



Michael Nolan

Materials Modelling

Tyndall National Institute, UCC

Head of Group and Interim Chief Scientist

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Expertise

- First principles simulations
- Surface chemistry
- Catalysis
- Methane conversion

Research focus in VistaMilk

Use state of the art atomistic simulation and experiment to develop new catalysts to promote low temperature methane activation in a prototype wearable device

Research outcomes

- Developed new atomistic simulation methodologies for prediction of the chemistry of etching and deposition in materials processing. Now widely used in the community
- Industry supported projects on developing new processes for (1) metal, (2) polymer, (3) metal oxide dielectric deposition: implemented into process flows through these partners
- Development of new low friction polymer coating and a deposition process - Invention Disclosure Form with MedTech company
- SFI-AMBER project on new low friction coatings
- Development of new chemical catalysts and Invention Disclosure Form of same.

Lizy Abraham

Wireless Sensor Networks

Walton Institute, South East Technological University

Researcher

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Expertise

- Wireless sensor networks
- Artificial intelligence and machine learning
- Computer vision
- Internet of Things
- Edge computing

Research focus in VistaMilk

Assessing the heterogeneity of farms in real-time with a focus on anomaly detection using edge computing

Research outcomes

Onsite monitoring of machine health of dairy equipment for condition monitoring and predictive maintenance



Donagh Berry

Animal Genetics

Teagasc

Director of VistaMilk & Senior Principal Research Officer

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Expertise

- Animal phenotyping strategies
- Genetic analyses (all animal species)
- Genomic analyses
- Derivation of breeding objectives
- Breeding scheme design

Research focus in VistaMilk

Contribute to animal breeding research - phenotyping tools & modelling, breeding objective development, genetic & genomic predictions, mating system, validation, and breeding scheme design

Research outcomes

- Impact of research to date worth €2.62b to the Irish dairy industry through national breeding goals, breeding schemes and genomic evaluations
- Led development of the first ever national bovine custom genotyping platform
- Lead investigator in the national dairy cow and dairy-beef breeding objectives used by 17,000 farmers
- Developed mating advice decision support tools deployed via a webservice and actively used by Irish dairy and beef producers
- 5 invention disclosure forms and 1 filled patent (P12895PC00)

Claire Gormley

Statistics

University College Dublin

Professor, in School of Mathematics and Statistics

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Expertise

- Statistical modelling
- High-dimensional data
- Modelling spectral data
- Bayesian methods

Research focus in VistaMilk

Develop novel, next generation analytical techniques to appropriately model the multimodal, multiresolution and multipurpose data generated across the soil to society pathway

Research outcomes

- Development of probabilistic approaches to predict milk traits from spectral data, providing predictions and their associated uncertainty
- Provision of open source software to facilitate widespread use of developed tools



Emer Kennedy

Calf Welfare

Teagasc

Senior Research Office, Dairy Enterprise Leader

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Expertise

- Calf health
- Calf welfare
- Calf management
- Replacement heifer rearing
- Grazing management

Research focus in VistaMilk

Contribute to animal disease and well-being research. Smart technologies to weigh, assess animal health and welfare of calves and youngstock. Strategies to reduce antimicrobial use

Research outcomes

- Colostrum management protocols for improved calf health
- Developed on-farm calf welfare assessment protocol
- Replacement heifer rearing guidelines
- Tools to improve calf welfare

Jonathan Magan

Food Chemistry

Teagasc

Research Officer

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Expertise

- Effect of cow diet on milk composition
- Milk chemistry
- Seasonal milk compositional factors
- Functional properties of milk
- Dairy product processing

Research focus in VistaMilk

Develop research on the effect of primary production factors at farm level on milk and end-product composition and quality - analysis of unique genetic profiles for protein composition, methane-reducing food additives and alternative forage sources

Research outcomes

- Contribution to substantial body of data underpinning the point-of-difference of Irish grass-fed dairy products
- Contribution to establishment of seasonal milk compositional and functional databases and mitigation strategies for seasonal processing issues
- One Invention Disclosure Form

Conor McAloon

Animal Health/Epidemiology
University College Dublin
Associate Professor
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Expertise

- Veterinary medicine
- Bovine health management
- Epidemiology
- Data analysis

Research focus in VistaMilk

Developing a suite of tools to enable improved disease prediction, facilitating early, targeted and non-antibiotic interventions to improve health and welfare in dairy cattle

Research outcomes

- Development of an early warning system for exotic disease incursions using national databases
- Development of epidemiological models that can be tailored to specific characteristics of novel emerging diseases in cattle
- Use of accelerometers as an aid to positive welfare indicator measurements in calves
- Investigation of accelerometers for the detection of foot conditions in dairy cattle

Brendan O'Flynn

Sensing Systems

Tyndall National Institute, UCC

Head of Group - Wireless Sensor Networks

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Expertise

- Embedded systems design and deployment
- Flexible sensors
- Wearable sensors
- Data analytics, robust edge artificial intelligence
- Smart sensing

Research focus in VistaMilk

Animal – Sensing Technologies : Chipless radio frequency identification RFID and wearable solutions for real time monitoring of cow and calf reproduction and health care. Emerging Tech – Methane sequestration systems and embedded systems integration for deployment

Research outcomes

- Currently exploring and developing novel smart sensing technologies which develop, define and lead the research activities of the Wireless Sensor Networks group at Tyndall National Institute developing smart sensing systems
- As part of these academic and industry partnerships, the circuits, and systems, developed using a hardware software co-design approach and including complex data fusion algorithms to analyse multiple sensor streams, and the exploitation of the relevant IP licensed to commercial partners in the form of:
 - ~60 Inventions Disclosure with 20 licenses/assignments to industry Partners
 - Enabling 3 Start-up companies out of WSN related research activities - Tyndall /NMRC
 - Inpact Microelectronics 1999. Miniaturised (MCM) wireless systems (Founder & Co-Owner)
 - ENDECO – 2010. Building energy management for the retail sector
 - GRASP – 2014. Gait monitoring systems for athletes

Luke O'Grady

Veterinary Medicine

University College Dublin

Assistant Professor in Population Medicine

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Expertise

- Nutrition, health, production, and welfare of dairy cattle
- Epidemiology and disease control at farm and national scales
- Animal health economics
- Machine learning and statistical analysis
- Simulation modelling and decision support tools for farmers and vets

Research focus in VistaMilk

Advancing cutting edge data acquisition and analytical techniques into actionable solutions

Research outcomes

- The creation of the REMEDY whole farm simulation model of UK dairy production systems, modelling the interactions between nutrition, genetics, health, production, and greenhouse gas emissions.
- Using social science and simulation modelling to explore the interactions of bovine viral diarrhoea control across all 4 national control programs within the UK
- Using computer vision to monitor behaviour and lameness in dairy cattle in on farm tools.
- Co-author in the stability section methodology for mixed models incorporated into the "stabilizer" R package.
- Multiple research activities and outputs that have informed the development and direction of Animal Health Ireland's bovine viral diarrhoea and mastitis control programmes



Ben Lahart

Methane Measurement

Teagasc

Research Officer

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Expertise

- Methane measurement using GreenFeed technology
- Nutritional factors influencing methane output
- Grazing management
- Feed additives
- Animal phenotyping

Research focus in VistaMilk

Development of improved prediction models for methane output of grazing dairy cows as well as the development of strategies to reduce methane output in grazing dairy systems - specifically focusing on the evaluation of pasture type and management as well as feed additives and genetics

Research outcomes

- Generation of country specific emission factors for pasture-based dairy cows for use in greenhouse gas models
- Contribution of genetic and nutritional strategies to reduce methane output from dairy systems within the Teagasc marginal abatement cost curve
- Three Invention Disclosure Forms



James Sweeney

Statistics

University of Limerick

Associate Professor in Dept of Mathematics & Statistics

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Expertise

- Spatio-temporal statistical modelling
- Statistical models for disease spread
- Design of experiments in field trials and animal studies
- Bayesian statistics
- Applied statistical modelling including non-parametric modelling

Research focus in VistaMilk

Contribute to development of spatial statistical models for geo-referenced data including soil, water, fertiliser. Disease modelling, particularly the spread of bovine tuberculosis amongst cattle herds

Research outcomes

- Lead investigator on SFI Challenges project GREEN-GRID. The project is focused on the development of spatio-temporal maps for wind and solar resources nationwide with a view to expediting the move to 100% electricity generation from renewables
- Lead investigator on SFI New Frontiers project 3-EX. The project is focused on the development of the next generation of respiratory disease spread models to ensure preparedness for future pandemics
- Contributor to World Health Organisation (WHO) proof-of-concept project on COVID-19 integrated epidemiological-economic modelling.



John Upton

Milking Efficiency

Teagasc

Senior Research Officer

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Expertise

- Milking machines
- Milking management strategies
- Milking efficiency
- Energy efficiency
- Renewable energy technologies

Research focus in VistaMilk

Deliver milking management strategies optimised at the cow level and allow for adjustment in milking machine settings within individual milkings to reduce milking times and improve milk quality

Research outcomes

- Developed technologies that have been deployed to market to improve milking efficiency and cow comfort during milking
- Delivered research programmes on dairy energy use which have been used to design national energy policy around solar energy
- Developed dairy energy decision support tool deployed via a webservice and actively used by Irish dairy farmers and advisors
- 3 Invention Disclosure Forms

Lee Coffey

Molecular Biology

South East Technological University

Lecturer and Researcher, Department of Science

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Expertise

- Molecular biology techniques including gene screening, expression, genome editing
- Synthetic biology, directed evolution
- Enzymes for food/feed/agritech/environmental/pharma/health/industrial applications
- Biological molecular communications for DNA data storage and biological health monitoring

Research focus in VistaMilk

Use of synthetic biology, organ-on-a-chip and novel implantables/ingestible bio-devices to monitor and improve animal health

Research outcomes

- Developed bacteria that act as information relays and base stations
- Successful use of synthetic biology for a range of applications such as to enhance gene therapy and in molecular communications
- Founder of an EI-funded spin-out company, with >4000 biological technologies licensed and patent pending technologies developed
- Principal Investigator for previous SFI Project 20/COV/0097
- Published two articles '*Modulated Molecular Channel Coding Scheme for Multi-Bacterial Transmitters*' and '*Hydrogel-based Bio-nanomachine Transmitters for Bacterial Molecular Communications*'

Margaret Kelleher

Animal Genetics

Irish Cattle Breeding Federation

Genetics Operations Manager

E-mail: mmkelleher@icbf.com



Expertise

- Genetic evaluations for dairy and beef cattle in Ireland
- Breeding objectives
- Genetic analysis on the national population
- Decision support tools like the cow's own worth index for dairy cows
- Applying research outcomes into useable industry applications

Research focus in VistaMilk

Contribute to animal breeding research with a focus on wider application to industry

Research outcomes

- Development a culling index for dairy cows and successfully deployed to industry via the national database
- Led a team of researchers across various organisations to update and upgrade the beef breeding objectives which has deployed to industry
- Part of a team that introduced and deployed carbon into the national dairy and dairy-beef breeding objectives
- Genetic analysis involving sexed semen with results shared nationally and internationally
- Run routine national and international genetic evaluations that are published bi-monthly



Pádraig Lyons

Renewable Energy

Tyndall National Institute, UCC

Head of Group, International Energy
Research Centre

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Expertise

- Renewable energy
- Energy storage (electrical/thermal)
- Real-time digital simulation
- Energy policy
- Energy systems integration

Research focus in VistaMilk

Renewable energy and energy efficiency in agriculture, agri-photovoltaics, energy data analytics, electrification of farming, energy system integration in agriculture, electrical infrastructure utilisation and smart grids

Research outcomes

- Development of a research programme that informed the development of system services for Transmission System Operators that support the integration of renewables on the electrical power system. The approach utilised co-simulation using laboratory based energy storage to emulate grid-scale storage in collaboration with real-time digital simulation known as Power Hardware in the Loop
- Led research that led to unique data set that provided insights into the real world operation of heat pumps in retrofitted Irish homes
- Led research as part of Energy Policy Insights for Climate Action (EPICA) programme that was funded by the Department for Energy Climate and Communications that has influenced the development of the Irish Government's Climate Action Plan and other government policy