to symposium delegates. The best presenter awards were determined by the audience which comprised mostly dairy farmers and industry people.

Emerging Scientists provide insight into the future of dairying at the 2015 Symposium

Adam Langworthy (centre), from the University of Tasmania took out the award for Best Presenter with his research on heat tolerant dairy pastures for south east Australia.

Runner up presenter was Jessica Andony (left) from Murdoch University for her study of on-farm tests for subclinical ketosis.

Ruairi McDonnell (right) from the Department of Agriculture in WA was awarded Best Paper for his assessment of potassium fertiliser needs of annual ryegrass pastures.

Philip Myers from Howard Australia said this year saw a record number of entries, all of a very high standard.

"It's very exciting to see the high calibre of our next generation of dairy researchers and their connection with the industry," he said.

2015 Dairy Science Award Winner and University Farms Manager Kim McKean displayed the new robotic milking system installed last year at Corstorphine.

Kim and his staff have been dealing with the realities of changing a milking system with great tenacity. This was also a fantastic opportunity to showcase the work being done by our dedicated research team at Camden.

Whilst the location of the 2016 Symposium is yet to be determine, one thing is for sure, the DRF Symposium reliably delivers a very engaging program that has a reputation for 'hitting the mark'.

Post Graduate Updates

Tori Alexander (Scott)

There have been a fair few changes in my life as a student since the last newsletter was released.

Firstly, I reached the milestone achievement of submitting my PhD thesis for examination earlier this year. This was a very exciting moment for me, as it would be for anyone, although I am still anxiously awaiting feedback from my examiners so I haven't let myself celebrate too much just yet.

In June, I sadly said my farewells to Roxanne and the team at Dairy NSW, having worked with this amazing group of people since October last year. However, my 'holiday' from studies and work was short lived, as I was offered a position within the area of animal biosecurity at the NSW DPI's State Veterinary Diagnostics Laboratory at EMAI (Elizabeth Macarthur Agricultural Institute). I commenced work at EMAI in July, and am really enjoying this new position.

While I am really excited about working full time, exploring the world of animal health and disease, and thinking about the opportunities and experiences that are still to come, I do feel saddened to say goodbye to the MC Franklin lab, my home away from home for the past several years.

The sense of comradery between everyone in the FutureDairy team made going to work each day so easy and such a pleasure. And, without a doubt, the icing on the cake was my supervisors, both of which I can't speak highly enough of.

Juan Molfino

With the number of AMS farms increasing all over Australia and some of the existing farmers in an expansion phase (increasing the number of robots and/or increasing the number of cows per robot) it's important for farmers to reach high levels of efficiency in order to maximize productivity.

My research focuses on **identifying and addressing inefficiencies at both individual cow and herd level** within the Automatic milking systems operating with voluntary traffic. Once I identify them, the next step will be to understand their impact on the whole system performance and find alternatives ways to manage them.

Over the past couple of months I have been working with large datasets from commercial AMS farms with the objective of developing a methodology to identify groups of cows with different levels of efficiency and inefficiency (see article in this newsletter). At this first stage I started looking at two main variables: daily milk yield and milking frequency per day.

Inefficient cows provide an opportunity to increase the whole farm system efficiency by managing them in a different way. **Efficient cows** will provide us the opportunity to study them and understand how they are achieving those levels of performance.

The **efficient cows** are those producing high volumes of milk with a relatively low milking frequency. These cows visit the robots less times therefore they are also spending less time and energy walking - important in large herds in pasture-based systems where some paddocks could be more than 1 km away.

On the other hand the **inefficient cows** present moderate or low milk yield with relatively high milking frequency; they are visiting the robots too often and not producing accordingly. They could have a negative impact on robot utilization and not allowing the farmer to maximize production per robot.

Preliminary results from one of the commercial farms analysed are promising, showing that the efficient group of cows presented a 30% greater milk production with a 10% lower milking frequency in comparison to the inefficient cows. I'm looking forward to get the final results ready to show them soon!

Last but not least, a few weeks ago I participated in the **Three Minute Thesis Challenge** that was held at USYD Camden Campus. It was not easy to condense a three year plan in three minutes, but it was a good experience and a great opportunity to see what other PhD students are doing. Congratulations to Hannah Pooley on her great presentation which received first place.

Ashleigh Wildridge

Since the last newsletter in April I have been very busy analysing data, writing up and visiting some of our Australian AMS farmers.

My work on fetching cows at night has produced some pleasing results where I was able to achieve significant improvements in lactating cow performance.

The main results identified an increase in the milking frequency of the cows, and a four-fold reduction in the number of cows with an excessively long milking interval. This means that the cows were milked more regularly which often leads to long term improvements in milk yield and udder health.

This was a great finding, and I was fortunate enough to share this information with our Australian AMS farmers at the annual AMS farmer gathering in July this year.

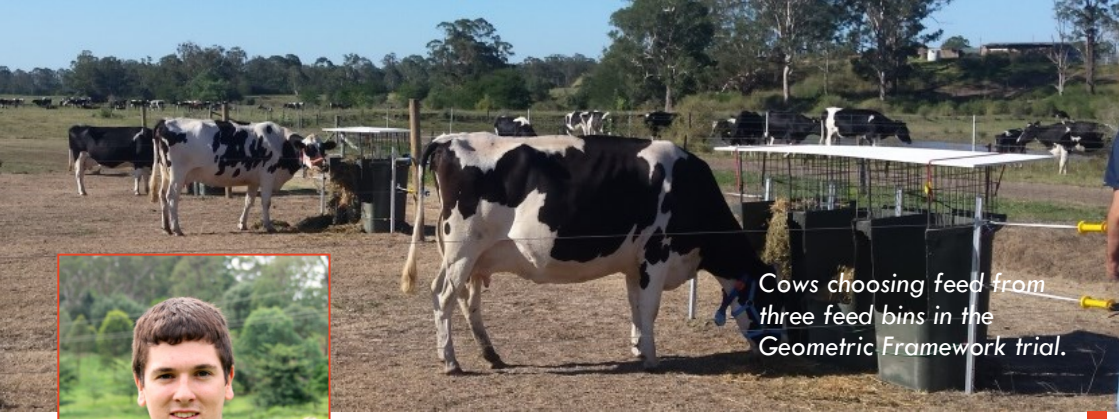
During the gathering we visited the commercial farm where I conducted this study and the farm owner shared his view of what impact my research had on his cows with the other AMS farmers.

It was really great to see our research results being received by the people that it directly impacts.

Apart from this, I am continuing to visit our new AMS farmers with the aim that I will be able to identify the behavioural changes that dairy cows go through when they have transitioned from conventional to automatic milking.

My second visits to these farms will begin in February 2016, I am very excited to see how much the cows have changed in their new dairies!

Lastly, plans are underway for the next stage of my PhD where I will be investigating the impact that hot weather has on our pasture based AMS cows, and coming up with some strategies to improve voluntary cow flow during the peak of summer.



Cows choosing feed from three feed bins in the Geometric Framework trial.

Alex John

It's been a lot of fun over the last few months as I've been out in the field doing a lot of trials lately. I've had the chance to visit a number of pasture-based robotic farms now, where I have been collecting data on robot utilisation and talking to farmers about their pasture management practices.

I hope to still see a few more farmers and once that is done I'll have a lot of data to work with. I'll be looking to see if there are trends between farmers with similar pasture management practices and how this translates to their robot utilisation throughout 24 hours, as well as how robot utilisation changes throughout the year and between cows within the herd.

I've also been running some feeding trials at our Mayfarm site here in Camden. We've constructed a series of 10 pens with individual feeders, allowing us to measure individual animal intake as we test various questions around intake behaviour. We have looked at feed selection in cows using a modelling approach called the 'Geometric Framework', described by Raubenheimer and Simpson (2007). Essentially this work is to determine the natural protein: carbohydrate ratio targeted by cows, which could have implications for production and reproductive performance in the future. If you would like to read further about Geometric Framework theory take a look at this article: Raubenheimer D and Simpson S 2007. Geometric analysis: from nutritional ecology to livestock production. Recent Advances in Animal Nutrition in Australia 16, 51-63.

We have also tested the concept of using video to predict individual animal intake. In this trial we measured feed depletion hourly over six hours whilst recording what the cow was eating at the same time with two small cameras mounted to either side of the cows head. The measured intake now needs to be matched to the video footage captured and is hopefully a first step to predicting intake with video data!

Finally, I've been looking at diurnal cow eating behaviour and how we can manipulate when cows are actively eating, in order to positively impact voluntary cow movement on robotic milking farms. A more detailed of description of this trial can be found within this newsletter.

Kamila Dias

I am happy to announce that I started my experiment this month! The aim of my research is to determine the impact that milking order has on milk yield and milk content for large herds.

A previous study observed a great difference in the nutritive value of pasture ingested by cows in the same herd according to milking order (Scott *et al.*, 2014). The first cows milked are also first to enter the paddock and therefore access to a higher proportion of leaves and protein than the last cows in the milking order. We expect higher milk yield and better milk composition (protein and polyunsaturated fatty acid) from the first cows as compared to those that are milked last.

We also expect to find more cows with milk fat depression in the first group as the pasture these cows graze has lower fiber content than the pasture on offer to the last cows. This problem can be found when the pasture has low fiber content (especially early spring), which can change the microbial rumen environment to produce more intermediary fatty acids (especially trans-10 cis-12 CLA) that cause milk fatty acid depression.

This project, funded by Dairy Australia (Large herds: creating value from data) and supervised by Dr Cameron Clark, has a three year duration. The first step is to analyse data from between 7 and 10 farms. After this, the second step will be to compare milk yield and milk composition between the first and last cows in the milking order from 5 of these farms.

For the next two years, this project intends to create novel systems for large herds to significantly increase the efficiency of milk production from the feed.

I'm proud to be able to conduct the first year of this project, but my work in Australia must finish in March 2016 as my scholarship from Brazil finishes at this time and will concentrate on finishing my Ph.D.

Left: As part of Alex John's trial cows were fitted with mini-cameras attached to either side of there head. The cameras are mounted on halters for easy attachment and removal from the cow. The cameras are powered by small lithium batteries mounted on top of the halters and also have the ability to track the cows via GPS.

Saranika Talukder

Congratulations to PhD student Saranika Talukder who was very recently awarded her PhD. Saranika did a fantastic job of putting together her work on 'Reproductive performance of dairy cows in automatic milking system under pasture based management system' with very little revision required by the reviewers.

She finished her thesis with 9 scientific papers and 13 conference papers. This is a wonderful achievement Saranika, well done!

PhD Student to commence in October

In October 2015 Momena (Mona) Khatun will be joining the Dairy Science Group at Camden to complete a PhD with the University of Sydney. Mona is coming to Australia from Bangladesh as the recipient of an Endeavour Scholarship

and her research topic will be discussed in the coming weeks. She will be living on campus at Camden whilst she works within the dairy team.

Congratulations Mona, we very much look forward to meeting you!

Farewell

In July we sadly said 'so long' to Dr Pietro Celi as he left the University of Sydney and headed for the USA.

Pietro has taken up a position as a Senior Research Scientist with DSM Nutritional Products and is now based in Baltimore in the US.

This is a tremendous opportunity for Pietro but also a huge move for him, his wife and three daughters.

The Dairy Research Foundation wishes them all the very best for the next chapter of their lives!

Pietro and wife Lorenza (centre) celebrate their farewell with the USYD crowd

Camden Farms

FIFTY YEARS is a long time to work in one industry, and long enough time to witness a fair amount of change

Farm Manager Kim McKean (pictured right with Farm Secretary Sherry Catt) will next year celebrate 50 years with Sydney University. A tremendous feat in this day and age!

Kim started as an animal attendant in 1966 and over the decades has trained thousands of veterinary and animal science students in practical animal husbandry, as well as provided on-the-ground support for more than 100 masters and PhD students.

The current focus is the recently installed AMR and whilst the new system has had its challenges Kim and his team are seeing light at the end of the tunnel. The cows are less stressed and consequently quiet to the point that sometimes a slight poke is required to elicit signs of life!

Cow trafficking has been a bit more of an adjustment for the team and the herd but life is getting easier as the cows continue to adapt to a new system.

The Dairy Science Group at Camden is looking forward to celebrating Kim's astonishing achievement in 2016!

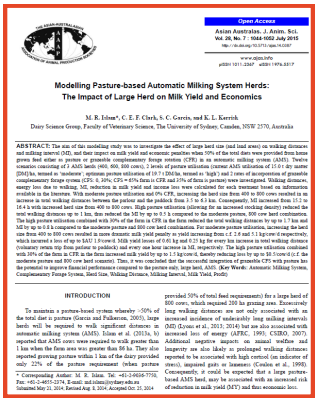
Nico Lyons awarded AW Howard Memorial Trust grant

Dr. Nicolas Lyons, the Development Officer Robotic Milking Systems (NSW DPI) has been awarded the AW Howard Memorial Trust's travel grant.

This has given Nico the opportunity to participate in an AUTOGRASS MILK International Study Workshop in Ireland and also attend and deliver a presentation at the European Federation of Animal Science annual meeting in Poland.

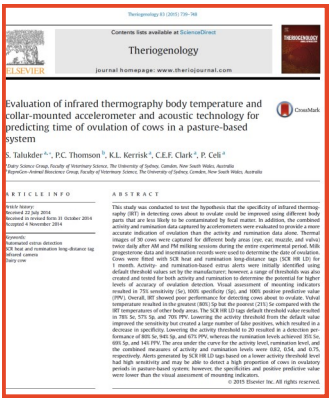
As part of this trip Dr. Lyons is undertaking a study tour of automatic milking systems in Europe visiting different farms and organisations.

Recent Scientific Publications



Asian Australas. J. Anim. Sci.
Vol. 28, No. 7 : 1044-1052 July 2015

Modelling Pasture-based Automatic Milking System Herds: The Impact of Large Herd on Milk Yield and Economics



Contents lists available at ScienceDirect
Theriogenology
journal homepage: www.theriojournal.com

Evaluation of infrared thermography body temperature and collar-mounted accelerometer and acoustic technology for predicting time of ovulation of cows in a pasture-based system

Management strategies for chicory (*Cichorium intybus*) and plantain (*Plantago lanceolata*): impact on dry matter yield, nutritive characteristics and plant density

2015 has been a very productive year for the Dairy Science Group with the publication of over 15 papers through scientific journals so far.

Below is a list of some of these and a full list is available on the FutureDairy website by clicking on the following link - Dairy Science Publications

Clark, C. E. F., Lyons, N. A., Millapan, L., Talukder, S., Cronin, G. M., Kerrisk, K. L., Garcia, S. C. (2015). Rumination and activity levels as predictors of calving for dairy cows. Animal 9(4): 691-695.

Hills, J. L., Garcia, S. C., Rue, B. dela, Clark, C. E. F.(2015). Limitations and potential for individualised feeding of concentrate supplements to grazing dairy cows. Animal Production Science 55(7): 922-930.

Islam, M. R., Garcia, S. C., Clark, C. E. F., Kerrisk, K. L. (2015). Modelling pasture-based automatic milking system herds: the impact of large herd on milk yield and economics. Asian-Australasian Journal of Animal Sciences 28(7): 1044-1052.

Lyons, N. A., Kerrisk, K. L., Garcia, S. C. (2015). Milking permission and milking intervals in a pasture-based automatic milking system. Animal Production Science 55 (1): 42-48.

Scott, V. E., Kerrisk, K. L.,Thomson, P. C., Lyons, N. A., Garcia, S. C.(2015). Voluntary cow traffic and behaviour in the premilking yard of a pasture-based automatic milking system with a feed supplementation regime. Livestock Science 171: 52-63.

Talukder, S., Celi, P., Kerrisk, K. L., Garcia, S. C., Dhand, N. K. (2015). Factors affecting reproductive performance of dairy cows in a pasture-based, automatic milking system research farm: a retrospective, single-cohort study. Animal Production Science 55(1): 31-41.