



BREAKING
BOUNDARIES
2030

UCD College of Health and Agricultural Sciences

NEWSLETTER

Research Innovation & Impact

Vol 1. Edition 2



RESEARCH INSIGHTS

A message from VP for Research,
Innovation & Impact
– Prof Lorraine Brennan



Welcome to our second edition of the College of Health and Agricultural Sciences Research Insights newsletter. In this edition we focus on the research facilities and infrastructure that we have available to our researchers. Research infrastructure underpins excellent scientific progress and is critical to our current and future research ambitions. From biobanks and data repositories to analytical platforms, human performance labs and UCD Lyons Farm these facilities and research infrastructure enable discovery, collaboration and impact. While the current newsletter highlights our current diverse infrastructure across the college it is also timely to highlight the need for further development and upgrading.

We need to explore models of shared platforms, sustainable investment strategies and development of approaches to align infrastructure growth and renewal with key evolving research needs.

As we work across all the schools in the College to deliver UCDs Research ambitions it is timely to remind ourselves that state of the art infrastructure is a critical enabler for research success. We look forward to building upon our current research infrastructure to ensure that we can deliver on our ambitious research plans.



Core Technology Platforms at UCD Conway Institute



UCD Conway Institute

UCD Conway Institute is a leading biomedical research institute, underpinned by operational excellence in laboratory management and the most comprehensive suite of centrally managed core technology facilities in Ireland.

We strive to facilitate every opportunity to advance interdisciplinary research, innovation and education, directly supporting national objectives and priorities.

Access to core technologies ensures rigor in experimental processes, drives scientific advances, supports publications and competitive funding applications, and delivers exceptional research training opportunities. Our core technology platforms are an area of exceptional strength and value.

Recent equipment procurements funded through internal UCD and external infrastructure grants such as the National Preclinical Imaging Centre and the Comprehensive Molecular Analysis Platform enable researchers to gather the

requisite preliminary data to strengthen future grant funding proposals and undertake world-leading research, directly supporting the UCD Strategy.

We provide technology solutions to research questions with access to high-end equipment and technical expertise across several experimental platforms.

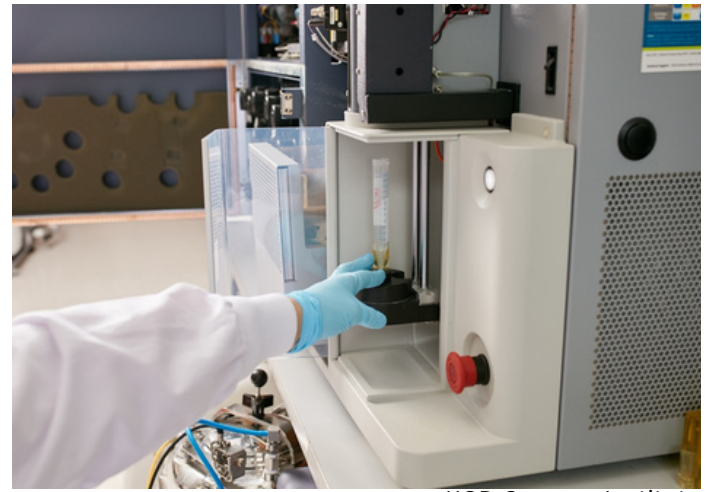
Our dedicated team of scientists and technical staff work with researchers to design experiments that address their research question, taking a 'problem solving' approach to find the best technology solution with downstream analysis as needed. This approach has provided comprehensive solutions to challenging research questions.

The Genomics Core offer a range of facilities for next generation sequencing, including short read and long read technologies, as well as single cell analysis.

We also offer high-throughput real-time and digital PCR analysis. Genome and transcriptome sequencing can be used to identify variants associated with disease, to determine how an organism responds to disease or drug treatment, to identify organisms and to track pathogens during disease outbreaks.

The Proteomics Core is dedicated to biological mass spectrometry, an analytical technique capable of accurately determining the mass, charge and chemical structures of molecules. Our instrumentation can cover all aspects of modern proteomic science including quantitative proteomics, protein post-translational modifications and protein-protein interactions. We offer dedicated strategic support at every stage from sample preparation to data analysis to enable researchers to take full advantage of their results.

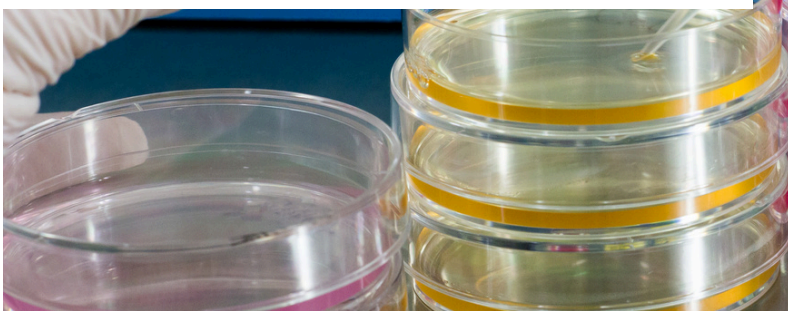
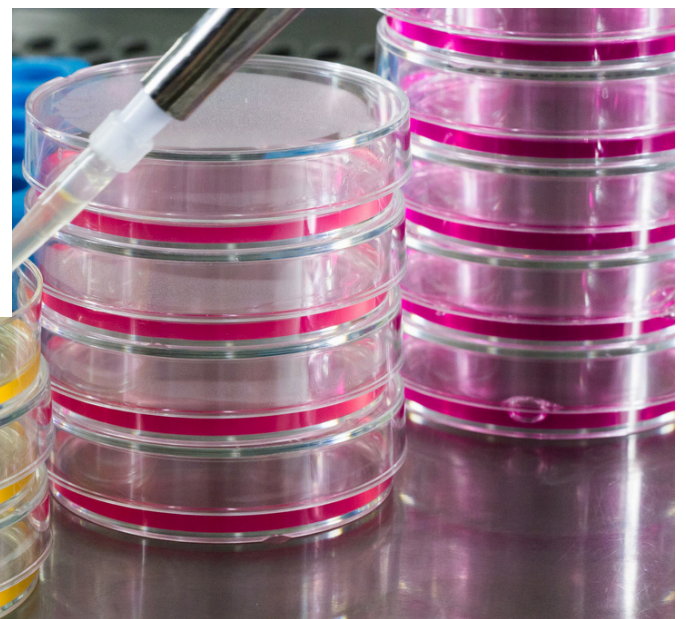
The Imaging Core provides contemporary imaging technologies and know-how to researchers with a consolidated instrumentation suite spanning all aspects of light and electron microscopy; from sample preparation to image processing and analysis. Our technical expertise can assist in the widest possible range of applications for microscopy, in advancing the development of new applications and new imaging technologies.



UCD Conway Institute

The Flow Cytometry Core allows researchers to count and examine the physical and biological characteristics of cells and particles with applications in humans, animals, plants and microorganisms.

We provide a comprehensive service across a wide range of studies from obesity and cancer research to nanoparticles and biofuel investigations. We work with major cytometry manufacturers to beta test instruments, evaluate markers, software and provide a consultancy service for to industry.





UCD Conway Institute

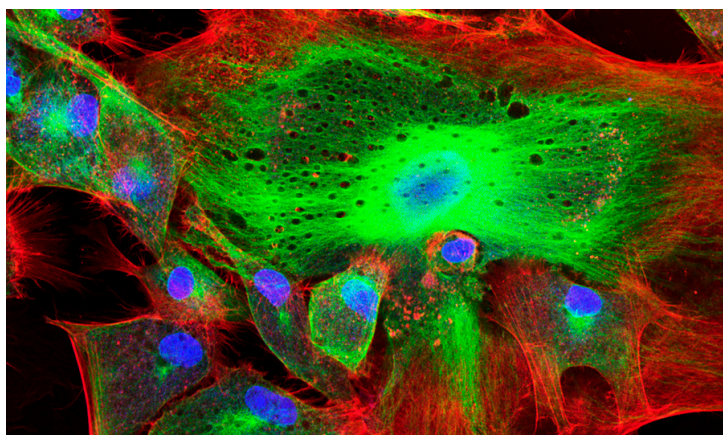
The Metabolomics Core is based on mass spectrometry for high-throughput metabolite identification and quantification. It is a powerful approach to investigate alterations in metabolic pathways under different conditions. It covers many related metabolites present in diverse areas of metabolism such as amino acid and lipid metabolism.


Measurements can be performed on a wide variety of biofluids, tissue and cell culture samples. We offer unique expertise and advice from experimental design and data acquisition to data analysis and biological interpretation.

Contact conway@ucd.ie to discuss individual requirements or visit www.ucd.ie/conway/ for more information.

The Research Pathology Core provides automated immunohistochemistry and linked digital pathology services on frozen and formalin fixed paraffin-embedded human and animal tissue. We advise and assist with research projects and help select the most appropriate antibodies.

Our slide scanning systems allows users to digitise brightfield and fluorescent microscopy slides; review, annotate, analyse and manage the images locally or remotely via a slide management system.



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UCD CLINICAL RESEARCH CENTRE

Advancing Health Through Discovery & Innovation

The UCD Clinical Research Centre (CRC) is Ireland's leading centre for clinical and translational research, dedicated to advancing high-quality research that transforms scientific discoveries into real-world health solutions. Embedded within the UCD School of Medicine and operating across major partner teaching hospitals, the CRC plays a pivotal role in improving patient care through evidence-based practices.

Key Aspects of UCD CRC

Facilities & Resources

- State-of-the-art clinical facilities designed for patient visits, procedures, and monitoring.
- Dedicated infrastructure for clinical trial data management, pharmacovigilance, and statistical analysis.
- Established biobank for extensive biological sample storage. Biomarker validation laboratory equipped with high-throughput analysers from Roche and Abbott, along with multiple multiplex ELISA platform



Research & Trials

- Conducts a broad range of clinical studies, including early-phase trials, observational research, and interventional studies.
- Expertise in regulatory compliance and research ethics to ensure integrity and safety.
- Dedicated support for translational research, including biobanking and biomarker analysis.
- Areas of focus include oncology, respiratory diseases, infections, cardiovascular health, neuroscience, critical care, and rare diseases.

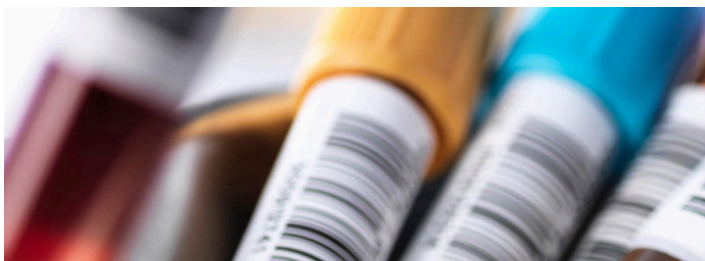
Clinical Trials Unit (CTU)

The UCD CRC houses Ireland's first dedicated Clinical Trials Unit, supporting investigators in designing, developing, and conducting high-impact academic-led clinical trials.

- Advises on trial design, regulatory compliance, and quality assurance, including systematic reviews to optimize methodologies.
- Provides full-service trial support, including data management, randomisation, pharmacovigilance, study oversight, and monitoring.
- Manages large-scale cohorts and datasets, offering expertise in advanced data analysis and AI.
- Conducts methodological research to enhance trial efficiency and impact.

Collaboration & Partnerships

- Works with industry partners, academic researchers, and healthcare providers to advance clinical trials, directly contributing to new treatments and improved patient outcomes.
- Engages with national and international research institutions, positioning Ireland as a key player in global clinical research.
- Collaborates with national clinical trial networks and the Trials Methodology Research Network to drive innovation.



UCD CLINICAL TRIALS UNIT

Dedicated to supporting the design, development and conduct of clinical trials.

UCD Clinical Research Centre.
WWW.UCD.IE/MEDICINE/CTU

Advise Industry & Academic Partners, Conduct Trials, Manage scale, Datasets & Analysis, Disease Registries, Methodological Research.

UCD College of Health and Agricultural Sciences | THE MATER HOSPITAL | ST VINCENT'S UNIVERSITY HOSPITAL | Ireland East Hospital Group | The National University of Ireland | N

Education & Training

- Offers a range of postgraduate programmes, including an MSc in Clinical & Translational Research and an online Graduate Certificate in Clinical Trials.
- Provides specialised training for healthcare professionals, fostering a research-driven culture and enhancing medical expertise.
- Hosts Ireland's first doctoral-level clinical trials programme, the UCD PhD in Clinical Trials.



Impact & Achievements

Between 2021 and 2024, the UCD CRC supported 170 new research projects, comprising:

- **80 clinical trials**
- **59 observational studies**
- **31 translational research studies** Of these, **124 studies were investigator-led** while **46 were industry-led**, underscoring the CRC's role as a driving force in independent and collaborative clinical research.



Conclusion

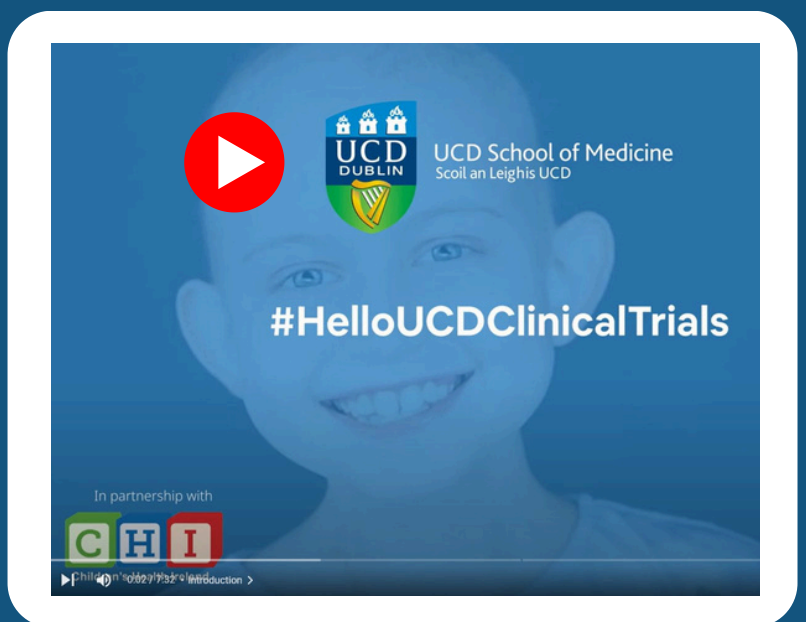
The UCD CRC is instrumental in translating scientific discoveries into clinical practice, significantly impacting both local and global healthcare. Through its world-class facilities, pioneering research, and commitment to education, the CRC continues to shape the future of medicine by improving patient outcomes and advancing healthcare innovation.


#HelloUCDClinicalTrials

Revolutionising Children's and Adolescents Cancer Treatment and Outcomes

Prof Owen Smith, Professor of Paediatric and Adolescent Haematology and Noreen Doyle Parent Advocate Clinical Trials for Childhood Cancer

[Watch](#)



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UCD HEALTH AFFAIRS

UCD Health Affairs (HA) is part of the UCD College of Health and Agricultural Sciences (CHAS) and collaborates with the five CHAS schools to enhance cooperation.

It serves as a formal channel for engagement between clinical partners, affiliated community healthcare organizations, and the HSE Dublin and South East region. By promoting an integrated approach to healthcare, UCD Health Affairs aims to develop an Academic Health Science System (AHSS) that fosters collaboration among hospitals, universities, and community healthcare organisations.

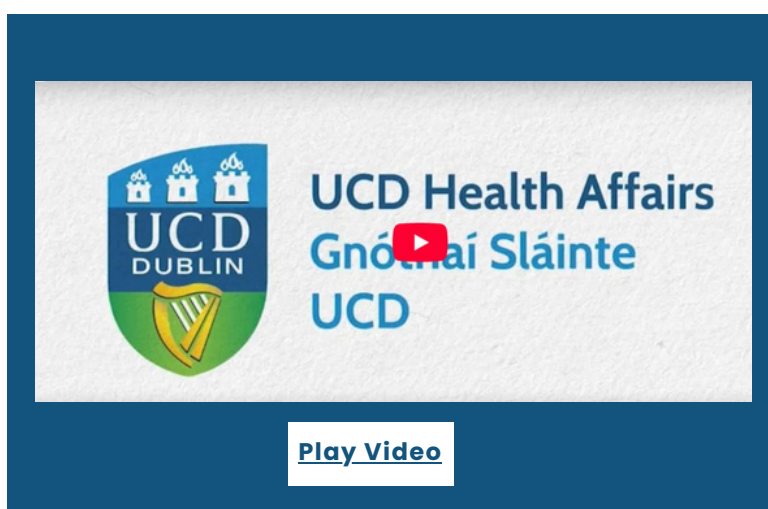
Research demonstrates that patients achieve better outcomes within an AHSS due to the seamless integration of teaching, training, research, and innovation with clinical services.




HSE Regional Executive Officers Visit to UCD

In October, UCD Health Affairs and UCD CHAS welcomed Regional Executive Officers Martina Queally (HSE Dublin and South East) and Sarah Long (HSE Dublin and North East), along with their teams, to campus. This introductory meeting provided an opportunity for the new RHA teams to engage with UCD's health sciences academic leadership and President Orla Feely.

Discussions focused on strengthening university-clinical partnerships and highlighting the importance of an academic health science system. The meeting aimed to enhance collaboration between UCD and healthcare partners across HSE health regions, fostering an integrated approach to healthcare and academic excellence. UCD looks forward to working closely with its new RHA colleagues on future projects.



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Academic Health Science System Grant

Established in 2021, the UCD Health Affairs Academic Health Science System (AHSS) Grant aims to foster collaboration between the UCD College of Health and Agricultural Sciences (CHAS), its clinical partners, affiliated community healthcare organisations, and the HSE Dublin and South East region. The grant supports health and science-related research, educational projects, and innovation initiatives that advance the AHSS concept while aligning with the strategic objectives of the College and its Schools. Applications are invited annually, with the call for submissions opening in early January.

UCD – Beacon Hospital Collaborative Research Seed Funding Grant

UCD Health Affairs and Beacon Hospital Academy have established two distinct seed grants of €20,000 each to support pioneering research collaborations. This funding aims to drive innovative research in high-impact areas such as cardiology, oncology, orthopedics, physiotherapy, and other emerging fields of interest. By leveraging UCD's academic excellence and Beacon Hospital's clinical expertise, this investment seeks to address urgent healthcare challenges and improve patient outcomes through cutting-edge research and development. The call for applications opens during the summer months.

Chief Academic Officer Group

UCD Health Affairs works closely with the Chief Academic Officers (CAOs) of the HSE Health Regions. These officers, linked to six medical school universities, serve as a bridge between universities, health regions, clinical partners, and affiliated community healthcare organisations.



Professor Susa Benseler, CAO – Childrens Health Ireland, Professor Anthony O'Regan, former CAO – Saolta Group, Professor Martina Hennessy, CAO – HSE Dublin + Midlands, Professor Timothy Lynch, CAO – HSE Dublin + South East, Professor Helen Whelton, Chair CAO Group, CAO – HSE South West, Professor John Laffey, CAO – HSE West + North West



PROFESSOR HELEN WHELTON - CAO HSE SOUTH EAST, DR COLM HENRY - CCO HSE, DR VIDA HAMILTON - CCO HSE DUBLIN + SOUTH EAST

Together with the CAOs, UCD Health Affairs hosted the Academic Health Science Systems in a Digital Age Conference on November 14th at O'Reilly Hall, University College Dublin (UCD). The event brought together national and international experts to explore the transformative role of digital technologies in healthcare research, education, and patient care. Discussions focused on the implementation and benefits of Electronic Health Records (EHR), the integration of Artificial Intelligence (AI) in clinical and academic settings, and the challenges of data availability in healthcare.



UCD INSTITUTE OF FOOD AND HEALTH

The **UCD Institute of Food and Health** drives impactful Agri-Food and Health research by fostering collaboration across the university and with external partners. The Institute has access to key research infrastructure from across the seven schools that it draws its academic membership from: the School of Agriculture and Food Science; the School of Biosystems and Food Engineering; the School of Public Health, Physiotherapy, and Population Science; the School of Veterinary Medicine; the School of Mechanical and Materials Engineering; and the School of Biology and Environmental Science.

Through these schools, the Institute has access to an extensive range of state-of-the-art research laboratories and equipment, making it a unique first point of call for access to specialised equipment and technical skills from a wide range of disciplines to support end-to-end agri-food and health research.



Institute of Food and Health Food Physics



Human Intervention & Sensory Analysis Facilities:

The UCD Institute of Food and Health laboratories are equipped with a full dietary intervention suite with food preparation and service facilities, an interview room, as well as two bespoke subject handling rooms with full anthropometric, phlebotomy, and subject-monitoring facilities. A dedicated 600-MHz NMR spectrometer, HPLC, and GC-MS facilities with all necessary data analysis pipelines for metabolomics as well as laboratories, sample preparation, and storage facilities, are also available. Biological facilities include robotic sample handling units for biological samples (Daytona); a cell tissue culture room; and a microbiological lab with incubators, autoclaves, and laminar flow cabinets.

In addition, the facility has two sensory evaluation suites, which comprise a food preparation area with hatch service to

seven individual evaluation booths with controlled lighting. The suites are fully computerised running Fizz and/or Red Jade sensory software to allow sophisticated sensory analyses of samples such as Temporal Dominance of Sensation. The Institute also has access to anthropometry and body composition (DEXA, BodPod, Impedance) and physical fitness (VO2 Max, muscle strength testing) equipment at the UCD Institute of Sport and Health.

Food Science and Food Processing facilities:

Our laboratories have a dedicated food compositional analysis lab; spectrophotometric and fluorimetric equipment in standard and plate-reader formats; Micro analysis lab with fully automated quaternary HPLC, GC-FID, GC-headspace analysis for flavour volatiles, LC-MS, GC-MS, Atomic absorption capacities; Physical characterisation laboratories

containing Instron texture analysers, Bohlin and Anton Parr rheometers with a broad range of measuring geometries, including an optical rheometer, Malvern particle size analyser, water activity meter, low-field NMR, differential scanning calorimeter, a multi-sensor “electronic tongue” for taste characterisation and Minolta colourimeters.

We also have access to a suite of novel processing technologies for improving stability and shelf life with expertise in protecting and delivering bioactives to enhance their functions and improve bioavailability and processing, including encapsulation.



Institute of Food and Health Sensory Analysis Suite

Microbiological Food Safety Laboratory:

Food safety research facilities within the Institute contain state-of-the-art bacteriology and DNA sequencing capabilities; Category II and III facilities that meet health and safety standards; and an advanced infrastructure for data analysis, storage, and computing power completely integrated with the UCD high-performance computing infrastructure.



Institute of Food and Health Electronic Tongue

Laboratory equipment includes an Illumina MiSeq platform, several Oxford Nanopore MinION platforms: QuantStudio Real-Time PCR system, NanoDrop spectrophotometer, Agilent TapeStation system, Qubit Fluorometer, Omnilog phenotypic microarray platform, liquid handling platforms (QIAcube and epMotion), plus related software for analysis.



The Food Safety laboratory is also integrated into the GenomeTrakr and GenomeGalaxy networks comprising public health and university laboratories, enabling the collection and sharing of genomic and geographic data relevant to zoonotic foodborne pathogens.

UCD INSTITUTE FOR SPORT AND HEALTH

The Institute for Sport and Health (ISH) is a unit of the School of Public Health, Physiotherapy and Sports Science, located in Newstead Block C, close to the running track. The Institute was established in 2007 and was led by Prof Colin Boreham who served as Director from commencement until his retirement in late 2024.

The mission of the Institute is to support the Research, Teaching and Service activities of SPHPSS in the fields of Sport, Health and Exercise Science.

One of the key activities in the service pillar of ISH is the management of the Elite Sports Stream of the UCD Ad Astra Academy. Sixty Ad Astra athletes are supported by staff affiliated with the Institute. This includes bespoke training programmes delivered by Strength and Conditioning coaches in the High-Performance Gym, access to the Human Physiology Laboratory, nutritional support and sports psychology support, provided by expert practitioners from the School and physiotherapy services from DBC Physiotherapy. The High-Performance Gym also supports select UCD sports teams and individual athletes, building strong relationships between UCD, the National Governing Bodies of Sport, Sports Institute Ireland and elite sports clubs.



The ISH laboratories serve dual purposes for teaching and research, with intensive use during the teaching semesters for the BSc Sport Health and Exercise Science, BSc Physiotherapy, Prof Masters Physiotherapy and MSc Clinical Nutrition and Dietetics programmes.

The key research activities in the Institute relate to the overarching themes of Sport, Health and Exercise as Medicine; including sports science and athletic performance, nutrition and metabolism, sports injury prevention and rehabilitation, clinical rehabilitation, health promotion, prevention and management of non-communicable disease.



The dual research/teaching facilities on the ISH footprint include:

Two Human Performance Laboratories, equipped for cardiopulmonary exercise testing (CPET), continuous blood pressure monitoring, heart rate via 12 lead ECG, pulmonary function testing, saliva, blood lactate and glucose testing.

Anthropometric testing capability, height, weight, BMI, body composition (Bod Pod, Bioimpedance, Skin Fold and DXA under specific license).



Neuromuscular performance assessment with isokinetic dynamometry (muscle strength/endurance), speed, agility, power and functional performance measurement in the physiology laboratories and also through portable field testing protocols.

A Metabolism Laboratory capable of measuring Basal Metabolic Rate through indirect calorimetry, active and total energy expenditure, accelerometry and dietary analysis. The laboratory kitchen and feeding facilities support research on taste perception and post-prandial metabolic responses.

The facilities in ISH are complemented by the SPHPSS Human Motion Analysis Laboratory located in the Health Sciences Centre, which houses a 3D motion capture system (CODAMOTION), force plates, high density and wireless EMG systems, EEG, ultrasound, Exoskeleton and Andago gait training system.

We welcome collaboration with colleagues with congruent research in the thematic area of sport and health.

UCD LYONS FARM

Lyons Farm Leading the Way in Sustainable Livestock and Crop Production Research

Dairy Education and Research Facilities

The dairy herd at Lyons consists of 180 high genetic merit spring-calving cows. With the support of a number of industry partners, a new dairy unit was opened in 2016 including a state-of-the-art Dairymaster 40-unit rotary milking parlour. The parlour is equipped with four individual feed lines that enable precision feeding to facilitate feed efficiency, environmental sustainability and enteric methane mitigation research.



A fully automated identification system using RFID tags integrates with the feeding and milking systems, supporting detailed animal health and behaviour monitoring, performance recording and targeted milk sample collection for detailed compositional and processing analytics.



Calf Education and Research Facilities

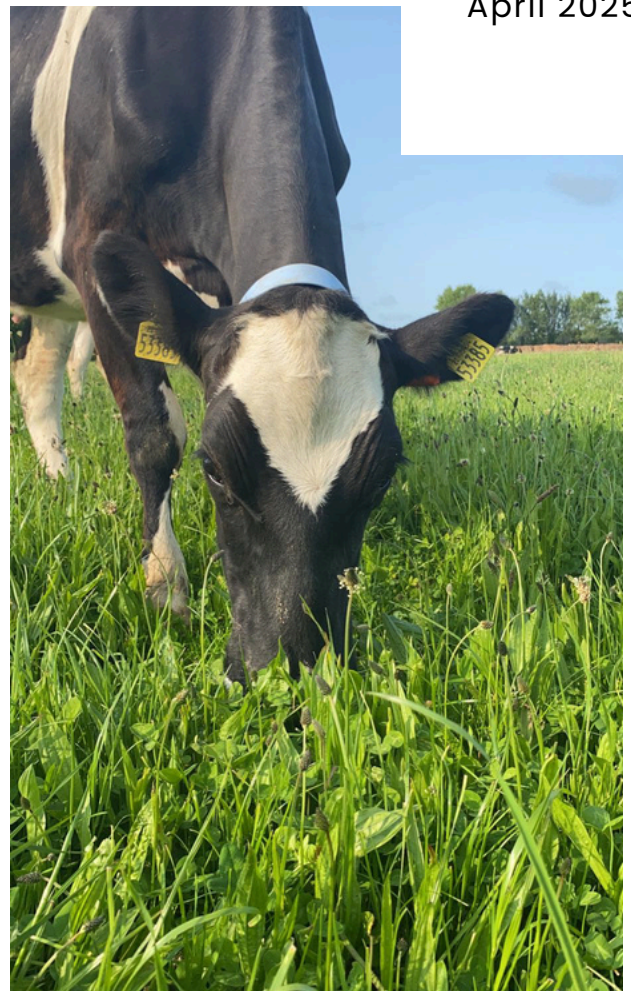
A new UCD Lyons Dairy Calf Education and Research Facility was opened on the farm in spring 2025 and will greatly expand the national research capacity of dairy heifer research - with a focus on early life nutrition, better integration of dairy and beef, and environmental impact, while also providing agriculture and veterinary students with hands-on experience in the best practice of calf rearing. The facility can accommodate 180 calves from the Lyons dairy herd. Automatic feeders for milk and solid feed (forage and concentrate) can record feed intake and allow for the feeding of different milk replacers, forage and concentrate types.

Methane Measurement Technology:

UCD Lyons Farm is home to seven GreenFeed units for the measurement of enteric methane emissions. These units measure fluxes of Methane, Carbon Dioxide, Oxygen, and Hydrogen from individual cattle and sheep, in either a pasture or indoor setting and are a critical tool in the national effort to reduce agricultural GHG emissions. Their presence facilitates research investigating the impact of pastures, feed ingredients and feed additives on enteric methane emissions.

Long-term Grazing Platform

The Long-term Grazing Platform (LGP) at Lyons Farm is a globally unique resource consisting of 12 hydrologically isolated 2 ha paddocks, each monitored for water flow and quality. Established in 2019 the LGP is a member of the Global Farm Platform - a global network of research farms investigating enhancements to the sustainability of ruminant systems. The LGP consists of three farmlets: 1) perennial ryegrass; 2) perennial ryegrass and white clover; 3) multispecies sward grazed by dairy-beef cattle. The LGP also features continuous tillage plots, forestry areas for soil carbon studies, and a meteorological station with soil moisture monitoring. A co-located Eddy covariance flux tower measures greenhouse gases as part of the National Agricultural Soil Carbon Observatory (NASCO).



Crops Research

Production of sustainable crop materials for both human and animal diets is the key focus of the crops research at Lyons. There is a dedicated multi-crop research programme where a range of commercial crops and pre-commercial crops are grown under controlled fertiliser and fungicide programmes as well as with different establishment systems. A range of in-field crop agronomy and biomass

measurements are taken through the growing season using hand-held as well as remote (drone) tools to build a digital growth model. Plot harvesting equipment allows yield performance measurements to be linked to in-season performance. The crop lab supports post-harvest grain quality assessment for composition analysis including protein, moisture, ash, Hagberg and other key quality parameters.





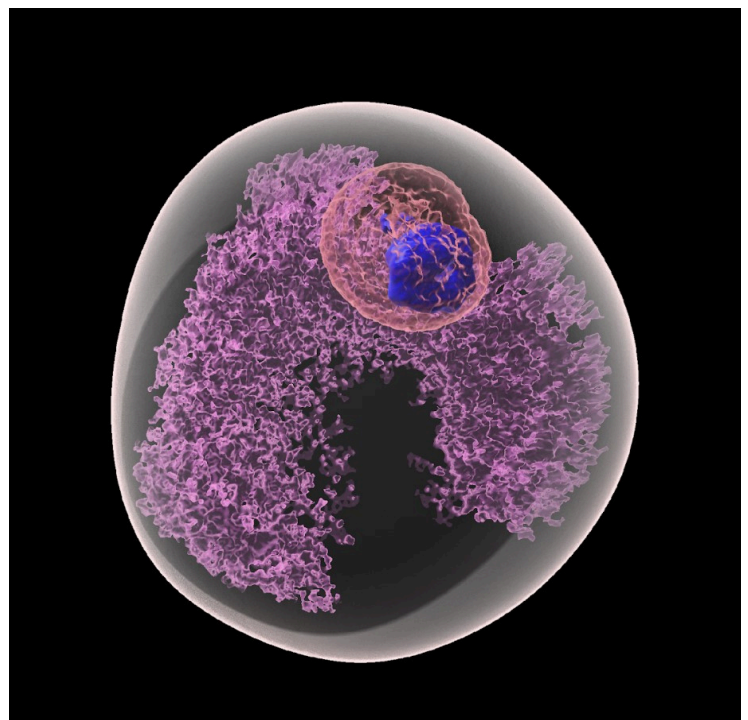
In Vitro Rumen Simulation and Digestibility Technology

In vitro technologies facilitate research investigating the effects of different types of diets or additives on the digestive process in ruminants without the need to conduct live animal experiments.

There are both batch culture (Ankom RF Gas Production System) and continuous culture (rumen simulation technique (RUSITEC)) facilities at Lyons. The processes are controlled with respect to temperature, pH, gas production (e.g methane), and other factors, which are crucial for understanding rumen digestion.

Reproductive Biology Research

The focus of research in the Reproductive Physiology Laboratory is to better understand what drives normal development during pregnancy and the causes of embryo loss (sperm, oocyte, embryo, reproductive tract) as well as the commercial application of assisted reproductive technologies (e.g., embryo transfer, sex-sorted semen) at farm level. To do this, both in vivo and in vitro models are used. In particular, the laboratory has a long history of using in vitro embryo production (IVF) as a tool to generate embryos to study factors affecting embryo quality and maternal embryo communication during pregnancy establishment.



Bovine oocyte showing labelling of the proteasome and the nucleus. Image by Dr Styliani Galatidou, created using Imaris Software at the UCD Conway Core Imaging Facility.

OUR COLLEGE

The UCD College of Health and Agricultural Sciences was established in 2015 and brings all of UCD's health professionals under one banner providing an exciting opportunity to exploit synergies which exist across the **One Health spectrum**.

The One Health initiative links the health of all living things, together with the existing synergies between human and animal health, public health and food science. The College supports the indigenous agri-food sector, animal health and medical professions through education and cutting-edge research. We offer a spectrum of health professional courses across the constituent schools of the College, including an extensive portfolio of graduate education for healthcare professionals designed to fit their busy clinical schedules.

The College comprises **five schools**, the School of Agriculture and Food Science, the School of Nursing, Midwifery and Health Systems, the School of Medicine, the School of Public Health, Physiotherapy and Sport Science and the School of Veterinary Medicine.

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