

HEALTH RESEARCH INSTITUTE

IMPACT to address
GRAND SOCIETAL
CHALLENGES

Annual Report 2018



UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

Health Technologies

Lifestyle and Health

Health Services Delivery

Public and Patient
Involvement



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Message from the Director

Prof. Rachel Msetfi

2018 has been an exciting year for the Health Research Institute (HRI), marked by the success of it's members in publications and funding, the provision of significant support for large and small interdisciplinary research groups to enhance their developing capacity, the welcoming of new members, including graduate and affiliate members from our partner organisations, the organisation of a full range of community research support activities, and a new strategic appointment.

This year also marked a closer alignment between the HRI, the University of Limerick (UL) Faculty of Education and Health Sciences (EHS) and the University of Limerick Hospital Group (ULHG). This alignment and cooperation in working together on research and innovation has acted as a catalyst in delivering the type of supportive ecosystem needed to develop research capacity as envisioned in the UL research strategy. This strategy highlighted investment in People and Ecosystem and ensuring Research Excellence with Impact as areas of focus. The potential for this work to be translated into clinical transformation cannot be underestimated.

The continued development of clinical research at UL and ULHG is an important strategic goal for both institutions. 2018 saw this development accelerate with UL joining Clinical Research Development Ireland and the HRB-funded Clinical Research Coordination Ireland consortia. The value for patients and the public of the availability of clinical trials is clear, with promising new treatments being made available to patients through research. The HRI Clinical Research Support Unit, which is based at the University Hospital Limerick Clinical Education and Research Centre is leading the way on this for Limerick, with continued support from our hospital group partners.

The HRI places great value on interdisciplinary research in addressing grand societal challenges; no one discipline can do this alone. Thus, our research themes cross disciplines and faculties as well as institutions, including Health Technologies, Lifestyle and Health, Health Services Delivery and Public and Patient Involvement in Research. I am delighted that the new research groups are consistent with this ethos, and include interdisciplinary approaches to ageing, cancer, physical activity, implementation science, migrant health, and product design. These groups will contribute to the continued development of our research community and collaborations over the coming years.

Moving forward, the HRI will continue to develop the existing portfolio consistent with our interdisciplinary ethos. We will continue to provide support for our members and nurture our partnerships, as well as develop our linkages with other UL institutes, including the Bernal Institute and Lero, the Irish Software Research Centre. This will support the continued development of the Biomedical Sciences programme at UL, which has been accelerated by our 2018 appointment of Paul Murray as Professor of Molecular Pathology with a special focus on translational cancer research.



Prof. Rachel Msetfi



interdisciplinary
research addressing
grand societal challenges
**no one discipline can
do this alone.**

Introduction

to the Health Research Institute

The establishment of the Health Research Institute (HRI) at UL in 2014 represented a major milestone and an ambitious plan in the development of the university's overall strategic goals to nurture and develop an international reputation in excellent health-related research with impact. The development of a unique health ecosystem, which enables, promotes and supports multidisciplinary collaborative research in health with a translational focus is a key element of the HRI's ethos.

The HRI capitalises on several distinctive strengths and capabilities, which have emerged in the University's development. The growth of impactful, internationally competitive research portfolios in the areas of Lifestyle and Health, Health Services Delivery, Health Technologies, and Public and Patient Involvement (PPI) provide unique opportunities for UL to forge distinctiveness and make real advances in becoming a global health research leader.

Building on earlier successes, the Institute advances interdisciplinary research that will bring about innovative solutions for disease prevention, healthcare delivery, and the health and wellbeing of the population. Our Clinical Research Support Unit (CRSU), located on the grounds of UHL, propels our collaborative vision, and further develops our holistic approach to research.

The HRI strategic plan articulates our vision, mission, values and commitment to creating critical mass and expertise in health research by establishing key priorities and outlining major milestones and targets. It describes the

supportive framework required to achieve our ambitions. The cornerstone of this ambitious strategy is based on a research culture which encourages person-centred interdisciplinary research that fosters partnerships and empowers our research teams to conduct world-class studies and become international research leaders.

Our strategy is fully aligned with the current University of Limerick's strategic goals. It was developed in partnership with our members and with consultation from our health research community.

This 2018 annual report summarises the achievements of our members towards realising our strategic goals outlined above, and gives an overview of the support mechanisms made available through the HRI.



creating critical
mass & expertise
in health research



Mission, Vision & Goals



Mission The HRI will conduct outstanding person-centred research to enhance the health and wellbeing of individuals and transform the health environment for the population.

Vision The HRI will be an internationally recognised research institute that delivers excellent research with impact in areas of Lifestyle and Health, Health Services Delivery, Health Technologies, and Public and Patient Involvement (PPI). It will foster a culture of interdisciplinary research collaborations to support discovery and innovation in health and wellbeing while also enhancing research training.

To realise this vision, we are committed to building and supporting a culture of research excellence and impact that will enhance our international reputation and become a point of pride and a key aspect of our identity.

Goals By specifying strategic goals, the HRI is identifying a roadmap to be followed for realising its vision. The strategy identifies a number of objectives with respect to each goal, and each objective is associated with a number of specific action items and targets/outcomes.

The success of the HRI is based around the achievement of the following four strategic goals:

- 1. Research excellence** - Deliver excellent research to establish our reputation as a Health Research Institute
- 2. Impact** - Leverage our position as the bridge between the clinically-based and university-based researchers to make an impact on patient health and wellbeing
- 3. People and ecosystem** - Invest in and empower our people through a culture of excellence and impact
- 4. International reach** - Extend our international reach by engaging in collaborative partnerships and disseminating research

Main Achievements

2018 Overview

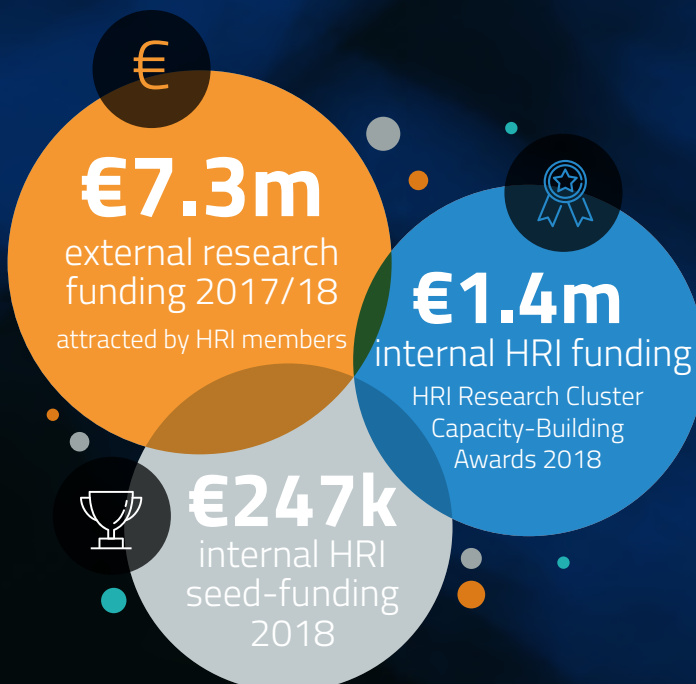
We introduced new membership types in 2018:

- Postgraduate & Postdoctoral Membership
- Affiliated Membership

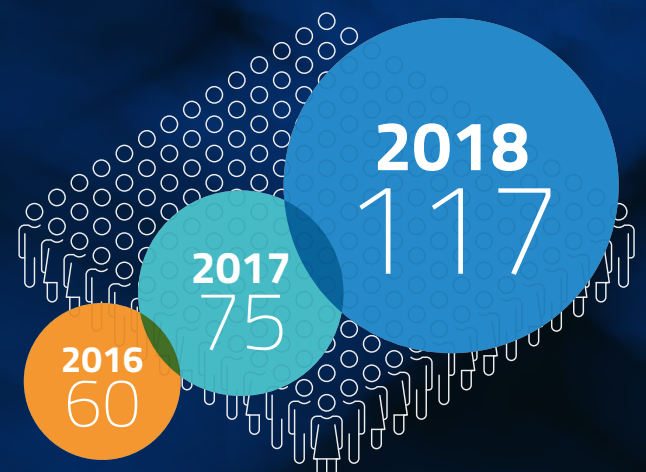
HRI Membership 2018



HRI Funding 2018

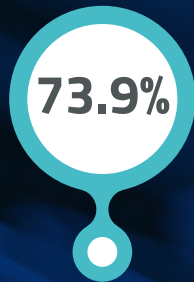


Full Members 2016-2018



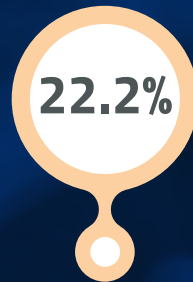
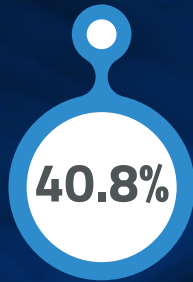
HRI Papers 2018

HRI-Affiliated
Papers



Increase in
HRI-Affiliated
Publications

Publications in
Top Quartile



Publications in top decile
Compared to 20.8%
average in UL in 2018

Citations



Research Excellence

Grants Awarded Academic Year 2017–18

(>€100,000 in value)

Funding Body / Programme	Budget	Description	Project Leader
Department of Agriculture Food and Fisheries Farm Programme	€326,850	DAFM – Extraction and Exploitation of Bioactive Fish Components for Health Enhancement	Dick Fitzgerald
Enterprise Ireland – Commercialisation Fund	€243,666	EI-Cothrom-Semi Automated Mammography (CSAM)	Conor Ryan
Enterprise Ireland – Commercialisation Fund	€359,144	EI-Mi-Flo: Validating the Manufacture and Use of a Novel Respiratory Device to the Point of European Market Readiness STAGE 2	Colum Dunne
Health Research Board – Investigator Led Projects	€369,088	HRB-ILP-ISAR (Adverse Outcomes in Older Adults Attending Emergency Department (ED): An Impact Analysis Study of the Identification of Seniors At Risk (ISAR) Clinical Prediction Rule)	Rose Galvin
Health Research Board – RCQPS	€277,166	HRB-OPTIMEND (OPTIMEND: Optimising Early Assessment and Intervention by Health and Social Care Professionals in the Emergency Department (ED))	Rose Galvin
Health Research Board – PPI Ignite	€313,427	HRB-PPI Ignite Award	Anne MacFarlane
Health Research Board – Applied Partnership Awards	€119,837	HRB-Area Level Deprivation and Funding Equity in Public Hospitals in Ireland: An Examination of Hospital Groups and Activity Based Funding	Cathal Walsh
Health Research Board – Applied Partnership Awards	€237,694	I-PARC (Ireland’s Physical Activity Research Collaboration): Bridging the Research to Action Gap to Support the Implementation of the National Physical Activity Plan	Catherine Woods
Health Research Board – Applied Partnership Awards	€119,369 (€81,741 - UL)	HRB-Implementing Evidence Based Guidance for Palliative Care in Dementia through Participatory Action Research	Alice Coffey
European Union – DG Justice	€177,277	EU-CIH-Call It Hate: Raising awareness of Anti-LGBT Hate Crime	Jennifer Schweppe
Irish Research Council – Consolidator Laureate	€599,821	IRC – Death and Burial Data Ireland 1864–1922 DBDIrl	Ciara Breathnach

Funding Body / Programme	Budget	Description	Project Leader
UK Medical Research Council – Joint Global Health Trials	€138,000	PROACTIVE – Cluster Randomised Controlled Trial (RCT) for Late Life Depression in Socioeconomically Deprived Areas of São Paulo, Brazil	Pepijn Van de Ven
HSE_HAPAI Awards	€449,723	Move for Life	Catherine Woods
Sport Ireland	€288,613	Children’s Sport Participation and Physical Activity (CSPPA)	Catherine Woods
Science Foundation Ireland – Investigator Programme (IVP)	€2,332,817	Automatic Design of Digital Circuits (ADDC)	Conor Ryan

TOTAL* €6,352,492

Funding Success



*In total, HRI's research income for the AY 2017/18 was €7,347,652. Grants over €100,000 accounted for €6,352,492 and the remaining €1,234,364 was comprised of ten GOI PG scholarships, four HRB Summer Studentships, and one WT Vacation scholarship. Funding was also secured through Enterprise Ireland Innovation vouchers, Commercialisation feasibility grants, Enterprise Ireland travel grants and through industry partnerships. This is the data from the full membership list.



translational research in biomedical sciences

New HRI Appointment

In 2018 the HRI appointed Prof. Paul Murray to the post of Professor of Molecular Pathology, with a commencement date of January 2019.

Prof. Murray's appointment is a strategic development, aimed at enhancing biomedical research at UL. This appointment will significantly impact the HRI's capacity to undertake research on cancer, and will increase the potential to attract national and international funding. The appointment will contribute to the development of the biomedical area within the university and will be linked to emerging research and teaching programmes.

Paul obtained his PhD in 1996 working on the contribution of the Epstein–Barr virus to the pathogenesis of Hodgkins lymphoma with Prof. Lawrence Young at the University of Birmingham. He was a Fulbright Fellow in the Ambinder Lab at the Johns Hopkins University, Baltimore, USA before setting up his own laboratory in the Department of Pathology at the University of Birmingham in 2000. In 2007, he moved to the Institute of Cancer Studies, at the University of Birmingham, holding concurrent Cancer Research UK and Leukaemia Research Fund Programme grants as well as a number of project grants, including UK Medical Research Council awards. He has published over 150 papers with an H-index of 61.

Research in Prof. Murray's Group is focused on the discovery of molecular pathways involved in the development and progression of aggressive cancers derived from mature lymphocytes (the lymphomas). These include the most common form of this disease, called diffuse large B cell lymphoma, a tumour recently defined as one of four haematological cancers with the highest unmet clinical need. The objective of the research is to better understand the pathogenesis of these malignancies and in doing so develop novel therapeutic approaches. For example, Prof. Murray's group is interested in examining the possibility that collagen within the tumour 'microenvironment' can cause the cancerous cells to spread around the body and to the central nervous system where they can have devastating consequences. They have already identified novel ways to block collagen and so potentially provide new treatments to cure patients at an earlier stage before the tumour spreads.

Prof. Murray joins the HRI at an exciting time in its development and he plans to develop translational research in the area of biomedical sciences, which will complement existing ongoing activities, as well as develop multidisciplinary themes across the campus in partnership with colleagues in the industry and health sectors.



Prof. Paul Murray

These initiatives will be linked to the development of undergraduate and postgraduate educational programmes in biomedical sciences. His expertise and leadership complements existing HRI research in this field and has synergy with the newly established UL Cancer Network (ULCaN) cluster, led by Dr Pat Kiely, which focuses on helping cancer patients during the stages of treatment and recovery.



HRI EVENTS in 2018

In 2018, the HRI hosted a range of initiatives to build and expand health research capacity, research networks, research impact and excellence across both clinical and academic settings at local, national and international levels.

The HRI hosted ten HRI members' lunchtime meetings to showcase past and upcoming HRI activities and events, and to provide members with an opportunity to network. The timeline of activities is published and disseminated biannually to give members the opportunity to plan attendances accordingly.

Highlights from Our 2018 Calendar of Events



HRI Research Day 2018

The HRI Research Day in December attracted almost 100 delegates and comprised a series of oral and poster presentations that showcased the breadth, depth and quality of health-related research and clinical partnerships that exist at our clinical sites, in primary care and across the university campus. The competition for best oral and poster presentations was judged by a team of academic and postgraduate reviewers combined with audience votes. Seven prizes were awarded for the best entries.

HRI Speed Networking Event

The HRI runs a biannual Speed Networking event designed to give new members the opportunity to showcase their research expertise and seek out new collaborators. These networking events have served to build research capacity, increase networking opportunities and enhance the national and international impact of research among academic, clinical and research staff.

Co-funded Events

In 2018, the HRI also provided financial support for The Nursing and Midwifery Board of Ireland (NMBI) National Student Midwives Debate on 2nd May, and the exhibition, 'The Spaces Between Us', featured in the Bourn Vincent Gallery.

Training

There were a number of training workshops run throughout the year.

The **Critical Appraisal Skills Programme (CASPIR)** was very popular, facilitating 45 participants who attended the workshops held in the CRSU as well as 80 undergraduate nursing students who attended a tailored workshop in UL.

Good Clinical Practice (GCP) is an international ethical and scientific quality standard for the design, conduct, performance, monitoring, auditing, recording, analyses and reporting of clinical trials. It also serves to protect the rights, integrity and confidentiality of trial subjects and their data. The CRSU launched its ICH-GCP training programme in June 2018 with a second workshop running in November 2018. The 15 participants were delivered a course with a practical focus on group activities and many opportunities for discussion and questioning.

The following content was included:

- Introduction to Drug Development and Clinical Research
- Research Ethics and Clinical Research Governance
- Principles of GCP
- Investigator Responsibilities
- Essential Documents
- Regulatory Inspection

Participants received a certificate of attendance, which is valid for two years and demonstrates the participant's evidence of GCP training for regulated research studies.



Siobhán Egan, Elaine Conway and Maria Ryan – CRSU Staff

The CRSU is also a source of training for research teams on particular areas of interest. For example, in November 2018 a consenting workshop was organised for the OPTIMEND team, to equip all study team members with the necessary skills to perform the informed consent process with potential subjects for this particular research study.

Grant-Funding Workshop

In 2018, the HRI ran a suite of grant-funding workshops tailored to specific grant-funding calls from national and international funding bodies. These workshops have facilitated the development of new research collaborations nationally and internationally, which have resulted in submissions of HRI-supported grant applications.



Research Impact

Awards

Irish Research Council Laureate Awards 2017/18



Dr Ciara Breathnach,
Senior Lecturer in History

Death and Burial Data, Ireland 1864–1922 (DBDIrI)

Vast quantities of historical Irish ‘big data’ are in the public domain but they exist as silos; much of it is unstructured and consequently they cannot interact or are not ‘interoperable’ with one another. Among the aims of DBDIrI is to apply linked data techniques to pre-digitised, openly available data, to yield new knowledge about bio-power behaviours. By placing the history of individual bodies and lives at the core of this research it will offer new ways of understanding death and the treatment of the dead body from civil, secular and religious perspectives. Death and burial are key themes in this study, which adopts a ‘life events’ approach to the study of social class, gender and power in Ireland from macro and micro-history perspectives. It also represents an entirely new framework for Irish historiography by not only providing linkages between bodies of data that were previously discrete, but also by offering a much more accurate series of datasets for analysis.

Science Foundation Ireland – Investigator Programme (IvP)



Prof. Conor Ryan

Automatic Design of Digital Circuits (ADDC)

Cothrom is an Enterprise Ireland Commercialisation Fund Award to build a Stage 1 breast cancer detector that uses machine learning to automatically detect suspicious areas in mammograms. Machine learning produces models that learn from labelled input data and then make accurate predictions about new data. In this case, we are using a set of labelled (normal, benign or malignant) mammograms from the Optimam Mammography Image Database maintained by Cancer Research UK to train models.

Cothrom differs from most machine learning approaches because it uses textural asymmetry across a subject’s breasts in a mammogram to highlight suspicious areas. Initial experiments using the well-known University of South Florida Digital Database for Screening Mammography (DDSM) data set gave a 100% accuracy in identifying true positives with a very low rate of 1.5 false positives per image.

The project team consists of the PI, Prof. Conor Ryan; a postdoctoral researcher with expertise in machine learning, Dr Mahmoud Elbattah; and an experienced user-interface programmer, Brian Halpin. The plan is to build a prototype tool which will be tested by radiologists from University Hospital Limerick and Cork University Hospital. The project team will also have the addition of a commercialisation specialist to assist with creating a spin-out company.

Health Research Board Research Collaborative in Quality and Patient Safety (RCQPS)

Early Assessment and Intervention by an Interdisciplinary Health and Social Care Professions (HSCP) Team on the Quality, Safety and Timeliness of Care of Older Adults in the Emergency Department: the OPTIMEND Randomised Controlled Trial

OPTIMEND is a Health Research Board-funded programme of research exploring the impact of early assessment and intervention by a team of HSCPs in the Emergency Department (ED) on the quality, safety and cost-effectiveness of care of older adults. The mixed methods study involves synthesis of international evidence, world café-style focus groups with key ED stakeholders, analysis of routine data from the ED at UHL, and the conduct of one of the largest RCTs in the ED internationally.

Through its robust and interdisciplinary approach, OPTIMEND has demonstrated a measurable impact on the care of older adults and has served to inform models of service provision in the ED nationally.



OPTIMEND team: *(from L-R)*
Dr Rose Galvin (UL)
Stephen White, *Senior Physiotherapist (UHL)*
Íde O'Shaughnessy, *Senior Occupational Therapist (UHL)*
Eimear Smalle, *Senior Medical Social Worker (UHL)*
Collette Devlin, *Research Nurse (UL)*
Dr Marica Cassarino, *Postdoctoral Researcher (UL)*

Academic Achievements

Doctoral Degrees Awarded

Student	Supervisor/Co-Supervisor	PhD Title
Robert Davies	Phil Jakeman, Brian Carson	Nutrient Recovery of Contractile Function Following Resistance Exercise
Petra Elftorp	Barry Coughlan	A Study of the Guidance Counselling Needs of Adults with Dyslexia Within the Irish Adult Educational Guidance Service
Kirsten Huysamen	Leonard O'Sullivan	Human Factor Considerations of Industrial Exoskeleton User Interaction
Monica Jain	Jakki Cooney	Investigation of the Impact of Point Mutations on the Binding Kinetics of ScpA-hC5a Pair
Michelle Kearns	Orla Muldoon, Rachel Msetfi	A Community Approach to Suicide and Mental Ill-Health: The Role of Stigma, Help-seeking and Group Identification
Elizabeth Kingston	Colum Dunne	Hand Hygiene and Professional Practice: Comparative Studies Exploring Attitudes and Practice Among Healthcare Students and Among Healthcare Professionals
Kevin O'Carroll	Helen Phelan	Phrased Notation and Renaissance Polyphony: Exploring a New Solution to an Old Problem
Cormac Powell	Alan Donnelly, Brian Carson	Novel Insights into the Physical Activity Continuum and Cardio-metabolic Health in Adults
Ian Sherwin	Mark Campbell, Tadhg MacIntyre	Coach Education, Coaching Behaviours and the Implications for Athlete and Coach Development
Mary Tumelty	Eimear Spain, Jennifer Schwegge	The Spiralling Costs, Delays, and Emotional Burdens of Medical Negligence Litigation: A Socio-legal Analysis of the Current Dynamic in Ireland
Niamh Whelan	Drew Harrison, Ian Kenny	The Biomechanical Specificity of Running Drills to Sprint Performance
Aileen Wright	Sue Franklin	Profiling Developmental Speech Sound Disorders: Differences, Deficits and Outcomes

Masters Degree Awarded

Student	Supervisor/Co-Supervisor	PhD Title
Donal O'Sullivan	Pepijn Van de Ven Rachel Msetfi	System to Investigate the Detection of Perceptions of Control from Speech

An abstract network diagram consisting of numerous thin red lines (edges) connecting small green circular nodes. The nodes are scattered across the page, with a higher density in the lower half. The background is a solid, warm yellow color. The text is overlaid on the upper left portion of the image.

fostering a culture of interdisciplinary research collaborations

People

HRI Membership

During 2018, the HRI underwent significant growth in membership

A part of this growth came through the creation of a new membership category for PhD students and postdoctoral researchers. By the end of 2018, a total of 42 PhD students and postdoctoral researchers had joined the HRI. By becoming members, these scholars will now have the opportunity to attend HRI meetings, workshops and training, all of which will assist in their professional development and training.

Over the past year, the HRI has also seen a substantial increase in the number of full members (from 75 in December 2017 to 117 in December 2018). The Institute therefore has a broader base and thus has become more diverse, with representation from all four UL academic faculties. The third membership category, affiliate members, increased slightly to 34 by the end of 2018.



2018
117 members

2017
75 members

Selected **Member Profiles**



Consultant Vascular Surgeon, University Hospital Limerick

Membership Type:
Affiliate Member

Eamon Kavanagh

Vascular surgery is a specialty that has evolved as a result of major technological advances in how care is delivered by minimally invasive endovascular techniques. Our department at UHL has collaborated with UL researchers since close links were established by Prof. Pierce Grace and Prof. Tim McGloughlin more than two decades ago.

The birth of the HRI at UL coincided with the establishment of the CRU at UHL. In the past year, we have developed a monthly research meeting in the CERC building for UL- and UHL-based staff. Ethics committee applications have been streamlined and several new projects have also taken shape. The HRI gives us an important degree of oversight and quality control. Besides providing useful notices about upcoming lectures and funding opportunities, the HRI has allowed us to forge links between established and developing researchers at UL along with clinical staff of all grades who may be interested in furthering their careers by undertaking research. In addition, highly relevant patient populations can be accessed for disease-specific studies in a controlled and ethical manner. This has major benefits for both UL and ULHG and for the patients who access our services.

Current projects include a prospective study on the potential use of novel biomarkers to determine plaque phenotypes in patients with atherosclerotic cardiovascular disease. This is a collaboration involving the departments of biological sciences, biomedical engineering, statistics, vascular surgery and radiology. Other projects include a geometrical and pressure wave analysis of vascular access for haemodialysis; a study on the mechanical characterisation of human saphenous and popliteal vein tissue; a regional audit of wounds and ulcers involving community and hospital-based tissue viability nurses; and a vascular risk factor patient-centred project in collaboration with McMaster University, Canada and Lero at UL.



Structured PhD Student Graduate Entry Medical School, University of Limerick

Membership type:
Postgraduate & Postdoctoral Membership

Alexandra Cremona

I am currently in my final year of a PhD in Graduate Entry Medical School where I am researching gestational diabetes. Upon joining the HRI as a postgraduate student member, I soon realised that the membership benefits extended beyond possibilities of funding as I had the opportunity to present my work during the early stage of the PhD and attend talks by speakers with similar backgrounds. I was also able to extend areas of my research and network among academics from all levels within the university. Being an HRI member has been so positive for me in many aspects. The HRI is geared to help researchers at all levels, and facilitate collaboration. As a result, the benefits I receive as a student are not only in the direct capacity as a student member, but also as part of a collaborative team within the HRI. As I move forward with my research, it is reassuring to know that the support from the HRI will continue throughout my academic career. This continuation is incredibly important, especially with the isolation that academics can experience, and when the PhD comes to an end I know the HRI will continue to support me with early career research funding opportunities and potential future collaborations.



Technology Enhanced Health Outcomes

Research Fellow
National Kidney Disease
Surveillance Programme
Graduate Entry Medical
School, UL

Membership type:
*Postgraduate & Postdoctoral
Membership*

Dr Leonard Browne

I am a research fellow in biostatistics at the Graduate Entry Medical School working on the HRB-funded projects 'Acute Kidney Injury (AKI) in the Irish Health System; Incidence, Severity and Clinical Consequences' and 'Assessing the Burden and Progression of Chronic Kidney Disease in the Irish Health System'. My work entails using longitudinal data analysis and statistical modelling to improve our understanding of kidney disease in Ireland and its impact on clinical health outcomes.

Our programme of research, which focuses on addressing the burden and impact of kidney disease, is translational by its very nature. The HRI has helped facilitate collaboration with colleagues across the spectrum of health research through various workshops and platforms to allow us to engage with likeminded researchers. These collaborations have led to numerous research proposals and funding applications, which aim to deliver innovative research that is timely, relevant, and of huge national and international importance. We have leveraged support from the HRI biostatistician and research funding officer to ensure our proposals are feasible and well-supported.

We have also leveraged support from the HRI-CRSU. One of our projects requires Health Products Regulatory Authority (HPRA) approval and the CRSU has provided support and guidance in relation to the application process, ethical issues, project-planning and protocol development. The CRSU was extremely useful in developing patient consent and information documentation for this process.

Developing Research Capacity by Investing in our Members

HRI Research Cluster Capacity - Building Awards

The HRI's largest exercise to stimulate research capacity-building was run in 2018. The research cluster capacity-building awards were aimed towards cluster researchers intending to work together to focus on a common research area. The purpose of this funding was to build capacity in the cluster areas, to increase competitiveness for external funding, increase research outputs, enhance research networks, and improve the mentoring of

early career researchers and PhD students. Two levels of funding were provided: one for more established clusters, each requiring at least five HRI full members, and one for emerging research areas, requiring three HRI members. The call closed in December, and following peer review, four large clusters and two emerging clusters were funded. Projects will commence in April 2019.

Cluster Name and Acronym	Principal Investigator	Award
Health Implementation Science and Technology (HRI-HIST)	Prof. Alice Coffey	€300,000
Physical Activity for Health (PAfH)	Prof. Alan Donnelly	€300,000
Ageing Research Centre (ARC)	Dr Katie Robinson	€300,000
UL Cancer Network (ULCaN)	Dr Pat Kiely	€300,000
The Creative Process Meets the Creative Product – Enhancing the Performance Artist through Research, Design and Technology: PPD+PA (Product Design + Performing Arts)	Dr Louise Kiernan	€90,000
Participatory and ARTs Based Methods for Involving Migrants in Health Research (PART-IM)	Prof. Helen Phelan	€90,000
TOTAL		€1,380,000

HRI Research Cluster Capacity-Building Awards 2018

Health Implementation Science and Technology (HRI-HIST)

Principal investigator: Prof. Alice Coffey

Co-Investigators: Prof. Norelee Kennedy, Prof. Stephen Gallagher, Prof. Sue Franklin, Dr Pepijn van de Ven, Prof. Stephen Kinsella, Dr Audrey Tierney

Summary

The HRI-HIST research cluster focuses on advancing research in the area of implementation science and the systematic uptake of evidence-based, technology-enhanced interventions into practice and policy. A critical issue in health today is the enormous gap between what we know can optimize health and health care and that which is implemented in everyday practice. Implementation science seeks to address this gap by understanding how best to ensure that evidence-based strategies to improve health are effectively delivered in clinical and public health practice.

To further develop UL's expertise in the area of health research, and to improve patient and population outcomes, this cluster is trans-disciplinary. It has external clinical and academic partners that will harness existing expertise nationally and internationally in intervention development/design with technology-assisted interventions. HRI-HIST is developing a programme of research training and collaboration that builds capacity in implementation science to facilitate change at patient and provider levels to inform standards of care and policy.

Our cluster members have a wide range of experience in implementing treatments in a variety of contexts, and will extend our experience and expertise in Implementation Science (IS) with Information and Communication Technology (ICT). The co-investigators and collaborators in the group bring a wealth of experience in conducting and disseminating evidence based interventions to populations spanning the life cycle. The group has influenced policy development and instructed discipline specific practice changes. However, the element of implementation science to enhance and sustain the evidence and science needs to be solidly employed. Adding an ICT element will ensure sustainability and efficiencies beyond what are current practices to ultimately improve access to interventions for populations that would benefit from them. The cluster will ensure that UL's strategic objectives across many domains are realised and a strong foundation will be established across a new cross-cutting field of IS spanning health, technology, policy and law.

Physical Activity for Health (PAfH)

Principal investigator: Prof. Alan Donnelly

Co-Investigators: Dr Roisin Cahalan, Dr Brian Carson, Prof. Susan Coote, Dr James Green, Dr Matthew Herring, Dr Ciaran Mac Donncha, Dr Tadhg MacIntyre, Prof. Catherine Woods

Summary The “Physical Activity for Health” (PAfH) cluster builds on existing collaborations and an internationally excellent track record of research in this area. This multidisciplinary group of physiologists, sports scientists, physiotherapists and health, sports and exercise psychologists is ideally placed to meet global and local policy requirements in the area of physical activity for health.

A key strength of this cluster are the collaborations with international experts in the area, and with stakeholders in community, policy and healthcare organisations. We have a track record of successful collaborations amongst our members that have led to co-supervised PhD graduations, funded projects and impact on health and social care. The cluster will build on our success to become an international leader in this area over the lifetime of this grant.

The activity of the PAfH will focus on the key areas of Research, Collaboration and Networking and Capacity Building and Training. The research is cross sectoral in public health, community, healthcare, sports and school settings, and across the lifespan, from children to older people. The cluster has four complementary and inter-linking focus areas:

- 1) Measurement, surveillance and Determinants of PA
- 2) Biomedicine of PA
- 3) PA and Exercise as Medicine
- 4) Policy Impact and Implementation of effective interventions

Ageing Research Centre (ARC)

Principal investigator: Dr Katie Robinson

Co-Investigators: Prof. Ita Richardson, Dr Kieran O’Sullivan, Dr Pauline Meskell, Dr Hilary Moss, Dr Amanda Clifford, Dr Helen Purtill, Dr Sara Hayes, Dr Pauline Boland, Dr Karen McCreesh, Dr Rose Galvin

Summary Worldwide increases in life expectancy are leading to the rapid ageing of populations. For older people to realise the opportunities presented by these additional years of life, one factor is imperative: health (WHO, 2015). Right now, evidence suggests older people are not experiencing better health than previous generations and it is clear that people who experience disadvantage across their lifetime have a higher risk of poor health in older age (Beard et al., 2016). Nationally, the Health Services Executive Planning for Health Report 2017 predicts a significant increase in healthcare service use over the next decade. As older people bear the greatest burden of disease they account for the greatest proportion of healthcare use.

The ARC cluster responds to and resonates with the objectives of the WHO World Report on Ageing (WHO, 2015), the Global strategy and Action Plan on Ageing and Health (WHO, 2016) and the WHO Guidelines on Integrated Care for Older People (2017) as well as aligning with national policy and ageing strategies (National Clinical Programme for Older People). The cluster comprises an interdisciplinary group of researchers with a shared research interest on ageing. It demonstrates how research activity, collaboration, stakeholder involvement, networking and training activities can be leveraged to optimise the abilities of cluster members to produce and disseminate high quality impactful research and secure funding from diverse sources to achieve sustainability.

The major aims of ARC include conducting internationally-significant research that leads to improvement in the health, well-being and social inclusion of older people. The cluster works across disciplinary boundaries to address research priorities that reflect the day to day realities of older people’s lives. ARC also develops capacity in ageing research at UL and builds collaborations with researchers, clinicians, industry partners, older people and their representative organisations.

UL Cancer Network (ULCaN)

Principal investigator: Dr Pat Kiely

Co-Investigators: Dr Joanna Allardyce, Dr Norma Bargary, Prof. J. Calvin Coffey, Prof. Colum Dunne, Prof. Liam Glynn, Dr Andreas M. Grabrucker, Dr Dervla Kelly, Prof. Des Leddin, Prof. Tiziana Margaria, Prof. Kieran McDermott, Dr Kieran McGourty, Dr John Mulvihill, Prof. Paul Murray, Dr Catherine Norton, Dr Eibhlís O'Connor, Prof. Cathal Walsh, Dr Michael Walsh

Summary The ULCaN cluster is aligning itself as a cluster that can perform holistic cancer research. Our approach and expertise encompasses the cancer journey from prevention through to screening, diagnosis, treatment, recovery and palliative care. Capacity building through collaboration, networking and training ensures that this cluster has strong potential to be a resource for informed policy decisions regarding the issues around access to care. Our overarching objective is to help patients on the Cancer Journey and ULCaN is committed to helping the public understand a cancer diagnosis and better handle the associated challenges with a view to empowering patients about cancer prevention and services. Our cluster is truly multidisciplinary and consists of 3 overlapping core pillars: (1) Patient Perspectives (2) Clinical Trials and Interventions, and (3) Basic Biomedical Science. A fourth pillar focused on the development novel approaches to manage and interrogate data sets will underpin these pillars.

Collectively, ULCaN researchers have state-of-the art infrastructure and instrumentation which can be better leveraged by clinicians at UHL to build more expansive and connected projects. Having a clear roadmap of cancer research activities will inform all stakeholders in ULCaN, and has serious potential to generate national and international funding and increase the contribution of UL researchers in clinical trials. Through a series of objectives, we will build collaborations with clinicians and organize targeted training workshops to increase grant activity. We are hopeful that this will increase UL and UHL researchers' participation in Clinical Trials, positively influence public opinion of Clinical Trials and promote access of ULCaN researchers to primary care cancer data.

The Creative Process Meets the Creative Product – Enhancing the Performance Artist through Research, Design and Technology: PPD+PA (Product Design + Performing Arts)

Principal investigator: Dr Louise Kiernan

Co-Investigators: Dr Órfhlaith Ní Bhriain & Mr Bernard Hartigan

Summary

This cross-disciplinary Research Cluster provides collective thinking of Design, Technology, Allied Health, Physical Science and Business to deliver market-driven and user-centered product/service innovations for the performance arts. The cluster aims to develop and commercialize products in this area. A number of issues for performance artists such as dancers and musicians in terms of the products, devices and wearables that are intended to physically support them in their performance have been identified. In many instances these products have not kept pace with the changes in the performance, are not ergonomically designed, or do not cater for the individual needs of performers.

Project areas include:

- Investigating into how technological advancements and the design of footwear can prevent injury and improve quality of life for the Irish dancer.
- Transferring the knowledge and skills developed in project 1 to mitigate against injury and enhance the performance of other dancers: ballet, tap, jazz, ballroom and salsa.
- Identifying needs amongst other performance artists such as musicians, in terms of ergonomics, repetitive strain injury, customization and physical impairments.

Participatory and ARTs based methods for Involving Migrants (PART-IM)

Principal investigator: Prof. Helen Phelan

Co-Investigators: Prof. Anne MacFarlane, Dr Sylvia Murphy Tighe

Summary

This group brings together arts-based and participatory scholars from medicine, nursing & midwifery, and the performing arts, as well as a leading NGO for migrants. Our vision is to develop increased understanding of the role of arts-based methods as participatory strategies for involving migrants in health research.

Migration is a global phenomenon and in 2016 WHO Europe published the first ever WHO strategy and action plan for refugee and migrant health. 17% of the population of Ireland is now born outside the country. In line with international imperatives for Public and Patient Involvement (PPI), involving migrants in health research is important. However, there is a persistent pattern of migrants' exclusion from health-related participatory spaces.

University of Limerick scholars are field leaders in participatory approaches to health research. There is also a pioneering cohort of scholars focused on arts-based research and health, particularly in relation to singing. Both groups have developed capacity in participatory and arts-based research with specific reference to issues of migration. Combined, we represent a unique and innovative collaboration to support existing and new collaborations and to shape national and international migrant health research and policy. Drawing on our experience of using participatory and arts-based methods, and utilising the existing infrastructure of the PPI theme in the Health Research Institute (HRI) at the University of Limerick (UL) we will work with existing civic engagement energies including the UL Sanctuary group and UL Engage towards three key goals:

- **Research:** to expand the evidence base for the role of arts-based methods in migrant health research and to evaluate training in the use of participatory and arts-based methods.
- **Collaboration and networking:** to develop stronger links between arts, health and migrant research energies within the university and beyond, and model networking strategies such as the Irish World Music Café.
- **Capacity Building and Training:** to develop training opportunities in arts-based research methods for health workers, migrants and researchers, with a view to building skill, knowledge, resources, and confidence in the application of this approach.

HRI Seed-Funding Call

The HRI seed-funding call, was launched in January with a closing date of 9th April 2018. The purpose of this call was to pump-prime developing multidisciplinary research projects and to allow innovative research to be progressed to the stage where it would be competitive for external research funding. A secondary aim was to provide research

opportunities for emerging researchers in order to enhance their experience of grant applications and project management. Funds of up to €60,000 were available for groups of three or more researchers working with a clinical partner on projects taking 12–18 months. Seven projects were funded following peer review. These are outlined below.

Project Title	Principal Investigator	Award
Can Matrix GLA Protein (MGP) Determine Arterial Plaque Phenotype in 'At Risk' Cardiovascular Patients?	Dr Eibhlis O'Connor	€15,965
Development of a Process to Study Concussion Recovery Using Blood Based Biomarkers	Dr John Mulvihill	€17,781
The Development of a Psychological Intervention for Patients with Acute Skin Failure Conditions	Dr Pauline O'Reilly	€49,130
Optimising Physical Activity and Health in Adults with Cystic Fibrosis	Dr Roisin Cahalan	€20,327
Is Social Dance Feasible for Older Adults After Discharge from Hospital?	Dr Amanda Clifford	€50,344
Spatial Characterisation of a Patient Derived Colonic Tumour and Atherosclerotic Plaque using a Grid Referenced Tissue Preparation Technology and Targeted Transcriptomics	Dr Kieran McGourty	€45,428
Physical Activity for the Secondary Prevention of Younger Stroke (PAYS)	Dr Sara Hayes	€48,255
TOTAL		€247,230



building a
culture of
research
excellence

Seed-funding Projects The Detail



Can Matrix GLA Protein (MGP) Determine Arterial Plaque Phenotype in 'At Risk' Cardiovascular Patients?

Principal investigator: Dr Eibhlis O'Connor

Project description: The rupture of vulnerable atherosclerotic lesions results in the formation of a thrombus, which has the potential to dislodge and migrate downstream causing a heart attack or stroke. These major adverse cardiovascular events are the leading cause of death worldwide. Calcification morphology plays a critical role in plaque stability, with large calcifications having a protective effect, while micro-calcifications promote rupture of the fibrous caps. Additionally, culprit lesions often contain less calcification than unruptured stable plaques. Collectively, these reports indicate that calcification morphology, particularly calcified particle distributions, could be crucial in high-risk lesion, and subsequently at-risk patient, identification.

The current gold standard for identifying atherosclerotic calcification is non-contrast computed tomography. However, clinical resolution is currently limited, meaning it cannot distinguish between critical calcification morphologies. In this regard, blood tests are routinely performed as part of patient care. Calcification has a highly regulated formations process similar to osteogenesis. Consequently, the purpose of this project is to investigate whether the circulating levels of these osteogenic regulators could be indicative of atherosclerotic calcification phenotype.

Progress to date: Forty consenting patients undergoing standard endarterectomy procedures have been recruited for this study. Fasting venous bloods were collected pre-operatively and plaque samples were acquired after surgical removal. Plaque samples underwent high-resolution micro-computed tomography and the calcification phenotype was determined using ImageJ image processing software. Levels of circulating OC, hs-CRP, Fetuin-A, TNF- α , IL-4/6/8/10/18, OPG, OPN, FGF-23 and BMP-2 were quantified using commercially available ELISA and multiplex kits.

Future work: Collaborate with the pathology laboratory at University Hospital Galway to quantify the circulating levels of dp-ucMGP using an Automated Chemiluminescence Sandwich Immunoassay system. Determine the predictive capacity of osteogenic biomarkers in determining atherosclerotic calcification phenotype. Results will be prepared in a manuscript for submission to *Atherosclerosis*.

Development of a Process to Study Concussion Recovery Using Blood Based Biomarkers

Principal investigator: Dr John Mulvihill

Project description: The project aims to:

1. Assess whether the Head Injury Assessment (HIA) can identify that a concussion has taken place by measuring specific biomarkers in the blood.
2. Track these biomarkers over time post-injury. We want to help better understand how we recover from concussion.

This work holds the potential to identify novel biomarkers that are more informative for concussion prognosis over time.

Progress to date: Post-concussion biomarkers, which should be found only in the brain, pass into the bloodstream. Currently, a number of these biomarkers have been identified in the blood of concussed patients. However, there is no quantifiably proven biomarker that confirms concussion, is specific to concussion, and is truly prognostic of concussion over time. Our study aims to address this by investigating the effectiveness of current biomarkers to assess their specificity and their prognostic capability. Further, we aim to identify novel biomarkers for concussion that could potentially overcome some of the specificity and prognostic shortcomings of current biomarkers.

Future work: Currently, this pilot study is being applied to the Munster Rugby team and our preliminary results will compare their HIA data to their blood biomarkers. Also, we have begun seeking funding in conjunction with the IRFU to expand this project to the following season and to the Connacht team.



The Development of a Psychological Intervention for Patients with Acute Skin Failure Conditions

Principal investigator: Dr Pauline O'Reilly

Project description: Little is known about the psychological care needs of patients who experience acute skin failure (ASF) conditions, such as Stevens Johnsons Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN). These conditions have a sudden onset with the patient presenting with flu-like symptoms, a very high temperature, and a red rash, which spreads and blisters, whereupon the top layer of the skin dies and is eventually shed. The individual becomes critically ill within a short period of time and is treated as a medical emergency. As the patient is acutely ill, the priority of care is focused on the maintenance and preservation of life. With this in mind, this research project aims to explore, co-design and co-develop a workable psychological intervention for these patients.

Progress to date: The project commenced on 3rd September 2018. To date, a protocol for the first systematic literature review, which aims to establish the psychological impact of SJS/TEN on an individual's wellbeing, has been registered with PROSPERO (O'Reilly et al, 2018). The review is at the thematic analysis stage. The completed review will be submitted for publication to the *British Journal of Dermatology*. A search strategy is being developed for a second integrative review. This review aims to identify evidence-based psychological interventions that may be used to support patients with SJS/TEN.

Future work: Ethical approval has been obtained from the Research Ethics Committee, UHL (REC Ref: 123/18) for work package 2. This work package involves interviewing patients who live with these conditions, their families and the professionals who provide treatment and care, so as to identify their priorities and perceptions of need in relation to psychological support. Data collection commenced in April 2019.

Interviews took place in November 2018 for a part-time research assistant, who will start work in 2019.

Steps Ahead – Optimising Physical Activity & Health in Adults with Cystic Fibrosis

Principal investigator: Dr Roisin Cahalan

Project description: Cystic fibrosis (CF) is one of the most common, life-limiting autosomal recessively inherited diseases in Ireland. Exercise and physical activity (PA) are widely documented in consensus statements as key principles in the management of CF. However, there is limited research conducted on a personalised PA intervention among people with CF.

Progress to date: There has been significant progress to date. An initial study has been completed which has illustrated that a Fitbit and ActivPAL are valid and reliable tools to assess step count in CF and can be used in PA interventions.

Future work: This is a novel, innovative study that is evaluating e-health technology to increase PA. This pilot study consists of a 12-week intervention using fitness tracking and incorporates an online monitoring platform (Fitabase) with weekly personalised text messaging feedback based on participants' progress. It will evaluate quantitative and qualitative data analysis, including step count, aerobic capacity, quality of life, sleep quality, wellbeing, lung function and semi-structured interviews following the intervention to establish participant satisfaction. This will also assist with forming and shaping future interventions. The HRI funded Fitbits and Fitabase and their use in this research study.

Is Social Dance Feasible for Older Adults After Discharge from Hospital?

Research Team: Dr Amanda M. Clifford, Dr Joanne Shanahan, Nevin Kasantzi, Dr Órfhlaith Ní Bhriain, Dr Hilary Moss, Prof. Desmond O'Neill, Prof. Liam G. Glynn

Project description: Following discharge from hospital, older adults are twice as likely to fall while approximately one-third have greater mobility and functional issues due to hospital deconditioning. Quality of life, functional ability and gait speed can also reduce post-hospital discharge and are factors associated with re-admission. Older adults appear to favour exercise that focuses on social connectedness, fun and achievable skills with appropriate benefits. Research among older Irish hospital patients indicates that dance is one of the most popular leisure activities in the year prior to hospitalisation.

The aim of this study is to examine the feasibility of an adapted dance programme for community-dwelling adults aged 65 years and older who have been recently discharged from hospital.

Progress to date: To inform the subsequent phases of the research programme, we began by performing a systematic review that evaluated the literature that assessed the effectiveness of exercise following discharge from hospital. Six RCTs were eligible for inclusion. Preliminary evidence from this review suggests that exercise can be beneficial for older adults post-hospitalisation. However, the barriers to exercise in this population (low self-efficacy, fear of falling and low motivation) require consideration in future studies.

Currently, the research team and the relevant stakeholders are establishing participant inclusion/exclusion criteria, a recruitment strategy and a referral pathway. In addition, the design of the adapted dance programme is being finalised. Concurrently the ethics application is being prepared with a submission date in 2019.

Future work: The next stage of the research programme will examine the feasibility and obtain pilot data on the benefits of Irish social dancing on physical and emotional wellbeing in older adults post-discharge from hospital.

The results of our review will be submitted for publication and were accepted for oral presentation at the AUDGPI Annual Scientific Meeting, hosted by RCSI, Dublin 2 on Thursday 28th February 2019.

Spatial Characterisation of a Patient Derived Colonic Tumour and Atherosclerotic Plaque Using a Grid Referenced Tissue Preparation Technology & Targeted Transcriptomics

Principal investigator: Dr Kieran McGourty

Project description: The aim of this research project is to develop a tissue preparation technology that is capable of assessing region-referenced transcriptomic and biomechanical/biochemical profiles of diseased tissue from human patients. This work will be conducted at near-cellular level while retaining the spatial information of cell tissue location. Initially, colonic-tumour tissues and atherosclerotic plaques will be utilised in conjunction with transcriptomic sequencing against a targeted panel of tumour/plaque transcriptomic markers. The key aim of this research project is to develop a 3-D profile of a patient-derived tissue using region-referenced RNA transcriptomic profiling and biomechanical/biochemical data.

Progress to date: Through the HRI seed-funding award we have entered into a collaborative agreement with academics at the Karlsruhe Institute of Technology (KIT), Germany with a view to producing our prototype for tissue pixilation of our samples. This prototype and the HRI seed-funding award has provided the basis of a larger application for an Enterprise Ireland Innovation Fund with BD Biosciences. We were successfully awarded that support in January 2019 to the value of ~€640,000 including funding for two postdoctoral researchers and a research assistant. This funding includes the same team identified on the HRI seed award including Dr Kieran McGourty (project lead), Dr John Mulvihill, Dr Pat Kiely, Prof. Michael Walsh and Dr Andreas Grabrucker along with BD Research Centre Ireland.

Future work: Importantly, the tissue preparation platform technology we aim to develop here can be extended beyond this pilot study and allow our group to open up novel investigations for other diseased and healthy tissues against a variety of parameters, including genomic, full transcriptomic, proteomic, and biomechanical characterisation.

Visiting our collaborative partners in Karlsruhe Institute of Technology, Germany. Left to right are Dr Neil Mackinnon (KIT), Sigita Malijauskaite (UL), Rachel Cahalane (UL), Dr Kieran McGourty (UL) and Prof. Jürgen Brandner (KIT)



Physical Activity for the Secondary Prevention of Younger Stroke (PAYS)

Principal investigator: Dr Sara Hayes

Project description: Physical activity (PA) is inversely associated with all-cause mortality. A low level of PA is the second highest population-attributable risk factor for stroke. The current evidence base for stroke is dominated by older adult populations. However, up to 30% of people with stroke are of working age. Recurrent stroke is a substantial burden among younger people, with up to 20% of younger people after first ischaemic stroke suffering another stroke within four years. Despite this, PA strategies to prevent secondary stroke are not tailored to meet the needs of this working-age stroke population. This identifies a clear direction for future research.

Future work: Academic and clinical researchers at UL and UHL, in collaboration with external collaborators at the National University of Ireland, Galway, the Irish Heart Foundation and the HSE, will work to increase our understanding of PA among people of working age who are at risk of recurrent stroke. This project will use a mixed-methods approach to examine two distinct objectives:

1. To examine the association between PA and recurrent stroke incidence in younger people. The current project will identify sub-groups of younger people who would benefit more from secondary stroke prevention strategies.
2. To gain an insight into the perspectives of key stakeholders on the use of mobile health in the delivery of a PA intervention after mild stroke.

We will use a large prospective population based dataset (UK Biobank) (n=502,549), wherein all participants with prospective data on recurrent stroke will be included in order to meet the first objective. The second objective will be met by conducting in-depth interviews with younger people after first stroke, their family members and interdisciplinary healthcare professionals.

Strokes in younger people are a major, under-examined public health concern. This research will deliver evidence with real potential to influence secondary prevention policy and practice in Ireland and internationally. This programme aligns closely with the strategic goals of the HRI, around cultivating joint clinical and academic partnerships, with strong potential for the further development of a critical mass of stroke prevention research excellence at UL and UHL.

New Appointments

Supporting Research



Goretti Brady

Goretti Brady is the Operations Manager of the Health Research Institute. Goretti, a graduate in Pharmacy from Trinity College Dublin, has worked as such both in retail and hospital environments. Her career path extended to business management and she has spent over 20 years in a range of senior leadership and directorship roles in Healthcare. Her business experience includes Operations, Strategy, Sales and Marketing, and ultimately Managing Directorship. Goretti now brings her operational and strategic skills to the HRI, coupled with her healthcare credentials and a deep passion for the power of translational health research and the merit of collaboration to achieve significant results. As Operations Manager, Goretti is here to help ensure that the HRI is using its resources effectively and efficiently to support all members on their research paths, and to nurture and develop our strategic partnerships and collaborations.



Marie-Thérèse Hayes

Marie-Thérèse Hayes is the Clinical Operations Manager of the Health Research Institute Clinical Research Support Unit. An NUI Galway graduate and a native of Limerick with over 20 years' experience in the pharmaceutical and medical device industry, Marie-Thérèse has managed multiple global clinical trials across many therapeutic areas. She has worked closely on cross functional teams from site feasibility, start-ups, and monitoring, as well as with the Health Authority and Ethical Committee submissions for Clinical trials.

As Clinical Operations Manager, Marie-Thérèse leads the CRSU in its efforts to provide research nursing support, clinical trial management and co-ordination, protocol development, advice on ethical and regulatory submissions, assistance with submission of ethical and regulatory documentation, and support for funding application preparation.



Ali Sheikhi

A huge amount of information and statistics arise from research (clinical trials, observational or longitudinal studies, etc.) every day, but it is what we choose to do with this information that makes it valuable. This is where Biostatistics plays a key role.

Biostatistics is a branch of applied statistics that has various applications in biomedical research and is an essential tool to conduct research in medical sciences.

As a Biostatistician with HRI, my role is to help researchers find out what to do with this information. This involves helping them to choose an appropriate study design, collect the information, analyse the data and report the findings. My aim is to develop novel methods to analyse the data, in order to transform data sets into useful and understandable information. And remember, the most important time to involve a Biostatistician in your research, is right at the beginning of the study!

Ecosystem

HRI Executive Committee & Staff

Name	Role	Institute/School/Department	Faculty
Prof. Rachel Msetfi*	HRI Director	Executive Dean, Faculty of Education and Health Sciences	EHS
Prof. Stephen Gallagher*	Assistant Dean Research EHS	Psychology	EHS
THEME LEADERS			
Prof. Alan Donnelly*	Theme Lead in Lifestyle & Health	Physical Education and Sport Sciences	EHS
Dr Rose Galvin*	Theme Lead in Health Service Delivery	School of Allied Health	EHS
Prof. Anne MacFarlane*	Theme Lead in Public & Patient Involvement	Graduate Entry Medical School	EHS
Prof. Michael Walsh*	Theme Lead in Health Technologies	School of Engineering	S&E
OPERATIONS TEAM			
Ms Goretti Brady*	Operations Manager	HRI	
Dr Imelda Doolan	Research Funding Officer	HRI/Research Office	
Dr Ali Sheikhi	Senior Biostatistician	HRI	
Ms Irma Hourigan	Project Manager	HRI	
Ms Karen Kemmy	Senior Administrator	HRI	
Dr Gavin Wilk	Administrator	HRI	
CLINICAL RESEARCH UNIT			
Ms Marie-Thérèse Hayes*	Clinical Operations Manager	HRI/CRSU	
Ms Maria Ryan	Quality and Regulatory CRA	HRI/CRU	
Ms Elaine Conway	Clinical Nurse Manager	HRI/CRSU	
Ms Rita Hinchion	Clinical Nurse Manager	HRI/CRSU	
Ms Siobhán Egan	Clinical Nurse Manager	HSE/CRU	
Ms Fiona Leahy	Clinical Nurse Manager	HSE/CRU	

* Member of Executive Committee

Clinical Research Support Unit (CRSU)

Origins & Development of CRSU

The HRI-CRSU took up residence in its current home in the Clinical Education Research Centre building in January 2017. The team moved from modest office accommodation in the main hospital to this building which is jointly funded by the Health Service Executive and University of Limerick. The multi-storey structure provides dedicated space for clinical research and offers first-class facilities in the form of an auditorium, medical library, research staff offices and much more. There are clinical rooms devoted entirely to ensuring that patient visits and experiences during clinical studies are as welcoming as possible. Access to hot desks and boardrooms for HRI members has enabled many clinician–academic engagements.

The CERC building accommodates the research needs of UL researchers and the broader hospital community across all disciplines.

In 2015, a Memorandum of Understanding based on a detailed framework document for the governance of clinical research through the UL/UL Hospitals Clinical Research Unit (CRU) was signed. This is currently being reviewed in order to further facilitate the development of clinical research.

In March 2017, an appendix to this agreement came into effect incorporating and formalising research engagement between Community Healthcare Organisations (CHO) Area 3 and UL. This understanding facilitates the official engagement and marrying of researchers from UL and CHO Area 3 with similar research interests.

The CRU continues to benefit greatly from the progressive collaboration between the ULHG and UL. This engagement has been further enhanced in 2018 with the commitment for the HSE-funding of a biostatistician. We were delighted that Dr Ali Sheikhi was appointed to this post in 2018 and has been providing biostatistical supports to the CRSU since his appointment.





HRI/CRSU - Extending our Reach

The University of Limerick is now a member of Clinical Research Development Ireland (CRDI) which is a not-for-profit research partnership with the objective of accelerating the translation of biomedical research into improved diagnostics, therapies and devices for patients.

Other CRDI partners are NUI Galway, Royal College of Surgeons in Ireland, Trinity College Dublin, University College Cork, and University College Dublin, their medical schools, associated academic hospitals and clinical research facilities; in June 2018, the University of Limerick became the sixth member of the partnership.

Health Research Board-Clinical Research Coordination Ireland (HRB-CRCI), an independent integrated national clinical research network, provides centralised support in the conduct of multicentre clinical trials (both commercial and academic) across Ireland. In 2018, the HRI-CRSU joined as a new partner centre, and is a proud part of the group which already includes Clinical Research Facilities at University College Cork, National University of Ireland Galway, Royal College of Surgeons Ireland, University College Dublin (two centres), Trinity College Dublin and Our Lady's Children's Hospital Crumlin. Our partnership with CRCI will enhance our capacity for conducting innovative high-quality research for the benefit of people's health and the economy. The HRI has a seat at both the CRDI Board (HRI Director and Prof. J. Calvin Coffey) and the CRCI Senior Management Team (HRI Director).

In June 2018 a collaborative working relationship between the HRI-CRSU and UHL's REDSPOT (Retrieval, Emergency and Disaster Medicine Research and Development) was established, with the goal of further supporting the delivery of high-impact research in the area of emergency care. The REDSPOT team avails of the CRSU QMS (Quality Management System) and link with the CRSU team for their expertise and support in the development and delivery of clinical research projects. Likewise, the CRSU team can provide access and introductions of HRI members to clinical researchers in these areas.

CRSU Services/Benefits for HRI Members

- Research nursing support for:
 - Recruitment of participants by identifying eligibility according to protocol-defined criteria, and ensuring compliance to all requirements of associated legislation
 - Consent acquisition advice through detailed information, answering queries, assisting in obtaining signatures prior to any study-related activities, documentation of process and provision of new and additional information as it arises throughout the study
 - The collection of clinical information from participants via medical records including charts, scans and other sources, ensuring compliance to all requirements of associated legislation
 - Maintenance and management of documents essential during research in order to demonstrate compliance to applicable regulatory requirements and institutional policies. This management includes completion of all relevant logs and organised filing with ready access for relevant sponsor and regulatory representatives
 - Data entry into research databases including electronic databases/eCRFs, to capture study-related information as well as dealing with data-related queries
 - Ensuring that specific protocol is followed and deviations minimised
 - Collecting bio-specimen samples and diligently processing these samples according to national and ICH-GCP standards and requirements, and compliance with all associated legislation

- Clinical trial management and co-ordination
- Protocol development
- Advice on ethical and regulatory submissions
- Assistance with submission of ethical and regulatory documentation
- Support for funding application preparation
- Access to the CRSU QMS to ensure all studies are conducted to the required standards and regulations
- Developing and enabling the collaboration between academics and clinicians with similar research areas of interest

HRI-CRSU/CRU Studies 2018

Study	Principal Investigator/ Clinical Lead	Funding Source
Preconditioning Shields Against Vascular Events during Surgery (Preconditioning SAVES)	Stewart Walsh & Eamon Kavanagh	Health Research Board
The biomechanical study of human carotid, femoral, popliteal and abdominal aortic tissue: On the use of blood-based biomarkers to determine location-specific arterial plaque phenotype in cardiovascular disease patients: A preliminary study	Eamon Kavanagh, Eibhlis O'Connor & Michael Walsh	Irish Heart Foundation
Critical Leg Ischemia Stem Cell Trial	Tim O'Brien	Health Research Board and Science Foundation Ireland
Assessing the Use of a Sutureless Catheter Securement Device in Patients Undergoing Dialysis with a Central Venous Catheter (StathGuard practical application study)	Austin Stack & Leonard O'Sullivan	Enterprise Ireland
Blood biomarkers for diagnosis and prognosis of concussion	John Mulvihill, Eibhlis O'Connor, Ian Kenny, Tom Comyns, Kieran McGourty & Peter Boers	HRI Seed fund
Optimising early assessment and intervention by health and social care professionals in the emergency department (OPTIMEND)	Rose Galvin & Damien Ryan	HRB/RCQPS
Highlow Study: Low Molecular weight heparin to prevent recurrent VTE in pregnancy: A randomised controlled trial of two doses	Fionnuala Ní Áinle & Denis O'Keefe	HRB Mother and Baby Clinical Trials Ireland
The Mechanical Characterisation of Human Saphenous and Popliteal Vein Tissue	Eamon Kavanagh, Tony Moloney & Michael Walsh	Irish Heart Foundation

Governance of Clinical Research

HRI/CRSU - Extending our Reach

The partnership between UL and the ULHG is described, collectively and operationally, as the Clinical Research Unit (CRU). This forms a sub-unit of the HRI (UL) and the Office of the Chief Academic Officer (CAO), (ULHG). This unit is governed by the CRU management board.

As partners in the CRU, both UL and ULHG bring together academic capacity and clinical expertise to develop a strong portfolio of research projects aimed at positively impacting healthcare delivery locally, nationally and internationally. The governance of the unit is through its management board which has equal representation from both UL and ULHG.

The management board comprises:

Prof. Rachel Msetfi	<i>HRI Director</i>
Prof. Paul Burke	<i>Chief Academic Officer (ULHG)</i>
Prof. J. Calvin Coffey	<i>Foundation Chair of Surgery (UL) and Consultant Surgeon (ULHG)</i>
Ms Marie-Thérèse Hayes	<i>Clinical Operations Manager (UL)</i>

Clinical Research Board (CRB)

Oversight of clinical trial governance, on behalf of UL, is undertaken by the Clinical Research Board (CRB). This board supports UL in ensuring it meets its responsibilities as sponsor. The CRB reports directly to the VP Research.

The CRB comprises:

Prof. Rachel Msetfi (Chair)	<i>HRI Director</i>
Ms Marie-Thérèse Hayes	<i>Clinical Operations Manager</i>
Dr Margaret Lawlor	<i>Technology Transfer Officer</i>
Ms Deirdre O'Dwyer	<i>Risk Management Officer</i>
Dr Barry Shanahan	<i>Research Governance Officer</i>
Ms Cliona Donnellan	<i>Insurance Manager</i>
Ms Goretti Brady	<i>HRI Operations Manager</i>



Appendix 1

HRI Full Members List

31st December 2018

Name	Department/School
Dr Joanna Allardyce	School of Allied Health
Dr Ross Anderson	Dept. of Physical Education and Sport Sciences
Dr Norma Bargary	Dept. of Mathematics and Statistics
Ms Maebh Barry	Dept. of Nursing and Midwifery
Dr Pauline Boland	School of Allied Health
Dr Ciara Breathnach	Dept. of History
Dr Roisin Cahalan	School of Allied Health
Dr Mark Campbell	Dept. of Physical Education and Sport Sciences
Dr Brian Carson	Dept. of Physical Education and Sport Sciences
Dr Amanda Clifford	School of Allied Health
Prof. Alice Coffey	Dept. of Nursing and Midwifery
Prof. J. Calvin Coffey	Graduate Entry Medical School
Dr Maurice Collins	School of Engineering and Bernal Institute
Dr Tom Comyns	Dept. of Physical Education and Sport Sciences
Dr Jakki Cooney	Dept. of Life Sciences and MSSI
Prof. Susan Coote	School of Allied Health
Dr Barry Coughlan	Dept. of Psychology
Dr Ann-Marie Creaven	Dept. of Psychology
Dr Niamh Cummins	School of Allied Health
Dr Adam de Eyto	School of Design
Prof. Alan Donnelly	Dept. of Physical Education and Sport Sciences
Dr Owen Doody	Dept. of Nursing and Midwifery
Prof. Colum Dunne	Graduate Entry Medical School
Dr Khalifa Elmusharaf	Graduate Entry Medical School

Name	Department/School
Prof. Dick Fitzgerald	Dept. of Life Sciences
Prof. John Forbes	Health Research Institute / Graduate Entry Medical School
Prof. Donal Fortune	Dept. of Psychology
Prof. Sue Franklin	School of Allied Health
Dr Romina Gaburro	Dept. of Mathematics and Statistics
Prof. Stephen Gallagher	Dept. of Psychology
Dr Rose Galvin	School of Allied Health
Prof. Liam Glynn	Graduate Entry Medical School
Dr Rosie Gowran	School of Allied Health
Dr Andreas Grabrucker	Dept. of Biological Sciences
Dr James Green	School of Allied Health
Dr Ronni Greenwood	Dept. of Psychology
Dr Anne Griffin	School of Allied Health
Prof. Ailish Hannigan	Graduate Entry Medical School
Prof. Drew Harrison	Dept. of Physical Education and Sport Sciences
Mr Bernard Hartigan	Dept. of Product Design and Technology
Dr Sara Hayes	School of Allied Health
Dr Amanda Haynes	Dept. of Sociology
Dr Matthew Herring	Dept. of Physical Education and Sport Sciences
Dr Siobhán Howard	Dept. of Psychology
Dr Sarah Hyde	Graduate Entry Medical School
Dr Eric Igou	Dept. of Psychology
Prof. Phil Jakeman	Dept. of Physical Education and Sport Sciences

Name	Department/School
Dr Dervla Kelly	Graduate Entry Medical School
Prof. Norelee Kennedy	School of Allied Health
Dr Ian Kenny	Dept. of Physical Education and Sport Sciences
Dr Patrick Kiely	Graduate Entry Medical School
Dr Louise Kiernan	School of Design
Dr Liz Kingston	Dept. of Nursing and Midwifery
Dr Elaine Kinsella	Dept. of Psychology
Prof. Stephen Kinsella	Dept. of Economics
Dr Louise Larkin	School of Allied Health
Prof. Des Leddin	Graduate Entry Medical School
Dr Yianna Liatsos	School of English, Irish, and Communication
Dr Dominika Lisiecka	School of Allied Health
Dr John Lombard	School of Law
Dr Ciarán MacDonncha	Dept. of Physical Education and Sport Sciences
Prof. Anne MacFarlane	Graduate Entry Medical School
Dr Tadhg MacIntyre	Dept. of Physical Education and Sport Sciences
Prof. Hussain Mahdi	Dept. of Electronic and Computer Engineering
Prof. Tiziana Margaria	Dept. of Computer Science and Information Systems, LERO
Dr Tríona McCaffrey	Irish World Academy of Music and Dance
Dr Karen McCreesh	School of Allied Health
Dr Arlene McCurtin	School of Allied Health
Prof. Kieran McDermott	Graduate Entry Medical School
Dr Kieran McGourty	Dept. of Chemical Sciences
Dr Jennifer McMahan	School of Education

Name	Department/School
Dr Muireann McMahon	School of Design
Dr Pauline Meskell	Dept. of Nursing and Midwifery
Prof. Lee Monaghan	Dept. of Sociology
Dr Lisa Moran	Graduate Entry Medical School
Dr Hilary Moss	Irish World Academy of Music and Dance
Prof. Rachel Msetfi	Centre for Social Issues Research, Dept. of Psychology
Prof. Orla Muldoon	Dept. of Psychology
Dr John Mulvihill	School of Engineering
Dr Carol-Anne Murphy	School of Allied Health
Prof. Fiona Murphy	Dept. of Nursing and Midwifery
Dr Sylvia Murphy Tighe	Dept. of Nursing and Midwifery
Dr Órfhlaith Ní Bhriain	Irish World Academy of Music and Dance
Dr Clifford Nolan	Dept. of Mathematics and Statistics
Dr Catherine Norton	Physical Education and Sport Sciences Dept.
Ms Anne O'Connor	School of Allied Health
Dr Eibhlis O'Connor	Dept. of Life Sciences
Prof. Clodagh O'Gorman	Graduate Entry Medical School
Dr Andrew O'Regan	Graduate Entry Medical School
Dr Bernadette O'Regan	Dept. of Chemical Sciences
Dr Pauline O'Reilly	Dept. of Nursing and Midwifery
Dr Deirdre O'Shea	Dept. of Personnel and Employment Relations
Dr Kieran O'Sullivan	School of Allied Health
Prof. Leonard O'Sullivan	Design and Manufacturing Technology

Name	Department/School
Prof. Helen Phelan	Irish World Academy of Music and Dance
Dr Helen Purtill	Dept. of Mathematics and Statistics
Prof. Ita Richardson	Dept. of Computer Science and Information Systems
Dr Katie Robinson	School of Allied Health
Prof. Conor Ryan	Dept. of Computer Science and Information Systems
Dr Elizabeth Ryan	Dept. of Biological Sciences
Dr Patrick Ryan	Dept. of Psychology
Dr Nancy Salmon	School of Allied Health
Dr Jon Salsberg	Graduate Entry Medical School
Dr Jean Saunders	Dept. of Mathematics and Statistics
Dr Jennifer Schweppe	School of Law
Dr Maria Semkovska	Dept. of Psychology
Dr Ali Sheikhi	Health Research Institute
Dr Eimear Spain	School of Law / Education and Health Sciences
Prof. Austin Stack	Graduate Entry Medical School
Dr Audrey Tierney	School of Allied Health
Dr Pepijn Van de Ven	Dept. of Electronic and Computer Engineering
Prof. Cathal Walsh	MACSI and Dept. of Mathematics & Statistics
Prof. Michael Walsh	School of Engineering
Dr Giles Warrington	Dept. of Physical Education and Sport Sciences
Prof. Catherine Woods	Dept. of Physical Education and Sport Sciences
Dr Aileen Wright	School of Allied Health
Dr Ioannis Zabetakis	Dept. of Life Sciences



Appendix 2

HRI Affiliated Papers in 2018

Decile 1 Papers

- 1 Cahalane, R. M., Barrett, H. E., O'Brien, J. M., Kavanagh, E. G., Moloney, M. A. and **Walsh, M. T.** (2018) 'Relating the mechanical properties of atherosclerotic calcification to radiographic density: A nanoindentation approach', *Acta Biomaterialia*, 80, 228–236.
- 2 Cantwell, M., Walsh, D., Furlong, B., Moyna, N., McCaffrey, N., Boran, L., Smyth, S. and **Woods, C.** (2018) 'Healthcare professionals' knowledge and practice of physical activity promotion in cancer care: Challenges and solutions', *European Journal of Cancer Care*, 27(2).
- 3 Collins, C. M., Malacrida, B., Burke, C., **Kiely, P. A.** and Dunleavy, E. M. (2018) 'ATP synthase F-1 subunits recruited to centromeres by CENP-A are required for male meiosis', *Nature Communications*, 9.
- 4 Dowd, K. P., Szeklicki, R., Minetto, M. A., Murphy, M. H., Polito, A., Ghigo, E., van der Ploeg, H., Ekelund, U., Maciaszek, J., Stemplewski, R., Tomczak, M. and **Donnelly, A. E.** (2018) 'A systematic literature review of reviews on techniques for physical activity measurement in adults: a DEDIPAC study', *International Journal of Behavioral Nutrition and Physical Activity*, 15.
- 5 Flynn, E., Smith, C. H., **Walsh, C. D.** and Walshe, M. (2018) 'Modifying the consistency of food and fluids for swallowing difficulties in dementia', *Cochrane Database of Systematic Reviews*, (9).
- 6 Gordon, B. R., McDowell, C. P., Hallgren, M., Meyer, J. D., Lyons, M. and **Herring, M. P.** (2018) 'Association of Efficacy of Resistance Exercise Training With Depressive Symptoms Meta-analysis and Meta-regression Analysis of Randomized Clinical Trials', *Jama Psychiatry*, 75(6), 566–576.
- 7 **Herring, M. P.**, Monroe, D. C., Kline, C. E., O'Connor, P. J. and **MacDonncha, C.** (2018) 'Sleep quality moderates the association between physical activity frequency and feelings of energy and fatigue in adolescents', *European Child & Adolescent Psychiatry*, 27(11), 1425–1432.
- 8 Kairey, L., Matvienko-Sikar, K., Kelly, C., McKinley, M. C., **O'Connor, E. M.**, Kearney, P. M., Woodside, J. V. and Harrington, J. M. (2018) 'Plating up appropriate portion sizes for children: a systematic review of parental food and beverage portioning practices', *Obesity Reviews*, 19(12), 1667–1678.
- 9 Kermavnar, T., Power, V., **de Eyto, A.** and O'Sullivan, L. (2018) 'Cuff Pressure Algometry in Patients with Chronic Pain as Guidance for Circumferential Tissue Compression for Wearable Soft Exoskeletons: A Systematic Review', *Soft Robotics*, 5(5), 497–511.
- 10 Kermavnar, T., Power, V., **de Eyto, A.** and O'Sullivan, L. W. (2018) 'Computerized Cuff Pressure Algometry as Guidance for Circumferential Tissue Compression for Wearable Soft Robotic Applications: A Systematic Review', *Soft Robotics*, 5(1), 1–16.
- 11 Lawlor, B., Segurado, R., Kennelly, S., Rikkert, M., Howard, R., Pasquier, F., Borjesson-Hanson, A., Tsolaki, M., Lucca, U., Molloy, D. W., Coen, R., Riepe, M. W., Kalman, J., Kenny, R. A., Cregg, F., O'Dwyer, S., **Walsh, C.**, Adams, J., Banzi, R., Breuilh, L., Daly, L., Hendrix, S., Aisen, P., Gaynor, S., **Sheikhi, A.**, Taekema, D. G., Verhey, F. R., Nemni, R., Nobili, F., Franceschi, M., Frisoni, G., Zanetti, O., Konsta, A., Anastasios, O., Nenopoulou, S., Tsolaki-Tagaraki, F., Pakaski, M., Dereeper, O., de la Sayette, V., Senechal, O., Lavenue, I., Devendeville, A., Calais, G., Crawford, F., Mullan, M. and Grp, N. S. (2018) 'Nilvadipine in mild to moderate Alzheimer disease: A randomised controlled trial', *Plos Medicine*, 15(9).

- 12 McDowell, C. P., Dishman, R. K., Vancampfort, D., Hallgren, M., Stubbs, B., **MacDonncha, C.** and **Herring, M. P.** (2018) 'Physical activity and generalized anxiety disorder: results from The Irish Longitudinal Study on Ageing (TILDA)', *International Journal of Epidemiology*, 47(5), 1443–1453.
- 13 **Msetfi, R.**, O'Sullivan, D., Walsh, A., Nelson, J. and **Van de Ven, P.** (2018) 'Using Mobile Phones to Examine and Enhance Perceptions of Control in Mildly Depressed and Nondepressed Volunteers: Intervention Study', *Jmir Mhealth and Uhealth*, 6(11).
- 14 O'Neill, A., O'Sullivan, K., O'Keefe, M., Hannigan, A., **Walsh, C.** and **Purtill, H.** (2018) 'Development of pain in older adults: a latent class analysis of biopsychosocial risk factors', *Pain*, 159(8), 1631–1640.
- 15 Powell, C., **Herring, M. P.**, Dowd, K. P., **Donnelly, A. E.** and **Carson, B. P.** (2018) 'The cross-sectional associations between objectively measured sedentary time and cardiometabolic health markers in adults – a systematic review with meta-analysis component', *Obesity Reviews*, 19(3), 381–395.
- 16 Ryan, A., Murphy, C., Boland, F., **Galvin, R.** and Smith, S. M. (2018) 'What Is the Impact of Physical Activity and Physical Function on the Development of Multimorbidity in Older Adults Over Time? A Population-Based Cohort Study', *Journals of Gerontology Series a-Biological Sciences and Medical Sciences*, 73(11), 1538–1544.
- 17 Short, C. E., DeSmet, A., **Woods, C.**, Williams, S. L., Maher, C., Middelweerd, A., Muller, A. M., Wark, P. A., Vandelanotte, C., Poppe, L., Hingle, M. D. and Crutzen, R. (2018) 'Measuring Engagement in eHealth and mHealth Behavior Change Interventions: Viewpoint of Methodologies', *Journal of Medical Internet Research*, 20(11).
- 18 Siontis, K. C., Zhang, X. S., Eckard, A., Bhave, N., Schaubel, D. E., He, K., Tilea, A., **Stack, A. G.**, Balkrishnan, R., Yao, X. X., Noseworthy, P. A., Shah, N. D., Saran, R. and Nallamothu, B. K. (2018) 'Outcomes Associated With Apixaban Use in Patients With End-Stage Kidney Disease and Atrial Fibrillation in the United States', *Circulation*, 138(15), 1519–1529.
- 19 Streicher, M., van Zwiene, J., Bardou, L., Nagel, G., Teh, R., Meisinger, C., Colombo, M., Torbahn, G., Kiesswetter, E., Flechtner-Mors, M., Denking, M., Rothenbacher, D., Thorand, B., Ladwig, K. H., Corish, C. A., Clarke, M., Kerse, N., Muru-Lanning, M., Gibney, E. R., **O'Connor, E. M.**, Visser, M., Volkert, D. and MaNu, E. L. C. (2018) 'Determinants of Incident Malnutrition in Community-Dwelling Older Adults: A MaNuEL Multicohort Meta-Analysis', *Journal of the American Geriatrics Society*, 66(12), 2335–2343.
- 20 Walsh, D. R., Ross, A. M., Malijauskaitė, S., Flanagan, B. D., Newport, D. T., **McGourty, K. D.** and **Mulvihill, J. J. E.** (2018) 'Regional mechanical and biochemical properties of the porcine cortical meninges', *Acta Biomaterialia*, 80, 237–246.
- 21 Yeomans, C., **Kenny, I. C.**, **Cahalan, R.**, **Warrington, G. D.**, **Harrison, A. J.**, Hayes, K., Lyons, M., **Campbell, M. J.** and **Comyns, T. M.** (2018) 'The Incidence of Injury in Amateur Male Rugby Union: A Systematic Review and Meta-Analysis', *Sports Medicine*, 48(4), 837–848.

Note: Data Source – Web of Science. Date last updated 23-03-2019.
Full HRI members are highlighted in **bold**.



Interdisciplinary approaches

to ageing, cancer, physical activity, implementation science, migrant health, and product design

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