Andrew Parnell

Statistics and Machine Learning

Maynooth University

Professor, Director of the Hamilton Institute

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Phone: +353 (0)1 708 6801

Expertise

- Bayesian modelling
- Spatio-temporal data analysis
- Quantitative ecology
- Missing data
- Anomaly detection

Research focus in VistaMilk

Tools for routinely monitoring data collected from Irish dairy farms. Accurately accounting for missing data in complex data sets. Detecting anomalies in temporal or spatio-temporal data

Research outcomes

- World's most widely used statistics packages for estimating animal diets remotely (>150k downloads)
- Winner of 2017 University College Dublin VentureLaunch prize for highest potential start-up in the area of genomic breeding analysis
- New software for Bayesian Machine Learning of agricultural data with complex interactions

Daniel Riordan

Sensing Systems

Munster Technological University

Head of Department - Technology, Engineering & Mathematics

E-mail: Daniel.Riordan@mtu.ie

Phone: +353 (0)53 917 1261

Expertise

- Development and deployment of sensors systems (electronics and software)
- Data amalgamation and analytics
- Autonomous agricultural systems
- Digital signal processing
- Vision systems

Research focus in VistaMilk

Development and deployment of sensors systems and process automation systems for application within the dairy sector (electronics and software)

Research outcomes

- PhD supervision leading to novel inventions; automated animal health monitoring, machine monitoring & autonomous agri-vehicles navigation
- 4 Invention Disclosure Forms and 2 Patents filed (EP4018362A2 & DE102015101508 - Both licenced to industrial Partners)
- Development & deployment of sensor systems in agriculture; water quality, machine monitoring, animal monitoring (on & off animal), animal housing monitoring, soil health/composition

Lizy Abraham

Wireless Sensor Networks

Walton Institute, South East Technological University

Researcher

E-mail: lizy.abraham@waltoninstitute.ie

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

Claire Gormley

Statistics

University College Dublin

Professor, in School of Mathematics and Statistics

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Phone: +353 (0)1 716 2525

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 probabilitic 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

Brendan Murphy

Statistics

University College Dublin

Professor of Statistics

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Phone: +353 (0)1 716 2382

Expertise

- Cluster analysis
- Classification
- High dimension data
- Bayesian methods
- Near and mid infrared spectroscopy

Research focus in VistaMilk

Development of new statistical models for agrifood data. Development of mathematical models for agrifood applications. Implementation of system of systems

Research outcomes

- Contributor to a number of open source software packages (mclust, BayesLCA, mixggm, MoEClust, pgmm, LCAvarsel, …)
- Development of methods for distinguishing cow diet from mid infrared spectroscopy of milk

Brendan O'Flynn

Sensing Systems

Tyndall National Institute, UCC

Head of Group - Wireless Sensor Networks

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Phone: +353 (0)21 2346041

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

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

Luke O'Grady

Veterinary Medicine

University College Dublin

Assistant Professor in Population Medicine

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Phone: +353 (0)1 716 6075

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

James Sweeney

Statistics

University of Limerick

Associate Professor in Dept of Mathematics & Statistics

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Phone: +353 (0)61 202 609

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.

Michael Murphy

Energy

Munster Technological University

Lecturer, Sustainable Energy Engineering

E-mail: MichaelD.Murphy@mtu.ie

Expertise

- On-farm energy optimisation
- Integration of renewable energy systems
- Calculation of carbon dioxide emissions offsets
- Open-source tools for farmers and researchers
- Grass measurement optimisation

Research focus in VistaMilk

Contribute to on-farm energy optimisation, integration of renewable energy systems and the development of open-source tools to aid farmers, researchers and policy makers in decision making

Research outcomes

- Investigator on several agri-engineering projects. Secured €2.5m in research funding
- Investigator on national project which developed the on-line farm energy optimisation tool which is currently being used by farmers and researchers (messo.shinyapps.io/Farm_Energy)
- Extensive industry-based research through several commercially co-funded projects
- Developed several open-source tools in agriculture and energy domains such as: GMOT, DRAF & elmada

Pádraig Lyons

Renewable Energy

Tyndall National Institute, UCC

Head of Group, International Energy
Research Centre

E-mail: padraig.lyons@tyndall.ie

Expertise

- Renewable energy
- Energy storage (eletrical/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

Salvatore Tedesco

Sensing Systems

Tyndall National Institute, University College Cork

Senior Researcher

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Phone: +353 (0)21 234 6286

Expertise

- Wearable technology
- Artificial intelligence and data analytics
- Edge analytics
- Project management
- Applied artificial intelligence for engineering

Research focus in VistaMilk

Artificial intelligence models for several contexts. Low-power edge analytics for animal behavior

Research outcomes

- Invention Disclosure forms (>20) on research activities
- New approaches for artificial intelligence applied to radio frequency identification in agri-tech
- 3 past licenses to spin out
- 3 open datasets publicly available

Sara Morrissey Tucker

Digital Immersive Media

Munster Technological University

Research Fellow

E-mail: Sara.MorrisseyTucker@mtu.ie

Expertise

- Digital immersive media
- Virtual reality
- Augmented reality
- Machine translation
- Sign languages

Research focus in VistaMilk

Contribute to the development of immersive reality technology solutions including annotated digital 360-video-based based content and graphic virtual training environments

Research outcomes

- >€850k in research funding brought to AgriTech sector and partners for the development and delivery of training and digital immersive technology solutions
- Amelioration of training practices in industry partners in terms of standardisation, resourcing, and quality through the creation and delivery of immersive employee training experiences
- Development of the first example-based data-driven machine translation system for sign languages