



UCD School of Medicine
Scoil an Leighis UCD

UCD School of Medicine Research Report 2022/23





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2022/23

IN NUMBERS

€23,493,427

Value of New
Research Grants

155

Total Number of
Grants Registered

1137

Total Number of
Journal Articles

2.17

Field Weighted
Citation Impact

520

Total Number of
Research Projects

81.75%

Research Active Staff

231

Total Research Students registered

78

New Students registered

51

Number of Graduates

12

Research Centres



INTRODUCTION

FROM ASSOCIATE DEAN FOR RESEARCH, INNOVATION AND IMPACT UCD SCHOOL OF MEDICINE

It is a great pleasure to introduce the annual report on Research, Innovation and Impact at UCD School of Medicine for the 2022-2023 academic year. Our faculty, researchers and students continue to flourish. As we report there were several noteworthy developments including research outputs of immediate impact on patient care, knowledge of disease mechanisms and translation and technology transfer. The profile of the School's research activities have been enhanced by quality publications, significant grant income and the recruitment of new faculty and their teams across the career continuum.

We continue to enhance our research environment through investment in technologies and support staff. Central to our activities are the high quality education and training of our students and research fellows in a supportive and inclusive environment. Our ambition to enhance the impact of our research has been supported by a specific School of Medicine Seed Fund to enhance translational research through collaboration between investigators at clinical sites and those engaged in lab-based research.

The publication of this report collates many of these activities and affords an opportunity to reflect on achievements and to further our ambitions for the future.

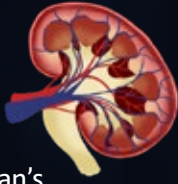
We are indebted to Elaine Byrne, Ed Moore and Niamh McCarthy in the Medicine Research Office for their support.

A handwritten signature in black ink that reads "Catherine Godson". The signature is fluid and cursive, with a period at the end.

Professor Catherine Godson

Associate Dean for Research, Innovation and Impact
UCD School of Medicine

2 RESEARCH HIGHLIGHTS 2023



Professor Catherine Godson and Dr Eoin Brennan's research group from UCD School of Medicine, UCD Diabetes Complications Research Centre and UCD Conway Institute were awarded €908,860 for a project entitled A functional genomics pipeline for genetic discovery in diabetic kidney disease. The project is a collaboration with Queen's University Belfast, Harvard Medical School and Mass General Hospital co-funded by the Health Research Board (HRB) and Health and Social Care (HSC) Research and Development, Northern Ireland.

Dr Christine Kelly was awarded €1.2M in funding from the Health Research Board's Clinical Scientist Fellowship Scheme. Dr Kelly's project will examine how to improve detection of new infectious threats in people who have recently travelled.



The following four projects from UCD's School of Medicine were awarded grants through Science Foundation Ireland's Frontiers for the Future Programme:



1. Dr Carol Aherne: 'Targeting mucin-mediated mechanisms to protect the intestinal barrier.'
2. Professor Desmond Cox and Dr Carmen Regan (Children's Health Ireland): 'The impact of E-cigarettes on Childhood Health Outcomes (ECHO) study.'
3. Dr Jan Miletin and Dr Jana Semberova: 'Individualized mask for infants requiring nasal Continuous Positive Airway Pressure – tailored Mask (tMASK) feasibility study.'
4. Dr Melinda Halasz and Dr Cormac Owens: 'Understanding and exploiting dysregulated mitochondrial metabolism and epigenetics for the therapy of MYCN-driven neuroblastoma'.

Assoc Professor Neil Docherty was awarded €99,073 with Dr Martina Wallace from the School of Agriculture and Food Science from the EFSD/Boehringer Ingelheim European Research Programme on "Multi-System Challenges in Diabetes" 2023 for a study entitled Impaired branched chain amino acid metabolism: an effector of insulin resistance-associated kidney disease?



The following School of Medicine researchers were awarded funding via the UCD STEM Challenge Fund:

- Dr Eoin Brennan: Induced pluripotent stem cell (iPSC) derived human blood vessel organoids as a powerful model to investigate vascular development and disease
- Professor James Jones: Perfecting an artificial skin.
- Dr Stephen Lalor: Developing a workflow to map metatranscriptomic data to metagenomic taxonomical characterisation of the lower airway microbiome to reveal functionally active bacteria in the development of severe asthma
- Dr Mark Pickering: Accessible solutions for measuring marine microplastics.
- Dr Stephen Thorpe: Development of a pancreatic cancer-on-chip model of immune cell filtration.

Two researchers from the School of Medicine were awarded funding via the IRC's Enterprise Partnership Scheme & Employment Based Postgraduate Programme. Dr Niamh McCullagh was awarded for her project 'Searching for Missing Homicide Victims: Developing a Data Driven Model'. Dr Aidan O'Dowling was awarded for his project 'Multiparametric analysis of the pancreatic cancer microenvironment in response to neoadjuvant therapy.'



The AI Innovation of the Year prize was awarded at the Public Sector Digital Transformation Awards to a team which includes two School of Medicine researchers, Professor Mary Higgins and Professor Fionnuala Ni Ainle. A diagnostic tool to identify preeclampsia is being piloted in the National Maternity Hospital, the Rotunda Maternity Hospital and the Coombe Hospital.

Dr Christopher Shannon, a postdoctoral researcher in the UCD Diabetes



Complications Research Centre, was awarded the Research and Knowledge Exchange Award by the The Physiological Society for his project entitled 'Role of the mitochondrial pyruvate carrier in diet-induced adipose remodelling'.

Professor Carel Le Roux published research on new drug therapy innovations to treat obesity in *The Lancet*. Results from a phase 2 clinical trial of survodutide showed up to 18.7% weight loss in overweight or obese individuals through a 46-week timeframe. 387 participants were involved in the study. Professor Le Roux also led the study on tirzepatide in a phase 3 clinical trial involving 938 adult participants with obesity or overweight and type 2 diabetes where 15% weight loss was achieved in a 72-week timeframe.

Professor Alistair Nichol, Director of the Irish Critical Care-Clinical Trials Network and Professor of Critical Care Medicine at UCD's School of Medicine, was involved in a vital article published in *Nature*. This third *Nature* paper from the GenOMICC study outlined genetic factors which put some people at higher risk for severe illness and disease due to Covid-19 infection. 16 genetic variants which impacted on blood clotting, the immune response and the inflammation response were found in people with severe Covid-19. The study was led by the University of Edinburgh and Genomics England with funding for the Irish component of the study provided by the Health Research Board.

Professor Nichol is also the co-lead author of a study on cardiac arrest patients admitted to intensive care units which was published in the *New England Journal of Medicine*. The study showed that maintaining a slightly elevated CO₂ level for the first 24 hours after resuscitation did not improve outcomes and conversely did not lead to worse outcomes either. The multi-site study included 1700 patients in 17 countries.

Sarah Kierans, a PhD candidate supervised by Professor Cormac Taylor, published a study in the *Proceedings of the National Academy of Sciences (USA)*, which outlined that an additional layer of organisation in the promotion of glucose metabolism in intestinal epithelial tumour cells has been uncovered. This work provides evidence that glucose metabolism in oxygen starved or hypoxic cells is greatly enhanced by the formation of complexes of the enzymes involved in glucose metabolism into highly efficient glucose metabolising machines or metabolons. The group proposes that understanding the mechanisms whereby glucose metabolism is controlled in cells, will identify new therapeutic targets in a range of diseases where glucose metabolism is altered, including cancer, diabetes and chronic inflammatory disease. Professor Taylor was awarded an SFI frontiers for the future Programme award of 950K to follow on from this work.

PhD candidate Dr Brendan Kelly published the results of a study using AI and Radiology to make personalised predictions from radiographs, in *European Radiology*. The approach used has the potential to be applied to cancer screening response and screening programmes.

Dr John McCabe, a consultant geriatrician at the Mater Misericordiae Hospital and Assistant Professor in UCD's School of Medicine, published a review in *Cells*. The review outlines new PET scanning techniques which can detect inflammation in the carotid artery and identify patients at high risk of stroke.

Dr Marissa O'Callaghan, a PhD candidate supervised by Associate Professor Cormac McCarthy and Professor Michael Keane, published a study in *Respirology*. The study quantified fat deposition as a percentage of total lung volume on a chest CT which could function as a biomarker for disease severity in Idiopathic Pulmonary Fibrosis.

A team of researchers from UCD's Systems Biology Ireland published an article entitled 'A Combination of Conformation-Specific RAF Inhibitors Overcome Drug Resistance Brought about by RAF Overexpression' in *Biomolecules*. The team used a combined experimental and computational approach to find ways that overcome the drug resistance.

Megren Fagihi, a PhD candidate in the UCD School of Medicine, published an article in the journal ACS Omega. Megren is investigating insulin agglomeration, with or without amyloid fibrillation, when exposed to a highly acidic environment of pH 3 similar to the human gastric interior. Insulin is known for its vulnerability to molecular changes when exposed to such acidic ambiance, a major challenge in developing oral formulations. The data reported in the paper highlighted the formation of human recombinant insulin agglomerates, with traces of fibrillation, shown by Transmission Electron Microscopy (TEM) performed at the Bioimaging Core of the UCD Conway Institute.

Professor Geraldine McCarthy was recognised by the American College of Rheumatology with the designation of Master award.

The School of Medicine's inaugural Research Retreat took place in June 2023 in the UCD Student Village Auditorium. The event featured over 30 presenters. Key note speakers included Professor Walter Kolch, Professor Patrick Murray, Professor Tim Lynch, Dr Stephen Thorpe, Dr Mary Higgins and Professor Patricia Maguire. The retreat provided an opportunity for university and hospital-based researchers to meet and foster cross collaboration.

Professor Jonathan Dodd, Full Clinical Professor at UCD School of Medicine, is the co-senior author of a study published in Diabetes Care on the effectiveness and safety of cardiac CT in symptomatic patients with diabetes, initially referred for invasive coronary angiography. The study found cardiac CT to be as effective as and safer than invasive coronary angiography in >3500 participants at 26 sites in 16 countries.

Professor Cormac Taylor Organised the HypoxEU conference in the O'Reilly Hall. This international conference attracted over 200 national and international delegates and the Keynote was delivered by 2019 Nobel laureate Professor Sir Peter Ratcliffe.

In order to encourage collaboration between scientists and clinicians €113,000 of funding was allocated to 11 projects via the School of Medicine's Translational Medicine Seed Fund.

1. Dr Carol Aherne & Dr Seamus Hussey.
Establishing patient-derived colonoids as a model of mucosal healing and a predictor of treatment response in paediatric ulcerative colitis.
2. Dr Darrell Andrews, Professor Yvonne O'Meara, Dr Denise Sadlier & Dr Lynn Redahan.
Investigating the mechanisms of failed inflammation resolution in chronic kidney disease (CKD).
3. Dr Eoin Brennan & Mr Martin O'Donohoe
Transcriptome Analysis of Non-Coding Sequences in Patient-derived Calcified Atherosclerotic Plaque Smooth Muscle Cells.
4. Dr Joanne Byrne, Ms Gurvin Saini, Professor Paddy Mallon, Professor Eoin Feeney & Associate Professor Aoife Cotter
Development of a multiplex serological assay for mpox and exploration of the demographic, clinical and immunological profile following mpox infection or vaccination.
5. Dr Stephen Thorpe, Dr Austin Duffy, Professor Walter Kolch, Professor Boris Kholodenko & Associate Professor Oleksii Rukhlenko
Refining treatment strategies for patients with metastatic pancreatic cancer.
6. Dr Alfonso Rodriguez-Herrera & Associate Professor Neil Docherty
A translational proof-of-concept study of the mechanistic basis and potential therapeutic value of enhancing urinary excretion of gluten immunogenic peptides (GIP) in Celiac Disease.
7. Dr Christopher Shannon & Professor Donal O'Shea
Monitoring hepatic mitochondrial adaptation to a very low-calorie diet in individuals with obesity.
8. Dr David Gomez & Dr Shirley Potter
Exploration of new approaches to characterise the molecular basis of human malignant melanoma
9. Dr Eoin Cummins, Professor Ronan Cahill & Dr Stephen Thorpe
The predictive value of spatial multiomic analysis of the tumor microenvironment in colorectal cancer
10. Professor Glen Doherty & Professor Cormac Taylor
To investigate glycolytic complexes in patients living with inflammatory bowel diseases.
11. Associate Professor John Baugh, Associate Professor Katherine O'Reilly, Dr Sarah Cullivan, Associate Professor Brian McCullagh, Professor Sean Gaine & Professor Seamus Fanning
Role of gut microbiome and associated metabolites in development of Pulmonary Hypertension.



RESEARCH SUPPORT UPDATES



School of Medicine Research Office

The research administration team provides support to research staff and students to ensure the school's mission of advancing healthcare through research is achieved. The team is focused on supporting school staff in submitting funding applications and supporting graduate research programmes, graduate research degree committees (Biomedical Research Degree Committee and the Clinical Research Degrees Committee) and students. In addition, the research team maintains close links to Graduate Studies and UCD Research to ensure school staff have access to the wide range of support and resources available centrally.

Moreover, this team supports the development of the school research strategy, compiles reports to track student progression, research funding and citations and organises multiple research related events. The team coordinates the production of the annual research report and organises the Student Summer Research Awards (SSRA) programme.



School of Medicine Marketing and Communications Team

The UCD School of Medicine Marketing and Communication Team (M&C Team) provides communication and multi-channel support to help raise awareness of the School's research activities and achievements, building brand and reputation equity.

Identified focus research areas include:

- Metabolic Medicine (obesity, diabetic complications)
- Inflammation
- Precision Oncology
- Cellular Physiology
- Clinical Research

The M&C Team have deployed a comprehensive Brand and Reputation Survey to key School staff including research representation across the Institutes and Centres, PhD students, postdoctoral fellows and all academic staff (including those based in affiliated hospitals).

Insights from this survey will help inform and shape the next iteration of the SoM Marketing & Communication Strategy. Research-specific questions are as follows:

Research

- In your opinion, what are UCD School of Medicine's strongest research areas?
- What are our most notable research achievements?
- Where do you see the School's research heading in the future?
- How do you think we can strengthen UCD's research agenda?
- What do you consider to be the most important measures of research excellence?
- What are our unique selling points when it comes to research study and PhD's at the School of Medicine?

The objectives of the Strategy are as follows:

- Broaden public understanding of the School, highlighting its strong tradition of research-based enquiry and leadership in this space

- Effectively shape the School's research narrative to appeal to external researchers, industry partners, policy makers and the School's internal stakeholders, distinguishing it from its competitors
- Promote further engagement with state and community leaders, alumni and non-alumni donors, prospective staff talent and prospective PhD students by building the research reputation
- Drive awareness of the School's wealth of research activity and output on a national and global scale, focusing on academic and clinical activities and key partnerships
- Use the School's research reputation and credibility to create a halo effect for all prospective students and staff

With further consultation, responses from the Brand and Reputation Survey will help guide unique selling points and key messages and assist in identifying research priorities for marketing and communication activities. These activities will include:

- News stories on the School's website
- Social media content (by appropriate channel)
- Coordination of imagery requirements – video/ photography
- Media engagement and press release copy (internal and external)
- Facilitation of events (e.g. launch events)
- Research newsletters
- Website content
- Brand support
- Alumni newsletters

In 2023, a significant project was undertaken for the SoM Research website. It has been audited, restructured and updated to ensure accurate and engaging content is presented in an intuitive and easy to navigate way.

For further information, please contact the UCD School of Medicine Marketing & Communications Managers, jean.ryan@ucd.ie or anna.truman@ucd.ie



Graduate Research Association of Medicine (GRAM)

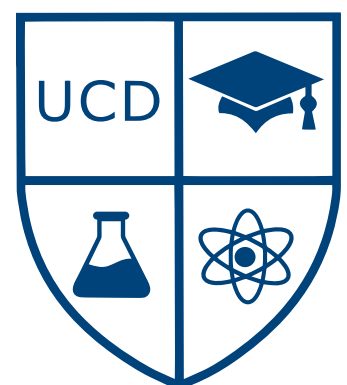
The Graduate Research Association of Medicine (GRAM) works to foster a sense of community amongst graduate researchers in the School of Medicine. Researchers in the School of Medicine include PhD, MD, MSc, MCh students and post-doctoral researchers. They are based at research institutes in UCD Belfield and at the School's major teaching hospitals such as St. Vincent's University Hospital and the Mater Misericordiae University Hospital.

GRAM is run by graduate researchers for graduate researchers, and is made possible through funding by the School of Medicine. GRAM aims to recognise and celebrate milestones of its members, including publication of papers, thesis submission and graduation. It aims to relay information about academic support and career opportunities. Through these actions, GRAM wishes to promote wellbeing and community amongst researchers in the School of Medicine.

In September 2023, GRAM organized a recruitment event to welcome back returning students and extend a warm welcome to new ones. This event was a great success, with 48 new members joining our growing community of graduate researchers. GRAM members gathered in the Health Sciences foyer, where there was pizza and other goodies.

In the later part of September, GRAM hosted its first major event of the year, a staff and student table quiz. This event was held in the UCD Clubhouse Bar and had a fantastic turnout from both staff and students, showcasing the strong sense of community within the School of Medicine. Prizes including One4All vouchers were up for grabs on the night, with the team 'All Guts, No Glory' taking home first place.

GRAM looks forward to the year ahead and organising more events for postgraduate research students in the School of Medicine.





School of Medicine Grant Advisory Committee

The UCD School of Medicine Grant Advisory Committee provides information and feedback to staff who are preparing research grant proposals. This committee was established to specifically provide support at the stage of proposal development. The objective of the committee is to offer independent, constructive advice on scientific merit and proposal development through recruitment of expert reviewers. This process is designed to complement existing support provided by UCD Research.

Applicants may engage with the committee at any stage of proposal development, and it is not necessary to submit a completed proposal to the committee for review. Feedback is provided in a transparent manner and open dialogue between applicants and reviewers is encouraged.

While the committee recommends submission dates based around known grant deadlines, this is a rolling process and proposals may be submitted to the committee for consideration at any time. Early engagement with this process is encouraged to facilitate a timely and constructive review process. We are supported in this endeavour by the UCD Medicine research office.

To date we have facilitated reviews of grants submitted to Science Foundation Ireland, the Health Research Board and the Irish Research Council. However, we will consider grants aimed at any funding call.

Further information on how staff can participate in this process may be found at www.ucd.ie/medicine/research/researchers/grantadvisorycommittee

Committee Members

- **Dr Eoin Brennan**
Lecturer/Assistant Professor (Ad Astra Fellow)
School of Medicine, University College Dublin
- **Dr Carol Ahearne**
Lecturer/Assistant Professor
School of Medicine, University College Dublin

School of Medicine Research Ethics Committee (UTMREC-SM)

The UCD School of Medicine Undergraduate and Taught Masters Research Ethics Committee (UTMREC-SM) is constituted as a committee of the UCD School of Medicine and as a sub-committee of the UCD Human Research Ethics Committee - Sciences (UCD-HREC-LS).

The Committee will review applications for ethical approval, or exemption from full ethical review, for research conducted by registered undergraduate and graduate taught students on behalf of UCD-HREC-LS.

In the academic year of 2023, there have been 49 low risk applications reviewed and no full review applications reviewed.

Committee Members

- **Assoc Professor John Baugh**
Chair, UCD School of Medicine Undergraduate and Taught Masters Research Ethics Committee (UTMREC-SM)
- **Dr Christine Costello**
BSc Physiology
- **Dr Dearbhaile Dooley**
Anatomy subject
- **Dr Rachel Toomey**
Radiography
- **Dr Michaela Davis**
Radiography
- **Dr Noreen Sheehy**
SSRA programme
- **Professor William Watson**
Programme Director - BHLS
- **Dr Tomás Barry**
Taught Graduate Programmes – Primary Care & General Practice



Research Integrity & Culture

Research integrity and culture have always been important facets of research within the School of Medicine. Good research culture is key to ensuring the highest standards of research integrity. Research culture relates to how we do our research, our behaviours and attitudes to each other in our work, how we value the contributions of others to our research, and how our research is communicated. As an institution, UCD has recently identified the advancement of research culture as a central component of its strategy, *Shaping the Future*. This aims to ensure that all those involved in research within UCD encounter a culture of integrity, dignity, respect, and inclusion.

UCD's Research Culture Initiative aims to promote a supportive and positive research culture across the university. One aspect of the implementation of this strategy is the creation of Research Integrity Champions. Within the School of Medicine, these are Dr Stephen Thorpe and Dr Deborah Wallace. Research Integrity Champions provide a point of contact for any research integrity queries within the school and are tasked with promoting a positive research culture. Research integrity activities focus on the engagement of future researchers, providing an awareness from the outset of what they should expect in a positive research environment. Student groups targeted include students of the Biomedical Health and Life Sciences programme, medical students partaking in the Student Summer Research Award scheme, enrolling research degree students, and graduate research students more broadly via the UCD Graduate Research Association of Medicine. Furthermore, the School Research Integrity Champions sit on the College of Health and Agricultural Sciences (CHAS) Responsible Conduct of Research Committee (RCRC). The CHAS RCRC facilitates the assembly and discussion between Research Integrity Champions, within the CHAS, regarding their current and future activities. Activities of the Schools' Research Integrity Champions as part of RCRC this year have included the delivery of seminars and workshops on Empowerment in Research Integrity Debates, and Authorship. In addition, a School-wide initiative was carried out to promote inclusion of research integrity on module descriptors where relevant.

Overall, the research culture within the School of Medicine is in a good place, and as Research Integrity Champions, we hope to promote excellence, not only in what we do, but how we do it.

If you have any comments or queries relating to research integrity or culture, the School of Medicine Research Integrity Champions can be contacted at medicine.ri@ucd.ie.



Dr Stephen Thorpe
Ad Astra Fellow, Assistant Professor,
UCD School of Medicine
School of Medicine Research
Integrity Champion



Dr Deborah Wallace
Assistant Professor in Clinical
Research, UCD Clinical Research
Centre
School of Medicine Research
Integrity Champion

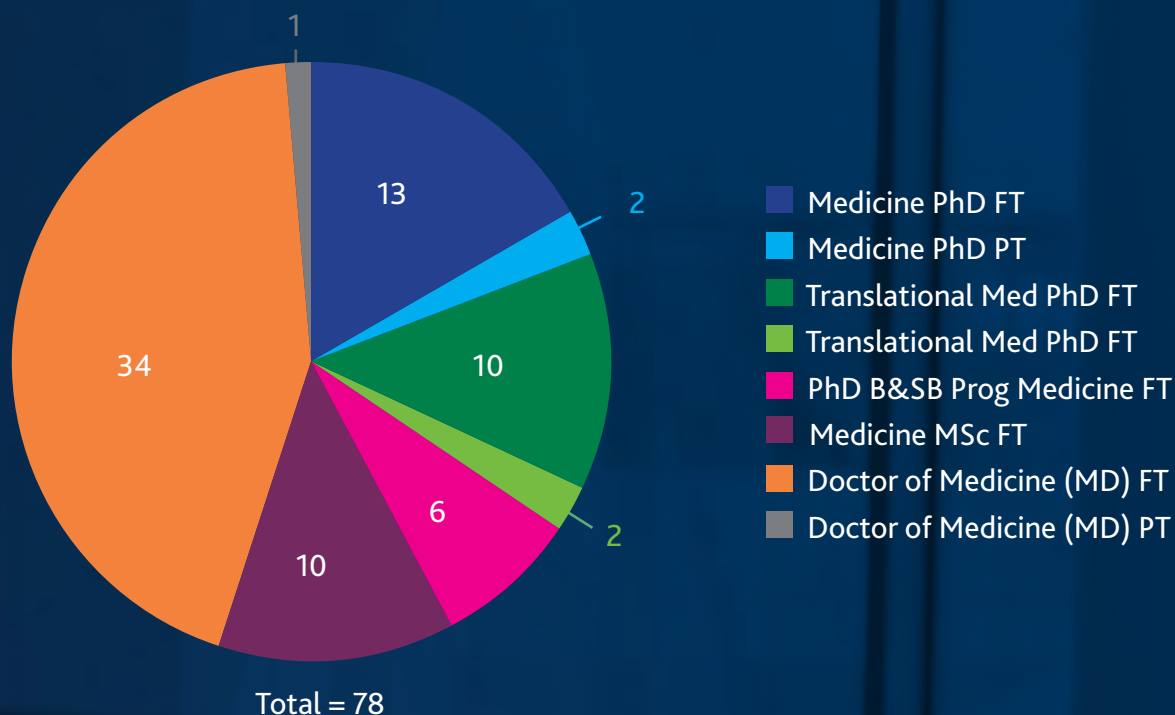


4 RESEARCH STUDENTS



New Graduate Research Student Registrations

2022/23



Active Graduate Research Students (PhD, MSc MD & MCh)

2022/23

Programme Code	Programme Description	Major Code	Major Description	Year								Total
				1	2	3	4	5	6	7	8	
DRLSC001	Doctor of Philosophy	X237	Medicine PhD Full-Time	13	12	13	12	2	1	0	0	53
DRLSC001	Doctor of Philosophy	X238	Medicine PhD Part-Time	2	0	7	2	2	0	2	1	16
DRLSC001	Doctor of Philosophy	X253	Translational Med PhD FT	10	7	12	9	2	0	0	0	40
DRLSC001	Doctor of Philosophy	X254	Translational Med PhD PT	2	0	1	2	0	0	2	0	7
DRLSC001	Doctor of Philosophy	X849	PhD B&SB Prog Medicine FT	6	3	7	2	4	0	0	0	22
DRLSC001	Doctor of Philosophy	X810	PhD Infection Biology(SMMS) FT	0	1	2	2	3	0	0	0	8
MRLSC013	Master of Science	X218	Medicine MSc FT	10	2	2	0	0	0	0	0	14
MRLSC013	Master of Science	X289	Medicine MSc PT	0	0	0	1	0	0	0	0	1
DRLSC004	Doctor of Medicine (MD)	X967	MD Doctor of Medicine FT	34	20	12	0	0	0	0	0	66
DRLSC004	Doctor of Medicine (MD)	X650	MD Doctor of Medicine PT	1	0	2	0	0	0	0	0	3
MRLSC015	Master of Surgery	X224	Medicine MCh FT	0	1	0	0	0	0	0	0	1
				78	46	58	30	13	1	4	1	231

Research Student Graduates 2023

The School of Medicine extends its warmest congratulations to students and their supervisors who have graduated over the last year.

Programme	Student	Thesis title	Supervisor(s)	Special Extern Examiner	Examiner's Institution
PhD	Ali Alanazi	The Development of Artificial Intelligence Vetting Models for MRI Patient Referrals	Professor Louise Rainford	Dr Luping Zhou	University of Sydney
	Kevin Cronin	Ultrasound Assessment of Hamstring Muscle Architecture in Professional Rugby Union Players	Professor Eamonn Delahunty	Dr Fiona Wilson	Trinity College, Dublin
	Cian D'Arcy	Analysis of melanoma co-culture systems effect on cell fate and signalling rewiring	Dr Christina Kiel	Dr Daniela De Zio	University of Copenhagen, Denmark
	Robin Decoster	Exploring Image Quality Judgements in Radiography	Dr Marie Louise Ryan Co-Supervisors: Professor Louise Rainford & Dr Rachel Toomey	Dr Francis Zarb	University of Malta
	Anna Delahunty	Determinants of appetitive traits in children aged 5 and 9-11 years old: Findings from the ROLO longitudinal birth cohort study	Professor Fionnuala McAuliffe	Dr Maria Mulhern	University of Ulster
	Brendan Dempsey	"I'm providing a really good service and I would actually be quite proud of myself for being involved": An exploration of service providers' experiences with liberalised abortion care in the Republic of Ireland	Dr Mary Higgins	Dr Fiona Bloomer	University of Ulster
	Stephen Duff	Validation of novel biomarkers of Acute Kidney Injury	Professor Patrick Murray Co-Supervisor: Professor Peter Doran	Professor Peter Maxwell	Queen's University Belfast
	Emma Dunne	APOLLO: A study of the Prevention of Heat Loss in Low birth weight infants	Professor Colm O'Donnell	Professor Berndt Urlesberger	Medical University of Graz
	Laura Gorman	3D printing anatomically accurate airway models and instruments for applications in Anaesthesia	Professor James Jones	Professor Gerard Curley	Royal College of Surgeons in Ireland
Roisin Hambly	Immunological pathways in hidradenitis suppurativa and potential therapeutic targets	Professor Brian Kirby Co-Supervisor: Professor Walter Kolch	Professor Errol Prens	Erasmus University, Rotterdam	

Research Student Graduates 2023

Programme	Student	Thesis title	Supervisor(s)	Special Extern Examiner	Examiner's Institution
PhD	Jane Howard	Comparative Analysis of Plasma Derived Extracellular Vesicles from Patients with Triple Negative Breast Cancer and Feline Mammary Adenocarcinoma	Professor Amanda McCann	Dr Ruth M.O Regan	University of Rochester Medical Centre
	Melissa Johnson	Design and development of novel smart hydrogels based on functionalised glycosaminoglycans for bioengineering applications	Professor Wenxin Wang	Professor Sandra Van Vlierberghe	Ghent University
	Philipp Junk	3D structural analysis of RAS effector binding and investigation of context-specific networks	Dr Melinda Halasz	Professor Rob Russell	University of Heidelberg
	Michael Kelly	The Development of an International Collaboration Examining Outcomes Following Pelvic Exenterative Surgery (PelvEx Collaborative)	Professor Desmond Winter	Professor Nawar Alkhamisi	Western University, Ontario
	Ailbhe King	The potential therapeutic role of GLP-1 receptor agonist treatment in Intermittent hypoxia induced metabolic dysfunction in obstructive sleep apnoea	Dr Silke Ryan	Dr Isaac Alemendros	University of Barcelona
	Thomas Lefeivre	Investigation of the functional interplay between signalling pathways and epigenetic factors in acute leukaemia	Professor Jonathan Bond Co-Supervisor: Dr Colm Ryan	Dr David O'Connor	University College London
	Simeng Li	The invitro risk stratification of endothelial specific immune reactions post allogenic transplant	Professor Guenther Eissner Co-Supervisor: Professor Owen Smith	Professor Nuala Mooney	Université Paris Cité
	Yinghao Li	Poly (β -amino ester)s (PAEs): from structure design to gene delivery application	Professor Wenxin Wang	Associate Professor Jos M.J. Paulusse	University of Twente
	Padraig Mc Gettrick	Inflammatory Phenotypes and Immune cell function in Comorbidities and Cardiovascular disease in HIV Infection	Professor Patrick Mallon Co-Supervisor: Assoc Professor Aoife Cotter	Professor Esteban Martinez	University of Barcelona
	George Merces	Characterisation of a Novel Bioadhesive Used by the Ctenophore Pleurobrachia pileus	Dr Mark Pickering	Professor Anthony Moss	Auburn University

Research Student Graduates 2023

Programme	Student	Thesis title	Supervisor(s)	Special Extern Examiner	Examiner's Institution
PhD	Aoife Ann Nolan	Profiling Mutant KRAS Protein Expression in Colorectal Cancer	Professor Walter Kolch	Dr David Santamaría	Cancer Research Center, Spanish Research Council (CSIC)
	Annabelle Nwaokorie	Constructing Mathematical Models that Predict Therapy Responses in Colorectal Cancer	Professor Walter Kolch	Professor Gary Hardiman	Queen's University Belfast
	Eoin O' Cinneide	Investigating genetic code change and killer plasmids of Saccharomyces yeasts	Professor Kenneth Wolfe	Professor Alessia Buscaino	University of Kent
	Daire O'Leary	Genetic and histopathologic features of chronic nonbacterial osteomyelitis in the Irish population	Professor Gerry Wilson	Professor Christian Hedrich	University of Liverpool
	Heather Steele	Bovine sperm sexing impacts sperm morphokinetics, gameto-maternal interaction and subsequent early embryonic development	Professor Sabine Koelle	Associate Professor Nick Wheelhouse	Edinburgh Napier University
	Patrick Swan	An in vitro and in vivo Assessment of the Effects of Alpha-MSH on Skeletal Muscle Glucose Uptake in Healthy Human Volunteers	Associate Professor Neil Docherty	Professor Filip Knop	University of Copenhagen
	Xianqing Wang	Development of topical non-viral gene therapy for recessive dystrophic epidermolysis bullosa	Professor Wenxin Wang	Dr Peter C. van den Akker	University of Groningen
	Neil Wrigley Kelly	SARS-CoV-2 Specific T Cells in People with and without Obesity	Professor Donal O'Shea	Professor Ed Lavelle	Trinity College Dublin
	Zoe Yandle	Detection and genomic epidemiology of rotavirus circulating in Ireland from 2015 to 2021	Dr Cillian F De Gascun Co-Supervisor: Dr Suzie Coughlan	Professor David James Allen	London School of Hygiene & Tropical Medicine
MD	Tracey Conlon	The presentation, clinical monitoring and treatment of children with Congenital Adrenal Hyperplasia in the Republic of Ireland	Dr Nuala Murphy	Professor Mitchell Geffner	University of Southern California
	Sinead Cremen	Investigating the Clinical Implications of Frailty and Underlying Mechanisms in Liver Transplant Candidates	Dr Tom Gallagher	Professor William Bernal	Kings College Hospital, London
	Ciara Egan	Non Invasive Strategies for Detection and Monitoring of Colorectal Diseases	Professor Glen Doherty	Dr Tony Tham	Ulster Hospital

Research Student Graduates 2023

Programme	Student	Thesis title	Supervisor(s)	Special Extern Examiner	Examiner's Institution
MD	Dylan Finnerty	The Effects of Erector Spinae Plane Block and other anaesthetic techniques on Quality of Recovery and Prognostic Biomarkers in cancer and non-cancer patients undergoing major thoracic surgery.	Professor Donal Buggy	Dr Gabriella Iohom	University College Cork
	Brian Kerr	Elevated natriuretic peptides and atrial fibrillation in those with established cardiovascular risk factors	Professor Kenneth McDonald	Professor Aaron Peace	Ulster University
	Brenda Murphy	Manipulation of inflammatory pathways in ex-vivo colorectal tumour tissue including isolated cell populations using NR4A and RAGE ligands	Dr Daniel Crean Co-Supervisor: Professor Desmond Winter	Professor Martin Schneider	University of Heidelberg
	Grace O'Carroll	Left Ventricular Diastolic Dysfunction in Diabetes	Professor Kenneth McDonald	Professor Katerina Naka	University of Ioannina
	Lauren O'Connell	The role of the Adora2B adenosine receptor in mediation of intestinal mucin production and epithelial defence.	Professor Desmond Winter Co-Supervisor: Dr Carol Aherne	Dr Michael Koeppen	University of Tuebingen
	Bobby O'Leary	The effect of the second stage of labour on neuromuscular pelvic floor injury	Professor Donal Brennan	Dr Philip Tooze-Hobson	University of Birmingham
	Amy O'Regan	The Role of Autotaxin in Lamina Cribrosa Cells in Glaucoma	Professor Colm O'Brien Co-Supervisor: Dr Sarah Eivers	Professor Makoto Aihara	The University of Tokyo
	Helen Rea	The Identification, Comparison and Validation of Proteins in Atopic Dermatitis and Psoriasis Using microdialysis and proteomics.	Professor Martin Steinhoff	Dr Hamish Hunter	University of Manchester
	Fiona Reidy	Endometriosis and infertility: A complex web involving oocyte quality, the innate immune system and the uterine microbiome	Dr Mary Wingfield	Professor Paul Hertzog	Monash University
	Grace Ryan	Exploring the Role of Immersive Technology in Medical Education	Professor Fionnuala McAuliffe Co-Supervisor: Professor Eleni Mangina	Professor Alec Welsh	University of New South Wales

Research Student Graduates 2023

Programme	Student	Thesis title	Supervisor(s)	Special Extern Examiner	Examiner's Institution
MD	Laurentina Schaeler	Assisted Human Reproduction – evolution in a time of COVID-19 pandemic and impending Legislation	Dr Mary Wingfield Co-Supervisor: Professor Fionnuala McAuliffe	Dr Mostafa Metwally	Sheffield Teaching Hospitals NHS Foundation Trust and The University of Sheffield
	Aoife Smyth	The role of miR-29b in ADAM 12 & 19 expression in lamina cribrosa cells in glaucoma	Professor Colm O'Brien	Dr Hari Jayaram	University College London
	Don Walsh	VEGFR2 Dependent Restoration of Pulmonary Endothelial Barrier Function by an Optimal Viscosity Perfusion Solution Following Ischaemia Reperfusion Injury	Professor Paul McLoughlin	Professor Wolfgang Kuebler	Charité-Universitaetsmedizin Berlin
	David Watchorn	GLP-1 and Inflammatory Mediators in Obese Asthma	Dr Marcus Butler	Professor John Wilding	University of Liverpool
MSc	Tamara Alrawahneh	Development of an Analysis Pipeline to Identify Mutations of Interest in SARS-CoV-2 Nucleocapsid Protein	Dr Virginie Gautier	Professor Christopher Creevey	Queen's University Belfast
	Anna Isayeva	The Effectiveness of the use of Liraglutide 3.0mg in Obesity Services (The STRIVE Study)	Professor Carel Le Roux	Professor Edward Gregg	Imperial College London
	Niamh Mahon	Sleepiness and Fatigue in the OPTIMISTIC Clinical Trial: Phenotypic and Transcriptomic Profiles in Myotonic Dystrophy Type 1	Dr Jeffrey Glennon Co-Supervisor: Dr Jayne Carberry	Professor Orla Hardiman	Trinity College Dublin
	Marguerite O'Brien	Pregnancy in Gypsy, Roma and Traveller Women Evidence Base and Clinician Awareness	Dr Mary Higgins	Dr Linda Biesty	University of Galway
	Eleni Patera	Are Neuroanatomy Multimedia Resources Effective in Improving Medical Students' Understanding of Structural and Functional Neuroanatomy?: A Systematic Review	Dr Tom Flanagan Co-Supervisor: Dr Mark Pickering	Dr André Toulouse	University College Cork
MCh	Niall Mclnerney	The effective implementation and assessment of a surgical simulation programme for undergraduate medical students	Professor Ronan Cahill Co-Supervisors: Associate Professor Maurice Stokes & Professor Helen Heneghan	Dr Salman Riaz	King's College London



STUDENT SUMMER RESEARCH AWARDS PROGRAMME 2023



Student Summer Research Awards (SSRA) programme 2023

The Student Summer Research Awards (SSRA) programme, coordinated by Dr Noreen Sheehy, is a research based initiative to support and showcase undergraduate research affiliated with the UCD School of Medicine.

The overarching aim of this eight-week programme is to provide undergraduate healthcare students with opportunities to undertake research at an early stage in their degrees, with a view to fostering a passion for enquiry, discovery, innovative and potentially translational research. These 8-week Summer research projects result in published conference proceedings and in many cases full peer reviewed publications.

In 2023, the SSRA programme continued to instil in our undergraduates an appreciation for the importance and relevance of research to medicine and indeed inspire some of them to consider a career as a clinical scientist.

133 students undertook SSRA projects in 2023, including students who were hosted in International Institutes across the United States, Canada, the United Kingdom, Africa and Europe. This is testament not only to the support of UCD alumni around the world but also to the incredible links that our students have made with international hosts.

The School of Medicine awarded nine Dean's Scholarship positions in 2023. Thanks also to the generosity of the benefactors of the Myles Smith family, the SSRA programme was able to continue to offer the Award for Research Excellence in 2023 in the areas of cardiology and vascular disease and rare cancers. The Clare O'Connor Summer Student Scholarship in Respiratory Research was also awarded in 2023. This award has been created thanks to generous donations by a number of individuals via Professor Muiris X FitzGerald, former Dean of Medicine and founder of the SVUH Cystic Fibrosis Unit. The Martin Gaensler Scholarship was also awarded in 2023 as well as the Artificial Intelligence (AI) in Medicine Scholarship.



SSRA Awardees 2023



Gold Medal

Aghogho Okpara

Exploring new treatments for Burkitt's Lymphoma

UCD

Supervisors: Dr Melinda Halasz & Dr Eoghan O'Connor



Silver Medal

Emma Grady

Unravelling the molecular effects of a novel leukaemia-related gene fusion

UCD

Supervisors: Professor Jonathan Bond & Dr Sharmila Biswas



Bronze Medal

Peo Mogatwane

The role of the KCNQ Potassium channel in regulating novel object recognition and thermal sensitivity in vivo

UCD

Supervisor: Dr Jeffrey Glennon

SSRA Awardees 2023 (cont.)



Poster prize 1st Place

Aimee Longmore

Spray-on gene therapy for Recessive Dystrophic Epidermolysis Bullosa (RDEB)

King's College London

Supervisors: Dr Su Lwin, Professor Michael Antoniou & Professor John A McGrath



Poster prize 2nd Place

Ciara McDermott

Investigation into the significance of tick borne fever-related comorbidities In Irish sheep flocks

UCD

Supervisors: Associate Professor Annetta Zintl & Dr Shane McGettrick



Poster prize 3rd Place

Aghogho Okpara

Exploring new treatments for Burkitt's Lymphoma

UCD

Supervisors: Dr Melinda Halasz & Dr Eoghan O'Connor



Alfred Myles Smith Bursary 2023

Salma Youssef

Pediatric Renal Artery Stenosis: mid-to long-term outcomes following renal artery angioplasty

Emory University

Supervisor: Dr C Matthew Hawkins



Clare O'Connor Summer Student Scholarship

Kaya Stasiewicz

Administration of extracellular vesicles from amniotic fluid stem cells attenuates lung macrophage enrichment in a transgenic mouse model of congenital diaphragmatic hernia

The Hospital for Sick Children, Toronto, Canada

Supervisor: Dr Augusto Zani



AI in Medicine Scholarship

Adil Dahlan

Masked Autoencoder Echocardiogram Foundation Model for Assessing Cardiac Function - Application 1: Estimating Ejection Fraction

Stanford University, California, USA

Supervisor: Dr William Hiesinger

Martin Gaensler Scholarship

Salma Youssef

Pediatric Renal Artery Stenosis: mid-to long-term outcomes following renal artery angioplasty

Emory University

Supervisor: Dr C Matthew Hawkins



ACADEMIC CENTRES

UPDATES 2023

UCD Centre for Arthritis Research

UCD Bioinformatics Centre

UCD Clinical Research Centre

UCD Diabetes Complications Research Centre

UCD Centre for Emergency Medical Science

UCD Centre for Experimental Pathogen Host Research

UCD Centre for Human Reproduction

UCD Perinatal Research Centre

UCD Centre for Precision Surgery

UCD Centre in Translational Oncology

Systems Biology Ireland

www.ucd.ie/medicine/ourresearch/researchcentres



Director
Professor Gerry Wilson

UCD CAR is based at UCD Conway Institute and comprises researchers in UCD and St Vincent's and Mater University Hospitals. Our interdisciplinary research covers proteomics, computational biology, genetics, stratified medicines, sports and exercise, immunology mechanisms of disease and animal models of RA. Our Centre has proven highly successful in developing translational experimental approaches including training and performance of mini arthroscopy and tissue biopsy. The programme based across the UCD CRC (Clinical Research Centre), provides whole tissue biopsy explant cultures for research that is an entirely unique resource. Our teams' ability to perform this research has led to both academic and industry collaborations attracting significant non-exchequer funding from both the EU and the US. The expertise for this highly developed research programme has led to novel translational research outputs including presentations at the highest quality international research meetings and publication in high impact factor peer-review journals. The centre has major PPI involvement at all stages of the research process including PPI panels in individual projects and an annual PPI conference. We also work closely with the UCD PPI Ignite staff.

Key Publications

2023

Total publications: 49 (2022), 35 (to 30th Oct 2023):

Nic An Riogh, E., E. Dunne, S. Cowley, K. Leamy, G. McCarthy, D. Kenny, and J. Stack. 2022. Dynamic platelet function: A novel biomarker in inflammatory arthritis? *PLoS One* 17:e0261825.

Chhana, A., B. Pool, K.E. Callon, D. Naot, R. Gao, B. Coleman, J. Cornish, G.M. McCarthy, and N. Dalbeth. 2023. Basic calcium phosphate crystals induce the expression of extracellular matrix remodelling enzymes in tenocytes. *Rheumatology (Oxford)* 62:1343-1349.

Smith, S.L., S. Alexander, N. Nair, S. Viatte, S. Eyre, K.L. Hyrich, A.W. Morgan, A.G. Wilson, J.D. Isaacs, D. Plant, and A. Barton. 2023. Pre-treatment calprotectin (MRP8/14) provides no added value to testing CRP alone in terms of predicting response to TNF inhibitors in rheumatoid arthritis in a post hoc analysis. *Ann Rheum Dis* 82:611-620.

Pryce, R., E. Langan, K. Tector, L. Raggett, R. Flynn, and K.M. Smart. 2023. Patients' experiences following total knee arthroplasty: a qualitative evidence synthesis. *Disabil Rehabil* 1-18.

Mc Ardle, A., A. Kwasnik, A. Szentpetery, B. Hernandez, A. Parnell, W. de Jager, S. de Roock, O. FitzGerald, and S.R. Pennington. 2022. Identification and Evaluation of Serum Protein Biomarkers That Differentiate Psoriatic Arthritis From Rheumatoid Arthritis. *Arthritis Rheumatol* 74:81-91.

Dorris, E.R., S. Grealis, K. Kegl, N. Kennedy, L. Larkin, B. Lynch, A. Moran, J. O'Brien, S. Skeffington, K. Slater, R. Ward, and A. Willett. 2022. Priorities for rheumatic and musculoskeletal disease research in Ireland. *BMC Rheumatol* 6:55.

Holm Nielsen, S., C. Magee, S.S. Groen, D. Sinkeviciute, A.C. Bay-Jensen, M.A. Karsdal, S.R. Pennington, and O. FitzGerald. 2023. Differentiating patients with psoriasis from psoriatic arthritis using collagen biomarkers. *Clin Exp Rheumatol* 41:574-580.

Key Awards

2023

Professor Oliver Fitzgerald:

- Andrew Keat lecture award from the British Spondyloarthropathy society, September 2023
- Co-President of the Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) 2021-2024. GRAPPA annual meeting with >300 participants held in Dublin, July 2023.

Dr Daire O'Leary (Paediatric rheumatology SpR) was awarded a PhD for her work on the genetic basis of an autoinflammatory bone disease and has given oral presentations at national and international meetings.

Key Grants

2023

Hippocrates Innovative Medicines Initiative (IMI)-funded European consortium which is focusing on addressing unmet needs in Psoriatic Arthritis (PsA) (<https://www.hippocrates-imi.eu/>). (S Pennington & O Fitzgerald).

HRB Investigator Led grant: Discovering and modulating mechanisms by which Peptidylglycine alpha-Amidating Monooxygenase (PAM) influences the risk of genetically inherited tissue damage in Rheumatoid Arthritis. (G Wilson).

Centre News

2023

Our annual PPI conference was held on November 8th and centred on weight management and rheumatic diseases. It was co-hosted with the Irish Coalition for People with Obesity (ICPO). To ensure maximum participation it was virtual with 130 registrants.

Appointments: Hippocrates project; PhD student (Conor Bryan), June 2023 and Post-Doctoral Fellow (Teresa Grohman), Sept 2023. Research Assistant (Jemma Falkov), Sept 2023.



Director
Dr Vadim Zhernovkov

Key Publications

2023

Selection of Key Publications from affiliated members determined from SCOPUS

There is an amazing diversity and quantity of information (with increasingly complex linkages) emerging in the biological and medical sciences. Bioinformatics is the use of computational approaches to make sense of biology, especially to analyse molecular sequences of DNA, RNA and protein.

The UCD Bioinformatics Centre is focused on advancing the quality of bioinformatics science. It supports academic researchers working in the areas of bioinformatics, genomics and molecular evolution. It encourages interdisciplinary collaborations inside and outside UCD through PhD programmes, teaching and software provision. Key areas include sequence alignment, molecular evolution, short peptides, protein structure prediction, cancer, pathogens.

Exploiting Cancer Synthetic Lethality in Cancer-Lessons Learnt from PARP Inhibitors. Pettitt SJ, Ryan CJ, Lord CJ. *Cancer Treat Res.* 2023;186:13-23. doi: 10.1007/978-3-031-30065-3_2.

Paralog dispensability shapes homozygous deletion patterns in tumor genomes. De Kegel B, Ryan CJ. *Mol Syst Biol.* 2023 Nov 14:e11987. doi: 10.15252/msb.202311987. Online ahead of print.

Transcriptional profiling of early differentiation of primary human mesenchymal stem cells into chondrocytes. Schwarzl T, Keogh A, Shaw G, Krstic A, Clayton E, Higgins DG, Kolch W, Barry F. *Sci Data.* 2023 Nov 3;10(1):758. doi: 10.1038/s41597-023-02686-y.

Cell state transition analysis identifies interventions that improve control of Mycobacterium tuberculosis infection by susceptible macrophages. Yabaji SM, Rukhlenko OS, Chatterjee S, Bhattacharya B, Wood E, Kasaikina M, Kholodenko BN, Gimelbrant AA, Kramnik I. *Sci Adv.* 2023 Sep 29;9(39):eadh4119. doi: 10.1126/sciadv.adh4119. Epub 2023 Sep 27.

A Combination of Conformation-Specific RAF Inhibitors Overcome Drug Resistance Brought about by RAF Overexpression. Imoto H, Rauch N, Neve AJ, Khorsand F, Kreileder M, Alexopoulos LG, Rauch J, Okada M, Kholodenko BN, Rukhlenko OS. *Biomolecules.* 2023 Aug 2;13(8):1212. doi: 10.3390/biom13081212.

Proteomic Mapping of the Interactome of KRAS Mutants Identifies New Features of RAS Signalling Networks and the Mechanism of Action of Sotorasib. Nolan A, Raso C, Kolch W, Kriegsheim AV, Wynne K, Matallanas D. *Cancers (Basel).* 2023 Aug 17;15(16):4141. doi: 10.3390/cancers15164141.

Kinase Suppressor of RAS 1 (KSR1) Maintains the Transformed Phenotype of BRAFV600E Mutant Human Melanoma Cells. Liu Z, Krstic A, Neve A, Casalou C, Rauch N, Wynne K, Cassidy H, McCann A, Kavanagh E, McCann B, Blanco A, Rauch J, Kolch W. *Int J Mol Sci.* 2023 Jul 23;24(14):11821. doi: 10.3390/ijms241411821.

Reversing pathological cell states: the road less travelled can extend the therapeutic horizon. Kholodenko BN, Kolch W, Rukhlenko OS. *Trends Cell Biol.* 2023 Nov;33(11):913-923. doi: 10.1016/j.tcb.2023.04.004. Epub 2023 May 30.

Deciphering the tumour immune microenvironment cell by cell. Nabhan M, Egan D, Kreileder M, Zhernovkov V, Timosenko E, Slidel T, Dovedi S, Glennon K, Brennan D, Kolch W. *Immuno-oncol Technol.* 2023 Apr 7;18:100383. doi: 10.1016/j.iotech.2023.100383. eCollection 2023 Jun.

Small Gene Networks Delineate Immune Cell States and Characterize Immunotherapy Response in Melanoma. Egan D, Kreileder M, Nabhan M, Iglesias-Martinez LF, Dovedi SJ, Valge-Archer V, Grover A, Wilkinson RW, Slidel T, Bendtsen C, Barrett IP, Brennan DJ, Kolch W, Zhernovkov V. *Cancer Immunol Res.* 2023 Aug 3;11(8):1125-1136. doi: 10.1158/2326-6066.CIR-22-0563.

Key Publications

2023

(cont.)

Antibody reliability influences observed mRNA-protein correlations in tumour samples. Upadhy SR, Ryan CJ. *Life Sci Alliance*. 2023 May 11;6(8):e202201885. doi: 10.26508/lisa.202201885. Print 2023 Aug.

Structure-based prediction of Ras-effector binding affinities and design of "branchegetic" interface mutations. Junk P, Kiel C. *Structure*. 2023 Jul 6;31(7):870-883.e5. doi: 10.1016/j.str.2023.04.007. Epub 2023 May 10.

Interactome dynamics of RAF1-BRAF kinase monomers and dimers. Iglesias-Martinez LF, Rauch N, Wynne K, McCann B, Kolch W, Rauch J. *Sci Data*. 2023 Apr 12;10(1):203. doi: 10.1038/s41597-023-02115-0. antibody reliability influences observed mRNA-protein correlations in tumour samples. Upadhy SR, Ryan CJ. *Life Sci Alliance*. 2023 May 11;6(8):e202201885. doi: 10.26508/lisa.202201885. Print 2023 Aug.

Structure-based prediction of Ras-effector binding affinities and design of "branchegetic" interface mutations. Junk P, Kiel C. *Structure*. 2023 Jul 6;31(7):870-883.e5. doi: 10.1016/j.str.2023.04.007. Epub 2023 May 10.

Interactome dynamics of RAF1-BRAF kinase monomers and dimers. Iglesias-Martinez LF, Rauch N, Wynne K, McCann B, Kolch W, Rauch J. *Sci Data*. 2023 Apr 12;10(1):203. doi: 10.1038/s41597-023-02115-0.

Analysis of context-specific KRAS-effector (sub)complexes in Caco-2 cells. Ternet C, Junk P, Sevrin T, Catozzi S, Wåhlén E, Heldin J, Oliviero G, Wynne K, Kiel C. *Life Sci Alliance*. 2023 Mar 9;6(5):e202201670. doi: 10.26508/lisa.202201670. Print 2023 May.

Targeting synthetic lethal paralogs in cancer. Ryan CJ, Mehta I, Kebabci N, Adams DJ. *Trends Cancer*. 2023 May;9(5):397-409. doi: 10.1016/j.trecan.2023.02.002. Epub 2023 Mar 6.

Unveiling the epigenomic mechanisms of acquired platinum-resistance in high-grade serous ovarian cancer. Silva R, Glennon K, Metoudi M, Moran B, Salta S, Slattery K, Treacy A, Martin T, Shaw J, Doran P, Lynch L, Jeronimo C, Perry AS, Brennan DJ. *Int J Cancer*. 2023 Jul 1;153(1):120-132. doi: 10.1002/ijc.34496. Epub 2023 Mar 20.

Memory of stochastic single-cell apoptotic signaling promotes chemoresistance in neuroblastoma. Hastings JF, Latham SL, Kamili A, Wheatley MS, Han JZR, Wong-Erasmus M, Phimmachanh M, Nobis M, Pantarelli C, Cadell AL, O'Donnell YEI, Leong KH, Lynn S, Geng FS, Cui L, Yan S, Achinger-Kawecka J, Stirzaker C, Norris MD, Haber M, Trahair TN, Speleman F, De Preter K, Cowley MJ, Bogdanovic O, Timpson P, Cox TR, Kolch W, Fletcher JI, Fey D, Croucher DR. *Sci Adv*. 2023 Mar 3;9(9):eabp8314. doi: 10.1126/sciadv.abp8314. Epub 2023 Mar 3.

Cell state transition analysis identifies interventions that improve control of *M. tuberculosis* infection by susceptible macrophages. Yabaji SM, Rukhlenko OS, Chatterjee S, Bhattacharya B, Wood E, Kasaikina M, Kholodenko B, Gimelbrant AA, Kramnik I. *bioRxiv*. 2023 Feb 10:2023.02.09.527908. doi: 10.1101/2023.02.09.527908. Preprint.

B-cell-derived transforming growth factor- β may drive the activation of inflammatory macrophages and contribute to scarring in hidradenitis suppurativa. Smith CM, Hambly R, Gatault S, Iglesias-Martinez LF, Kearns S, Rea H, Marasigan V, Lynam-Loane K, Kirthi S, Hughes R, Fletcher JM, Kolch W, Kirby B. *Br J Dermatol*. 2023 Feb 10;188(2):290-310. doi: 10.1093/bjd/ljac048.

Whole-cell energy modeling reveals quantitative changes of predicted energy flows in RAS mutant cancer cell lines. Sevrin T, Strasser L, Ternet C, Junk P, Caffarini M, Prins S, D'Arcy C, Catozzi S, Oliviero G, Wynne K, Kiel C, Luthert PJ. *iScience*. 2023 Jan 5;26(2):105931. doi: 10.1016/j.isci.2023.105931. eCollection 2023 Feb 17.

Key Publications

2023

(cont.)

B-cell and complement signature in severe hidradenitis suppurativa that does not respond to adalimumab. Hambly R, Gatault S, Smith CM, Iglesias-Martinez LF, Kearns S, Rea H, Marasigan V, Lynam-Loane K, Kirthi S, Hughes R, Fletcher JM, Kolch W, Kirby B.. Br J Dermatol. 2023 Jan 23;188(1):52-63. doi: 10.1093/bjd/ljac007.

Oncotherapeutic Strategies in Early Onset Colorectal Cancer. O'Reilly M, Linehan A, Krstic A, Kolch W, Sheahan K, Winter DC, Mc Dermott R.. Cancers (Basel). 2023 Jan 16;15(2):552. doi: 10.3390/cancers15020552.

Dynamic regulation of RAS and RAS signaling. Kolch W, Berta D, Rosta E.. Biochem J. 2023 Jan 13;480(1):1-23. doi: 10.1042/BCJ20220234.

Key Awards

2023

Professor Emeritus Des Higgins receives the EMBL's Lennart Philipson Award in recognition of his significant contributions to bioinformatics.

Key Grants

2023

Precision Oncology Ireland. This is a consortium of 5 Irish Universities, 6 Irish Cancer Research Charities, and 7 international companies aiming to develop new diagnostics and therapeutics for personalised cancer treatment. The Consortium is part-funded by Science Foundation Ireland under their Strategic Partnership Programme and is co-ordinated by Systems Biology Ireland.

SFI CRT PhD programme. The SFI CRT PhD programme now has 25 PhD students funded in UCD across multiple schools (Medicine, SBES, SBBS, Agriculture and Food Science, Veterinary Medicine, Computer Science, Mathematics and Statistics). The programme has run cloud computing resources for the PhD students in collaboration with the CloudCIX company.

Centre News

2023

QBI/SBI Symposium on Molecular Networks of Cancer and Other Diseases. The conference was organised by Systems Biology Ireland and the Quantitative Bioscience Institute (USA). The theme of this conference emphasizes how basic discovery research can translate to graspable impact at the clinical level, bringing change to real-life patients facing difficult diagnoses.

Students from the SFI CRT PhD programme organized the ICBG conference: www.icbsymposium.com



Director

Professor Patrick Murray

The UCD-CRC is based at the Mater Misericordiae, St. Vincent's University Hospitals and National Maternity Hospital, Holles Street, National Rehabilitation Hospital, St Lukes Kilkenny, and Wexford General Hospital.

Patients with different chronic diseases including chronic kidney disease (CKD), pulmonary fibrosis and cancer, donate samples to the Centre on a regular basis, and these are assessed in the context of their own treatment and for the development of more accurate therapies for these diseases.

UCD CRC has created core research infrastructure to support and advance high quality, impactful investigator-led translational and personalised medicine research.

The clinical research infrastructure includes:

- Eight out-patient interview rooms for patient examination and tissue collection
- Four procedure rooms for more complex patient studies
- An endoscopy suite for internal medical examination, including arthroscopy and bronchoscopy
- Recovery room facilities for patients' post-procedure
- Dual Energy X-ray Absorptiometry (DEXA) Scanner with full body composition analysis capabilities which support osteoarthritis/osteoporosis studies
- Climate-controlled storage facilities for Investigational Medicinal Product materials

UCD CRC on-site laboratory facilities support the immediate processing of biological samples collected during research studies. The laboratory infrastructure on hospital sites complements biomedical research facilities on the University campus and includes:

- Cell and tissue culture suites for primary cultures, equipped with sterile cell culture hoods & incubators
- A molecular biology laboratory with standard equipment and facilities for molecular analysis
- Imaging Laboratory (with contrast and fluorescence microscopy)
- UCD-Abbott Core Biomarker Laboratory including ARCHITECT i2000SR, ARCHITECT ci4100, the new Alinity ci and the Roche Cobas411 high throughput analysers. A Quanterix multiplex Elisa machine was added to the portfolio in 2019.

UCD CRC has developed a network of biological resource centres for sample receipt, storage, and processing across the hospital campuses in recognition of the importance of access to appropriately consented, well pheno-typed quality controlled biological samples to translational research.

This network includes;

- Dedicated biobank rooms with monitoring and control
- Multiple freezer units with temperatures ranging from -20 to -80oC (11 -20o C; 4 -40o C and 34 -80o C freezer)
- Large Liquid Nitrogen storage capacity
- 24/7 monitoring of freezer and temperature-controlled storage
- Comprehensive security and emergency response plans

The appropriate use of intelligent and secure IT solutions is key to the Centre's translational research mission, permitting the generation and exchange of data and information between the 'bed' and the 'bench'.

UCD CRC is addressing these challenges by implementing cost-effective IT solutions which combine to create a sophisticated clinical research information infrastructure that supports all aspects of clinical research.

Key Publications

2023

Madeleine C. Murphy, MB, PhD^{1,2,3}; Jan Miletin, MD⁴; Claus Klingenberg, MD, PhD^{5,6}; et al Hans Jørgen Guthe, MD, PhD⁷; Vincent Rigo, MD, PhD⁸; Richard Plavka, MD⁹; Kajsa Bohlin, MD, PhD^{10,11}; Almerinda Barroso Pereira, MD¹²; Tomáš Juren, MD¹³; Ekele Alih, PhD²; Marie Galligan, PhD¹⁴; Colm P. F. O'Donnell, MB, PhD^{1,2}, Prophylactic Oropharyngeal Surfactant for Preterm Newborns at Birth, A Randomized Clinical Trial, *JAMA Pediatr.* Published online December 11, 2023. doi:10.1001/jamapediatrics.2023.5082

Brady M, Duffy R, Domegan L, Salmon A, Maharjan B, O'Broin C, Bennett C, Christle J, Connell J, Feeney L, Nurdin N, Mallon P, Doran P, McNamara R, O'Grady S, McDermott S, Petty-Saphon N, O'Donnell J. Establishing severe acute respiratory infection (SARI) surveillance in a sentinel hospital, Ireland, 2021 to 2022. *Euro Surveill.* 2023 Jun;28(23):2200740. doi: 10.2807/1560-7917.ES.2023.28.23.2200740. PMID: 37289427; PMCID: PMC10318943.

MacCann R, Leon AAG, Gonzalez G, Carr MJ, Feeney ER, Yousif O, Cotter AG, de Barra E, Sadlier C, Doran P, Mallon PW. Dysregulated early transcriptional signatures linked to mast cell and interferon responses are implicated in COVID-19 severity. *Front Immunol.* 2023 May 16;14:1166574. doi: 10.3389/fimmu.2023.1166574. PMID: 37261339; PMCID: PMC10229044.

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UCD CRC Updates

2023

UCD CRC Widening Participation, Ensuring Access, and Enhancing Support.

UCD CRC has enabled a continuum of clinical innovation from bench to bedside and the community, by strengthening translation from the basic sciences, conducting phase 1-3 trials in our hospitals, and establishing a general practice-based network.

Establish the UCD CRC at additional sites.

UCD CRC have continued to embed the expanded footprint of UCD CRC and have recruited a research coordinator in the National Maternity Hospital, who commenced April 2023.

UCD CRC are embedding the linkages between investigators at the new sites and our core CRC team, in these key areas of data management, protocol development, study/protocol design, statistics support/analysis, database creation/hosting, support with ethics application(s) and GCP training. Our Pharmacovigilance officer is providing support for regulatory applications.

UCD CRC have commenced and continued to recruit patients to several studies at these sites including;

- AI_PREMie study, National Maternity Hospital and Wexford General Hospital sites.
- Iron Woman study, National Maternity Hospital
- PLANET-3 Trial, National Maternity Hospital
- Sprint Sari study, St Luke's Hospital Kilkenny
- IBD and Skin Cancer risk, St Luke's Kilkenny

UCD CRC Updates

2023

(cont.)

Developing priority external partnerships to expand trial portfolio.

UCD CRC has continued to develop strong relationships with other research centres both nationally and internationally. The UCD CRC continues to be central to the EU funded Vaccelerate Network and is coordinating and sponsoring one of the Europe wide vaccine trials, Boostavac. UCD CRC are continuing to have a leading role in supporting a number of Clinical Trial networks, primarily funded by the HRB. These include:

- Rare Diseases Clinical Trial Network
- Irish Critical Care Clinical Trials Network
- Infectious Disease Clinical Trial Network Ireland
- HRB DIFA Award | BRAIN OXYGEN NEUROMONITORING ASSESSMENT (BONANZA) EUROPE TRIAL; a multicentre, randomised phase III trial of brain tissue oxygen (PbtO₂) monitoring versus standard care after severe TBI
- HRB DIFA Award | REMAP-CAP (Randomised, Embedded, Multi-factorial, Adaptive Platform Trial for Community Acquired Pneumonia) Ireland 2023: Beyond COVID-19

Through these networks, aligned with HRBs vision, we are enabling research, and ensuring that UCD is central to and supportive of the national trial ecosystem.

Hub & Spoke model of Integrated Care Research

In 2022 University College Dublin's (UCD) Clinical Research Centre (CRC) expanded its geographical access to research with the addition of a partnership with the Ireland East / UCD General Practice Research Network (GPRN). Member practices are primarily in the eastern region of Ireland (five in Dublin, four in Wexford, three in Kilkenny, two in Meath, one in Cork). Fifteen GP sites have participated in GPRN projects so far and two sites have recently been added. The GPRN aims to enhance patient care by facilitating impactful, interdisciplinary, and practice-based research in general practice. It is especially concerned with conducting GP-focused research that aims to inform scientific advancement and healthcare policy nationally, particularly on the question of how to best promote access to and integration of primary and secondary care.

Support University Investigators to evaluate their discoveries.

With the hiring of our UCD CRC Project Manager to develop relationships across sites we have provided support for university investigators to evaluate their discoveries in a clinical environment, supporting the national research ecosystem.

Several research funding and ethics committee applications by UCD investigators which will allow for clinical investigations were supported during 2023.

Research funding applications supported:

- A proposal led by UCD investigators to the HRB - Rare Diseases Research and Innovation Catalyst Awards 2023.
- A proposal being led by UCD investigators in obesity to the Horizon Europe call "Personalised prevention of non-communicable diseases - addressing areas of unmet needs using multiple data sources" which has 11 European organisations attached.
- A successful proposal to the UCD Health Affairs Academic Health Science System (AHSS) Grant (PI: Dr Neil Docherty) which will investigate "Renal Functional Reserve Assessment in Obesity". Following close communication with the investigator and UCD CRC colleagues (e.g., PPI) this project is due to start recruitment for a pilot study in the CRC SVUH in 2023 Q3. The main project aims to build networking activity across the other IEHG sites.

UCD CRC Updates

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(cont.)

- A successful proposal to the European Foundation for the Study of Diabetes (EFSO) and
- Boehringer Ingelheim European Research Programme on “Multi-System Challenges in Diabetes” (PIs: Dr Neil Docherty & Dr Martina Wallace).

Research ethics applications supported:

- Application to the MMUH research ethics committee for a collaboration between Professor Catherine Godson (UCD) and Dr Martin O’Donohue (MMUH).
- Application to the SVUH research ethics committee for Dr Neil Docherty’s “Renal Functional Reserve Assessment in Obesity” study.

Support was provided to a range of activities which aim to support the local and national research ecosystem.

- Support was provided to UCD investigators and adjunct clinical investigators through a UCD School of Medicine (SOM) Research Retreat (19th June 2023) which was organised by Professor Catherine Godson. The principal objective of this retreat was to strengthen the translational research capacity in the School of Medicine by developing meaningful collaborations to optimise outcomes of current and future activities. It provided a platform for the UCD SOM academic and clinical staff to showcase their current research interests, and to support potential synergistic relationships between the school and its clinical sites.
- Ongoing support is being provided to UCD Diabetes Complications Research Centre (DCRC) investigators in relation to developing a UCD Research Campaign in the area of metabolic health and disease. An initial meeting with Dr Loraine Smith (UCD Research Partner for Building a Healthy World) was held on the 3rd of April 2023.
- Ongoing support is being provided with an aim to establish an All-Island Diabetes Research Academy. The initial meeting between investigators from UCD, Ulster University, Queen’s University Belfast and University of Galway will take place the 30th of August 2023.

Enhanced pharmacy & regulatory support to expand investigator-initiated portfolio

UCD CRC have expanded the CRC team to support investigator-initiated trials, which has been achieved through both the support from the HRB and additional funding leveraged from EU for vaccine trials and other. The sponsorship oversight group, led by Professor Pat Murray is central to ensuring trials are carried out to the best standards.

UCD CRC has expanded investigations in the medical devices area, and there are two Article 74 medical device investigations going through the submissions process at present, a third Article 62 study is planned for early 2024 (FM Research). UCD CRC are supporting Professor Ronan Cahill’s group, who intend to conduct an Article 62 investigation as part of their Horizon2021-funded CLASSICA project.

Modernising Delivery & Enhancing Support

UCD CRC are working on the implementation of an electronic trial documentation including eTrial Master Files and site files. This is to improve the patient experience by providing direct access to CRC studies, sites and opportunities through dedicated resources including a Patient Portal on the UCD CRC App, and tools for increasing understanding and enabling consent.

Improving Design & Supporting Outputs

UCD CRC is focused on ensuring that investigators have access to biostatistics, data management and trial analytics supports. UCD CRC has recruited additional statistical expertise to support our growing trial portfolio.

UCD CRC Updates

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(cont.)

This facilitates provision of CRC statistical advice before submission to UCD CRC management team. This also expands our data management capability to protect data integrity.

Enhanced statistical expertise to support expanding trial portfolio

UCD CRC statisticians have experienced significant activity over the past twelve months, both in clinical trials and observational research. UCD CRC continues to support CRC Sponsored trials and provides statistical review and development of protocols for new studies as well as statistical oversight and input to ongoing studies –writing statistical analysis plans, set-up of trial randomisation, statistician DSMB membership, data analysis and publication/reporting of completed trials. UCD CRC also provides statistical support for funding applications and to studies that do not fall under HPRA regulation with design, data analysis and publication. The HRB funded statistician post has allowed us to support a greater number of studies than we could previously.

Systematic reviews of all trial concepts prior to final approval

UCD CRC have recruited a Librarian to support the systematic review activity with the assistance of UCD Library Diarmuid Stokes, to ensure this programme is grounded in the library and information systems community at UCD.

Expand our data management capability to protect data integrity and advance timelines in the clinical research programme

The Pharmacovigilance team has provided pharmacovigilance support for safety monitoring activities and processing of serious adverse events (SAEs) that occur in UCD-sponsored regulated clinical trials. UCD CRC have also provided support and advice to ensure collection of high quality, reliable data on our studies. Assistance is provided with development of clinical trial protocols, advice on data protection issues, efficient data collection and CRF design, and establishment of electronic databases to ensure the right data is collected for each study protocol. Case Report forms and databases have been developed across a number of new CRC studies over the period in a variety of therapeutic areas:

- AI_PREMie: Artificial Intelligence to Prevent preterm birth due to preeclampsia while protecting Mothers' lives.
- SLEEPIO After Cancer Study (SACS): Digital CBT for insomnia (dCBT-I) in women cancer patients: a randomized control trial
- PDT Study: A randomised, single blinded, prospective study to compare simulated daylight photodynamic therapy with natural daylight photodynamic therapy for treatment of actinic keratoses.
- COPD Cohort: Prospective data collection of data for patients attending for COPD care.
- Ovarian escape in premenopausal women receiving ovarian function suppression for breast cancer.
- ELIVE Pre-HF: The impact of Empagliflozin on Left atrial Volume and the feasibility of using Fitbit and mHealth to prescribe Exercise in non-diabetic Pre-Heart Failure, support with protocol finalization for HPRA submission.
- HARP-X: randomisation list generated and established on REDCap.
- IRONWOMAN: randomisation list generated and established on REDCap.
- PLANET3 trial: support for finalization of protocol (non-regulated trial).
- OPTICA observational study: statistical analysis, evaluation of impact of reduced sample size due to under-recruitment. A manuscript is in preparation for journal submission.

UCD CRC Updates

2023

(cont.)

Strengthening Understanding & Increasing Engagement

UCD CRC builds on the existing UCD commitment to ensuring that our patients, their families, and the wider community are aware and informed. Linking with the national PPI programme, this activity is progressing well. UCD CRC has recruited a dedicated Research Subject Advocate to improve access to trials, collaboration with other clinical research networks and to increase engagement with patients and the public in clinical trial activities.

UCD CRC have provided a patient education programme and worked with HRB-Trials methodology Research Network to further expand this activity. A suite of educational programmes is being developed and key topics include Clinical trial design, selecting populations, Placebos, Interventions, Endpoints, Good Clinical Practice, Trust and Transparency, Pharmacovigilance, Ethics, Regulation and Data Protection.

UCD CRC work with patients & ensure their voice is heard by;

- Reviewing grant applications and protocols to address ethical and safety issues including consents, enrolment, and data processing, while ensuring plain English language is incorporated and necessary medical terms explained.
- Updating the patient section of the UCD CRC website to improve content, language, and readability.
- Developing a patient advisory group for the CRC to monitor and advise on the CRC strategy driven by the patient perspective.
- Working with the UCD communications teams to develop a strategy to increase awareness of the CRC, clinical trials, and the importance of the patient voice in research activities. This has involved generating metrics to measure engagement activity on the UCD CRC Twitter page/website and planning ways to increase engagement through more frequent posting, collaborating with other clinical trial networks, working with patients to develop social media content, and developing a calendar of events to boost activity.
- Working with UCD PPI Ignite and the National PPI network to arrange and facilitate a PPI workshop hosted in Dublin City University (DCU). The workshop facilitated networking between clinical research sites, PPI contributors, and those working in PPI to inform how PPI can be developed across research infrastructures. There were over 30 attendees from over 20 clinical research infrastructures.
- Working with patients on several committees/groups across the UCD CRC network to embed their voice in research activities, including the Pre-term birth steering committee, linked to the National Maternity Hospital, and the UCD Cancer Trials Cluster working group.
- The UCD CRC hosted a recent public webinar 'A Taste of Trials'. An introduction presentation detailed clinical research, clinical trials, and participating in a clinical trial. Another presentation detailed past and current trials run by the Irish Critical Care - Clinical Trial Network (ICC-CTN). A final presentation detailed the OVHIPEC-2 Trial in Advanced Ovarian Cancer. The webinar concluded with an interview with a clinical trial participant and a short Q&A session. Over 80 attendees from 5 regions (Ireland, UK, USA, France, and China) signed into the webinar.
- Organising an International Clinical Trials Day event across our six hospital sites, where CRC staff engaged with approximately 400+ hospital staff, patients and public, to inform them of clinical trials and research carried out by the CRC, and how they can get involved.

UCD CRC Updates

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(cont.)

- Attending the annual UCD Festival, where CRC staff informed the public about clinical trial research, teaching kids and families about clinical trial methodology, with engagement with approximately 300+ members of the public.

Patient advocate appointed to DSMBs and trial steering committees.

The patient advisory board is in the planning phase. The objectives have been developed and suggested members for the advisory group are being invited, while planning for the first meeting is being undertaken. Two studies have been identified that are potentially suitable for a patient representative. Investigators have since been contacted to progress this.

Coordination & Collaboration.

Impact on patients, the healthcare system and wider society. UCD CRC has revised CRC management structures allowing for additional site and activity representation. UCD CRC has also recruited a Practice Based Network Manager and a National Clinical Trial Coordination Programme Officer to continue engagement in collaborative international trial networks and partnerships.

UCD CRC have continued to work with our leadership group with site leads from all CRC participating sites, and our general practice network on a monthly basis. This promotes collaboration and partnership across sites and supports the wider clinical research network.

UCD CRC continues to maintain and sustain our existing strong industry partnerships and are working continuously to develop new or expanding industry partnerships include;

- Abbott Laboratories
- Agilent (PERSONA DTIF)
- Atturo (PERSONA DTIF)
- Neoteryx (PERSONA DTIF)
- South Texas Accelerated Research Therapeutics, L.L.C.
- Nutromics

UCD CRC have advanced our involvement in both national and international clinical trial networks. Through the HRB funded CTNs, we also partner with Dementia Trials Ireland, Cancer Trials Ireland and other comparable groups. In international terms we have continued to develop strong relationships with several UK universities, continuing to act as EU legal representative for their Trials as follows;

- VAPOR-C (Sponsor: Peter MacCallum Cancer Centre, Australia)
- SPICE (Sponsor: Monash University)
- STOP'EM Trial (Sponsor: University of Liverpool)
- TICH-3 (Sponsor: University of Nottingham)
- TIGER Study (Sponsor: King's College London)

Other:

European Clinical Research Alliance on Infectious Diseases (ECRAID) Research Network.

Irish Project Lead- Dr Akke Vellinga. Sponsor: University Medical Centre Utrecht.

This is a primary care adaptive platform trial for pandemics and epidemics (ECRAID-Prime) is a research network which plans to adapt a master protocol for a variety of primary care adaptive platform trial for pandemics and epidemics. ECRAID have requested UCD coordinate and take on some sponsor responsibilities for the Irish trials which will be conducted through the Ireland East GP Network, with Dr Akke Vellinga acting as team lead.

UCD CRC Updates

2023

(cont.)

Participation in the National Clinical Trial Coordination Programme feasibility programme

UCD CRC participates fully in NCTO activities. The HRB NCTO feasibility and study start-up working group (SFSWG) role is to identify an investigator and help them through the process of delivery from the signing of the Confidential Disclosure Agreements (CDAs) to feasibility completion and on to site inspection to start-up and first patient visit timelines. There are 5 working groups in the NCTO and UCD CRC has a staff member on all of these.

In summary UCD CRC continues to support significant research activity across all parts of the clinical and translational research continuum. In addition to the trial metrics reported herein we support many observational, biobanking and epidemiological studies. These are reported annually in the CRC Annual report, available from www.ucd.ie/medicine/research/ucdclinicalresearchcentre

During this period 65 studies have been submitted for review and approval. 55 studies have been approved by the UCD CRC OCG and Leadership Groups. 31 are Clinical Trial studies, 2 device study, 2-Biobank study, 16 Observational studies, 3 Biobank and Observational Studies, 10 others, and 1 registry study. These are primarily investigator lead with 43 studies and 22 industry studies.

In terms of geographical location of the studies across the UCD CRC network, the breakdown is as follows: 30 SVUH, 13 MMUH, 3 NMH, 3 Wexford, 3 GP Network, 1 NRH, 1 St Lukes Kilkenny, 3 SVUH & MMUH, 2 NMH, Coombe and Rotunda Hospitals, 1 CHI, 1 HSE Integrated Care, 1 MMUH, TCD, St. James's Hospital, CUH, Connolly Hospital, GUH, 1 MMPH, 1 MMUH & SVUH, Beaumont, St James, CUH, UHG, 1 MMUH, SVUH, Beaumont, Tallaght, St James, CUG, GUH, 1 SVUH, & St James, Tallaght, Our Lady's hospice, 1 SVUH & UHG.



Director
Professor Catherine
Godson

The UCD Diabetes Complications Research Centre (DCRC) focuses on the macro and microvascular complications of diabetes and obesity.

We comprise a multidisciplinary research group with expertise in molecular cell biology, genetics, bioinformatics, pharmacology, systems biology, chemical pathology and clinical medicine. Investigators are based in the UCD Conway Institute, the Mater Misericordiae University and St Vincent's University Hospitals and work closely with international collaborators in academia and industry. Research programmes are funded by national and international sources including Science Foundation Ireland (SFI), The European Union, Wellcome Trust, the National Institutes of Health (NIH), the Juvenile Diabetes Research Foundation (JDRF), European Renal Association (ERA), European Association for the Study of Diabetes (EASD) and bio pharma industry.

The DCRC is primarily associated with the UCD School of Medicine and also associated with the School of Biomolecular and Biomedical Sciences (SBBS), School of Veterinary Medicine and School of Public Health, Physiotherapy and Sports Science (SPPSS). We are based in the UCD Conway Institute of Biomolecular and Biomedical Research.

Mission Statement

The Mission of the UCD Diabetes Complications Research Centre is to advance our knowledge of the initiation, progression and regression of vascular complications of diabetes and obesity.

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- Al-Ozairi E, Irshad M, Taghadom E, Sojan L, Al Kandari J, Alroudhan D, et al. Glucagon-like peptide-1 agonists combined with sodium-glucose cotransporter-2 inhibitors reduce weight in type 1 diabetes. *Obesity (Silver Spring)*. 2023;31(3):716-23. PMID:36811241.
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Key Awards

2023

UCD Impact Case Study: Changing the guidelines for treating type 2 diabetes. The study was led by Professor Carel le Roux with Dr Werd Al-Najim, Professor Helen Heneghan and Professor Catherine Godson.

Dr Clare Reynolds received a Mid-Career Researcher Prize from the *Experimental Physiology Journal*.

Professor Catherine Godson presented the prestigious Barry M. Brenner, MD, Endowed Lectureship on "Toward Solutions! Pro-Resolving Lipid Mediators of Metabolism and Inflammation" at the American Society of Nephrology (ASN) Kidney Week Conference in Philadelphia.

Key Grants

2023

The Physiological Society, Research and Knowledge Exchange Award - Dr Chris Shannon (Roche lab) received €11,660 for his project "Role of the mitochondrial pyruvate carrier in diet-induced adipose remodelling".

UCD School of Biomolecular and Biomedical Science, SPARK Award - Dr Jessica Davis (Crean lab) received €10,000 for her project "Induced pluripotent stem cell (iPSC)-derived human cerebral organoids as a powerful model of prenatal cocaine exposure".

UCD Academic Health Science System (AHSS) Award - Dr Neil Docherty received the €24,700 for his project "Renal Functional Reserve Assessment in Obesity".

Science foundation Ireland & Health Research Board US-Ireland Research Award - Professor Catherine Godson & Dr Eoin Brennan received €908,860 for their project "A Functional Genomics Pipeline for Genetic Discovery in Diabetic Kidney Disease".

Enterprise Ireland – Professor Helen Roche & Dr Fiona McGillicuddy received €12,460 for EU Proposal Coordinator Support.

UCD STEM Challenge Fund Award, Dr Monica de Gaetano received €17,000 for 18 months for the project "Nano-formulation of novel Small Synthetic Molecules in Resolution Pharmacology: an innovative approach to tackle Low-grade Inflammation in Atherosclerosis".

EU Funding Programmes: Funding programme: Erasmus Mundus Design Measure Award, Dr Werd Al-Najim received €55,000 for 15 months for a "European Masters IN ObEsity Management (EMINENT)".

Key Grants

2023

(cont.)

European Foundation for the Study of Diabetes: Boehringer Ingelheim European Research Programme on “Multi-System Challenges in Diabetes” Award, Dr Neil Docherty and Dr Martina Wallace received € 99,075 for 24 months for the project “Impaired branched chain amino acid metabolism: An effector of insulin resistance-associated kidney disease?”.

Centre News

2023

Beyondbmi is a new UCD spin-out supported by Nova UCD. Beyondbmi is a platform and app that aims to help people with sustainable weight loss through a medically led programme. It provides access to doctors, dietitians and health coaches to help with weight loss and health gain.

MetHealth, an early-stage start-up focused on transforming obesity care was winner of the UCD Start-up of the year award 2022.

Professor Catherine Godson was appointed Associate Dean for Research, Innovation & Impact, UCD School of Medicine.

Professor Catherine Godson was appointed to the Board of the Medical Council by the Minister for Health, Stephen Donnelly.

Professor Catherine Godson won the 2022 Eicosanoid Research Foundation Outstanding Achievement Award for diabetes complications research.

Professor Helen Roche was appointed as UCD’s Vice-President for Research, Innovation and Impact.

Dr Monica de Gaetano was named one of UCD Institute of Discovery’s Rising Stars. Monica spoke about how “Atherosclerosis is the silent killer of the 21st century” on the Rising Stars podcast.

Ms. Mariam Marai (PhD student - Godson/Brennan) won UCD’s Student Medical Journal 2023 Image Competition for “Broken Hearts: Investigating diabetic fibrosis in mice heart”.

Three PhD students defended their PhD thesis in 2023:

- Dr Shane Clerkin (Crean lab) - *“Tuneable Biophysical Hydrogel Scaffolds for Biomedicine: The Development of Designer Matrices for the Derivation of Stem Cell-Derived Kidney Organoids”*.
- Dr Niall Treacy (Crean lab) - *“The Growth and Differentiation of Human Induced Pluripotent Stem Cell-Derived Kidney Organoids Within Self-Assembling peptide Hydrogels”*.
- Dr James White (Docherty lab) - *“Characterisation of Changes in the Adipose Tissue Proteome in Pre-clinical and Clinical Studies of Surgical and Medical Approaches to Obesity Therapy”*

National & international conference awards:

59th Irish Association for Cancer Research (Athlone, Co Westmeath; 22-24 February 2023)

- Ms Kathleen Mitchelson (Roche lab) was awarded the Highly Commended Display Poster Prize for her poster *“Fatty acids and adipose depot functionality with respect to obesity-linked colorectal cancer progression”*

Irish Nephrology Society Meeting 2023 (Maynooth, Co. Kildare; 12-13 May 2023)

- Ms Mariam Marai, (Godson/Brennan lab) won the JP Garvey Award (Best Student/Intern Poster) for her poster *“The FPR2 agonist AT-01-KG targets IL-6 to suppress inflammation in diabetic kidney disease”*.
- Dr Darrell Andrews (Godson lab) won the Best Moderated Poster Award for her poster *“Investigating the role of FPR-2 agonists in tissue repair and regeneration”*.

UCD Diabetes Complications Research Centre

www.ucd.ie/medicine/research/researchcentres/ucddiabetescomplicationsresearchcentre

Centre News

2023

(cont.)

4th International Conference on Precision Nutrition and Metabolism in Public Health and Medicine (Ioannina, Greece; 25-30 June 2023)

- Mr Rory Turner (Wallace Lab) won the Aegean Conferences Student Travel Award. Rory delivered an oral presentation on his PhD research, "*Targeting Branched Chain Amino Acid Metabolism as a Potential Treatment for Liver Fibrosis*".

The UCD Centre for Emergency Medical Science

www.ucd.ie/medicine/research/researchcentres/ucdcentreforemergencymedicalscience



Director
Professor Walter Cullen

UCD Centre for Emergency Medical Science (UCD CEMS) was established in 2001 to provide a national centre of excellence for research, development, education and training in pre-hospital emergency care.

Excellence in Education, Training & Research

UCD CEMS is located in the Health Sciences Centre at the UCD School of Medicine, Belfield, Dublin 4.

The principal activities of UCD CEMS are:

1. Provision of graduate and undergraduate education and training in pre-hospital emergency care
2. Provision of short courses in immediate care - including cardiac, trauma and paediatrics
3. Management and delivery of the MERIT Project (Medical Emergency Responders: Integration & Training)

Key Publications

2023

Bury G, Fitzpatrick C, Heron B, et al. Ukraine Trauma Project: the feasibility of introducing advanced trauma- care skills to frontline emergency medical services responders. *BMJ Open* 2023;13:e077895. doi:10.1136/bmjopen-2023-077895

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Centre Updates

2023

Retirement of Professor Gerard Bury. Professor Bury remains Teaching and Research Active.

The UCD Ukraine Trauma project has trained and equipped almost 200 medics and paramedics in Ukraine to manage severe haemorrhage as a result of wartime activity. This project has the full backing of the University and the Minister for Health.



Director
Professor Patrick Mallon

Established in 2019, CEPHR brings together researchers and research groups from across UCD who focus on infection-related research.

CEPHR comprises state-of-the-art secure clinical and laboratory research facilities with specialized core research infrastructure all integrated under a single governance structure.

CEPHR is physically located in three principal UCD hubs: the Belfield Hub, the MMUH Hub (based at the Mater Misericordiae University Hospital) and the CEPHR SVUH (located in the Education & Research Centre at St Vincent's University Hospital).

CEPHR facilities at Belfield are specifically designed for research on the pathogenesis of a range of infectious diseases and comprises Biosafety level 2 (BL2) and BL3 containment facilities for safety manipulation of pathogens and dedicated fully equipped laboratories for molecular virology, cellular biology and immunology, including tissue culture labs, -80 °C freezers and a vapor-phase liquid nitrogen system for PBMC cryopreservation, all linked within a continuous, remotely monitored biobanking facility.

CEPHR members comprise clinical, translational, statistical and biomedical researchers working interactively on aspects of host and pathogen research from the UCD School of Medicine, the UCD School of Biology and Biological Sciences, and the UCD School of Politics and International Relations. At present, CEPHR includes 15 research academic staff, 5 Infectious Diseases Consultants, 3 Infectious Diseases Specialist Registrars, 3 Project Managers, 2 Data managers, 1 Senior Laboratory attendant, 14 FTE PhD students (including both clinical and laboratory expertise), 7 FTE post-doctoral researchers and 8 Research assistant positions.

As the only centre of its kind in Ireland, and one of the few academic research centres in Europe that integrates host and pathogen research incorporating both clinical and non-clinical research sites, CEPHR has been able, through national and international collaborations, to exploit emerging funding opportunities in personalised medicine and stratification of infectious diseases.

Key Publications 2023

Correlation of RBD IgG and Neutralising Capacity Across Variants and Time Supports The Use of RBD IgG Thresholds to Predict Protective Host Immunity. Grace Kenny*, Sophie O'Reilly*, Neil Wrigley Kelly, Riya Negi, Colette Gaillard, Dana Alalwan, Gurvin Saini, Tamara Alrawahneh, Nathan Francois, Matthew Angeliadis, Alejandro Abner Garcia Leon, Willard Tinago, Eoin Feeney Aoife G Cotter, Eoghan de Barra, Obada Yousif, Mary Horgan, Peter Doran, Jannik Stemler, Philipp Köhler, Rebecca Jane Cox, Donal O'Shea, Ole Olesen, Alan Landay, Andrew Hogan, Jean-Daniel Lelievre, Virginie Gautier, Oliver Cornely, Patrick W. G. Mallon on behalf of the All Ireland Infectious Diseases Cohort Study, the VACCELERATE consortium and the EUAGED Study Group. *Authors contributed equally. Nature Communications. In press

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Jayne Doherty, Neil O Morain, Roisin Stack, Miriam Tosetto, Rosanna Inzitari, Sophie O'Reilly, Lili Gu, Juliette Sheridan, Garret Cullen, Edel Mc Dermott, Maire Buckley, Gareth Horgan, Hugh Mulcahy, Margaret Walshe, Elizabeth J Ryan, Virginie Gautier, John Prostko, Edwin Frias, David Daghfal, Peter Doran, Colm O Morain, Glen A Doherty. Reduced Serological Response to COVID-19 Booster Vaccine is Associated with Reduced B Cell Memory in Patients With Inflammatory Bowel Disease; VARIATION [VARIability in Response in IBD Against SARS-COV-2 Immunisation]. *Journal of Crohn's and Colitis* (2023)

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Naomi Jackson, Jaythoon Hassan & Hugh J Byrne (2023) Raman spectroscopic analysis of human serum samples of convalescing COVID-19 positive patients. *Clinical Spectroscopy* 5, 100028 <https://doi.org/10.1016/j.clispe.2023.100028>

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Key Grants

2023

OH-ALLIES: One Health – ALL Ireland for European Surveillance (Coordinator: DAFM; Partners: UCD, UoG, AFBI, IEC). Total amount 700,000 (EU4Health work programme for 2022) 2024–26 . PIs: Virginie Gautier, Paddy Mallon

STRIVE. Strategies and Treatments for Respiratory Infections and Viral Emergencies. PI: Jane O'Halloran. Funded by US National Institutes of Health (NIH)

HRB dual-track Postdoctoral Fellowship schemes, Applying Research in Policy and Practice (ARPP) and the Clinician Scientist Fellowships (CSF). Dr Christine Kelly. Over 1M euro.

Centre News 2023

CEPHR Structure: CEPHR Infrastructure is undergoing renovations to expand the laboratory and office capacity. CEPHR is expanding the CL3 facilities as part of the the Science Foundation Ireland Infrastructure Award "UCD Enhanced Containment Level 3 (CL3) Laboratory Suite for Human and Animal Risk Group 3 Biological Agents a National Resource for Translational Research and Infectious Diseases Preparedness" which was awarded in 2022. In addition, CEPHR office space and seminar rooms are undergoing renovations to include more office space for the Project Management office.

CEPHR Personnel: Dr Aoife Cotter, CEPHR clinical lead at the MMUH Hub, was appointed as President of Infectious Diseases Society Ireland in May 2023. Dr Jaythoon Hassan, CEPHR Senior Clinical Scientist at the Belfield Hub, filed a Patent Application for 'DNA Extraction Chip' (GB2306715.0) in May 2023. Michael Carr, Clinical scientist affiliated to the National Virus Reference Laboratory, was invited to join a WHO-led prioritisation exercise for pathogens of epidemic and pandemic threat in the expert group on Polyomaviruses.

CEPHR Activities: As part of CEPHR strategic development, both a Community Advisory Board (CAB) and an International Advisory Board (IAB) were included within CEPHR governance structure. The CAB, made up of Patient and Public Involvement (PPI) representatives ensures the patient voice is integrated into all aspects of the research process as partners rather than as research participants. The IAB comprises senior, international Infectious Diseases Academics and Trialists to advise on CEPHR activities, strategy and future directions. The CAB and IAB meet annually with CEPHR representatives to provide advice, revise and plan CEPHR development.

CEPHR European HIV Seminars reassumed after COVID and ran its 5th annual meeting. Held on June 16-17 in Dublin with the topic 'Celebrating Diversity in Science and Society', this year's meeting brought together an exciting panel of both local and international key opinion leaders in the field covering Sexual Health in Transgender people, HIV Prevention, complications of HIV (including HPV) and HIV Cure.

CEPHR was invited to showcase its pandemic research response to the HERA board. Professor Jane O'Halloran participated in a Workshop session hosted by the Department of Health during the inaugural HERA Board Meeting held in Dublin in September 2023.



Director
Professor Michael Turner

The UCD Centre for Human Reproduction at The Coombe Women Hospital was founded in 2007 and was recognised in 2015 by the Academic Council as one of the university's designated research centres. The Centre is focussed on improving outcomes in women's health and for parents and newborns through advancing clinical research and novel technology with multi-professional, multi-disciplinary collaboration. The research outputs from the Centre have provided guidance on maternity services development.

The team comprises of Neonatologists, Obstetricians, Gynaecologists and Anaesthesiologists with collaborative projects spanning areas of Epidemiology, Public Health, Human Performance, Computing, Dietetics, Midwifery, Haematology, Medical Science, Medical Education and Engineering.

Key Publications 2023

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Key Awards

2023

Use of nipple shield to measure breastmilk flow rates in term and preterm infants. Horizon 2020 Research and Innovation Program. Doolan A, White M, Kinoshita M, Turner M. €288,363.

Randomised Placebo-Controlled Trial of Early Targeted Treatment of Patent Ductus Arteriosus with Paracetamol in Extremely Low Birth Weight Infants (ETAPA). HRB/Definitive Intervention and Feasibility Awards. Miletin J. €718,576.

Safeguarding the Brain Of Our Smallest Children – an open-label phase-III randomised trial of cerebral oximetry combined with a treatment guideline versus treatment as usual in premature infants. HRB/Definitive Intervention and Feasibility Awards. Miletin J. € 982,647.

Individualized mask for infants requiring nasal Continuous Positive Airway Pressure – tailored Mask (tMASK) feasibility study. SFI/Frontiers for Future Project. Miletin J. €374,911.

Centre Updates

2023

The founder of the Centre, Professor Michael Turner, retired this year having led the Centre from its inception in 2007 to become a dynamic, multi-professional research centre with research outputs feeding into national policy planning. Dr Amy O'Higgins has taken over Professor Turner's post.

Dr Asma Fagear joined the team in August as a Special Lecturer / Clinical Tutor.



Director
Professor Fionnuala
McAuliffe

UCD Perinatal Research Centre, based at the National Maternity Hospital, Dublin, coordinates national and international collaborative research in maternal health and its impact on maternal and infant outcomes. Led by Centre Director Professor Fionnuala McAuliffe, UCD Perinatal Research Centre is internationally recognised for its research in maternal and fetal health, diabetes and nutrition in pregnancy, and impact of maternal health on long-term health of Mum and infant.

The Centre comprises researchers with backgrounds ranging from clinical obstetrics, paediatrics, nutrition, exercise physiology, behaviour and marketing, public health to health economics. The research is funded by grants from Health Research Board Ireland, Science Foundation Ireland, the European Union, and the National Maternity Hospital Medical Fund.

Key Publications

2023

Feehily C, O'Neill IJ, Walsh CJ, Moore RL, Killeen SL, Geraghty AA, Lawton EM, Byrne D, Sanchez-Gallardo R, Nori SRC, Nielsen IB, Wortmann E, Matthews E, O'Flaherty R, Rudd PM, Groeger D, Shanahan F, Saldova R, McAuliffe FM, Van Sinderen D, Cotter PD. Detailed mapping of Bifidobacterium strain transmission from mother to infant via a dual culture-based and metagenomic approach. *Nat Commun.* 2023 May 25;14(1):3015. doi: 10.1038/s41467-023-38694-0.

Moore RL, Feehily C, Killeen SL, Yelverton CA, Geraghty AA, Walsh CJ, O'Neill IJ, Nielsan IB, Lawton EM, Gallardo RS, Nori SRC, Shanahan F, Murphy EF, Van Sinderen D, Cotter PD, McAuliffe FM. Ability of Bifidobacterium breve 702258 to transfer from mother to infant: the MicrobeMom randomised controlled trial. *Am J Obstet Gynecol MFM.* 2023 May 2:100994. doi: 10.1016/j.ajogmf.2023.100994. Online ahead of print. PMID: 37142190

Yelverton CA, O'Keefe LM, Bartels HC, McDonnell C, Geraghty AA, O'Brien EC, Killeen SL, Twomey P, Kilbane M, Crowley RK, McKenna M, McAuliffe FM Association between maternal blood lipids during pregnancy and offspring growth trajectories in a predominantly macrosomic cohort: findings from the ROLO longitudinal birth cohort study. *Eur J Pediatr.* 2023 Oct 11. doi: 10.1007/s00431-023-05251-2

O'Reilly SL, Laws R, Maindal HT, Teede H, Harrison C, McAuliffe FM, Geraghty A, Campoy C, Bermúdez MG, Pirhonen L, Burden C, Davies A, Laursen DH, Skinner T; IMPACT DIABETES B2B Consortium. A Complex mHealth Coaching Intervention to Prevent Overweight, Obesity, and Diabetes in High-Risk Women in Antenatal Care: Protocol for a Hybrid Type 2 Effectiveness-Implementation Study. *JMIR Res Protoc.* 2023 Sep 18;12:e51431. doi: 10.2196/51431.

Yelverton CA, Killeen SL, Feehily C, Moore RL, Callaghan SL, Geraghty AA, Byrne DF, Walsh CJ, Lawton EM, Murphy EF, Van Sinderen D, Cotter PD, McAuliffe FM. Maternal breastfeeding is associated with offspring microbiome diversity; a secondary analysis of the MicrobeMom randomized control trial. *Front Microbiol.* 2023 Aug 31;14:1154114. doi: 10.3389/fmicb.2023.1154114. eCollection 2023.

Lee SA, Corbett GA, McAuliffe FM. Obstetric care for environmental migrants. *Ir J Med Sci.* 2023 Sep 16. doi: 10.1007/s11845-023-03481-9. Online ahead of print.

Callanan S, Killeen SL, Delahunt A, Cooney N, Cushion R, McKenna MJ, Crowley RK, Twomey PJ, Kilbane MT, McDonnell CM, Phillips CM, Cody D, McAuliffe FM. The impact of macrosomia on cardiometabolic health in preteens: findings from the ROLO longitudinal birth cohort study. *Nutr Metab (Lond).* 2023 Sep 4;20(1):37. doi: 10.1186/s12986-023-00759-8.

McGovern L, Geraghty A, McAuliffe F, O'Reilly S. An exploration of prenatal breastfeeding self-efficacy: a scoping review protocol. *Open Res Eur.* 2023 Jan 24;2:91. doi: 10.12688/openreseurope.14938.3. eCollection 2022

Yelverton CA, Geraghty AA, O'Brien EC, Killeen SL, Larkin E, Mehegan J, Cronin M,

Key Publications

2023

(cont.)

McAuliffe FM. Maternal Well-Being in Pregnancy and Breastfeeding Practices: Findings from the ROLO Study. *Am J Perinatol*. 2023 Aug 14. doi: 10.1055/s-0043-1772230.

Nguyen-Hoang L, Smith GN, Bergman L, McAuliffe FM, Poon LC; FIGO Committee on the Impact of Pregnancy on Long-Term Health* and the FIGO Division of Maternal and Newborn Health. FIGO pregnancy passport: A useful tool for women and their healthcare providers on health risks following pregnancy complications. *Int J Gynaecol Obstet*. 2023 Jul 24. doi: 10.1002/ijgo.15029

Geraghty AA, O'Brien EC, Callanan S, Mehegan J, McAuliffe FM. Cardiovascular fitness is associated with child adiposity at 5 years of age: findings from the ROLO longitudinal birth cohort study. *BMC Pediatr*. 2023 Jul 8;23(1):345. doi: 10.1186/s12887-023-04157-0

Kovács Z, Reidy F, Glover L, McAuliffe FM, Stockmann H, Kilbane MT, Twomey PJ, Peters M, Saare M, Rudd PM, Utt M, Wingfield M, Salumets A, Saldova R N-glycans from serum IgG and total serum glycoproteins specific for endometriosis. *Sci Rep*. 2023 Jun 28;13(1):10480. doi: 10.1038/s41598-023-37421-5.

Gainfort A, Delahunt A, Killeen SL, O'Reilly SL, Hébert JR, Shivappa N, McAuliffe FM. Energy-Adjusted Dietary Inflammatory Index in pregnancy and maternal cardiometabolic health: findings from the ROLO study. *AJOG Glob Rep*. 2023 Apr 24;3(2):100214. doi: 10.1016/j.xagr.2023.100214.

Cauldwell M, Adamson D, Batia K, Bhagra C, Bolger A, Everett T, Fox C, Girling J, Head C, English K, Hudsmith L, James R, Johnson M, MacKiliop L, McAuliffe FM, Mariappa G, Orchard E, O'Brien M, Siddiqui F, Simpson L, Simpson M, Timmons P, Vause S, Wander G, Walker N, Steer PJ Direct current cardioversion in pregnancy: a multicentre study. *BJOG*. 2023 Apr 11. doi: 10.1111/1471-0528.17457.

Killeen SL, Callaghan SL, O'Reilly SL, McAuliffe FM. Pregnancy Nutrition Core Outcome Set (PRENCOS): A core outcome set development study. *BJOG*. 2023 Apr 5. doi: 10.1111/1471-0528.17470.

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Cody F, Unterscheider J, Daly S, Geary M, Kennelly M, McAuliffe F, Morrison J, O'Donoghue K, Hunter A, Dicker P, Tully E, Fhearaigh R, Malone F; Perinatal Ireland Research Consortium. Dynamic growth changes in fetal growth restriction using serial ultrasonographic biometry and umbilical artery doppler: The multicenter PORTO study. *Int J Gynaecol Obstet*. 2023 Apr;161(1):198-203. doi: 10.1002/ijgo.14470

Bartels HC, O'Keefe LM, Yelverton CA, O'Neill KN, Geraghty AA, O'Brien EC, Killeen SL, McDonnell C, McAuliffe FM. Associations between maternal metabolic parameters during pregnancy and fetal and child growth trajectories from 20 weeks' gestation to 5 years of age: Secondary analysis from the ROLO longitudinal birth cohort study. *Pediatr Obes*. 2023 Jan;18(1):e12976

Ryan G, Rafferty A, Murphy J, Higgins MF, Mangina E, McAuliffe FM. Virtual reality learning: A randomized controlled trial assessing medical student knowledge of fetal development. *Int J Gynaecol Obstet*. 2023 Mar 8. doi: 10.1002/ijgo.14684.

Du Y, McNestry C, Wei L, Antoniadis AM, McAuliffe FM, Mooney C. Machine learning-based clinical decision support systems for pregnancy care: A systematic review. *Int J Med Inform*. 2023 Mar 8;173:105040. doi: 10.1016/j.ijmedinf.2023.105040.

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overweight and obesity in children? A scoping review. *Lancet Glob Health*. 2023 Mar;11 Suppl 1:S20. doi: 10.1016/S2214-109X(23)00103-1.

Choedon T, Sethi V, Killeen SL, Ganjekar S, Satyanarayana V, Ghosh S, Jacob CM, McAuliffe FM, Hanson MA, Chandra P. Integrating nutrition and mental health screening, risk identification and management in antenatal health programmes in India. *Int J Gynaecol Obstet*. 2023 Feb 19. doi: 10.1002/ijgo.14728

Du Y, Rafferty AR, McAuliffe FM, Mehegan J, Mooney C. Towards an explainable clinical decision support system for large-for-gestational-age births. *PLoS One*. 2023 Feb 21;18(2):e0281821. doi: 10.1371/journal.pone.0281821

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Delahunt A, Callanan S, Killeen SL, McDonnell CM, McAuliffe FM. Including the child's voice in research from a longitudinal birth cohort: insights from the ROLO young person's advisory group. *Res Involv Engagem*. 2023 Feb 9;9(1):2. doi: 10.1186/s40900-023-00411-y

Rooney DJ, Conway M, O'Keeffe LM, McDonnell CM, Bartels HC, Yelverton C, Segurado R, Mehegan J, McAuliffe FM. Dietary intakes of iron, folate, and vitamin B12 during pregnancy and correlation with maternal hemoglobin and fetal growth: findings from the ROLO longitudinal birth cohort study. *Arch Gynecol Obstet*. 2023 Jan 28. doi: 10.1007/s00404-023-06916-x

McAuliffe FM. Impact of pregnancy on long-term health: Advances in postpregnancy care—An opportunity to improve long-term maternal health. *Int J Gynaecol Obstet*. 2023 Jan;160 Suppl 1:4-6. doi: 10.1002/ijgo.14536.

Soepnel LM, Draper CE, Mabetha K, Mogashoa L, Mabena G, McAuliffe FM, Killeen SL, Jacob CM, Hanson MA, Norris SA. Evaluating implementation of the FIGO Nutrition Checklist for preconception and pregnancy within the Bukhali trial in Soweto, South Africa. *Int J Gynaecol Obstet*. 2023 Jan;160 Suppl 1:68-79. doi: 10.1002/ijgo.14541

Hypertensive disorders of pregnancy and long-term cardiovascular health: FIGO Best Practice Advice.

Poon LC, Nguyen-Hoang L, Smith GN, Bergman L, O'Brien P, Hod M, Okong P, Kapur A, Maxwell CV, McIntyre HD, Jacobsson B, Algurjia E, Hanson MA, Rosser ML, Ma RC, O'Reilly SL, Regan L, Adam S, Medina VP, McAuliffe FM; FIGO Committee on Impact of Pregnancy on Long-term Health and the FIGO Division of Maternal and Newborn Health. *Int J Gynaecol Obstet*. 2023 Jan;160 Suppl 1:22-34. doi: 10.1002/ijgo.14540.

The challenges of obesity for fertility: A FIGO literature review.

Gautam D, Purandare N, Maxwell CV, Rosser ML, O'Brien P, Mocanu E, McKeown C, Malhotra J, McAuliffe FM; FIGO Committee on Impact of Pregnancy on Long-term Health and the FIGO Committee on Reproductive Medicine, Endocrinology and Infertility. *Int J Gynaecol Obstet*. 2023 Jan;160 Suppl 1:50-55. doi: 10.1002/ijgo.14538.

Management of obesity across women's life course: FIGO Best Practice Advice.

Maxwell CV, Shirley R, O'Higgins AC, Rosser ML, O'Brien P, Hod M, O'Reilly SL, Medina VP, Smith GN, Hanson MA, Adam S, Ma RC, Kapur A, McIntyre HD, Jacobsson B, Poon LC, Bergman L, Regan L, Algurjia E, McAuliffe FM; FIGO Committee on Impact of Pregnancy on Long-term Health and the FIGO Division of Maternal and Newborn Health. *Int J Gynaecol Obstet*. 2023 Jan;160 Suppl 1:35-49. doi: 10.1002/ijgo.14549.

Pregnancy as an opportunity to prevent type 2 diabetes mellitus: FIGO Best Practice Advice.

Key Publications

2023

(cont.)

Adam S, McIntyre HD, Tsoi KY, Kapur A, Ma RC, Dias S, Okong P, Hod M, Poon LC, Smith GN, Bergman L, Algurjia E, O'Brien P, Medina VP, Maxwell CV, Regan L, Rosser ML, Jacobsson B, Hanson MA, O'Reilly SL, McAuliffe FM; FIGO Committee on the Impact of Pregnancy on Long-term Health and the FIGO Division of Maternal and Newborn Health. *Int J Gynaecol Obstet.* 2023 Jan;160 Suppl 1:56-67. doi: 10.1002/ijgo.14537

Using FIGO Nutrition Checklist counselling in pregnancy: A review to support healthcare professionals.

Killeen SL, Donnellan N, O'Reilly SL, Hanson MA, Rosser ML, Medina VP, Jacob CM, Divakar H, Hod M, Poon LC, Bergman L, O'Brien P, Kapur A, Jacobsson B, Maxwell CV, McIntyre HD, Regan L, Algurjia E, Ma RC, Adam S, McAuliffe FM; FIGO Committee on Impact of Pregnancy on Long-term Health and the FIGO Division of Maternal and Newborn Health. *Int J Gynaecol Obstet.* 2023 Jan;160 Suppl 1:10-21. doi: 10.1002/ijgo.14539.

Bartels HC, Walsh JM, O'Connor C, McParland P, Carroll S, Higgins S, Mulligan KM, Downey P, Brophy D, Colleran G, Thompson C, Walsh T, O'Brien DJ, Brennan DJ, McVey R, McAuliffe FM, Donnelly J, Corcoran SM. Placenta accreta spectrum ultrasound stage and fetal growth. *Int J Gynaecol Obstet.* 2023 Mar;160(3):955-961.

Gautam D, Ryan GA, McAuliffe FM, Purandare N Armed conflict-Women: Most affected but least responsible. *Int J Gynaecol Obstet.* 2023 Feb;160(2):450-451.

O'Reilly SL, Conway MC, O'Brien EC, Molloy E, Walker H, O'Carroll E, McAuliffe FM. Exploring Successful Breastfeeding Behaviors Among Women Who Have High Body Mass Indices.

J Hum Lact. 2023 Feb;39(1):82-92.

Key Awards

2023

2023 The UK Nutrition Society summer conference, Liverpool July 2023 Sophie Callanan PhD (PI Professor McAuliffe from UCD Perinatal Research Centre) received best oral presentation for study entitled 'breastfeeding behavior and cardiovascular risk in later reproductive age women'.

Key Grants

2023

Professor McAuliffe, UCD Perinatal Research Centre as co PI with Professor Niamh Nowlan PI from Biomedical Engineering received Wellcome Leap award for a project entitled 'Fetal movement monitor' from 2022-2025 for €1,500,000. This study will evaluate a novel fetal movement monitor in pregnancy, with a view to reducing stillbirth.

Other grants include: National Children's Research Centre, Science Foundation Ireland, Tallaght Hospital Fund, NMH Medical Fund, EU Horizon.

Centre Updates

2023

Professor Fionnuala McAuliffe, was elected onto the executive council of the International Federation of Gynecology and Obstetrics (FIGO) for 2023-2025. FIGO, with member societies in 139 countries/territories, is the only organisation that brings together professional societies of obstetricians and gynecologists on a global basis. Ireland will contribute through the development of clinically relevant guidelines and easy to use clinical toolkits, and through the promotion of optimal nutrition in high, middle and low income countries.

Anna Delahunt was awarded her PhD entitled 'Determinants of appetitive traits in children aged 5 and 9-11 years old: Findings from the ROLO longitudinal birth cohort study'.

Dr Grace Ryan was awarded her MD entitled 'Exploring the Role of Immersive Technology in Medical Education'.

Dr Kristyn Dunlop and Dr Clare Kennedy joined Dr Gillian Corbett and Dr Fiona O'Toole as Academic Clinical Fellows and PhD/MD students.

Dr Gillian Corbett and Dr Siobhan Corcoran established the first Irish Preterm birth advisory council for PPI engagement in our service and research.

Bump 2 Baby and me RCT finished recruitment of 800 patients worldwide and follow up to 1 year postpartum is in progress.

Ai Premie recruiting women to a prospective study examining the ability of AI to predict the later development of pre-eclampsia.

Latch-on Study completed study recruitment – a multicentre RCT to improve breastfeeding in women with BMI>25 and submitted for publication.

PrePop study actively recruiting women at risk of preterm birth, which is an RCT of probiotics vs placebo to improve vaginal microbiome.

IronMother commenced, UCD CRC supported RCT of treatment of iron deficiency anaemia in pregnancy.

Alcohol screening in pregnancy study commenced in collaboration with Professor Aiden McCormick.



Director
Professor Ronan Cahill

UCD Centre for Precision Surgery is an applied research, education and training facility dedicated to excellence in surgical practice and the future of surgical care. Research and training is focused on the fusion of technology and real-time data analytics in the operating theatre. The centre is led by Professor Ronan Cahill, Colorectal Surgeon and UCD-Mater Full Professor of Surgery and includes a team of surgical researchers, engineers, biomolecular scientists, data analysts and domain experts. The Centre comprises the Digital Surgery Unit and the Clinical Anatomy Centre.

The Digital Surgery Unit was established at the Mater Misericordiae University Hospital in 2019 to facilitate engagement in impactful research in response to global healthcare challenges including cancer care and, as events unfolded, Covid-19. The Clinical Anatomy Centre, established in 2017, is located in the original Mater operating theatres and offers an advanced skills training and simulation facility where new technologies, systems and procedures can be introduced, perfected and embedded. The combined capability of the Digital Surgery Unit and the Clinical Anatomy Centre offer an unrivalled national resource for consolidating & scaling surgical training, skills development, simulation and research on a clinical site.

Key Publications 2023

Moynihan, A., Hardy, N., Dalli, J., Aigner, F., Arezzo, A., Hompes, R., et al. CLASSICA: Validating artificial intelligence in classifying cancer in real time during surgery. *Colorectal Dis.* 2023; 00: 1–11. <https://doi.org/10.1111/codi.16769>

Clinical Experience of a Smart Articulating Digital Device For Transanal Minimally Invasive Surgery. Khan MF, Kearns E, Cahill RA. *Dis Colon Rectum.* 2023 Sep 25. doi: 10.1097/DCR.0000000000002987. PMID: 37787571

Intra-operative in-line holographic display of patient-specific anatomy via a three-dimensional virtual model during laparoscopic right hemicolectomy for colon cancer: Video correspondence - A video vignette. Moynihan A, Khan MF, Cahill RA. *Colorectal Dis.* 2023 Oct;25(10):2122-2123. doi: 10.1111/codi.16744. Epub 2023 Sep 13. PMID: 37705193

Ethical perspectives on surgical video recording for patients, surgeons and society: systematic review. Walsh R, Kearns EC, Moynihan A, Gerke S, Duffourc M, Corrales Compagnucci M, Minssen T, Cahill RA. *BJS Open.* 2023 May 5;7(3):zrad063. doi: 10.1093/bjsopen/zrad063. PMID: 37354452

Fluorescence-guided surgery: comprehensive review. Sutton PA, van Dam MA, Cahill RA, Mieog S, Polom K, Vahrmeijer AL, van der Vorst J. *BJS Open.* 2023 May 5;7(3):zrad049. doi: 10.1093/bjsopen/zrad049. PMID: 37183598

Reusable cloth masks in operating theatre. Collard MK, Vaz A, Irving H, Khan MF, Mullis D, Brady D, Nolan K, Cahill R. *Br J Surg.* 2023 Sep 6;110(10):1260-1263. doi: 10.1093/bjs/znad104. PMID: 37119205

Evaluating clinical near-infrared surgical camera systems with a view to optimizing operator and computational signal analysis. Dalli J, Jindal A, Gallagher G, Epperlein JP, Hardy NP, Malallah R, O'Donoghue K, Cantillon-Murphy P, Mac Aonghusa PG, Cahill RA. *J Biomed Opt.* 2023 Mar;28(3):035002. doi: 10.1117/1.JBO.28.3.035002. Epub 2023 Mar 29. PMID: 37009578

Real-time administration of indocyanine green in combination with computer vision and artificial intelligence for the identification and delineation of colorectal liver metastases. Hardy NP, Epperlein JP, Dalli J, Robertson W, Liddy R, Aird JJ, Mulligan N, Neary PM, McEntee GP, Conneely JB, Cahill RA. *Surg Open Sci.* 2023 Mar 2;12:48-54. doi: 10.1016/j.sopen.2023.03.004. eCollection 2023 Mar. PMID: 36936453

Key Publications

2023

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BF2-Azadipyrrromethene Fluorophores for Intraoperative Vital Structure Identification. Caulfield C, Wu D, Miller IS, Byrne AT, Mac Aonghusa P, Zhuk S, Cinelli L, Bannone E, Marescaux J, Gioux S, Diana M, March TL, Vahrmeijer AL, Cahill R, O'Shea DF. *Molecules*. 2023 Feb 25;28(5):2167. doi: 10.3390/molecules28052167. PMID: 36903411

Clinical application of machine learning and computer vision to indocyanine green quantification for dynamic intraoperative tissue characterisation: how to do it. Hardy NP, MacAonghusa P, Dalli J, Gallagher G, Epperlein JP, Shields C, Mulsow J, Rogers AC, Brannigan AE, Conneely JB, Neary PM, Cahill RA. *Surg Endosc*. 2023 Aug;37(8):6361-6370. doi: 10.1007/s00464-023-09963-2. Epub 2023 Mar 9. PMID: 36894810

Age alone is not a barrier to efficacy of cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for colorectal peritoneal metastases: analysis of 1138 patients from the UK and Ireland Colorectal Peritoneal Metastases Registry. Kelly ME, O'Sullivan NJ, Bolger JC, Polignano F, Youssef H, Renehan A, Malcomson L, Alves S, Cecil T, Mulsow J, Moran B, Mohamed F; UK & Ireland Colorectal Peritoneal Metastases Registry. *Br J Cancer*. 2023 Jan;128(1):42-47. doi: 10.1038/s41416-022-02037-5. Epub 2022 Nov 8. PMID: 36347966

NIR-ICG identification of ureters during complex colorectal and gynaecological operations: How to do it! - A video vignette. Khan MF, Emma K, O'Brien E, Galvin D, Walsh T, Cahill RA. *Colorectal Dis*. 2023 Mar;25(3):528-529. doi: 10.1111/codi.16374. Epub 2022 Oct 27. PMID: 36239664

Implementation of an on-site simulation programme during COVID-19 and the assessment of its impact on medical students' competence. McInerney NJ, Khan MF, Coady L, Dalli J, Stokes M, Donnelly S, Heneghan H, Cahill R. *Ir J Med Sci*. 2023 Jun;192(3):1009-1014. doi: 10.1007/s11845-022-03057-z. Epub 2022 Jun 22. PMID: 35732874

Centre Updates

2023

UCD Centre for Precision Surgery key personnel & affiliates 2023:

- Professor Ronan Cahill - Director, UCD Centre for Precision Surgery; Consultant Colorectal Surgeon; UCD-MMUH Professor of Surgery
- Professor James Jones - Professor of Anatomy, UCD
- Dr Kevin Nolan -Assistant Professor of Mechanical and Materials Engineering, UCD
- Debbie Killeen -Research Project Manager, UCD
- Mr. Faraz Khan - Colorectal Surgeon MMUH; Surgical Lecturer UCD
- Mr. Niall Hardy - SpR; PhD Candidate in Translational Medicine "Artificial Intelligence and Colorectal Cancer"
- Mr. Jeffrey Dalli - SpR; PhD Candidate in Translational Medicine "Application of Artificial Intelligence Methods to optimise intraoperative tissue perfusion assessment"
- Ms. Alice Moynihan - SpR; MD Student "Validation of New Methods for Image Guided Surgery"
- Dr. Cathleen McCarrick - Special Lecturer/Clinical Tutor UCD
- Dr. Emma Kearns - Special Lecturer/Clinical Tutor UCD
- Christian Myles - Senior Technical Officer, UCD Anatomy; PhD Candidate
- Anwesha Sarkar - PhD Candidate "Study on the mechanistic cellular uptake of surgical probe Indocyanine green in colorectal cancer model systems"
- Mr. Gareth Gallagher - Research Engineer, UCD
- Dr. Ra'ed Malallah - Research Engineer, UCD

Centre Updates

2023

UCD Centre for Precision Surgery key events 2023:

- 50 training events held at the Clinical Anatomy Centre in 2023 included wet labs, specialty-specific skills workshops and study days.
- Immersive art exhibition 25-28th March 2023: 'Beyond the Surface: Art, Illuminating the Future of Surgery'
www.artsandhealth.ie/2023/03/10/the-mater-misericordiae-university-hospital-presents-beyond-the-surface-art-illuminating-the-future-of-surgery
- The Future of Surgery - UCD Festival, 10th June 2023
festival.ucd.ie/events/the-future-of-surgery



Director
Professor Amanda McCann

The UCD Centre in Translational Oncology (UCTO) consolidates and gives a unified identity to cancer research across basic and clinical academic staff affiliated to UCD (~80) who are dedicated to foster excellence in cancer research, with the ultimate goal of improving personalised patient treatment and care. UCTO membership spans across two UCD Colleges (College of Health and Agricultural Sciences (CHAS) and the College of Science), five UCD Schools (School of Medicine, School of Veterinary Science, School of Public Health Physiotherapy and Sports Science, School of Nursing Midwifery and Health Systems, School of Biomolecular and Biomedical Science, affiliated institutes (for example UCD Conway Institute, Systems Biology Ireland and UCD Hospital Cancer Centres of Excellence/affiliated teaching Hospital sites (including Saint Vincent's University Hospital (SVUH), the Mater Misericordiae University Hospital (MMUH) and Our Lady's Children's Hospital Crumlin (OLCHC). These hospitals represent 3 of the 9 designated cancer centres of excellence in Ireland. The amalgamation of this critical mass of clinical and research expertise in the UCTO, continues to foster multidisciplinary research and collaboration into the future, to the benefit of increasing knowledge about cancer and enhance patient care across all ages and cancer types.

The UCTO has established channels of communication with patients, through clinical members, and through the director's (AMcC) additional role as Chair of the Patient Voice in Cancer Research (PVCR) committee for which she was awarded a UCD Values in Action (VIA) award in 2019. These links give UCTO colleagues unprecedented possibilities to implicitly involve patients in the research journey from hypothesis inception to grant application and project implementation, through to public/scientific/funder dissemination. Patient involvement is a key strategic vision for UCTO.

UCTO was approved in February 2017 and officially launched by Professor Cecily Kelleher (CHAS Principal) and UCTO Director 21st September 2018.

Key Publications 2023

Long non-coding RNAs: definitions functions challenges and recommendations
Mattick, J.S Wu, M. Nature Reviews Molecular Cell Biology 10.1038/s41580-022-00566-8

GENCODE: reference annotation for the human and mouse genomes in 2023
Frankish, A Flicek, P. Nucleic Acids Research 10.1093/nar/gkac1071

An update on the pathological classification of breast cancer
Rakha, E.A Quinn, C.M. Histopathology 10.1111/his.14786

Testosterone suppression plus enzalutamide versus testosterone suppression plus standard antiandrogen therapy for metastatic hormone-sensitive prostate cancer (ENZAMET): an international open-label
Sweeney, C.J Thomas, C. The Lancet Oncology 10.1016/S1470-2045(23)00063-3

Accurate liquid biopsy for the diagnosis of non-alcoholic steatohepatitis and liver fibrosis
Angelini, G Mingrone, G. Gut 10.1136/gutjnl-2022-327498

Aberrant protein expression of Appl1 Sortilin and Syndecan-1 during the biological progression of prostate cancer
Martini, C Brooks, D.A. Pathology 10.1016/j.pathol.2022.08.001

Tirzepatide once weekly for the treatment of obesity in people with type 2 diabetes (SURMOUNT-2): a double-blind randomised multicentre placebo-controlled phase 3 trial
Garvey, W.T Jones, T. The Lancet 10.1016/S0140-6736(23)01200-X

Trends and predictions of malnutrition and obesity in 204 countries and territories: an analysis of the Global Burden of Disease Study 2019
Chong, B Chew, N.W.S. eClinicalMedicine 10.1016/j.eclinm.2023.101850
Tirzepatide for the treatment of obesity: Rationale and design of the SURMOUNT clinical development program
le Roux, C.W Bunck, M.C. Obesity 10.1002/oby.23612

Key Publications

2023

(cont.)

- European Respiratory Society statement on familial pulmonary fibrosis Borie, R van Moorsel, C.H.M. European Respiratory Journal 10.1183/13993003.01383-2022
- The efficacy of GLP-1RAs for the management of postprandial hypoglycemia following bariatric surgery: a systematic review Llewellyn, D.C Dimitriadis, G.K. Obesity 10.1002/oby.23600
- Postoperative recovery with continuous erector spinae plane block or video-assisted paravertebral block after minimally invasive thoracic surgery: a prospective randomised controlled trial Moorthy, A Buggy, D.J. British Journal of Anaesthesia 10.1016/j.bja.2022.07.051
- Use of digital measurement of medication adherence and lung function to guide the management of uncontrolled asthma (INCA Sun): a multicentre single-blinded randomised clinical trial Hale, E.M Costello, R.W. The Lancet Respiratory Medicine Lancet Diabetes & Endocrinology Commission on the Definition and Diagnosis of Clinical Obesity Rubino, F Cummings, D.E. The Lancet Diabetes and Endocrinology 10.1016/S2213-8587(23)00058-X
- A systematic review of oncological outcomes after nipple-sparing mastectomy for breast cancer Zaborowski, A.M Prichard, R.S. Journal of Surgical Oncology 10.1002/jso.27115
- Dynamic regulation of RAS and RAS signaling Kolch, W Rosta, E. Biochemical Journal 10.1042/BCJ20220234
- Rationale and trial design of NATALEE: a Phase III trial of adjuvant ribociclib + endocrine therapy versus endocrine therapy alone in patients with HR+/HER2⁺ early breast cancer Slamon, D.J Hortobagyi, G.N. Therapeutic Advances in Medical Oncology 10.1177/17588359231178125
- Prognostication in Advanced Cancer by Combining Actigraphy-Derived Rest-Activity and Sleep Parameters with Routine Clinical Data: An Exploratory Machine Learning Study Patel, S.D Dijk, D.-J. Cancers 10.3390/cancers15020503
- Diminishing benefits of urban living for children and adolescents' growth and development Mishra, A González-Gil, E.M. Nature 10.1038/s41586-023-05772-8
- CanScreen5 a global repository for breast cervical and colorectal cancer screening programs Zhang, L Layne, M.A. Nature Medicine 10.1038/s41591-023-02315-6
- The value of injectable viscoelastic supplements for joints Bowden, D.J Kavanagh, E.C. Skeletal Radiology 10.1007/s00256-022-04178-3
- Buccal delivery of small molecules and biologics: Of mucoadhesive polymers films and nanoparticles " An update Nair, V.V Morales, J.O. International Journal of Pharmaceutics 10.1016/j.ijpharm.2023.122789
- Anaesthesia analgesia and cancer outcomes: time to think like oncologists? Mincer, J.S Buggy, D.J. British Journal of Anaesthesia 10.1016/j.bja.2023.02.001

Key Grants

2023

(cont.)

Department of Housing Local Government and Heritage Helen Roche UCD Research UCD-Met Eireann Research Professorship Programme (UCD/ME ResProf) 4997707
University College Dublin Foundation Clg Walter Kolch Medicine Childhood Cancer Project MAGIC I1326500

Science Foundation Ireland (SFI) Walter Kolch Medicine The Role of Dynamic Protein-Protein Interaction Changes in Adaptive Drug Resistance 1298722

Science Foundation Ireland (SFI) Melinda Halasz Medicine Understanding and exploiting dysregulated mitochondrial metabolism and epigenetics for the therapy of MYCN-driven neuroblastoma 614492

Science Foundation Ireland (SFI) Noreen Sheehy Medicine ViroSPEC "Developing label free spectroscopic techniques for virology a novel analytical approach through multidisciplinary partnership 608513

Horizon Europe David Brayden Veterinary Medicine Development of a multifunctional biomaterial patch for buccal delivery of peptide-analogue treatments (BUCCAL-PEP) 586896

Science Foundation Ireland (SFI) Oleksii Rukhlenko Medicine Using cyber-physical network modelling to tackle RAS-driven cancers 566035

Boehringer Ingelheim Ltd. Walter Kolch Medicine Understanding allele- and compound-specific KRAS target engagement pERK activation and non-genetic resistance by systems pharmacology 499131

The Wellcome Trust (WT) Eric Conway Biomolecular & Biomed Science Short Circuit: Drugging the super-enhancer network in AML 485153

Horizon Europe Margaret Mcgee Biomolecular & Biomed Science Twinning for Promoting Excellence Ability and Knowledge to develop novel approaches for targeting inflammatory and degenerative age-related joint diseases (TWINFLAG) 400000

European Science Foundation (Esf) Walter Kolch Medicine Digital Cancer Twins for Kids Digitwins 385074

Centre Updates

2023

The prestigious Millin Lecture and medal recognises excellence in original research and is one of the highlights of the surgical calendar each year at the Royal College of Surgeons. In March this year the Millin Lecture was delivered by Assoc Professor Shirley Potter, a Consultant Plastic and Reconstructive Surgeon at the Mater Misericordiae University Hospital and Associate Professor in the School of Medicine at UCD. The title of her talk was Malignant Melanoma, an unlikely poster child for personalised cancer treatment, and it highlighted her ongoing research at The Conway Institute and The Charles Institute at UCD. As a newly accepted Conway Fellow, Professor Potter has recently been appointed as one of the Personalised and Translational Medicine theme champions for The Conway and hopes to strengthen clinical and academic partnerships.



Director
Professor Walter Kolch

Systems Biology Ireland investigates new therapeutic approaches to disease, with a focus on cancer at a systems level. We use a combination of traditional wet-lab and computational modeling approaches to understand cellular signaling networks.

Systems Biology Ireland (SBI) specialises in cellular signal transduction investigation with a particular focus on development of new diagnostics and treatment strategies for diseases. The centre has expertise in:

- Drug target and biomarker discovery
- Patient stratification and sub-population characterisation
- Combination therapy prediction and screening
- Protein-Protein interaction profiling
- Computational network inference and modelling
- Dynamic mechanistic disease models

We collaborate nationally and internationally to produce high impact research that delivers tangible results for patients and clinicians.

Key Publications

2023

SBI researchers, Professors Boris Kholodenko, Walter Kolch and Dr. Oleksii Rukhlenko developed a novel approach, termed cSTAR (cell State Transition Assessment and Regulation) published in Nature in September last year and reviewed in Trends of Cell Biology. cSTAR paves the way to control cell fate decisions by therapeutic drugs and reverse pathological cell states back to health. This publication was featured in Irish media and chosen as a topic of discussion in the popular "The Stem Cell Podcast". More recently, SBI researchers used the unique cSTAR approach to distinguish TB-susceptible and TB-resistant immune response patterns in mice and identified compounds that enhance the resistance of the TB-susceptible mice to virulent M. tuberculosis, converting susceptible to resistant states. The article describing this work will be published in Science Advances in September 2023.

SBI researchers funded through the Precision Oncology Ireland programme published a study on immunotherapy response in melanoma in collaboration with the company AstraZeneca in Cancer Immunology Research in August 2023.

Professor Cormac Taylor's lab published an article in PNAS in August 2023 which identified a new mechanism of controlling glucose metabolism in hypoxia in August 2023.

Key Awards

2023

Professor Des Higgins, former Principal Investigator at Systems Biology Ireland who retired after an illustrious position at UCD at the end of 2022 won the 2023 EMBL Alumni Award in March 2023.

Professor Walter Kolch, Director of Systems Biology Ireland, received the Science Foundation Ireland (SFI) Mentorship Award 2022 at the annual SFI Summit in Limerick in November 2022.

Key Grants

2023

SBI in collaboration with Children's Health Ireland secured €2.35M funding for a 5-year programme entitled Molecular and Genomic Interrogation of Childhood Cancer "MAGIC-I" which will explore the use of genome sequencing and digital twins in clinical practice. The project which originated from Philanthropic Giving and supplemented with industry co-funding was launched on 1st July 2023. It is one of four recently funded projects in the childhood cancer space being led out of SBI.

SBI researchers were incredibly successful in securing SFI funded individual awards over the past 12 months; Professor Cormac Taylor was awarded an SFI Frontiers for the Future Programme (~950K), Professor Walter Kolch was awarded an SFI Frontiers for the Future Programme (~1.3M), Dr. Melinda Halasz was awarded an SFI Frontiers for the Future Programme co-funded by Children's Health Foundation (~614K) and Dr. Oleksii Rukhlenko was awarded an SFI-IRC Pathway Programme (~567K)

Centre Updates

2023

SBI has been extremely active in the public engagement space over the past 12 months. Together with UCD Conway the Centre secured a fifth round of funding for its ABE Ireland School's Outreach Programme (which has reached ~250 teachers to date enabling them to conduct ABE practicals in the classroom with more than 15,500 students), a second round of funding for its transition year (TY) placement programme CuriosiTY (pilot programme hosted 72 TY students from Dublin city and county in UCD labs and the current round will host 192 students from 6 counties in the East and Northeast). SBI researcher Dr. Oleksii Rukhlenko worked with secondary school student Ayush Tambde (sixth year in Stratford College) on his submission to the BT Young Scientist & Technology Exhibition. Ayush won the prize for Best Individual, with his project, 'Analysis of single-cell proteomic data to understand the mechanisms of oncogenic transformation and how to control them' and Horizon Student Award for the best overall Biological and Ecological project.

The SBI Centre is also reaching out to the public through activity on its SFI Strategic Partnership programme Precision Oncology Ireland (POI). The Invisible Spectrum initiative is a community focused multi-lingual event organised through POI aimed at engaging minority community groups (e.g. Bangladeshi community) in science and cancer research. ~200 Bangladeshi community members have participated to date. Other outreach events held by POI over the past 12 months include the POI Public Showcase (approximately 170 attendees across 3 locations), AstraZeneca Open Day (approximately 20 attendees), Meeting delegates from Flanders & Heilbronn (20 attendees), UCC "Night on the Plaza" (200 attendees), judging at the ESB Science Blast (class of 30 schoolchildren), promotional booth at the 2023 IACR conference (around 200 attendees), participating in large-scale events on UCD campus with several hundred in attendance, including Choirs for Cancer and the UCD Festival, giving POI a total estimated outreach of up to 1,385.

Professor Cormac Taylor organised the HypoxEU conference in the O'Reilly Hall (11th – 13th September 2022). This international conference attracted over 200 national and international delegates. The Keynote was delivered by 2019 Nobel laureate Professor Sir Peter Ratcliffe.

Professor Jonathan Bond is co-PI of a new European collaborative translational research project linked to the ALLTogether Clinical Study, which is the largest childhood, adolescent and young adult leukaemia clinical trial ever undertaken in Europe. During the new ALLTogether T-ALL Team Science Study, funded by the Fight Kids Cancer charity, researchers across six European centres will create 60 murine patient-derived xenograft models of treatment resistant T-ALL. Samples will undergo comprehensive molecular profiling, including proteomics analysis at SBI, UCD. These data will be integrated using Digital Twin approaches by Professor Bond in collaboration with Professor Kolch at SBI. The aim of the study is to identify new therapy approaches for these high-risk childhood blood cancers that can be tested in drug screening efforts linked to the A2G clinical programme.

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