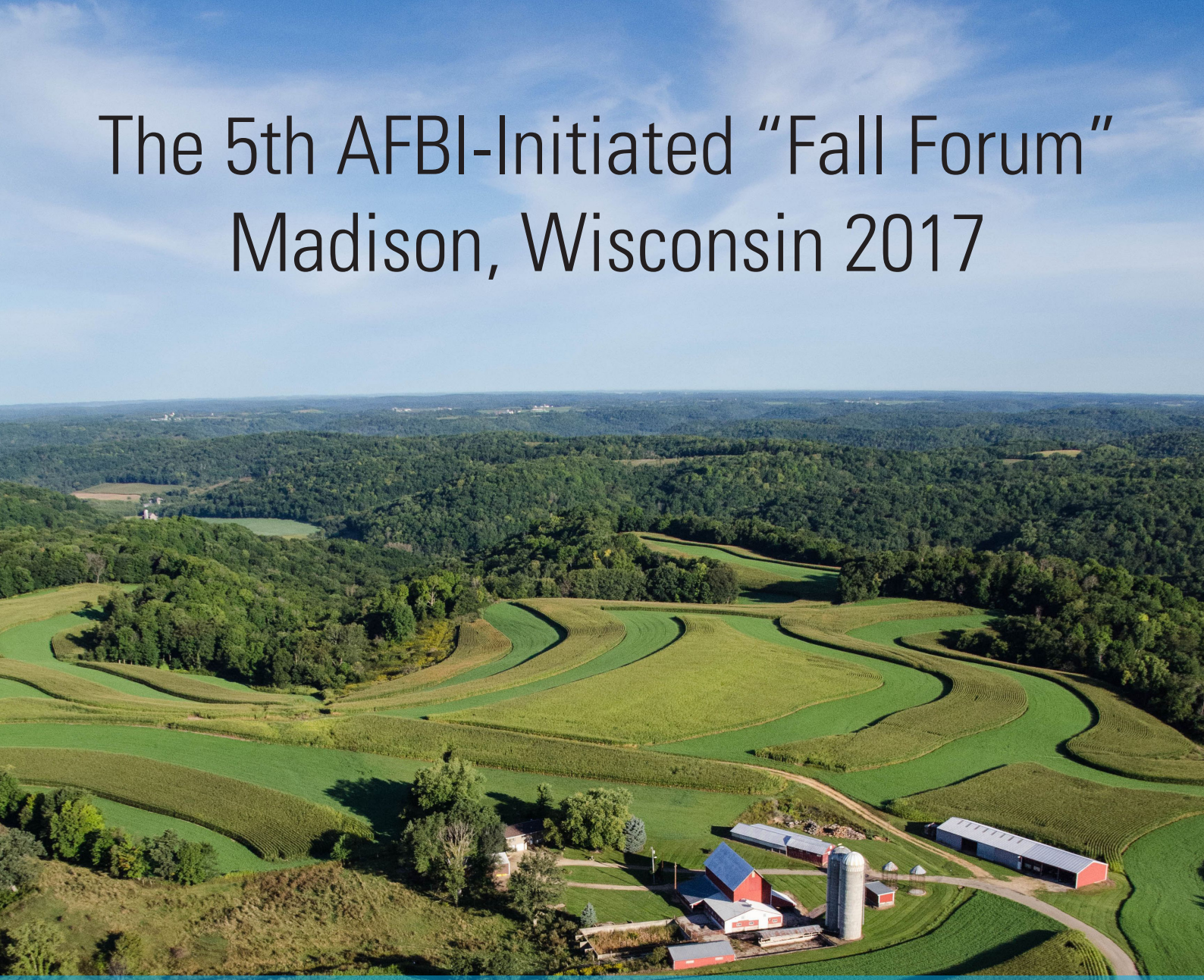
The 5th AFBI-Initiated "Fall Forum" Madison, Wisconsin 2017



MINIMISING THE ENVIRONMENTAL IMPACT OF SUSTAINABLE, RESILIENT, AND NUTRITIOUS FOOD PRODUCTION- CAN SCIENCE DELIVER?

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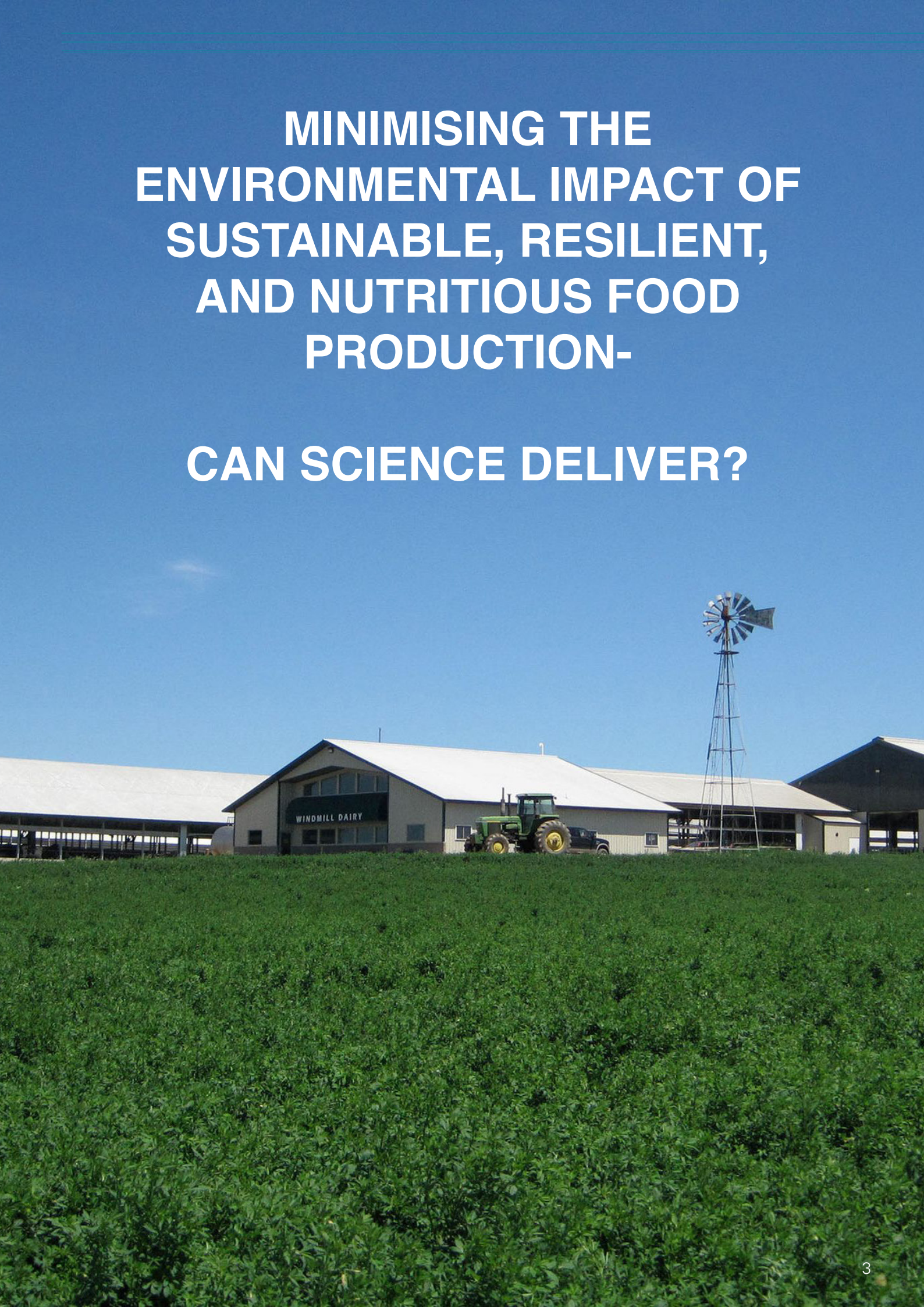


AFBI Ag Forum Welcome and Opening Remarks

It's Not Rocket Science !
Dr Mark Boggess, Director, US Dairy Forage Research Center

Welcome to the 5th AFBI Ag Forum. Thank you for joining us in beautiful Madison Wisconsin, here on the campus of the University of Wisconsin. We at the US Dairy Forage Research Center are both proud and excited to be serving as hosts for this year's Forum.

In the USDA - Agricultural Research Service (ARS), we are focusing more and more on "grand challenges" as an opportunity to collaboratively target complex problems for agriculture with an eye on the year 2050 and beyond.

So, what is a "grand challenge" for the livestock industries? What research programs should be developed now to best address future challenges for livestock production ? More specifically, maybe the question should be: How do we best describe and develop integrated animal production systems for the future that both feed the world and ensure profitability for producers while guaranteeing environmental sustainability, and even provide ecosystem services?

Tough questions ! If this sounds like a "grand challenge" to you, then we would agree and that is exactly the "grand challenge" question we are now addressing for dairy at the USDFRC. That's where all of our friends and partners come in.

We only have one planet, so in the larger picture resources are limited. Consequently, with 10+ billion future souls to feed, Agricultural systems as a whole will be required to balance resources consumed with resources produced. In other words, future animal production systems will be focused on optimizing their use of resources, in concert with optimized herd productivity, where efficiency is everything.

As such, our challenge as scientists is to better understand the complex biological systems we manage on livestock farms including the extraordinary relationships between microbial, plant and animal "omics", and how these interact with diverse management and environmental factors. Add socioeconomic factors such as animal care and wellbeing, the human health and nutrition benefits provided by animal products and ecosystem services, and you have a "grand challenge" indeed!

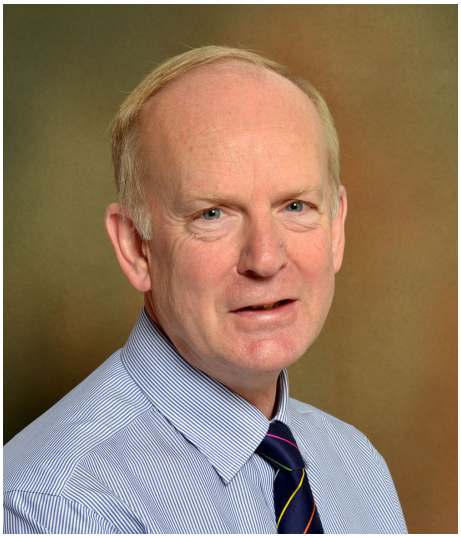
No, the future of science for the livestock industries is not "rocket science." It's way more complicated than that!

So what does all of that mean for each of us gathered at the Ag Forum? My sense is that we are all faced with similar challenges, so that answer is simple – we can't do it alone. We are gathered here in Madison to leverage the talents of some of the best minds on the planet. We're here to share insights, build partnerships, expand collaboration, and find solutions to the many complex challenges for the livestock industries. Our stakeholders are counting on us and we are counting on you !

So again I say Welcome to our friends from "across the pond" in Northern Ireland and the Republic of Ireland, from Canada, from New Zealand and from ARS and the University of Wisconsin. We are very happy you are here and we look forward to a successful 2017 Ag Forum!

Opening Remarks

by Dr Sinclair Mayne, Chief Executive, Agri-Food and Biosciences Institute



It is with great pleasure that I welcome fellow scientists to Madison, Wisconsin, for what will be the Fifth AFBI initiated Fall Forum.

Northern Ireland is acknowledged across the world for the quality of its agri-food products and as Northern Ireland's leading scientific research provider, the Agri-Food and Biosciences Institute (AFBI) embraces a wide range of scientific expertise which provides a strong integrated research approach to agriculture and food production, whilst delivering internationally recognised innovation.

In order to deal with the major global challenges of increased food demand, extreme climatic events and pressure on land use, there is a growing consensus that we need to fundamentally change our food production systems. Sustainable intensification and the ability to produce "more from less" is just one example of an approach which, to be genuinely effective, will increasingly require investment in science with an international dimension in order to generate new knowledge, drive innovation and improve competitiveness.

Together, AFBI and the USDA's Dairy Forage Research Center have worked to deliver what we genuinely believe will be an inspiring Fall Forum experience, capable of delivering a number of robust international scientific collaborations which will result in measurable benefits for farmers, food producers and communities across the regions.

I therefore extend my heartfelt thanks to Director Dr Mark Boggess and his team at the Center, who are providing first class facilities for this event, for their support in facilitating the Forum and producing two additional days of stimulating agri-food events.

Similarly, I would like to thank Director Dr Marcus Kehrli, Dr Eduardo Casas and their team from the National Animal Disease Center in Ames, Iowa, for agreeing to lead a highly pertinent full day workshop addressing major livestock disease challenges of mutual regional importance.

Finally, to all of our friends and colleagues from the United States, Canada, New Zealand and the Republic of Ireland, we look forward with great anticipation to this opportunity to further develop and strengthen our international scientific relationships.

USDA-ARS
DAIRY AGROECOSYSTEM WORK GROUP (DAWG)

Monday November 6th:

FIELD TRIP

Time	Activity
9:00 AM	Leave DFRC building in Madison for USDA farm, Prairie du Sac, WI
10:00 AM	Arrive USDA farm, tour research facilities
	• General dairy tour and Gas emission chambers (Ali Pelletier) • FarmLab Overview (Alison Duff) • Barnyard experiments (Pete Vadas)
12:30 PM	Lunch in Prairie du Sac
2:00 PM	Arrive Arlington, WI, UW Research Farm
	• Winter Runoff plots (Pete Vadas, Melanie Stock) • WICST Long Term Cropping System Trials (https://wicst.wisc.edu/) TBD
4:30-5:00 PM	Arrive back in Madison

Evening Buffet Dinner hosted by Dr Mark Boggess and the US Dairy Forage Research Center

Fall DAWG 2017

Tuesday November 7th:

Time	Activity
8:00-8:30	**Welcome and Introductions, Networking**
8:30-9:00	Program Overview
Mark Boggess: Madison, Wisconsin - DAWG and ARS Dairy Grand Challenge updates	
	Marlen Eve: Beltsville, Maryland - ARS National Programs Update
9:00 – 10:00	*Location Research Updates*
	• Reactive Nitrogen Initiative modeling progress • Lactation herd modeling updates • N^{15} fertilizer cycling project • P modelling update
10:00 – 10:30	**Coffee Break**
10:30 – 11:30	*Location Research Updates continued ….*
	• Josh Gamble: St. Paul, Minnesota – Nutrient cycling analysis of dairy field data • Mike Holly: University Park, Pennsylvania – Regional dairy systems modeling overview and Whole farm modeling of Irish dairies • Dave Tarkalson: Kimberly, Idaho – Manure priming study • Other DAWG reports: Ft Collins, Kimberly, Bushland
11:30 – 12:00	*System Modeling – Whole-farm Modeling Initiative*
Peter Vadas: Madison, Wisconsin	
12:00 – 1:00	**Lunch**
1:00 – 2:00	*International Research Program Updates*
2:00 – 2:30	*Interactive Discussion – Opportunities for Expanded Collaboration*
2:30 – 2:50	**Coffee Break**
3:00 – 4:30	*Breakout Sessions: Defining Opportunities for Project Integration and International Collaboration*
	• Whole farm/lactation herd modeling initiatives • N^{15} fertilizer cycling • Reactive N – data access and research/modeling support • Connecting DAWG with ARS – LTAR
4:30 – 5:00	**Summary Discussion, Emerging Issues, and Action Items**

NADC-AFBI workshop program.

Madison, WI, Tuesday, November 7th, 2017.

Time	Activity
8:00 – 8:10	Eduardo Casas (Introduction)
8:10 – 8:30	Dr. Louise Cosby, AFBI (Bovine respiratory diseases)
8:30 – 8:50	Dr. Robert Briggs, NADC (Bovine respiratory diseases)
8:50 – 9:10	Dr. Bernadette Earley, Teagasc (Recent advances in sequencing technologies to characterize the respiratory pathogens associated with Bovine Respiratory Disease Complex)
9:10 – 9:30	Discussion (Bovine respiratory diseases)
9:30 – 9:45	**Coffee break**
9:45 – 10:05	Dr. Marcus Kehrli, NADC (Emerging diseases of cattle)
10:05 – 10:25	Dr. Ian Sutherland, AgResearch (Emerging diseases of cattle)
10:25 – 10:40	Discussion (Emerging diseases of cattle)
10:40 – 11:00	Dr. Heather Allen, NADC (Antimicrobial resistance)
11:00 – 11:20	Dr. Nicolae Corcionivoschi, AFBI (Antibiotics vs Antimicrobials - in vitro, ex vivo and in vivo effect of novel antimicrobials and implications on gut health.)
11:20 – 11:40	Dr. Kaye Burgess, Teagasc (Antimicrobial resistance)
11:20 – 12:00	Discussion (Antimicrobial resistance)
12:00 -13:00	**Lunch**
13:00 -13:20	Dr. Matthew Sylte, NADC (Foodborne pathogens)
13:20 – 13:40	Dr. Nicolae Corcionivoschi, AFBI (New approaches to *Campylobacter* detection: virulence, commensalism and broiler performance)
13:40 – 14:00	Dr. Fiona Brennan, Teagasc (Foodborne pathogens)
14:00 – 14:15	Discussion (Foodborne pathogens)
14:15 – 14:30	**Coffee break**
14:30 – 14:50	Dr. Tyler Thacker, NADC (Tuberculosis)
14:50 – 15:10	Dr. Robin Skuce, AFBI (Tuberculosis)
15:10 – 15:30	Dr. Mitch Palmer, NADC (Tuberculosis)
15:30 – 15:45	Discussion (Tuberculosis)
15:45 – 16:05	Dr. Judy Stabel, NADC (Paratuberculosis)
16:05 – 16:25	Dr. John Bannantine, NADC (Paratuberculosis)
16:25 – 16:40	Discussion (Paratuberculosis)
16:40 – 16:45	Eduardo Casas (wrap-up)

DAY 3; WEDNESDAY NOVEMBER 8TH

KEY ROLES;

1] Role of the Workshop Chairperson includes;

scene setting 20 minute Plenary presentation before each Workshop by the Workshop Chairperson will define the specific thematic areas for discussion

* Reference desired outcome[s] from applied scientific collaboration
* Outline perceived "knowledge gaps" which need addressing in order to achieve desired tangible outcome
* Post Workshop - Plenary presentation outlining agreed priority theme[s] for International collaboration, agreed nominated partners, potential jurisdictional funding sources, short term action plan together with the long term desired outcome[s] from such International collaborative research.

2] Role of Regional "lead" scientists

* Presentations within the Workshop of circa 10-15 minutes by Regional leads representing each of the 4 other National organisations within the workshop.
* Outlining organisational strengths and "knowledge gaps" on the Topic.
* Outlining key priorities for collaborative research outcome[s] from International collaboration on the topic.
* Suggested jurisdictional funding channels with the potential to support and enable an international research project.

Arrive Coffee at	8.00am - 8.25am prompt finish.
8.30am - 8.40am -	Welcome Introduction by Dr Mark Boggess [Director of US Dairy Forage Research Center]
8.40am - 9.00am -	Brief history / objectives of Fall Forum + outline of AFBI / Brexit implications — Dr Sinclair Mayne [CEO of AFBI]
9.00am - 9.10am -	Dr David Bailey, Genome Alberta President and CEO — Plenary Chairperson + outline of Canada's LSARP programme for Agri-Food in Q1 2018
9.10am - 9.30am -	New Zealand landscape by Dr Ian Sutherland, Head of Animal Science at AgResearch NZ, on New Zealand Ag research structure, priorities / funding sources and desired outcomes through Forum participation
9.30am - 9.50am -	Workshop 1 Chair; Dr Elizabeth Magowan [AFBI] Plenary presentation on LIVESTOCK FEED EFFICIENCY DRIVERS
9.50am —10.10am -	Workshop 2 Chair; Dr Jerry Hatfield [USDA] presentation on Role of Soil Microbiomes in Enhancing the Yield Potential of Soils

Disperse to allotted Breakout areas as directed by Dr Bailey.

10.15am - 2 x WORKSHOPS COMMENCE CONCURRENTLY;

* WORKSHOP 1; Livestock Feed Efficiency Drivers

Scope;

Feed efficiency in livestock is highly divergent both within and between breeds and even siblings, but remains a key driver of farm profitability. Whilst there are a large number of both external and internal factors which can affect feed use efficiency, the research emphasis to date has more greatly explored the impact of external factors such as feed form and stocking practices, rather than focusing on the internal factors of the animal, even though these internal factors can contribute equally as much divergence.

As such the 'Livestock Feed Efficiency drivers' workshop at the Fall Forum will focus specifically on internal animal factors driving feed use efficiency across the main farmed livestock species i.e. cattle, sheep, pigs and chickens.

These Internal factors to be explored will range from eating behaviour to gastrointestinal structure, function and microbiotia, as well as the genetics and genomics of the animal and gut microbiota and the activity of cellular processes to lay down lean meat.

The Fall Forum is designed to break down international barriers and, as such, this workshop will consider not only key knowledge banks and gaps from participating partners and regions, but critically also how that knowledge could be most effectively utilised to achieve an uplift in productivity across the developing world. A highly desirable outcome therefore will include serious consideration of the design of a major international research project which will transcend scientific disciplines and incorporate industry partners.

Jurisdictional lead scientists;
a] Ireland - Professor David Kenny / Dr Mark McGee, Teagasc
b] USA - Dr Amanda Lindholm, USDA-ARS Clay Centre
c] Canada - Dr Robert Gruninger, AAFC
d] New Zealand - Dr Ian Sutherland, AgResearch

Workshop Chair; Dr Elizabeth Magowan [AFBI]

* WORKSHOP 2; Role of Soil Microbiomes in Enhancing the Yield Potential of Soils

Scope;

All soils have been degraded through the loss of organic matter and this has decreased their ability to supply water and nutrients to a crop. Over time this has decreased the production potential of soils and decreased the resilience of soils to variation in weather and management. These changes in soils are viewed as a change in the chemical or physical attribute of the soil; however, the more important changes may be manifested in the soil microbiome. What is lacking in our understanding is the linkage between changes in the soil microbiome and the physical and chemical processes. We propose an international collaboration focused on four main topics.

1. Quantify the linkages between crop yields in arable, grassland, and agroforestry soils and spatial variation in soil properties.
2. Quantify the linkages between soil microbiome and soil properties related to water and nutrient availability
3. Quantify the role of the soil microbiome in the resilience of cropping systems
4. Quantify the changes in the soil microbiome to diversity in plant species

Jurisdictional lead scientists;

a] Ireland - Dr Fiona Brennan, Teagasc
b] Canada - Dr Lori Phillips, AAFC
c] Northern Ireland - Dr Suzanne Higgins, AFBI
d] New Zealand - Dr Tony Conner, AgResearch

Workshop Chair; Dr Jerry Hatfield, USDA-ARS

10.15am - 11.15am - Mini-Presentations within workshops of 10-15 minutes each by 4 x other Regional leads to outline Regional priorities and knowledge gaps together with desired outcomes from their Regional perspective, referencing Chair's Presentation paper - agreement on best approach to Workshop continuation post Health Break.

11.15am - 11.45am - Health break / Networking

11.45am - 1.00pm - Continuation of Workshops - Scoping or advancing Scope of proposal / identifying jurisdictional and Global funding opportunities.

1.00pm - 2.15pm - LUNCH / Networking

2.15pm PROMPT - 3.30pm - Workshops continue; Final Scoping development and final agreement on:
a] Committed participants / regional leads confirmed
b] Key actions
b] Individual responsibilities / scopes
c] Timescales
d] Jurisdictional funding possibilities
e] Desired key outcomes from applied research collaboration.

3.30pm - 4.00pm — Health break / Networking

4.00pm - 4.15pm - Report to Plenary on Workshop 1 by Group Chairperson with Q&A. This will include proposed path forward with timescales and nominated Regional "lead scientists", desired outcome from Research and potential Jurisdictional funding sources

4.15pm - 4.30pm - Report to Plenary on Workshop 2 by Group Chairperson with Q&A. Structure as above

4.30pm - Summary of the day + closing remarks by Plenary Chair, Dr David Bailey, together with information on this evening's Dinner + Thursday Forum structure.

4.45pm - Close

7.00pm - 9.30pm - AFBI formal Dinner [sponsored by InvestNI]

DAY 4; THURSDAY NOVEMBER 9TH;

Arrive 8.00am for Coffee

8.30am - 8.40am - Intro / Outline of Day with Forum objectives by Plenary Chair, Dr Stanley McDowell, AFBI Director of Veterinary Sciences Division (VSD)

8.40am - 9.00am -

****Workshop 3; Plenary Paper by Dr Ed Topp of AAFC on "Soils-Plants Microbiomes and interaction, exploring AMR through the Food chain"**

Scope;

Fundamental understanding of the ecology of enteric bacteria in cropping systems [persistence, mechanisms of crop uptake, crop and genotype variation, gene transfer etc]
Risks of transmission of AMR bacteria from manures to crops destined for animal or human consumption, and key regulating parameters [climate, management, type of manure, bug-crop specificities, etc].
Management practices to reduce the risk of AMR transmission to crops [manure pre-treatment, harvest delay, cropping systems, etc]

Jurisdictional lead scientists;
a] Ireland - Dr Kaye Burgess, Teagasc
b] USA - Dr Jude Maul
c] Northern Ireland - Dr Lisa Black, AFBI
d] New Zealand - Dr Tony Connor, AgResearch

Workshop Chair; Dr Ed Topp [AAFC]

9.00AM - 9.20AM -

**Workshop 4; Plenary paper by Dr Scott Kronberg, USDA-ARS; "Transforming the nutritional content of red meat and milk to produce foods for improved human health"

Scope:

There is ample evidence that increasing the omega-3 and decreasing the omega-6 fatty acid content of red meats and milk and dairy products offers the potential to improve the long-term health of many people. There is also evidence that increasing the anti-oxidative capacity of red meat and milk is helpful for several reasons. However, our ability to increase the omega-3 fatty acid content of red meat and milk has been greatly limited by the bio-hydrogenation (i.e. transformation) of dietary omega-3 fatty acids in the rumen of ruminant livestock and the consequent low availability of these fatty acids for various lipids associated with their muscles and milk. Therefore, we suggest an international collaboration that is focused on 1) increasing the amount of omega-3 fatty acids and anti-oxidants in red meat and milk, 2) evaluating the impact of these increases on several aspects of meat and milk production (e.g. standard meat and milk quantity and quality variables) and 3) evaluating downstream aspects of red meat and milk (or dairy products) with elevated concentrations of omega-3 fatty acids and anti-oxidants (e.g. flavor, oxidative stability and impacts on human health).

Jurisdictional lead scientists;

a] Northern Ireland - Dr Elizabeth Magowan, AFBI
b] Canada - Dr Payam Vahmani, AAFC
c] Ireland - Dr Aidan Moloney, Teagasc
d] New Zealand - Dr Ian Sutherland, AgResearch NZ

Workshop Chair; Dr Scott Kronberg [USDA-ARS]

First TWO Workshops of the day on above Topics; - 9.30am PROMPT IN BREAKOUT ROOMS.

9.30am - 10.30am; 10-15 Minute within Workshop Mini-Presentations by 4 other Regional Leads to set Regional priorities and identify"knowledge gaps" and what they seek from partners + agreement on key areas for honing an existing / emerging collaborative proposal post Health break.

10.30am - 10.50am - Health break

10.50am - 12.00pm - Workshops resume

12.00am - 12.15pm - Plenary - Workshop Chair 3 Reports + Q&A

12.15pm - 12.30pm Plenary - Workshop Chair 4 reports + Q&A.

12.30pm - 1.30pm - Lunch;

1.30pm - 1.50pm -

**Workshop 5; Plenary paper by Dr Ian Sutherland, AgResearch NZ ; "Livestock fertility with reference to Fertility in Cattle, phenotyping and gene editing"

Scope;

Optimising livestock fertility is a key driver of productivity and profitability worldwide, particularly in (but not confined to) dairy cattle. The current workshop provides an opportunity to compare and contrast approaches to fertility management/research across different farming systems, breed and species. As examples, comparing intensive, housed dairy cattle systems with extensive pastoral grazing raises a number of issues such as age at puberty in dairy cattle, or survival of lambs. Also, what is the role of precision phenotyping approaches, including assessment of oocyte quality and antral follicle counts? Is there a role for gene-editing in modifying animal fertility, assuming genes and pathways influencing embryonic survival and the health of progeny? It is proposed that discussion of issues such as these, and an improved awareness of resources available to the various research groups will encourage greater collaboration in future.

Jurisdictional lead scientists;
a] USA - Dr Robert Cushman, USDA-ARS Clay Centre
b] Ireland - Dr David Kenny, Teagasc
c] Northern Ireland - TBC, AFBI
d] Canada — Dr Angela Canovas, University of Guelph

Workshop Chair; Dr Ian Sutherland, AgResearch NZ

1.50pm - 2.10pm -

**Workshop 6 Plenary Paper by Dr Laurence Shalloo, Teagasc; "Adding value to Smart Animal Technologies to improve the Decision Making Process, including technologies for rapid product composition analysis [e.g. meat, milk etc] Live Animals re linear assessments, liveweight monitoring, body condition score monitoring, animal activity monitoring, data management and the implementation within decision support tools".

Scope;

World-wide there is huge interest in the application of precision technologies and ICT to agriculture. There is an opportunity to influence these developments in the area of livestock ruminant production. Precision technologies in farming promise increased efficiency, improved product quality, reduced environmental impact, and overall improvements in animal health and welfare (Bewley, 2012). However, the promised benefits of precision technologies have been slow to be realised. In a review of sensors in health management for dairy farms, Rutten et al. (2013) noted that while the measurement part of systems largely worked, the integration and decision-support parts were inadequate because a solution-driven approach was not adopted. As a result, while many relevant technologies are currently available, their value to farming systems is unclear (Steeneveld et al., 2015). This workshop will address the implementation of outputs from smart animal technologies to increase their utility within the decision making process and will result in the completion of a framework to develop a project around the development of decision support tools that utilise Smart Animal Technologies across a number of different on farm uses.

Jurisdictional lead scientists;
a] Northern Ireland - Dr Debbie McConnell, AFBI
b] USA - TBC
c] Canada - Dr Christine Baes, Univertsity of Guelph
d] New Zealand - Dr Ian Sutherland, AgResearch

Workshop Chair; Dr Laurence Shalloo [Teagasc]

2.15pm PROMPT - 3.15pm; **Workshops 5 & 6 concurrently, 4 x 10-15 minute Regional presentations - Workshops Chaired by Dr Ian Sutherland of AgResearch NZ and Dr Laurence Shalloo of Teagasc, respectively.**

3.15pm - 3.35pm - Health break

3.35pm - 4.45pm - Workshops

4.45pm - 5.00pm - 15 Minute Plenary Presentation by Workshop 5 Chair on outputs, agreed actions, partners involved etc

5.00pm - 5.15pm - 15 Minute Plenary Presentation by Workshop 6 Chair [as above]

5.15pm - 5.30pm - Plenary Q&A to all 6 Chairpersons on stage, comments on Fall Forum structure, potential improvements plus closing remarks by Plenary chair & AFBI VSD Director, Dr Stanley McDowell

5.30pm - CLOSE OF MADISON FALL FORUM

Friday November 10th; Free Day BUT before before 11.00am or Departure, can each of 6 x Workshop Chairperson's Reports please be submitted to Ray Atkinson for general distribution and follow through.

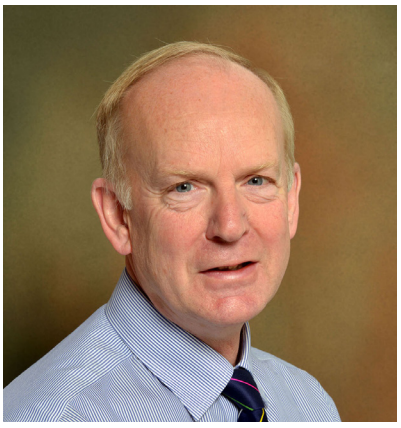
BIOS

Dr Mark Boggess

Dr. Mark Boggess is the Director of the USDA Agricultural Research Service U.S. Dairy Forage Research Center (USDFRC), in Madison, WI. In this role Dr. Boggess administers the integrated research programs for the Agency focused on improving the capacity and efficiency, and the economic and environmental sustainability of the dairy and dairy forage industries. The USDFRC supports a diverse group of scientists with subject matter expertise in soil science and ecology, agronomy, forage breeding and physiology, dairy science, dairy nutrition and genetics, agricultural engineering, bio-chemistry, and microbiology. Research priorities are focused on feed and nutrient utilization, integrated dairy and dairy forage systems, and nutrient cycling and waste management.

Prior to serving as the Center Director for the USDFRC, Dr. Boggess served as the National Program Leader for USDA Agriculture Research Service (ARS) programs in Food Animal Production and Pasture, Forage and Rangeland Systems in Beltsville, Maryland. In this role, Boggess provided primary leadership for ARS research across the US, including programs for genetics and genomics, nutrition, reproductive physiology, animal welfare and meat quality for the food animal industries. He also provided leadership to develop and integrate and improved pasture and rangeland management practices and land-use/renovation strategies. These programs were focused on optimizing economic viability and environmental sustainability for diverse stakeholder groups responsible for managing forages, vegetation, livestock and natural resources on private and public lands.

Dr Sinclair Mayne

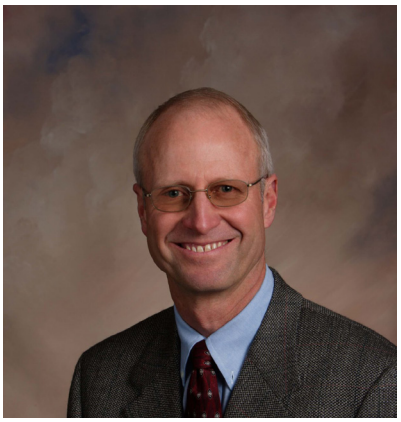


Sinclair is Chief Executive of the Agri-Food and Biosciences Institute (AFBI), an internationally renowned scientific organisation based in Northern Ireland, with a staff complement of circa 630 and an annual budget of £50m. AFBI works with a range of partner organisations and stakeholders to provide scientific solutions to the global challenges of climate change, food security and environmental protection, whilst supporting a more profitable and sustainable agri-food industry.

Sinclair graduated from Queen's University, Belfast, with a BAgr in 1980, followed by a PhD in ruminant production systems in 1983. He has worked in research and development for over 30 years, initially at the Grassland Research Institute in England, and then the Agricultural Research Institute of Northern Ireland, Hillsborough, which became part of the Agri Food and Biosciences Institute (AFBI) in 2006. His research interests include grass production and utilisation, improving the efficiency of milk and beef production and reducing the environmental impact of livestock production systems.

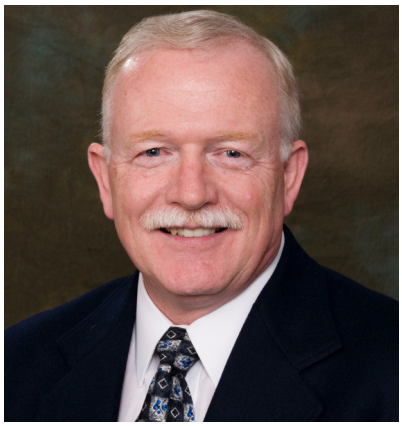
Sinclair is a Past President of the British Society of Animal Science and the British Grassland Society and is a Fellow of the Royal Agricultural Societies.

Dr. Scott L. Kronberg



Scott is a research animal scientist at the USDA-ARS Northern Great Plains Research Laboratory in Mandan, North Dakota where he has been based for seventeen years. His research has been focused on increasing the concentration of omega-3 fatty acids in red meat and reducing ammonia and greenhouse gas production associated with beef production.

Dr. Marcus E. Kehrli, Jr.



Marcus became the Director of the National Animal Disease Center of the USDAís Agricultural Research Service in May 2013, and has over 35 years of experience in infectious, metabolic and emerging diseases research, including having covered a broad, multidisciplinary program of applied and fundamental research on bacterial, viral and prion diseases in wildlife, cattle and swine. Dr. Kehrli was previously Principal Research Investigator for Pfizer Global Research and Development, Veterinary Medicine Pharmaceutical Discovery, where his research focused on a pursuit of novel therapeutic solutions for livestock diseases. His research career at the USDA-National Animal Disease Center began in 1982 investigating immunosuppression and bovine mastitis, and Dr. Kehrli remains a Collaborating Professor at Iowa State University in the Departments of Animal Science, and Veterinary Microbiology and Preventive Medicine, and the Immunobiology interdepartmental Program.

Dr. Kehrli's primary area of research expertise is immunity to infectious diseases of cattle and swine. Receiving a PhD (1989) in Immunobiology, a DVM (1982), a BS in Dairy Science (1978) and a BS in Bacteriology (1978), all from Iowa State University, he has authored or co-authored over 160 publications in refereed scientific journals. He holds 4 U.S. Patents and is a past President of the American Association of Veterinary Immunologists, whilst also having served on various committees for the American Dairy Science Association (ADSA), the National Mastitis Council Research Committee, and the Swine Health Committee of the National Pork Board.

Dr. Kehrli has also received the USDA and Federal Laboratory Consortium Technology Transfer Award for Outstanding Achievement in Technology Transfer for the discovery and development of a DNA PCR test to eradicate bovine leukocyte adhesion deficiency (BLAD), the American Dairy Science Association (ADSA) West Agro, Inc. Award for Outstanding Contributions to Mastitis Abatement, the ADSA Pharmacia & Upjohn Physiology Award in recognition of outstanding research in dairy cattle physiology, the ADSA Fellow Award for distinguished service to the dairy industry, the ARS Special Administrator's Award in recognition of the ARS Research Response Teamís efforts on the 2009 H1N1 Pandemic Influenza Virus, the 2011 ARS Midwest Area Senior Scientist of the Year Award for sustained excellence in animal health research contributions and leadership, and an Honorary Doctorate from the University of Liège, Belgium, Faculty of Veterinary Medicine in 2011.

In 2014, Dr. Kehrli was recognized by the College of Veterinary Medicine at Iowa State University with the Stange Award for Meritorious Service by an alumnus, and in 2016 as the Distinguished Dairy Science Alumnus at Iowa State University.

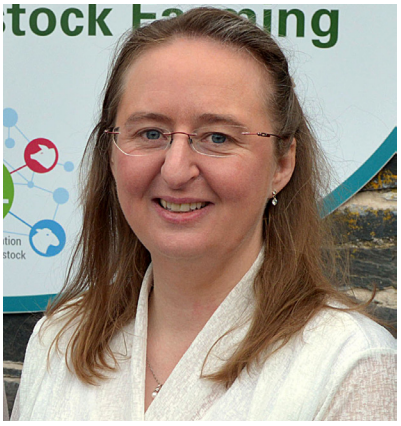
Dr Laurence Shalloo

Laurence Shalloo is a Principle Research Officer in the Livestock Systems Research Department of the Animal and Grassland Research and Innovation Programme, and is based at Moorepark. Laurence graduated with a B.Agr. Sc (1st Hons.) from UCD in 1999, and with a PhD from UCD in 2004, funded through the Teagasc Walsh Fellowship Scheme where he developed the Moorepark Dairy Systems Model.

Laurence commenced work at Teagasc Moorepark in 2004. He is a research co-ordinator on a number of Research Stimulus funded projects involving diverse areas from developing models of the milk processing sector to developing a national sustainability assurance scheme.

He is currently an SFI funded investigator. He is a research co-ordinator of a work package in the FP7 funded project AUTOGRASSMILK as well as significant involvement in (MULTISWARD, ANIMALCHANGE, GREENHOUSEMILK) projects. Currently supervising six Ph.D. students registered at UCD, CIT and Massy University based at Moorepark and New Zealand. Laurence is responsible for the generation of the economic values for the Irish Dairy cow selection index (EBI). Laurence was instrumental in the development of the Pasture Profit Index as well as the development of PastureBaseIreland (A national grassland recording system).

Dr Elizabeth Magowan



Elizabeth completed a PhD in dairy nutrition from Queen's University, Belfast (with DARD Science Service and ARINI) in 2004 and joined AFBI as a pig research scientist in 2003.

Elizabeth developed the AFBI pig research programme until April 2017 after which she took up the post as Director of Sustainable Agri-Food Sciences Division.

Elizabeth's research focused on optimising pig production performance through management and nutritional strategies whilst reducing environmental impact. Elizabeth worked extensively on industry/academic collaborative studies and presented her work across the UK and at international conferences as well as publications in journals.Elizabeth was awarded the Sir John Hammond Award in 2017, from the British Society of Animal Science, in recognition of her scientific work in collaboration with industry.

In addition to managing a busy research programme, key achievements during Elizabethís time as the Monogastric project leader within AFBI included performing the role of deputy co-ordinator of a large EU FP7 project ECO-FCE, completing a term of office on the council of the British Society of Animal Science, leading AFBI to secure preferred supplier status for R&D to a large retailer and leading AFBIís membership of the UK Centre of Excellence for Livestock (CIEL) as well as undertaking the role of interim Director of CIEL in its formative months.

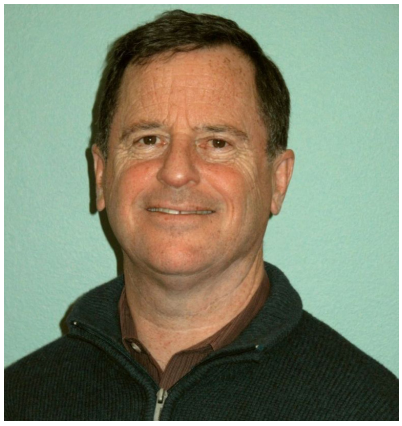
Dr Eduardo Casas

Eduardo has worked for more than 25 years in animal genomics. He has worked in the identification of genomic regions associated with productive and carcass traits in beef cattle. He is currently working on the identification of regulating elements of gene expression associated with animal diseases. He narrowed the genomic region where the myostatin, the gene responsible for double muscling in cattle, and led key studies to establish to establish the effect of this gene in productive and carcass traits. Dr. Casas identified genomic regions where genes associated with meat tenderness are located. He participated in the identification of the calpain gene as partially responsible for meat tenderness in beef cattle, and developed studies to estimate the effect of this gene in productive and carcass traits, focusing on meat tenderness. He is co-inventor in a patent in which molecular markers were developed in the calpain gene to assess meat tenderness in beef cattle.

Dr. Casas is a productive scientist. His research has resulted in more than 90 scientific publications, 4 book chapters and more than 120 abstracts. Dr. Casas has been invited as an international advisor/consultant in animal genomics, to establish genomic research projects in Mexico, Costa Rica, and Chile. He has been invited to give more than 60 presentations to scientists, students, producers and government authorities in Argentina, Brazil, Chile, Colombia, Costa Rica, Germany, Mexico, Paraguay, Puerto Rico, Spain, United States, Uruguay, and Venezuela. He has been reviewer for more than 30 international journals, has been associate editor of Journal of Animal Science and Latin-American Archives of Animal Production, and has been member of the editorial board of Veterinaria-Mexico, Veterinaria-OA, and Tecnociencia-Chihuahua. He has reviewed grants for several institutions in the United States, Canada, and the United Kingdom. Dr. Casas has received the Northern Plains Early Career Scientist of the Year Award from the Agricultural Research Service, USDA in 2003, and the Bouffault International Animal Agricultural Award from the American Society of Animal Science in 2011.

Dr. Casas graduated from the National Autonomous University of Mexico with a degree in Veterinary Medicine in 1985, and received a Ph.D. degree in molecular genetics from the University of Wisconsin in 1996. After receiving his Ph.D. he accepted a position as geneticist at the USDA, ARS, US Meat Animal Research Center, in Clay Center, Nebraska, and since 2011 he has been the Research Leader of the Ruminant Diseases and Immunology Research Unit, at the USDA, ARS, National Animal Disease Center, in Ames, Iowa.

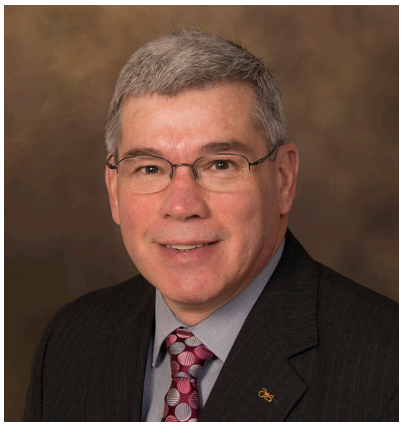
Dr Ed Topp



Ed is a native of Montréal; he received his PhD from the Department of Microbiology at the University of Minnesota in 1988. Since then Ed has toiled as a research scientist with Agriculture and Agri-Food Canada, and also has adjunct appointments with the Department of Biology at Western University in London Ontario, and the Department of Soil and Water Sciences at the University of Florida. Ed leads several national studies that seek to better understand and to better manage the risks that food production practices pose for environmental quality and human health. This with the objective of devising means of mitigating the exposure of food and water to pathogenic and antimicrobial resistant enteric bacteria, and ìemergingî organic contaminants.

Ed is the national coordinator for the Genomics Research and Development Initiative project on AMR, a key component of the innovation pillar of the Canadian National AMR Action Plan. Ed is a former [2011] president of the Canadian Society of Microbiologists.

Dr Jerry L. Hatfield



Jerry is the Laboratory Director of the USDA-ARS National Laboratory for Agriculture in Ames, Iowa, and co-PI on the Agriculture Model Improvement and Intercomparison Project. His personal research focuses on quantifying the interactions among the components of the soil-plant-atmosphere system to quantify resilience of cropping systems to climate change and development of techniques to enhance decision-making for agriculture. He leads the agriculture sector for the National Climate Assessment, a member of the IPCC process that received the 2007 Nobel Peace Prize, and lead on the agriculture indicators of climate change for the USGCRP.
He is a Fellow of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America and Past-President of the American Society of Agronomy and member of the American Meteorological Society, American Geophysical Union and Soil and Water Conservation Society. He is the recipient of numerous awards and was elected to the ARS Hall of Fame in 2014 for his research on improving agriculture and environmental quality and the 2016 recipient of the Hugh Hammond Bennett award from the Soil and Water Conservation Society. He is the author or co-author of 438 refereed publications and the editor of 17 monographs.

Dr Ian Sutherland

Ian is the Science Group Leader of AgResearch's Animal Science Group, based at Ruakura Research Centre in New Zealand's North Island. AgResearch is a Crown-owned company which conducts industry-relevant research to support New Zealand's livestock farming sector. Ian has a B.Sc. in Parasitology from The University of Glasgow (1983) and a Ph.D. from Leeds University (1987). In addition to his time at AgResearch, he completed three post-doctoral contracts in Scottish Universities and was a Project Leader with the CSIRO in Queensland. Ian is a past-President of the NZ Society for Parasitology and is a current Council Member of the World Federation of Parasitologists. As the Group Leader for Animal Science, he has responsibility for AgResearch's research into Animal Genomics, Health, Nutrition, Welfare, Reproduction and Rumen Microbiology. He is also AgResearch's key contact with a range of commercial entities, including a number of pharmaceutical companies.

DIRECTIONS and HOTELS

Hotel Information for AFBI Ag Forum

A block of 30 rooms has been reserved at the Best Western Plus InnTowner for four nights, Nov. 6-9, 2017. You may reserve a room for any or all nights.

- Individuals are responsible for making their own reservations by October 11, 2017.
- Individuals are to pay for their rooms and any other hotel charges they make.

Best Western Plus InnTowner

2424 University Avenue
Madison, WI 53726
Telephone: (608)233-8778
www.inntowner.com

Room Rate: $129.99 plus taxes*
For U.S. Government employees, the hotel will honor the $115 per diem rate for Madison, WI, if you present your travel documents and government ID at check-in.

To make a reservation: Individuals should call the hotel directly at **608-233-8778** or go online to www.InnTowner.com/reservations. Be sure to use the group code, **AGFORUM**, in order to receive the rate as shown above. Please note: This rate is not guaranteed after the room block release date which is **October 11, 2017**. Rooms may still be reserved after this date, based on availability, at prevailing room rates.
You will be asked to guarantee your reservation with a credit card.

Cancellation policy:

Individuals must cancel their reservations at least 24 hours prior to check-in on their date of stay to avoid the penalty charge.

Other notes:

- Breakfast is included in the room rate.
- The hotel is about 1 mile (1.6 km) from the meeting space for those who want to walk.
- The hotel will provide shuttle service for those who do not want to walk.
- The hotel has shuttle service to the Dane County Regional Airport. Call the hotel when you land.
- Check-in time is 3:00 p.m.
  Check-out time is 12:00 p.m.

** Rates are listed as single/double occupancy per room, per night and increase in increments of $10.00 for each additional guest occupying the room. Room Rates are subject to all applicable taxes. The tax rate is 14.5% (9% local, 5% state and 0.5% county).*