The University of Limerick

Sustainability Report 2021

UNIVERSITY OF LIMERICK
OLLSCOIL LUIMNIGH

50
Reflecting | Connecting | Transforming
Machnamh | Nasc | Gníomh

SUSTAINABLE DEVELOPMENT GOALS

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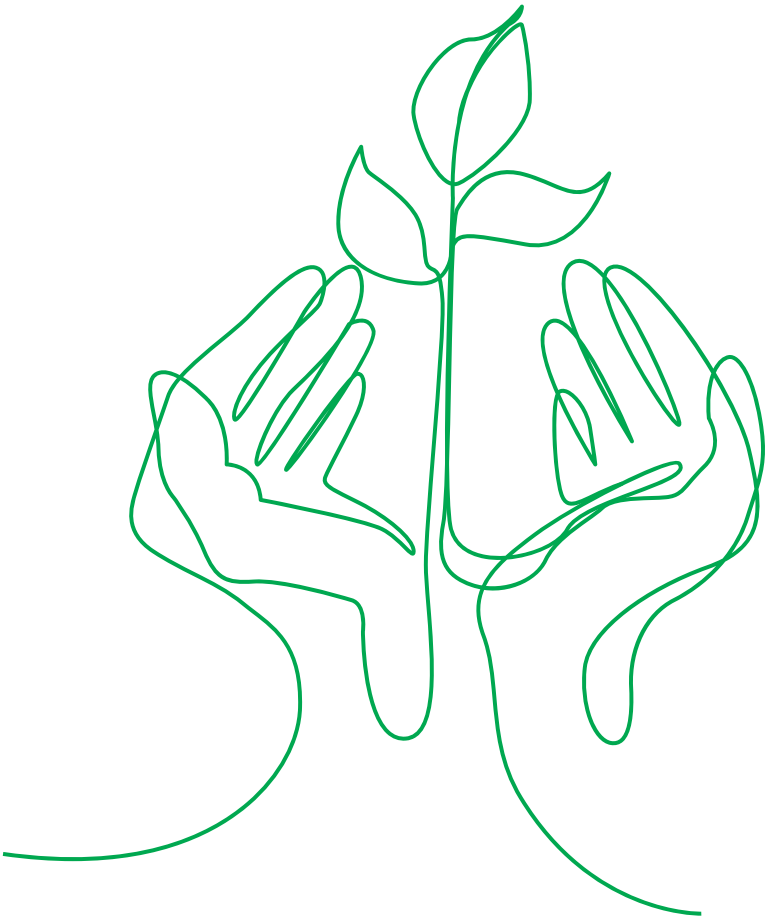


President's Forward

I am delighted that the UL Sustainable Working Group has completed an eight-month long challenge to **collectively shape a sustainability framework that will guide and inspire action** at University of Limerick for the next decade.

To all members of this cross-institutional working group I offer my congratulations on this achievement, which speaks of their expertise and imagination, passion and commitment towards a thriving organisation, region and world. I appreciate how complex a task it was to develop systems-wide, dialogic and integrative approaches and I take this opportunity to commend the group on their energy, foresight and resolve. I am very proud and grateful for the work they have done to develop a highly participatory, design-led process to create a sustainability roadmap, which has been formally approved by University of Limerick's Executive Committee and Governing Authority.

The UL Sustainability Framework 2030 advocates a mission-based approach which aligns with much of the work currently being undertaken within the EU and globally. The framework will act as a bedrock for our decisions and actions to shape the future of higher education, research and the university itself. It connects with so much of what has already been pioneered by UL but also looks to building new capabilities, and enables increased experimentation on campus, all aimed at ensuring that UL becomes a sustainable university, through and through. I am confident it will unite and drive collaboration between all our valued stakeholders.

To this end, we are in the process of resourcing and developing UL's new mission engine on campus: the Mission Lab, which has been designed to facilitate engagement while driving and transparently measuring our progress towards our portfolio of tasks and actions. Each mission has been inspired by and mapped on the UN Sustainability Goals (SDGs).

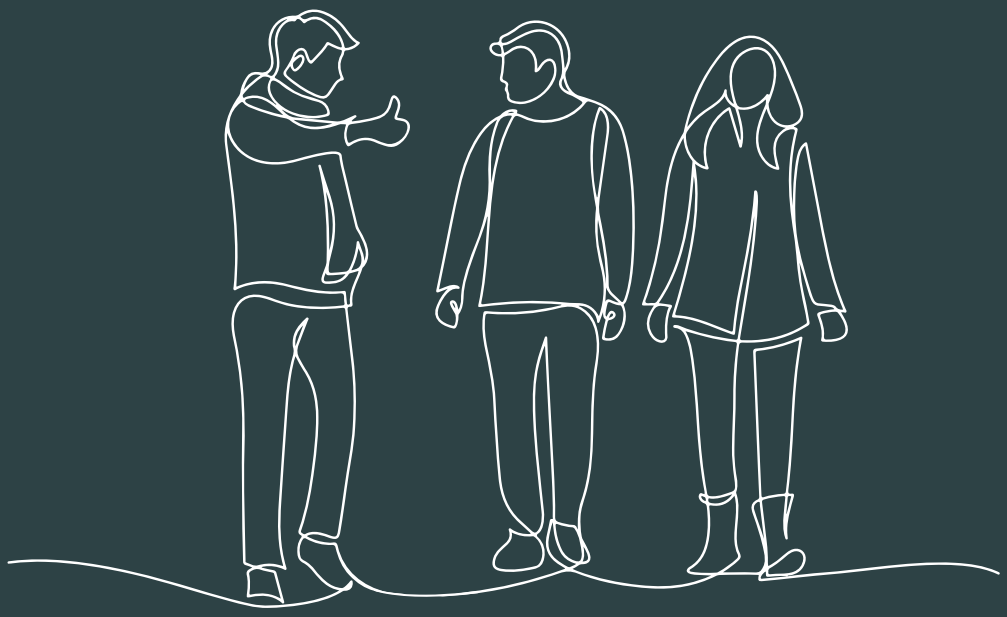
We believe that **UL's mission-based approach will enable us as a higher education institution to step up actively to the challenges we all face** and to act collectively in addressing them.

I look forward to celebrating our successes and learnings as we embark on an ambitious and impactful change programme over the coming years.

We cannot do this alone, and as we take our first steps towards a truly sustainable university, one that acts as a role model for sustainability in the region and beyond, we know that we will need the support and guidance of many actors, cross-sectoral groups and individuals to succeed.

Kerstin Mey
President
University of Limerick

taking our first steps towards becoming a **truly sustainable university**



On becoming a sustainable university

We have overstepped our planetary boundaries, the limits past which our planet cannot rejuvenate. Our planet is getting steadily hotter, and we are losing polar sea-ice.

We are facing ozone depletion and with it increased loss of biodiversity and extinctions, while chemical pollution has potentially irreversible effects on living organisms. CO_2 levels in the atmosphere are rising, around a quarter of the CO_2 that humanity emits is dissolved in the oceans making them hostile to living organisms. We have converted more and more land to human use all over the planet, with the result that the forests, grasslands and wetlands converted to agriculture are driving reductions in biodiversity and impacts on water flows. Atmospheric aerosol loading, with atmospheric pollution and land use change releasing dust and pollutants into the air, which causes roughly 800,000 people to die prematurely each year.

The global economy is an engine that uses energy from extracted carbon to generate wealth that governments then seek to redistribute from rich to poor. The capitalist system is the greatest wealth creator because it is based, fundamentally, on extraction and accumulation. The last two centuries have witnessed the greatest expansion of lives, via population growth, and of living standards in our history as a species. These expansions have taken place alongside vast increases in greenhouse gases which now threaten our survival as a species. Economies are embedded in societies spatially, determined by the patterns of extraction, accumulation, consumption and distribution. They are culturally determined by a system of power relations which takes perpetual growth in living standards as a given and features increasing inequalities of income and wealth within countries. These are unsustainable processes. What is unsustainable will, eventually, stop. We have to stop and unlearn these behaviours. We must think and behave in a way that protects the planet and helps life to flourish.

We need to co-create a way of life, a way for each of us to **live sustainably**, all the time, as far as we possibly can.

Sustainability as a concept, movement, terminology, or way of life is not new. Indeed, the concept of sustainability is often overused and misunderstood, it is not an invention of the 20th century. It is rooted in previous cultures and can be traced back over many centuries "at its core, sustainability relates to the basic human need to maintain and to nurture the conditions on which life depends" (Grober, 2012). This is our third sustainability report in UL, in this report our ambition remains the same to share stories connected to sustainability work here on campus so that we can continue to grow and connect important actions.

So, what is it we are setting out to do?

We need to facilitate a change in basic assumptions to a fully sustainable culture: a cohesive, systems-wide, collective approach and way of being, day in, day out, across the whole UL community.

A sustainable world will not happen without determined effort – our actions today determine the future we manifest. The gravity of this responsibility cannot allow us to drift along with the tides of change. Instead, we are called intentionally to open our minds, hearts and hands to the possibilities that can only be revealed by moving bravely into the unknown. If we become trapped by dogma and incremental innovation, we will find ourselves sustaining a world characterised by the faults of the present. The success of our collective transition will depend on the degree to which higher education institutions (HEIs) claim a role in advancing the critical gaps in our knowledge and nurturing the vital shifts in our culture. To fully leverage the potential for change that HEIs hold, this role must play out across all aspects of our institutions: from boardrooms to lecture halls to campus grounds alike.

To become a sustainable university, we must start by acknowledging that true sustainability will require permanent adaptive responsiveness to on-going change. The prerequisite of adaptability and responsiveness is embodiment. It ensures ideas and intentions are rooted in action. Consequently, embodiment can be seen as the central characteristic of a sustainable university; it is a title for institutions that go beyond traditional curricula and research programmes and actively explore change within their own ethos, practices and operations.

Andrea Deverell
Future and Foresight Lead
University of Limerick

End poverty in all its forms everywhere.

1 NO POVERTY

University of Limerick joins fight against period poverty

University of Limerick joins the fight against period poverty. The initiative which provides period products on campus was started by UL students, who created the 'Anytime of the Month' campaign. Their work in highlighting period poverty and establishing supports to alleviate it has expanded to include working with gynaecologists, doctors and nurses who offer unbiased medical information about periods and period health to students.

A number of businesses have signed up to the programme to provide period products in the workplace and the campaign team has conducted workshops with 21 third-level student unions across Ireland. These institutions are now part of the network and are providing period products free of charge. UL President, Professor Kerstin Mey, said, "I am so proud of the incredible group of engaged and socially aware UL students who have become change-makers in their community with the development of the 'Anytime of the Month' campaign. The university is following their lead to ensure we have supports in place to alleviate the effects of period poverty."

Research by 'Anytime of the Month' found that one in two teenagers in Ireland is impacted by period poverty, while one in three students in third-level education is also afflicted by it. Furthermore, their study reported that 75 per cent of people have gone longer than the recommended four hours wearing a sanitary product due to lack of money or lack of access to products, posing a risk to long-term health. According to Catriona O'Halloran, co-project lead of 'Anytime of the Month', the campaign started in UL to support students, and by establishing the provision of free period products is the long-term change they always hoped to achieve. "This is a huge step forward for everyone in the UL community," she said. "Our initiatives have now reached all across Ireland, but we are very proud of our UL roots and it's fantastic to have the support of the university."

University of Limerick is making period products available free for students across the campus, including at the main reception and in the Stables bar. In addition, the university is fully supporting the 'Anytime of the Month' ally badge system, which aims to create a network of 'friendly strangers' at UL, who can help if someone needs sanitary products.

Giving Voice

"Sustainability is about meeting the needs of people while also maintaining the ecological wellbeing of the planet. It straddles issues of poverty and inequality as well as environmental concerns. To address sustainability challenges, we must interrogate our everyday actions and decisions to ensure that we are critical consumers, advocates for justice and active agents of change for a better world. It is critically important that our approaches to education amplify the core values of sustainability: justice, care, respect and empathy."

Deirdre Hogan, Ubuntu Network Coordinator, School of Education, UL.

End hunger

achieve food security and improved nutrition and promote sustainable agriculture.

2 ZERO HUNGER

Crop rotations with beans and peas offer more sustainable and nutritious food production

Growing peas, beans, lentils and chickpeas is potentially a more sustainable and nutritious approach to European agriculture, according to a study published in April 2021 in the journal Frontiers in Sustainable Food Systems. The study presents some of the first holistic evidence that adding legumes to traditional crop rotations (typically including barley, wheat and rapeseed) offers significant environmental benefits as well as increased nutritional value for humans and livestock.

All crops need the critical nutrient nitrogen to grow, and, for most crops, farmers must provide nitrogen via fertilisers. However, conventional fertilisers are not sustainable – they require significant energy to produce, they are depleting finite resources and they pollute the surrounding environments. The European Union Green Deal Farm to Fork strategy specifically aims to address this problem, with goals to cut greenhouse emissions and chemical pesticide use by 50 per cent, as well as reducing synthetic fertiliser use by 20 per cent by 2030. In contrast to other crop types, legumes are among the few crops that can get all the nitrogen they need from the air around them. This is thanks to a symbiotic partnership with bacteria that transforms nitrogen in the air into a form that can be used by plants.

Legume crops not only do not require fertiliser themselves, but they also enrich the soil with nitrogen, reducing the need for nitrogen fertilisers for future non-legume crops. From a nutritional perspective, legumes are also one of the most nutrient-rich crops, providing protein, fibre, folate, iron, potassium, magnesium and vitamins. “Our innovative approach goes beyond simple food footprints by looking at the footprint of delivering a specific quantity of human or livestock nutrition from all crops produced within representative crop rotations,” said Dr David Styles, a Bernal Institute member and the lead researcher on the study. “This provides a clearer picture of inter-crop effects and the overall efficiency of different cropping sequences in delivering nutritious food (or livestock feed). Our results strengthen evidence on the positive role that healthy diet transitions could make to environmental sustainability.” Dr Styles added, “Legumes provide a healthier balance of carbohydrates, protein and fibre compared with cereal crops, and could improve the nutritional profile of the food we eat.”

Giving Voice

“Humanity faces several wicked environmental challenges; however, we are also the innovators of sustainable solutions. We have great opportunity if we act collectively and responsibly. Multi-disciplinary work is key; every sector has a role to play. As a university, we lead with our teaching, our research and our strategy. We need to be exemplary in our stewardship of the ecosystem that supports us all. Using the SDGs as a framework for this work should ensure that our vision is fair, equitable and sustainable.”

Dr Yvonne Ryan, Principal Investigator BE-MAP, Green Campus Committee, Environmental Committee and Campus Community and Operations, SDGs Working Group, UL.

Ensure healthy lives and promote well-being for all at all ages.

3 GOOD HEALTH AND WELL-BEING

Bernal study will lead to urethral repairs that mimic the native tissue

A collaboration between researchers from the Bernal Institute, the Royal College of Surgeons in Ireland and the University of Pittsburgh will enable the fabrication of a biomimetic urethral scaffold that mimics the mechanics, composition and structure of the native tissue. Trauma to the urethra is a frequent and costly event that can be caused by injury, inflammation, stricture, congenital defect or malignancy. Urethra repair strategies often use a skin flap or vascularised graft. Grafts that are formed from a patient's own tissue are difficult to harvest, have limited availability and are associated with donor site morbidity. Tissue engineered urethral scaffolds are not subject to such limitations.

Existing urethral scaffolds frequently fail, however, as they do not mimic the composition, structure, or mechanical properties of the native tissue, which were previously unknown. This study, therefore, addresses a crucial gap in the literature by characterising the relationship between urethral tissue mechanics, composition and gross structure. The findings have been used to develop a biomimetic urethral scaffold with physical properties that more accurately mimic the native tissue than existing tissue engineered scaffolds. The tissue characterisation data presented in the study paves the way for the development of biomimetic urethral grafts and demonstrates positive findings that warrant further in vivo evaluation.
This work was funded by the European Union's Horizon 2020 research and innovation programme under a Marie Sklodowska-Curie grant awarded to Dr Eoghan Cunnane. The human tissue was supplied by Professor Jochen Hess (University Hospital Essen), tissue characterisation was performed in the Bernal BioLabs under the supervision of Professor Michael Walsh, scaffold fabrication was performed in collaboration with Professor Fergal O'Brien (Royal College of Surgeons in Ireland) and animal work was performed in collaboration with Professor David Vorp (University of Pittsburgh).

Research finds new link between personality and risk of death

Ground-breaking research led by University of Limerick has revealed for the first time that the immune system links personality to long-term risk of death. The study sheds new light on why people who are more conscientious tend to live longer. Results from the new international study published in the journal Brain, Behaviour, and Immunity have found that the immune system plays a previously unknown role in the link between personality traits and long-term risk of death. "Personality is known to be associated with long-term risk of death. It is a well replicated finding observed across numerous research studies internationally," explained principal investigator on the study, Dr Páraic Ó Súilleabháin, lecturer in Psychology, member of the Health Research Institute and research coordinator on the doctoral programme in Clinical Psychology at UL. "The critical question is 'how'. We wanted to find out if a biological pathway such as our immune system may explain why this happens. Our personality is critically important throughout our lives, from early stages in our development, to the accumulation of the impact of how we think, feel and behave across our lives, and in the years preceding our death. It is also becoming increasingly apparent how important personality is for our long-term health and resulting longevity. For instance, it has been shown that people scoring lower on the personality trait of conscientiousness (a tendency to be responsible, organised and capable of self-control) can be at a 40 per cent increased risk of future death compared to their higher-scoring counterparts. What is not clear is how this could happen and, importantly, what biological pathway might be responsible for this link."

Led by Dr Ó Súilleabháin, this study was conducted with a team of collaborators from the Department of Psychology at UL, the Department of Psychology at West Virginia University, the Department of Psychology at Humboldt University Berlin, and the College of Medicine at Florida State University. The researchers wanted to investigate if two biological markers which are central to the immune system may explain why personality traits are associated with long-term mortality risk. There are further biological

mechanisms that are yet to be discovered which will give a clearer picture of all the different ways that our personalities are so critical to our long-term health. "These findings are very important and identify for the first time that an underlying biological marker directly links personality to long-term mortality risk. With replication, these findings provide an opportunity for future interventions to increase our longevity and health across the lifespan," said Dr Ó Súilleabháin.

World-leading back pain academic Dr Kieran O'Sullivan receives Research Excellence award

Dr Kieran O'Sullivan, senior lecturer in Physiotherapy, has been announced as the UL 2021 recipient of the Research Excellence and Impact Award for Early Career Researcher. After working in clinical practice as a physiotherapist for a number of years, Dr O'Sullivan's research focus has been to shed new light on why back pain is such an ongoing challenge. His research has led to the development and testing of novel solutions for the treatment of back pain. Dr O'Sullivan is the National Director of Professional Development for Physiotherapists.

The Research Excellence and Impact Award for Early Career Researcher at UL celebrates individuals in the early stages of their research career who have made outstanding contributions through the excellence of their research and its impact beyond academia. According to Dr O'Sullivan, "the costs (personal, societal and economic) of low back pain are enormous, and the likelihood of being disabled by back pain has worsened in recent decades."

"Hundreds of studies have shown that things like stress, worry, anxiety and low mood make us more likely to get persistent back pain. Importantly, these studies show not just that back pain causes distress, but that distressed people get more back pain. Being run down by things like stress and worry has a very real effect on our physical health. This is not imaginary; this is real biology. Back pain should not be considered a purely 'physical' issue. Instead, we should treat the whole human and then focus treatment on the aspects that deserve most attention for that individual which might vary. For some, for example, it could be poor fitness or strength; for others it might be sleep, worries or stress."

Dr Kieran O'Sullivan's research is primarily supported by the Health Research Board, the Irish Research Council, the European Commission and the National Health and Medical Research Council, Australia.

UL-Lero research shows commercial video games could help treat mental illness

Popular video games have the potential to provide low-cost, easy access, effective and stigma-free support for some mental health issues, according to research carried out at University of Limerick and Lero, the Science Foundation Ireland Research Centre for Software. Lero researcher Dr Mark Campbell said there is mounting scientific evidence supporting the efficacy of commercial video games to improve mental health outcomes after his team reviewed existing academic research on the impact of video games on mental health issues, particularly depression and anxiety.

"It is worth considering commercial video games as a potential alternative option for the improvement of various aspects of mental health globally," said Dr Campbell, who led a team attached to University of Limerick's Health Research Institute and Physical Education and Sport Sciences department to publish their latest research paper 'Gaming your mental health: A narrative review on mitigating depression and anxiety symptoms via commercial video games' in academic journal JMIR Serious Games. "The overall accessibility and pervasiveness of commercial video games within modern society positions them as an invaluable means of reaching individuals with mental health disorders, irrespective of age and sex, and with limited access to mental health care, particularly relevant during the current COVID-19 pandemic," he explained.

Lead author on the paper, Magdalena Kowal, said, "There is a heightened demand for accessible and cost-effective methods that prevent and facilitate coping with mental health illness. This demand has become exacerbated following the advent of the COVID-19 pandemic and subsequent increase in mental health disorders, depression, and anxiety in particular."

Magdalena Kowal said commercially available virtual reality (VR) video games also have great potential in treating mental health issues. "These are well-suited for the implementation of cognitive behavioural techniques for the treatment of depression and anxiety disorders in the future. Given the immersive nature of VR technology and the controllability of the virtual environment, it could be particularly well-suited for use in exposure therapy," she added.

UL study shows Irish kidney dialysis patients may face higher risk of hospitalisation and infection

A new University of Limerick study has found that the treatment used in the majority of Irish kidney failure patients may lead to higher rates of hospitalisation, infection and even death. The research carried out by a team at University of Limerick School of Medicine led by Professor Austin Stack found high rates of central venous catheter dependency in Irish patients undergoing haemodialysis, which the researchers believe may lead to worse clinical outcomes than those in other countries.

Patients who develop kidney failure are hugely dependent on their 'lifeline' connection between the dialysis machine and the patient's blood vessels. This connection is usually in the form of an arteriovenous fistula (AVF), a surgical connection between a vein and artery in the patient's blood vessels, or a large central venous catheter (CVC), which is an artificial plastic tube inserted into a large vein in the body (usually a neck vein). The research shows that Irish patients who started dialysis were more likely to be using a catheter than a fistula (77 per cent versus 23 per cent) for treatment, and that the percentage of patients with a functioning fistula varied substantially across major centres in Ireland. The proportion of patients using a fistula only increased modestly at the end of the first year on dialysis. The study, funded by the Health Research Board (HRB), looked at 610 patients initiating haemodialysis in Ireland between January 1, 2015, and December 31, 2016, with a follow-up one year later.

With over 500 new patients in Ireland developing kidney failure and requiring dialysis each year, and in excess of 2,000 patients undergoing treatment on the haemodialysis programme annually, Professor Stack said that the "national programme for dialysis needs to be resourced and empowered to deliver for our patients". Dr Mairéad O'Driscoll, CEO of the HRB, said that they aimed "to support research that improves people's health, improves patient care, and saves lives. This study does exactly that, as it will lead to improved care and outcomes for Irish patients undergoing haemodialysis."

UL study reveals link between Crohn's disease and fatty tissue in the gut

New research led by University of Limerick has revealed a direct link between fatty tissue and Crohn's disease. The research, published in leading journal Scientific Reports, has been described as "an exciting starting point" for the further exploration of Crohn's disease, which affects thousands of people every year in Ireland and internationally. The study involved body composition analysis of patients with Crohn's disease using equipment hosted on the UL campus, with the UL team collaborating with gastroenterology and surgical specialists in University Hospital Limerick (UHL).

"People with Crohn's disease incorporate fat into their body in a way that is different to people who do not have Crohn's and appear to preferentially lay down fat on the lower parts of their body rather than the abdomen," explained Professor Colum Dunne, Foundation Chair and Director of Research at the UL School of Medicine.

"In our study it was evident that, in the abdominal areas where the intestines are located, Crohn's-related ulcers or lesions and inflammation are associated with higher depositions of fat. More simply, in that part of their body that has relatively less overall fat, disease shows up as linked with fatty tissue surrounding the gut," explained Professor Dunne, who led the study along with Professor Phil Jakeman and Professor J. Calvin Coffey. Professor Dunne said the latest research was "a practical example of impact in real world clinical care". He continued, "There is a lot happening in this area at University of Limerick. Our research benefits from the ability to look at clinical problems as part of interdisciplinary teams. For example, our approach in exploring inflammatory bowel disease has resulted in development of a new diagnostic test that differentiates Crohn's disease from ulcerative colitis based on blood-borne

biomarkers and may enable monitoring of treatment without need for endoscopy. This type of innovation relies on team members who contribute diverse expertise, ranging from lab-based analysis to front-line clinical specialists. The close relationship between the university and hospitals in Limerick encourages that way of working."

A UL documentary explores impact of music on people living with dementia

Online music therapy as an effective intervention for people living with dementia is explored in a new documentary by Lisa Kelly, PhD student at University of Limerick. The student documentary 'Music, Technology and Dementia', which was released on March 1, 2021 to coincide with World Music Therapy Day, was funded by Lero, the Science Foundation Ireland Research Centre for Software based at UL.

The documentary provides a window into how people living with dementia are using music and technology at home, according to Galway-based music therapist and UL PhD student Lisa Kelly, who is a research assistant with Lero. "Before the pandemic, I was providing music therapy in a residential care facility for people living with dementia. The residents' response to music was incredible and provided them with a way to connect when verbal interaction became difficult. The COVID-19 pandemic necessitated our moving to technology to stay connected with one another while safely staying apart, so I was no longer able to provide in-person services," Lisa explained. Her thoughts went out to those living in rural or isolated areas who may have reduced mobility or live alone. "Could technology and online working be the solution to bridge this gap and help people living with dementia through music?" she wondered. "It sparked my curiosity," she said. "It spurred me to begin my PhD studies at the interface of music therapy, technology and dementia. As part of this, I wanted to connect with people living with dementia using technology and music daily, as well as those who facilitate online music programmes for people with dementia."

Among the contributors to the documentary is Dr Hilary Moss, MA Music Therapy Course Director at UL, who said we know that people can still respond to music in the later stages of dementia. "When they can't have a conversation with you, they can sing a song, recall song lyrics, even still play instruments that they learned during their life. I think it is important that we investigate and develop online music therapy services for people living with dementia. We are keen to support people who are living at home. We all want to remain at home for as long as possible," said Dr Moss.

Kevin Quaid of the Irish Dementia Working Group, who is living with Lewy Body Dementia, explains that his symptoms are worse at night and how listening to music on his smartphone helps. "When you wake at night and you do not know who you are, that is the frightening part of it. But if I can get my wits about me and stick in the little earbuds and put on a bit of music, it will just bring me back and bring me around to reality again," he explained.

Professor Ita Richardson, principal investigator at Lero, said that their research is focused on how community healthcare can be provided using software and technology. "Music therapy is one aspect of this care, so it is very exciting to have the opportunity to understand how technology can change the work of the music therapist while providing additional benefit to those who need it most," she said.

Student Showcase

EpiHelp (Mark Shine)

EpiHelp is a smart medical wrist-worn device that will help reduce the frequency of seizures in epilepsy through stress reduction and management by setting reminders to users to be mindful of their mental health and stress. The wearable component incorporates the Star of Life and the epilepsy medical ID as part of the design. EpiHelp works in tandem with a companion app. The aim is to eliminate over-analysing and keep everything minimal and stress free. The app features a variety of functions including a seizure log where the user can log their seizures instantly through the device if and when they have an episode.

Enhancing (Weijie Chen)

Enhancing is an interactive product aimed at improving fine motor, planning and organisational skills for people with Dyspraxia (DCD). Enhancing encourages the user to engage in hands-on physical interactions with the product, exercising their hand muscles through a series of deliberate and unconscious actions that have been incorporated into the everyday use of the product which, over time, will contribute to improved dexterity. Enhancing also encourages positive, supportive relationship building and interaction through the mobile app platform. In addition, the app provides a platform for users to improve their planning and organisational skills incrementally over time with the aid of their parents, teachers or special needs assistant. Enhancing consists of three separate components: an interactive exercise hub, a handheld task planning device and a wireless charging station that promotes hands-on interactions.

Giving Voice

"We can achieve sustainability if we live in a manner that does not exceed the planetary boundaries. This ultimately means consuming less. It also means creating and maintaining an environment in which the beauty of the natural world is guaranteed for future generations. It is my hope that working together will lead us to a sustainable transformation at UL by focusing on sustainable education, the local community and embedding sustainable practices right across our organisation to become ultimately a sustainable university."

Vicky Kelly, Futures and Foresight, Finance Division, UL.

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

4 QUALITY EDUCATION

University of Limerick makes global impact on latest THE rankings

University of Limerick has seen a major improvement in its position in the latest global rankings that measure institutions' social and economic impact. UL has climbed to 50th overall in the Times Higher Education (THE) Impact Rankings 2021, which assess the contributions made by universities worldwide to achieving a more sustainable world through the United Nations Sustainable Development Goals (SDGs).

In total, 1,240 universities from 98 countries and regions participated in 2021 across the 17 SDGs. In the overall THE Impact Rankings, UL is ranked 50th out of 1,115 universities for the year – moving up from a 101-200 ranking out of 768 universities in 2020.

The major improvement in the overall ranking is a result of UL's performance in SDG 17 (Partnership for the Goal) where the university is ranked 39th compared to a 301-400 ranking in 2020. UL is ranked 10th globally for SDG 11 (Sustainable Cities and Communities) and is the top-ranking Irish university in this category.

For the individual SDGs, UL ranked in the top 50 in three categories. Highlights include:

- Ranked 10th for SDG 11: Sustainable Cities and Communities – top ranking Irish university
- Ranked 35th for SDG 16: Peace, Justice and Strong Institutions – ranked 3rd nationally
- Ranked 39th for SDG 17: Partnership for the Goals – ranked 3rd nationally
- Ranked 62nd for SDG 8: Decent Work and Economic Growth – ranked 4th nationally

Reacting to the ranking announcement, Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris said, "This is fantastic news, and while the exceptional standard of the Irish higher education system is no surprise to me, I am delighted to see our universities ranked so highly internationally for their work in creating a sustainable future." The Minister went on to say that sustainability is a significant economic and social challenge, and that he looks forward to working with the university sector and partners in research and innovation to tackle it head-on. "We know we have the talent, and now, with my department's full support, we can work across our sectors and outside our boxes to make ideas reality," said Minister Harris.

Students receive inaugural Intel diversity and inclusion scholarships

Five students at University of Limerick have been awarded scholarships under a newly established diversity and inclusion programme backed by Intel. The scheme, which is for technology disciplines, aims to support students with accessibility needs to further their academic career.

Each student receives a scholarship of €5,000 as well as the opportunity to apply for an Intel internship. Speaking about the new scholarship programme, UL President, Professor Kerstin Mey, said, "Intel and UL have a very strong existing partnership through our established memorandum of understanding, our many creative collaborations and of course the fantastic scholarship supports that Intel provides for our students. This new scholarship programme is particularly welcome, as it addresses one of the key focuses of our memorandum of understanding, which is supporting equal opportunity to education across demographic profiles." Sarah Hartnett, Director of Development at the UL Foundation, said, "These scholarships help foster an inclusive environment where students have equality of access and equality of outcome." She expressed sincere thanks to Intel for their leadership in this regard.

Brian Aherne, Intel Shannon General Manager, explained, "Intel's success in Ireland has been built on the quality of highly skilled and educated people available in the country and we have a long history of inclusive scholarships with the Women in Technology and Paul Whelan undergraduate scholarships at UL." He went on to say that Intel is delighted to play its part in increasing diversity and encouraging a new generation of high achievers to take up the challenge of a career in science and technology.

Positioning global citizenship at the heart of teacher education

Addressing key issues of our time including global inequality and climate change requires new ways of thinking and an acceptance that we must explore in a critical way how our lives and societal systems and structures perpetuate the status quo. Education can provide learners with opportunities to consider and explore alternatives to current ways of living and working. A reorienting of education, away from a focus on markets, economic growth and competitive individualism, and a move towards a philosophy and pedagogy of care for planet and people can bring about the mind-set shift necessary for positive change.

In 2006, the Ubuntu Network was established in the School of Education, UL, in association with partner higher education institutions (HEIs), as a collegial and collaborative community of teacher educators with a shared passion for embedding equality and sustainability into post-primary initial teacher education (ITE) programmes. As a Centre of Excellence in Global Citizenship Education (GCE) and Education for Sustainable Development (ESD), the network supports the integration of GCE/ESD principles, values and themes into teaching, learning and assessment, provides capacity–building opportunities for members, and advocates for the inclusion of GCE/ESD in national policy and curriculum reform.

Ubuntu-supported projects delivered 469 hours of GCE/ESD in the 2020-2021 academic year. These projects involved 2,071 pre-service teachers on 28 ITE programmes across 12 HEI institutions. Forty-two faculty-based teacher educators used creative and transformative pedagogical strategies to support learners to develop critical consciousness about the local and global challenges represented within the SDGs, and the capacity and commitment to bring about positive change at personal, community, national and global levels.

Commenting on her experience of embedding global citizenship across the teacher education programme she is responsible for, Dr Rachel Farrell, Professional Master of Education Programme Director and Lecturer in Education, School of Education, University College Dublin said, "I have been energised by the variety of ways that our student teachers have integrated the SDGs seamlessly into their teaching, learning and assessment and their willingness to share their insights and experience through their multi-modal artefacts of learning."

With the recent inclusion of GCE as a core element of the Teaching Council of Ireland's *Céim Standards for Initial Teacher Education*, the Ubuntu Network is striving to support the mainstreaming of GCE/ESD in a manner than promotes increased critical engagement and an action orientation.

The Ubuntu Network is led by project coordinator Deirdre Hogan and supported by academic coordinator Dr Joanne O'Flaherty. Its members include teacher educators right across the HEI sector, who as observed by Professor Oliver McGarr, lecturer in Education at UL, are provided with the opportunity to meet with colleagues across teacher education in Ireland and explore ways to develop their practice in this area. The network also benefits from the involvement of non-governmental organisations engaging in GCE/ESD and is funded by Irish Aid at the Department of Foreign Affairs and Trade. Irish Aid supports GCE in Ireland to encourage learning and public engagement with global issues.

Funding allocated to University of Limerick to support students with disabilities

University of Limerick has been allocated significant government funding as part of an initiative approved by Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris TD, aimed at supporting students with disabilities to access and engage with higher education. Involving 23 HEIs and €5.4m in total expenditure, the aims of this initiative are broad. In addition to supporting students with disabilities, they include improving college campuses and assisting staff with training and development. UL has been allocated almost €340,000 under the scheme, with more funding for the purchase of assistive technologies. In total, some €600,000 has accrued to UL.

Some of the projects funded at UL include:

- Strategic development of Disability Support Services (DSS) student supports through an occupational therapy framework
- A blended learning programme on assistive technology (AT), Universal Design for Learning (UDL) and accessibility in higher education
- Captioning outsourcing project in education – pilot
- Exploring best practice for hard of hearing students using technology in HE (joint project with TU Dublin)
- Promoting inclusive mainstream practice through the provision of text-to-speech resources (sectoral project led by UL and including DCU, NUIG, TCD, UCC, UCD, TU Dublin and MIC)
- Developing a UL universal design strategy.

Minister Harris has recognised that college can be extremely daunting for people with disabilities and that the projects underway will make a transformational difference to people's lives and support the overall strategic development of disability services in HEIs. The Fund for Students with Disabilities (FSD) aims to support students with a range of conditions and disabilities including sensory and physical disabilities, specific learning difficulties such as dyslexia, autism, mental health conditions and significant ongoing illness. The autism-friendly rooms being established in nine colleges, and funding to provide tactile wayfinding maps and loop systems for deaf and hard of hearing students will all contribute to making third-level institutions more accessible to everyone. "Importantly, we will use some of the funding for training staff and hiring new staff to help students with additional needs," said Minister Harris.

Dr Alan Wall, Chief Executive of the Higher Education Authority (HEA), welcomed the Minister's announcement. Recognising that the FSD has been a key enabler for many years in ensuring that students with disabilities receive essential supports and can participate in higher education on an equal basis with their peers, he continued, "the announcement today not only gives HEIs the opportunity to further develop and enhance these supports but also allows them to focus on the strategic development of disability supports and services. This is critical when we bear in mind the particular impact COVID-19 has had on vulnerable and disadvantaged learners and as we move to the development of the next National Access Plan."

Graduate seminar on sustainable development

An online seminar series on sustainable development is coordinated by Dr Bernadette Connaughton, senior lecturer in the Department of Politics and Public Administration at UL. Colleagues from the UL environmental committee collaborate on this interdisciplinary module.

The aim of the module is to introduce students to the principles, policies and practices of sustainable development. The SDGs serve as an overarching framework for the seminar themes, as these goals provide an appropriate lens through which to view the most urgent global sustainability challenges. COVID-19 underscores the importance of the SDG agenda and its universal implementation.

The purpose of each seminar is to raise students' consciousness of a specific SDG and emphasise the principal pillars of sustainable development – environmental, economic, social and governance. Furthermore, ideas and concepts, practices and challenges in sustainable development are explored via specific topics and case illustrations ranging across global, EU, national, regional and local levels. The module aims to promote student engagement with the SDG agenda and the current 'decade of action' by building on their knowledge, interdisciplinarity and critical thinking skills through targeted discussion and analysis.

National Forum Seminar Series

A National Forum Seminar Series 2021/22 event on the topic of universal design for learning took place online on December 3, 2021, convened by Dr Lydia Bracken. The seminar was titled 'Promoting Inclusivity through Universal Design for Learning (UDL)' and was delivered by Tracy Galvin, Educational Developer, Queen's University Belfast.

As part of the seminar, participants were prompted to consider how UDL and accessibility compliment the wider context of the SDGs and how the lessons learned during the COVID-19 pandemic can ensure that the learning experiences of our ever-increasing, diverse learner population are catered for in a global context. Tracy provided practical tips for embedding UDL and accessibility into course design, and there was also consideration of the potential of UDL as a framework to promote inclusivity and accessibility in other areas of campus life beyond the classroom.

UL contributes to needs analysis of children from refugee backgrounds as part of Erasmus+ K2 MaMLiSE Project

As part of the Erasmus+ K2 MaMLiSE Project to develop new educational approaches for migrant education, an inter-faculty team from UL (Dr Angela Farrell, Dr Mary Masterson, Michelle Daly and Andrea La Touche) worked in conjunction with academics and teachers from partner institutions in Poland, Greece and Germany, while spending a week at the Intercultural School of Ioannina in north-western Greece. Here the team undertook a needs analysis and developed teaching materials and resources to better address the social, cultural, education and psychological needs of children from a refugee background. This project aligns with UL's commitment to achieving UN SDG Goal 4 which relates to widening access to education, particularly for disadvantaged groups in society.

Music on the Move: Music as a Tool of Social Inclusion in the Context of Post-Conflict Migration

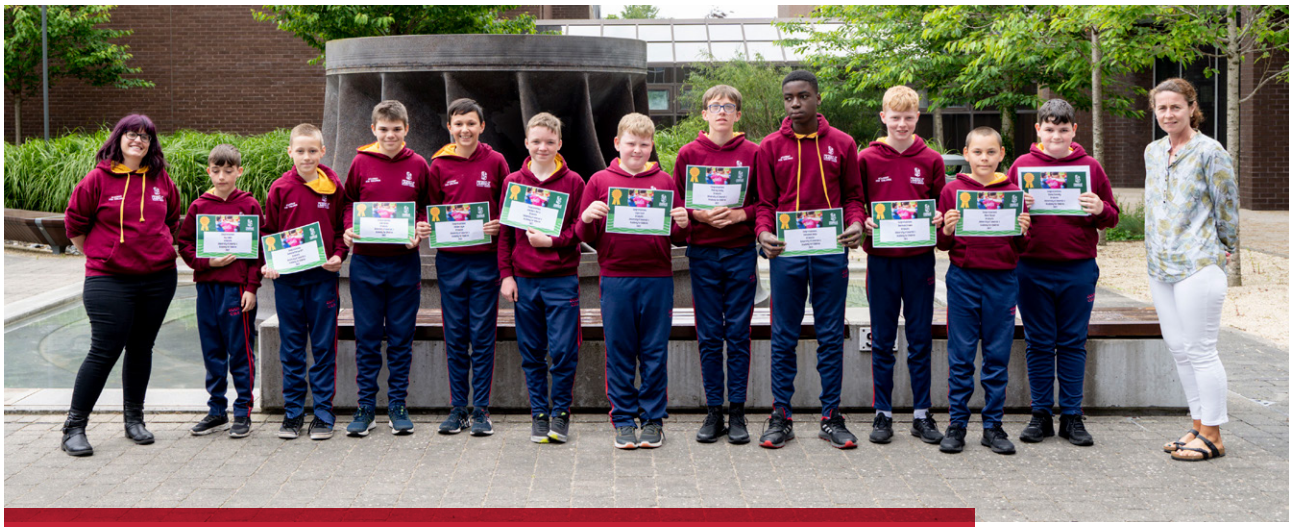
UL graduate and current postdoctoral researcher, Dr Hala Jaber, Irish World Academy of Music and Dance, was awarded a prestigious Government of Ireland scholarship in October 2021 for her research project, 'Music on the Move: Music as a Tool of Social Inclusion in the Context of Post-Conflict Migration'. This research will form part of the work of the PART-IM (Participatory and Arts-Based Methods Involving Migrants in Health Research) research cluster led by Professor Helen Phelan and supported by the Health Research Institute.

Increasing conflict around the world drives up the numbers of displaced people, refugees and migrants. Post-conflict migration carries with it underlying issues such as potential trauma experiences. Even with the immense support and services provided to migrants, there are moments where a lack of understanding of the individual's culture, traditions and potentially traumatic experience while seeking refuge may lead to fall-outs or failures in providing the service.

Dr Jaber's doctoral research identified a gap in community music research around the impact of trauma and conflict on migrants and the implications of this for community music pedagogy and training. Her research project proposes to address this gap using participatory arts-based research, resulting in a training pilot and publications focusing on the co-creation, implementation and evaluation of the model. Training will be available, and not limited to community musicians, artists, workers, educators and teachers.

First graduates from University of Limerick's new 'Academy for Children'

Graduates of a younger kind have celebrated a University of Limerick milestone with a difference. In June 2021 a group of sixth class students from a Limerick primary school were the first to be conferred from UL's new 'Academy for Children', which aims to inspire future graduates and deepen UL's ties to the community. In all, 39 pupils from Our Lady Queen of Peace National School in Janesboro collected their certificates as the first graduating class of the Academy for Children. The academy encourages and supports local primary school children to reach



6th Class pupils from CBS Doon at their UL Academy for Children graduation

Niamh O'Sullivan Primary School Access Coordinator with 6th class pupils from CBS Doon celebrating their graduation from the UL Academy for Children with their teacher, Joanne Breen

their full potential and continue their journey through education. The graduation ceremony was officiated by Professor Nigel Healey, Interim Provost and Deputy President of UL, who spoke about the transformative power of education. "University education can transform a person's life chances and enable them, regardless of their background, to achieve their potential," said Professor Healey.

The UL Access Office created the Academy for Children in late 2020, enhancing UL's commitment to community engagement and widening the participation of underrepresented groups at third level. The ethos of the academy is based on a firm belief in partnership, in community and in keeping children at the heart of the decision-making process. Our Lady Queen of Peace National School was chosen as the pilot partner and the school worked in collaboration with the UL Access Office, the Limerick Sports Partnership and the Irish Athletic Boxing Association to design specific aspects of the programme.

School principal Eamonn O'Connell spoke about the importance of the "meaningful links that had been created with the university" and how the programmes "lessened the daunting challenge" of the move to secondary school. The highlight of the academy was the delivery of a French programme developed by staff in the School of Modern Languages and Applied Linguistics at UL. The initiative was praised by Dr Loïc Guyon, Consul Honoraire de France, during the ceremony. Dr Guyon welcomed the support UL has given in terms of language learning at primary level and how this is "beneficial in helping the kids to successfully progress from the primary school environment to the post-primary one."

The role of the academy is to open doors and expand horizons, to introduce the university to those who do not know it and to inspire future graduates, to bring the university to the community and the community to the university. The Academy for Children will expand its membership to other local DEIS (Delivering Equality of Opportunity in Schools) primary schools in the coming year. The programme of activities will include exploration days at UL as well as the delivery of bespoke programmes for the fifth- and sixth-class children in the schools.

University of Limerick gets five-star rating in influential global ranking

University of Limerick has achieved the highest possible standard in the new QS Stars Rating System, the only university in Ireland to achieve this in 2021. UL joins an exclusive group of universities worldwide to receive the overall five-star status in the ranking, which is considered one of the most influential and credible ratings for universities globally. The QS Stars Rating System was launched in 2009 to assess HEIs more broadly than rankings alone and five stars is the maximum score that can be achieved. It is compiled by education analysts Quacquarelli Symonds (QS), the world's leading provider of services, analytics and insight to the global higher education sector.

The five-star rating is valid until March 2024 and follows a rigorous and independent data collection process and analysis of performance metrics by QS. The evaluation process at UL lasted five months and focused on the collection of dozens of indicators including institutional data and surveys results, employer engagement, focused analysis of research output, teaching and internationalisation.

QS Star ratings are entirely based upon an institution's performance, rather than how they compare to peer universities. In addition to the overall rating, UL also earned the highest five-star rating in several other areas: Teaching, Employability, Research, Internationalisation, Facilities, Innovation, and Inclusiveness. Professor Nigel Healey, UL's Interim Provost and Deputy President, welcomed the recognition. "This rating places UL globally in the top 2 per cent of all universities. The advantage of the QS rating system over a global ranking is that it signals to potential staff and students, as well as to future partners, the areas in which UL excels," Professor Healey explained. "We have always been well known for our strengths in internationalisation, innovation, inclusion and employability, as well as the quality of our learning and teaching, and it is reassuring to know that these are externally assessed as world-leading with a five-star rating. But as we approach our 50th anniversary in 2022, these new ratings let the world know that we now also have research and facilities that are world-class," he added.

The overall five-star rating reflects UL's commitment to being an independent, internationally focused university. UL is young, energetic, and enterprising with a proud record of innovation in education and excellence in research and teaching. The rating reflects the university's mission to build on the expertise of its scholars in creating, harnessing and imparting knowledge for the benefit of our students and the enrichment of the community. Five stars in Internationalisation demonstrate the diversity of UL's staff and students. The rating has been awarded based on international research collaborations, the international mobility programme, a dedicated international student support centre as well as the proportion of international faculty and students at UL.

A five-star rating in Employability is testament to UL's outstanding reputation and excellent relationships with employers both domestically and internationally. UL graduates continue to enjoy exceptional employment prospects with a graduate employment rate of over 96 per cent. The university's Cooperative Education programme is one of the largest in Europe. Each year, over 2,000 students across 56 degree programmes undertake a six-to-eight-month placement as part of their undergraduate degree programme, one fifth of which are with international companies.

UL is recognised as possessing one of the most spectacular and environmentally sympathetic third-level campuses in the world, and this has been reflected in the QS five-star Facilities rating. The campus has unrivalled sports and cultural facilities including Ireland's first Olympic-size swimming pool, an indoor sports arena, a boathouse with a state-of-the-art indoor rowing tank, the 1,100-seat University Concert Hall, the Irish Chamber Orchestra Building and the Irish World Academy of Music and Dance.

University of Limerick Foundation awards Traveller Community scholarship

University of Limerick Foundation has awarded a Traveller Community scholarship to Irish comedian and presenter Martin "Beanz" Warde to complete an MA in Journalism at University of Limerick. Martin, who has a growing profile in the media, is a powerful advocate for human rights. Speaking about the award, he said, "I'm delighted to have been awarded this scholarship, as I feel that it's important for Irish media to be more diverse, drawing on marginalised voices in order to more accurately report on news. Up until now, all journalist perspectives about Travellers have been from outside the Travelling Community, so hopefully my vantage point as a Traveller will help to remedy this."

Dr Fergal Quinn, Course Director of the MA in Journalism, said, "Martin is the first person from the Travelling Community to have applied for our MA in Journalism since its inception, and that in itself is indicative of the access and cultural issues that inhibit participation by the Traveller Community in the media. His regular, high-quality, multimedia output and commitment to doing journalism make him a very worthy recipient of this scholarship." Speaking about the award, Sarah Hartnett, Director of Development at the UL Foundation, said, "We are delighted to offer this scholarship to help empower marginalised communities and facilitate better representation at third level. We will make every effort to raise the funds to continue with this scholarship in the next academic year."

UL experts deliver landmark disability awareness training to An Garda Síochána

On June 21, 2021, experts from the School of Law and for the School of Medicine at University of Limerick, together with colleagues from the School of Medicine at University College Cork, delivered a landmark Disability Awareness Training seminar to senior officials within An Garda Síochána. The special interactive, online seminar represented a key element in a wider, ongoing disability awareness training pilot study which is being conducted by Dr Alan Cusack (School of Law) and Professor Gautam Gulati (School of Medicine). The seminar, which was delivered by Professor Gulati, Dr Cusack, and Dr Valerie Murphy of the School of Medicine at University College Cork, focused on best practice approaches to identifying and responding to intellectual disability and covered the following key issues:

- Understanding the legal and policy issues in the field
- Recognising when a suspect may have an intellectual disability
- Providing information to the vulnerable suspect
- Communication skills and strategies
- Supporting the person with an intellectual disability in custody.

All attendees at Monday's training event will receive the option of a 1:1 follow-up session with the course facilitators to address any individual queries that may arise in their police practice. It is now hoped that this training will be delivered on a wider scale within An Garda Síochána, thereby meeting Ireland's international obligations under the UN Convention on the Rights of Persons with Disabilities. The effectiveness of the training will be evaluated through the analysis of pre- and post-session questionnaires. The results will be published in an international journal at the end of the year.

New Geography module: 'A Sustainable World?'

In autumn 2021, 22 BSc PE with Geography students took the new module 'A Sustainable World?', which will be available to 100+ geography undergraduate students as the numbers taking geography grow. Written by Dr Catherine Porter and delivered by Dr Sara Hannafin with some additional support from Dr Greg Finnegan, the module covers issues such as population and food supply, sustainable cities, rethinking economic growth and managing our water supply. As the module was available to pre-service teachers this year, their first assignment involved developing innovative resources for teaching the SDGs at post-primary level and presenting their ideas to the group.

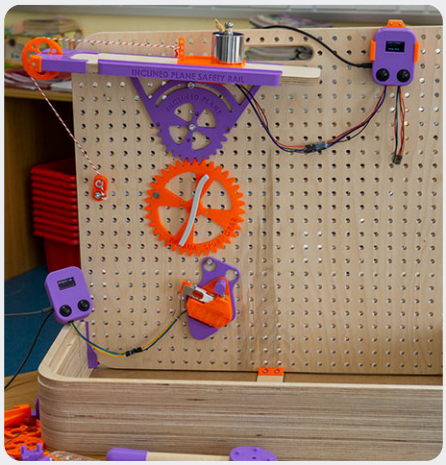
First-year AHSS students address UN SDGs by building ideal fictional country

First-year students on the Introduction to Public Administration module participated in a group, problem-based learning exercise called LULITMI, coordinated by module leader and course director for Bachelor of Arts, Dr Chris McInerney. LULITMI is a fictitious country recently emerged from a period of colonisation. With access to a profile of their country, the students played the role of expert citizens asked for suggestions on how LULITMI should be administered as an independent country.

The whole project was situated within the context of the SDGs. Students were informed that LULITMI had decided that its future development would be planned within a framework provided by the SDGs. They were assigned topics, all of which were linked with specific sustainability development goals, and were asked to come up with proposals on how the country would be run, which they had to present for consideration to a panel of international experts. For the purpose of the exercise, this panel was made up of volunteers involved in the Limerick Spring Festival of Politics and Ideas and AHSS faculty colleagues.

Student Showcase

Archie (Steve Murphy)



Archie is an exploration of physical and tangible interaction in the teaching of STEM (Science, Technology, Engineering and Maths) in the primary school education system. It is aimed at both incidental and discrete STEM lessons in the classroom. The intended user is the primary school teacher and students aged between 8 and 13. The system uses integrated technology to deliver a teaching aid which is technology enhanced. The use of the system increases student engagement and participation in STEM lessons and helps to develop both cognitive and psychomotor skills. It is customisable and re-configurable allowing for exploratory play as well as teacher-led STEM lessons. The system uses Arduino-powered technology to measure and present data to the user related to the core concepts behind basic machines. This topic is covered in the primary education science curriculum and encompasses levers, pulleys, inclined planes, wheels and axles (gears) screws and the wedge.

The project was based on a user-centred design approach and involved both a thorough literature review as well as several empirical research methods such as interviews, focus groups and surveys. At the end of the research phase, a design generation and prototype development phase were conducted with input from a sample of the user demographic in a co-design/participatory design effort. The outcome of this was the prototype shown in the images. This prototype was subsequently tested and proved to be successful in achieving its intended design requirements.

Giving Voice

"In Teacher Education, through transformative learning of head, heart and hand, we have a role and responsibility to promote and foster a duty of care for people and planet. The transferability of empathy from inside the classroom to each student's home and community is an essential underpinning. Teacher Education graduates are role models and agents of change in transferring awareness and engagement and contributing towards the local, national and global societal and environmental challenges from numerous perspectives to ensure an inclusive and equitable world."

Dr Keelin Leahy, Senior Lecturer/Course Director, BTech (Ed) Materials and Architectural Technology, School of Education, UL.

Achieve gender equality and empower all women and girls.

5 GENDER EQUALITY

UL backing new project offering pathway for young women to computer science career

University of Limerick is supporting a new outreach engagement project that aims to address the gender imbalance in the take-up of computer science at higher level. With women accounting for just one in five computer science graduates in Ireland, CodePlus, a Computer Science (CS) outreach engagement project is to be rolled out across the country to target 10,000 girls at secondary school with a view to encouraging them to consider taking the subject at third level. Claire McInerney (Education and Public Engagement Manager, Lero) cites the United Nations, Action Plan to close digital gender gap as one of the foundations driving the expansion of the CodePlus programme in Ireland. She went on to say that "women's equal and meaningful participation in the digital society is seen as both integral to the realisation of women's rights in the 21st century and the realisation of a just, inclusive and rights-based information society, and necessary to achieve global objectives around gender equality and women's empowerment by 2030."

Launching the programme, the CodePlus team ran an online panel event for TY, 5th- and 6th-year secondary school girls. A panel of female software industry professionals spoke about their individual career experiences to inspire and enthuse students about computer science.

Good or bad jobs: characteristics of older female part-time work

Professor Christine Cross, Dr Jonathan Lavelle, and Dr Maeve O'Sullivan, researchers at the Kemmy Business School, have come together in an attempt to understand the working life of older females. Despite consistently high rates of part-time employment among older women, the quality of this cohort's work is largely under-researched with the focus being mainly on younger women. To address this gap, the research engages with the key strands of this debate—age, gender and employment status—to interrogate the job characteristics and position of this worker cohort in the Irish labour market.

Findings reveal notable differences between this cohort's job characteristics compared with those of other part-time workers and older women working full-time. These job characteristics include low-wage employment in poor-quality jobs, suggesting that job quality is influenced by age, gender and employment status, which raises concerns regarding the likelihood of precarious employment among this cohort. In addition to individual-level consequences, this study's findings have major implications for public and organisational policy on part-time labour market participation, highlighting the need for a new research agenda on older workers. The findings contribute to advancing our knowledge of issues related to older female part-time workers.

Ten University of Limerick students receive WiSTEM2D scholarship awards

Ten University of Limerick students have received scholarships as part of Johnson & Johnson Ireland's Women in STEM2D Award Programme. At a virtual awards ceremony on January 29, 2021, Irish aeronautical engineer and award-winning STEM advocate Dr Norah Patten presented the awards, which are supported by Lero— the Science Foundation Ireland Research Centre for Software based at UL. WiSTEM2D refers to Women in Science, Technology, Engineering, Mathematics, Manufacturing and Design, and the WiSTEM2D programme underlines Johnson & Johnson's (J&J's) commitment to developing and implementing high-impact strategies to support female students undertaking STEM2D degree courses at UL and in universities around the world.

Dr Patten congratulated the award recipients and highlighted the gender imbalance that continues to exist in STEM fields, noting that a recent study by the Department of Education's STEM Education Implementation Advisory Group found that there are significant gender imbalances in STEM subject choices made by male and female students at the post-primary level in Ireland, and that it is critical to encourage greater participation of girls in these subject areas. "This programme is an important initiative which serves to support and encourage these female students who, although still in a minority, have made it into the STEM field, and this is crucial to keep them in the sector going forward," she said.

Professor Ita Richardson, principal investigator in Lero, in praising J&J's continued funding of the WiSTEM2D programme, noted that their commitment to women in STEM2D has had a positive impact on over 100 UL female graduates to date, as apart from the funding they receive, students benefit greatly from the mentorship and leadership given by strong J&J role models.

Anna Rafferty, Johnson & Johnson WiSTEM2D University Lead and Director of Strategy, Johnson & Johnson Ireland, said that the company is working doubly hard this year to support students as they adapt to remote learning and continue their pursuit of STEM2D careers, where women are still under-represented. "At J&J, we recognise the importance of supporting women early in their careers, so that we can help develop a talent pipeline of future female STEM leaders," she said, reiterating that her colleagues "are committed to delivering this high-intensity programme through virtual mentoring, virtual site visits and ensuring that these promising young women don't miss out on any opportunities despite the challenges of the pandemic"

Speaking about the impact of the awards programme, past recipient Jessica Silva said, "This programme shaped my career trajectory. With the support of a J&J mentor and the network I was able to build, I quickly found myself feeling empowered, confident, and fully believing in my worth. Upon completely my degree in Biomedical Engineering, I was very fortunate to join J&J's Global Operations Leadership Development programme. I have had the opportunity to live in three different countries, experience different sectors and hold four different positions across the last 2.5 years. I will always be grateful for the WiSTEM2D programme and the role it has played in my career."

The scholarship recipients will benefit from extensive industry mentoring and leadership training as part of J&J's WiSTEM2D programme. Recipients of the scholarship were presented with bespoke framed glass artwork created by Fermoy-based artist, Suzanne O'Sullivan.

CSIS and Lero at University of Limerick receive Athena SWAN Bronze Award

The Department of Computer Science and Information Systems and Lero at University of Limerick achieved an Athena SWAN Bronze Award in 2021. This is the first Athena SWAN award for a university department that includes a Science Foundation Ireland (SFI) centre and, in addition, UL and Trinity College Dublin were the first universities in Ireland to achieve a departmental Athena SWAN award for computer science.

The Athena SWAN Charter is an accreditation framework that is used across the globe to support and transform gender equality in higher education (HE) and research. UL President, Professor Kerstin Mey, congratulated CSIS/Lero colleagues on their successful application for an Athena SWAN Bronze award. Led by Professor Ita Richardson, the self-assessment team used the Professional Managerial and Support Staff Interim Pilot Process, a process that broadens the scope of the application. Professor Mey noted that the Athena SWAN assessment panel commended the commitment of CSIS/Lero across the board to using the Athena SWAN process in its work to make progress on gender equality. She expressed the hope that UL would be on track to secure a Silver Institution Award in 2022.

"Progress on gender equality right across higher education is essential for retaining talent and ensuring our institutions at all levels are representative of society," said Dr Victoria Brownlee, Head of Athena SWAN Ireland. "These are the first entry-level awards to recognise institutions and departments taking action to address gender inequalities in career development experienced by professional, managerial and support staff as well as by academic staff. It's very encouraging to see so many applicants engage in improvements to support the spectrum of staff roles in the sector."

Welcoming the announcement of the award, Lero Director, Professor Brian Fitzgerald, commented, "At Lero, we are steadfast in our commitment to gender equality, not just in higher education, but also in our society. We have a strong education and public engagement programme aimed at increasing the number of girls and women who choose to learn and pursue careers in computer science. We have undertaken a number of actions to support, sponsor and mentor women within the centre. We have a growing number of female Lero researchers." Professor Fitzgerald acknowledged that there is still more to do and promised that "Lero will continue to strive for gender equality, not just at UL but also more widely."

"Receiving this Athena SWAN award is an external confirmation of our commitment to gender equality," said Professor Richardson. "Working with primary and secondary schools to encourage girls to consider careers in software, we see that the number of female ICT enrolments nationally increases annually – overall by 20 per cent since 2014/2015. We have increased the number of funded female researchers and principal investigators in Lero, and our future work includes the development of career development initiatives for researchers."

Remarking on the institutional and department awards conferred in this round, Dr Ross Woods from the Centre of Excellence for Equality, Diversity and Inclusion at the Higher Education Authority (HEA) said, "The Athena SWAN charter is an invaluable lever in changing institutional and departmental cultures. The news of these awards is timely with the recent announcement that a gender equality plan will be a requirement for Horizon Europe funding, with nearly all higher education institutions in Ireland holding one as part of the Athena SWAN process."

'It can be for anyone' – UL project helps to address gender imbalance in physics

"It can be for anyone," according to Dr Gráinne Walshe, Director of the Science Learning Centre and leader of the SFI-funded SOPHia Project, referring to the title of an initiative aimed at encouraging more students, especially girls, to take up physics as a subject for the Leaving Certificate. The project is run by Department of Physics and the Science Learning Centre in UL's Centre for Transformative Learning in partnership with the Institute of Technology Carlow and the Tait House Community Organisation, with the support of the Institute of Physics in Ireland.

Launched in 2018, the project "aims to encourage young people to form positive perceptions of physics, and to help address the gender imbalance in physics", according to Maria Quinn, Chief Technical Officer in UL's Department of Physics, and SOPHia manager. This imbalance reflects a three-to-one ratio of male to female students taking physics at Leaving Certificate level.

As part of the SOPHia Project Science Competition, which took place despite the pandemic, 38 awards were handed out to students. Over 450 individual students from across Ireland, ranging from primary school level to transition year, entered the competition, with 250 projects in total, over double the number of 2020 entries. "The restrictions during the pandemic meant that students had an opportunity to work on their posters at home or in school, and then send them in via email," explained Dr Walshe. "We have seen increased enthusiasm for physics in general, especially among girls." More than half of the participating students were female.

The student projects submitted to the competition were evaluated by a panel of physics graduates, postgraduates, academics and professionals in the depths of lockdown in January 2021. "It was not an easy task, given the high quality of the entries," explained Dr Walshe. She noted that the competition and project activities were possible thanks to funding from the SFI Discover programme, without which the project could not have grown as it has.

Speaking of the gender imbalance among those studying physics, Elora McFall, a UL Physics graduate who now helps to coordinate the SOPHia project, experienced this at first hand, being one of a handful of young women in her Leaving Cert physics class and the only woman in her degree class. “SOPHia shows students that physics can be for anyone,” she said. “Hopefully, one day our impact will help to provide future role models in both academia and industry. We have now delivered our school workshops to over 4,000 students.”

The SOPHia project also runs teacher events, provides web-based learning materials, and has its very own beehive using sensor technology to monitor the conditions in the hive.

Giving Voice

“The pandemic has had a profound impact on the UL community and our ways of working. While UL devolved to spare rooms and kitchen tables across the region, the challenge as I see it moving forward will be to find adaptive working practices and a balance that supports people from home and our local communities but also enables us to have the benefits associated with working alongside our UL colleagues.”

Michael O’Brien, Athena SWAN Projects Officer/Data Analyst, Office of the Director Human Rights, Equality, Diversity & Inclusion, UL.

Ensure availability and sustainable management of water and sanitation for all.

6 CLEAN WATER AND SANITATION

Passive treatment for the removal of contaminants from wastewater

Led by Dr Ronan Courtney of the Bernal Institute, a research collaboration between industry and the Bernal Institute, UL has developed and demonstrated the removal of contaminants from industrial wastewaters using passive technology. Generation of wastewaters from industrial waste sites is projected to occur over the time frame of several decades and conventional treatment using dosing and mixing systems requires sustained energy inputs and chemical additions. The UL project utilises and optimises constructed wetlands to adjust wastewater pH and remove metal contaminants to levels that comply with regulatory standards. In the UL-led pilot, plant ecotoxicological assessment using bioassays has demonstrated the absence of stress across aquatic food chains and results are sustained over several years. Ongoing research is upscaling the technology and implementing further test beds at industrial sites. This approach can assist with the remediation of abandoned legacy sites and ensure that river systems are not negatively impacted.

Eco-friendly device developed at University of Limerick detects real-time pipe damage

A researcher at University of Limerick has developed a low-cost, environmentally friendly sensor that can detect damage in pipelines and could save water as a result. The damage detection sensor uses highly sensitive, eco-friendly crystals that generate an electrical signal in response to a leak. It is the first validation of these biological crystals for real-world applications, according to Dr Sarah Guerin, a postdoctoral researcher at the Department of Physics and the Bernal Institute at UL, who has been developing amino acid crystal devices since 2017.

An Irish research collaboration between the Bernal Institute at UL and the Dynamical Systems and Risk Laboratory in University College Dublin has validated the crystal-based sensor. The journal Cell Reports Physical Science has just published a study on the findings of the innovative research. “The sensor is made of crystallised amino acids that are sensitive enough to detect leaks as small as 2mm,” said Dr Guerin.

“Computer simulations show that they generate electricity in response to a force – such as strain or vibration – known as the piezoelectric effect. Biomolecular piezoelectric materials offer an inexpensive, non-toxic and renewable alternative to current commercial piezoelectric devices, which rely on toxic heavy elements or require heavy processing,” Dr Guerin explained. “Leak detection in fluid-carrying pipes is crucial for sustainable water access, and vibration-based techniques have proven to be effective at early detection of leak onset. Current commercial solutions are either battery powered or, if piezoelectric, very costly. In addition, most commercial accelerometers have rigid structures, making them unsuitable for bonding to curved pipes,” explained the UL researcher.

“This sensor has a number of advantages over current technologies,” said Dr Guerin. “It is flexible, cheap to make, and outperforms ceramics and polymers that are used in these structural health monitoring applications. The fabrication process is suitable for mass production of these devices.”

Professor Vikram Pakrashi of UCD, a senior author on the study who has developed extensive testing facilities for validating materials for structural health monitoring that simulate infrastructural damage in, for example, buildings and pipelines, said the findings of the research were significant. “These amino-acid-based sensors will provide real-time sensing of pipe degradation, allowing for data-driven decision making on repair and maintenance, aiding in the global challenge of equitable water access,” he explained.

Giving Voice

“I am so fortunate to have worked alongside the sustainability team at UL when it is such a passion of mine, growing up hearing about climate change and many other environmental issues it has been a great sense of relief to see what the people in my university and local community are doing to better this world we live in. I am so excited to see what my colleagues and fellow students will do in the future to secure our future.”

Amy Stone, Co-op Student for Healthy UL and Sustainability, Futures and Foresight Division.

Ensure access to affordable, reliable, sustainable, and modern energy for all.

7 AFFORDABLE AND CLEAN ENERGY

Aviation experts and researchers join forces to produce and implement sustainable aviation fuels (SAF) in Ireland

Building on long partnerships with Irish and international aviation players, the Bernal Institute is supporting the aviation sector to decarbonise. This support includes a research portfolio of advanced lightweight composite structures, jet engine materials, improved airworthiness and, since 2019, a partnership with the leading developer SkyNRG, a KLM spin-out, from the Netherlands. In 2021, the Bernal Institute and Sustainable Flight Solutions, a pilot-led initiative working to achieve green aviation, hosted a series of workshops to design a framework to decarbonise Irish aviation. The workshops were aimed at developing a roadmap for SAF production and use in Ireland to inform policymakers and other stakeholders including the wider public.

The SAF industry is fast developing in mainland Europe and emerging in Ireland. Capitalising on the potential of the Atlantic Wind Energy project provides a significant economic and climate opportunity. Speaking of his experience in this area, Luuk van der Wielen, Director of the Bernal Institute, commented, "During my earlier career, I chaired BioPort Holland, the platform for KLM, SKyNRG, Amsterdam Airport, the Port of Rotterdam, the largest kerosene hub in Europe and relevant ministries. BioPort Holland was instrumental in scoping the integral SAF opportunity for the Netherlands 10 years ago, to its current success. Developing a comparable framework in Ireland is urgent, and the collaborative workshops increased awareness of the need to develop an Irish SAF roadmap."

Delegates from four major airlines operating in Ireland, the main airports, aviation and national authorities, aviation fuel traders and manufacturers, political parties, as well as three universities with leading aviation-linked research and education programmes (Dublin City University, Trinity College Dublin and University of Limerick), as yet an informal coalition under the working title SAF-EIRE, contributed to the initial development of a roadmap for Ireland. The Bernal Institute in collaboration with TCD and leading aviation players is also exploring concrete manufacturing scenarios to guide the roadmap development. Discussions with aviation stakeholders, industry experts and Bernal researchers around creating the SAF roadmap are ongoing, targeting initial delivery in 2022.

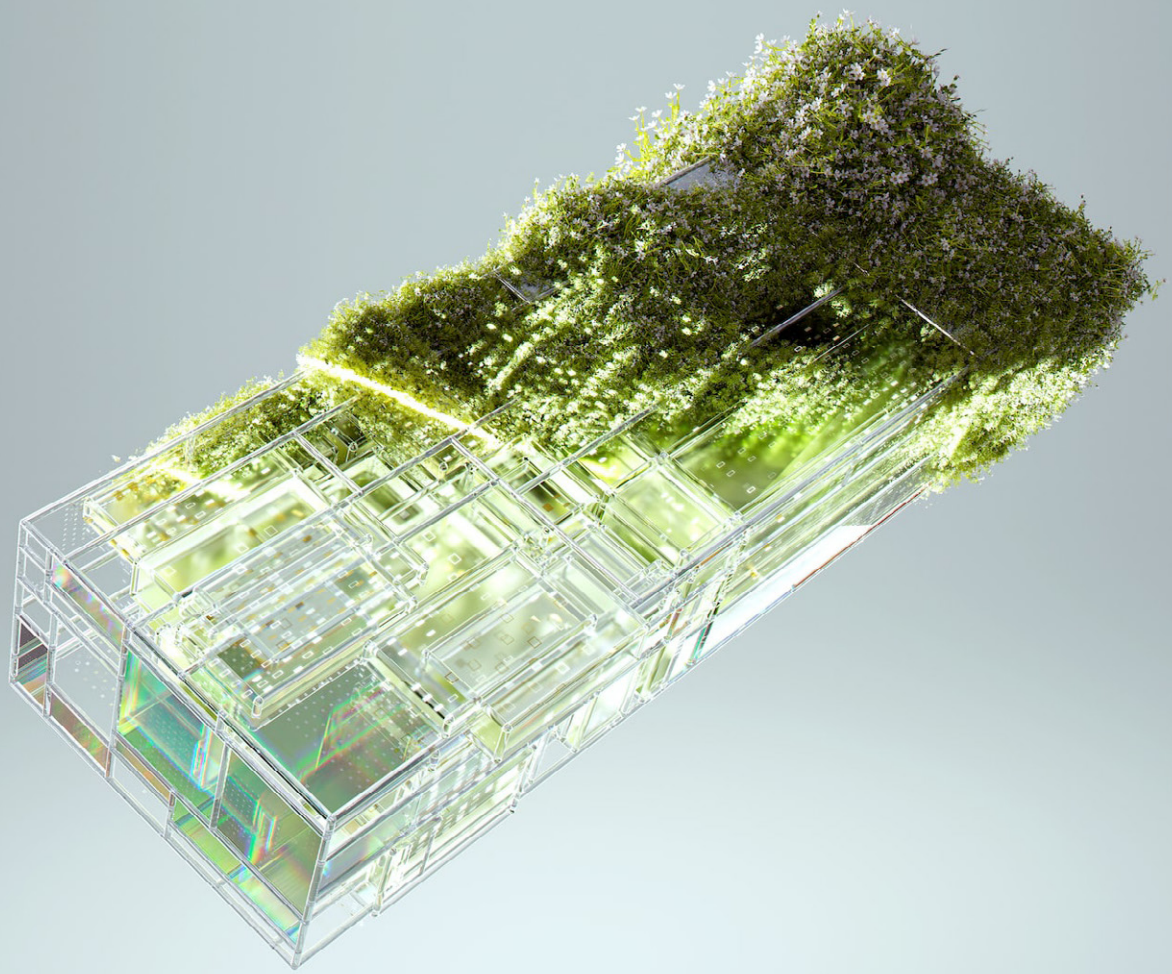
Giving Voice

"Sustainability is cyclical. As consumers, we are both the first and last link of this cycle. Industry always works towards the demands of its customers, not the converse. Instead of a blockade segregating buyers and sellers, the unmistakable driving force that is community can be the fuel to propel this cycle forward. Consequently, sustainability is possible to attain in the present. It does not have to be a fantasy of the future."

Mia Shinners Kennedy, Student Advocates Sustainability Working Group, UL.

Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

8 DECENT WORK AND ECONOMIC GROWTH



UL-Lero research shows COVID-19 hit stock markets as it spread from country to country

As COVID-19 spread around the world, stock markets in individual countries took a major hit, researchers at University of Limerick and Lero, the Science Foundation Ireland Research Centre for Software have found – although stock markets in China where the disease first struck avoided significant falls. A research paper 'Immune or at-risk? Stock markets and the significance of the COVID-19 pandemic' by a Lero team based at University of Limerick confirmed that the growth in COVID-19 cases largely explained changes in stock prices, but surprisingly did not have the same impact in China or on the global index MSCI World. The results of the study, published in the Journal of Behavioural and Experimental Finance, suggest that the implied volatility of the respective markets, often used as a proxy for investor sentiment, played a greater role in explaining market prices than COVID-19 growth.

Lead author Niall O'Donnell, a PhD student at UL and Lero, said the current pandemic provides us with a unique opportunity to identify the effect that pandemics have on financial markets. "Our findings indicate that investors began to act before any realised financial damage was observed, highlighting again the significance of investor sentiment and the expectation of returns, rather than real revisions in financial returns. We also find that changes in the Chinese SSE 180 index and the MSCI World index prices were not significantly explained by COVID-19 growth," he explained. "Instead, these indices were largely influenced by conventional market drivers linked to economic growth such as crude oil, bond yield spreads and implied volatility. We theorise based on these results that, among these factors, early interventions by China may have played a role in index price fluctuations also."

The research team points out that global stock market losses of $16 trillion were observed in less than a month as the pandemic took hold and as fears rose of a worldwide recession. Lero's Dr Barry Sheehan, a co-author on the study and course director of the MSc in Machine Learning for Finance programme at UL's Kemmy Business School, said, "Our analysis into the determinants of global stock market indices as COVID-19 spread provides valuable insights into the evolving market dynamics and price drivers during times of crisis and uncertainty." Dr Darren Shannon, also of Lero and UL, said the work carried out by the team found that markets in Spain, Italy, the UK and the USA were found to be negatively and significantly related to the total number of COVID-19 cases. This occurred despite controlling for other market drivers. "However, COVID-19 cases did not significantly influence the sharp fall and subsequent rise of the Chinese SSE 180 index. Instead, fluctuations in market prices were explained by trading volumes, Brent crude oil price and implied market volatility, among other factors. Similarly, COVID-19 cases did not significantly influence the MSCI World index," he added.

KBS joins the top elite one per cent of business schools worldwide

The Kemmy Business School (KBS) at University of Limerick has been recognised as one of the world's top business schools with the announcement that it has achieved 'triple-accreditation'. In December 2021, the KBS was accredited by the prestigious EFMD Global quality system (EQUIS) adding to its existing international accreditations by the Association to Advance Collegiate Schools of Business (AACSB) and the Association of MBAs (AMBA).

The triple accreditation from the three centres of business and academic excellence now places the KBS within the top 1 per cent of business schools in the world. Each of the three accreditation evaluation processes is hugely rigorous and examines each business school against international standards in terms of governance, programmes, students, faculty, research, ethics, responsibility and sustainability, and engagement with the world of practice.

The KBS is the only Irish school outside of Dublin to achieve triple accreditation and the third Irish business school to receive this accolade, alongside the Smurfit Business School in UCD and the Trinity Business School in TCD.

The EQUIS award places a premium on creating an effective learning environment that encourages students to acquire management skills, whilst also instilling a sense of global responsibility. All successfully accredited schools must strike a balance between academic excellence and professional relevance, whilst innovating their programme design and delivery. "We are immensely proud of becoming a

triple accredited business school, which is testament to our continued focus on academic excellence and innovation. It clearly illustrates the strong calibre of our business graduates, our connections to industry and our global outlook," said Professor Finbarr Murphy, Dean of the KBS.

The Kemmy Business School was commended during the accreditation process for its strong social responsibility ethos. This is reflected in the school being named after Jim Kemmy, a former parliamentarian, scholar, and mayor of the City of Limerick whose public life focused on a concern for the common good, a belief in education as a prerequisite for accessing opportunities, international openness and a society based on principles of fairness and dignity.

UL President, Professor Kerstin Mey, welcomed the announcement, saying, "achieving triple accreditation is really the top of the quality standard bar for business schools worldwide. We now join a group of elite business schools committed to delivering excellence in business education, research and impact."

"The presence of a world-class business school plays a huge role in terms of economic contribution to the entire Mid-West region. Our research and community engagement are directly addressing and providing solutions for businesses and civic organisations as well as contributing directly to policy change nationally," Professor Mey added.

"With this triple award the Kemmy Business School is recognised as a central hub for international excellence in all aspects of business education and research. The awards build upon our growing international network connections with similarly accredited schools worldwide, which will further add to the international vibrancy of the school. The business school has evolved to be at the forefront of international business education, delivering world-leading business programmes," said Professor Finbarr Murphy, KBS Dean.

"We have exciting plans for the business school going forward, in terms of cutting-edge academic programmes, and continued research tackling core societal, economic and business challenges. The last two years have been unprecedented, but these awards signify our growing international reputation and our commitment to providing students with a world-class business educational experience," he continued.

UL Business students are learning how to develop sustainable careers

The labour market is increasingly volatile with more and more workers, including graduates, facing uncertain futures. As early-career experiences have lasting effects on career success, it is important that students make successful transitions to the world of work upon graduation. While universities do a good job of helping students to increase their career-related human capital, inequalities still exist. For instance, graduates who are from the first generation in their families to attend university often don't achieve the career success of those from more privileged backgrounds. While career services are available to help students in universities, not all students take advantage of these services.

Fourth-year Business students, taking a minor option in Work Psychology, are exploring what career success means to them personally and are charting a path to achieve it. Lecturer Jill Pearson teaches a module entitled The Psychology of Career Success in which students develop career self-management knowledge and skills to help ensure their future employability. As well as setting goals and developing strategies to achieve career success, they learn the importance of being adaptable and resilient, so they are prepared for future labour market volatility.

Examining economic inequality and social identity

Finn Lannon, a PhD student in Social Psychology, has been working on a project to investigate how economic inequality can translate into poor intergroup relations and behaviour. The project examines the influence of economic inequality via psychological processes that have not received sufficient attention in the past. By means of a social identity approach, which involves an examination of the influence of economic inequality on intergroup relations and the propensity for collective action. This approach also tests whether the economic inequality strengthens the psychological relevance of one's ingroups (i.e., ingroup identification) by making 'us' versus 'them' binaries more salient.

A better understanding of the psychological processes that occur as social groups interact across levels of economic inequality can ultimately lead to better policy and aid the reduction of inequality. The study aims at understanding how economic

inequality influences people at the group level and the psychological process behind their group membership and striving for positive self-esteem as per social identity theorising.

This work is ongoing, but has been presented internally in UL at various seminar series and research lab groups as well as in a conference presentation at the UK & Ireland PRME Conference 2021. The project has potential for dissemination in conferences across multiple disciplines as well as informing policy around re-distributions of wealth and managing intergroup conflict. Some seed-funding has been secured internally and from the UK & Ireland PRME seed funding competition and the research fits within the UN Sustainable Development Goals.

Student Showcase

Visual Ear (Michael Burke)

Visual Ear is a smart communications wearable for both hearing-impaired and hearing construction workers. The objective of Visual Ear is to integrate hearing-impaired workers seamlessly into on-site communication and safety channels and to overcome the impact of loud background noise. This is achieved by creating a smart wearable that vibrates for tactile communication with the user, combined with an inbuilt screen allowing them to send and receive short messages. With Visual Ear, users can interact quickly. The app interfaces allow a user to seek emergency help without the need to call or speak to an operator. Visual Ear also allows the user to keep up to date with key information as is it needed throughout the day.

Giving Voice

"Sustainability is one of the most pressing issues which must be resourced and resolved within our lifetime. Our contribution as designers and educators in the Design Department is to equip our graduates with the tools, knowledge and perspective to overcome the challenges of today and create competitive and sustainable product solutions for the future."

Bernard Hartigan, Lecturer (Below the Bar), Product Design and Technology Department, School of Design, Science and Engineering, UL.

Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

UL-based Confirm launches cutting-edge new research facility

A new research facility to better equip the 'factories of the future' has opened at Confirm, the Science foundation Ireland (SFI) Smart Manufacturing research centre based at University of Limerick. Confirm has announced the successful deployment of Ireland's first manufacturing-focused Future Wireless Innovation Test-Bed facility. This is located at the Confirm Centre for Smart Manufacturing, headquartered within University of Limerick's Digital District, which is one of the most advanced purpose-built manufacturing research facilities in the world.

The new facility was designed and deployed under the leadership of Dr Eoin O'Connell, a funded investigator in Confirm, to explore ideas and technologies for improving manufacturing environments towards creating smarter factories by utilising the latest wireless technologies such as 5G, 6G and Wifi6. "It is now clear that the manufacturing sector will ultimately be driven by the capacity and scalability of high-speed networks," said Dr O'Connell. "The Future Wireless Innovation Test-Bed at Confirm will enable cutting-edge research to deliver the breakthroughs needed for the factory of the future."

Planning and executing the Innovation Test-Bed was a collaborative effort between Confirm and Netmore. The designers first looked at the challenges manufacturing companies face that can benefit from enabling technologies such as 5G, by specifically focusing on test use cases for real-world issues like industrial IoT (Internet of Things), robotics and the deployment of mixed reality in manufacturing, explained Director of Confirm, Professor Conor McCarthy. "Wireless communication between products, machines, production systems and supply chains form a major part of our digital thread strategy, designed to achieve mass customisation and enable re-configurability in manufacturing plants and associated digital supply chains."

Early tests at the facility have included a practical study undertaken in December 2020 where an Autonomous Intelligent Vehicle (AIV) was controlled on a 5G network at Confirm, believed to be the first reported case of such 5G wireless robotic control in Ireland. The initial results demonstrate that the integration of 5G as a wireless signalling system within a manufacturing environment is both very promising from an accuracy standpoint and also now a more viable option. The Innovation Test-Bed promises fast connectivity, more bandwidth and low latency with support for tens of thousands of devices in a small location, all of which are attractive prospects to manufacturing facilities.

Netmore CEO, Ove Anebygd, said the company was "very pleased" to be collaborating with Confirm as a supplier of 5G infrastructure for its operations in Smart Manufacturing. "The fact that Netmore's 5G technology is selected for the Innovation Test-Bed at Confirm is proof that our services and our technology are suitable in the best possible way for environments that place high demands on capacity, reliability and security. We look forward to a long and successful collaboration with Confirm Smart Manufacturing."

UL spinout medical device company Ostoform closes €3m investment

UL spinout company Ostoform, a specialist medical device company, has closed a €3 million equity investment led by BGF, Ireland's largest growth capital investor. Now based in Mullingar in Co. Westmeath, Ostoform designs and manufactures medical seals for use with patients who have received a colostomy, Ileostomy or urostomy. The company is led by CEO and founder Kevin Kelleher and based on research undertaken in collaboration with co-founders Rhona Hunt and Professor Leonard O'Sullivan at the Design Factors Research Group, School of Design, at University of Limerick.

Earlier this year, Ostoform was awarded a grant of €2.7 million via the Disruptive Technologies Innovation Fund (DTIF) to support the development of the company's product pipeline which means that the company now has almost €6 million to support growth and development. Ostoform's key product currently is the Ostoform Seal used by ostomy patients. The UL patented Ostoform Seal has been shown to significantly reduce the risk of skin complications, positively impacting patient quality of life. The product is exported globally, with a particular focus on the US where it is being distributed by Medline.

In addition to the investment from BGF, this equity round has been supported by Enterprise Ireland (EI) and existing investors including HBAN MedTech who first invested in Ostoform as the company spun out of UL in 2018. Ostoform is no stranger to awards, having received Enterprise Ireland Commercialisation funding

and won Best University Spin-Out at the InterTrade Ireland Seedcorn Investor Readiness Competition, and the One to Watch Award at the Enterprise Ireland Big Ideas event. CEO, Kevin Kelleher, said, "This is a landmark equity raise for us which will enable us to capitalise on growing international opportunities for our existing and pipeline products. We are delighted to have the support of BGF as we take the next steps on our journey."

Professor Norelee Kennedy, VP Research, described Ostoform as "a great example of Irish innovation in the MedTech sphere, with their solutions having the potential to significantly improve the daily quality of life for ostomy patients." Paul Dillon, Technology Transfer Office Director at UL, added, "This is a great example of the Irish knowledge transfer system pulling together to develop a solution that addresses a significant clinical issue." He noted that in addition to the EI vital funding, Ostoform also received important support from the BioInnovate Programme.

Ground-breaking UL projects funded through State investment in disruptive technologies

A number of exciting new projects involving University of Limerick have received funding through State investment in disruptive technologies. In April 2021, the Government announced an investment of €95m over the next three years for ground-breaking projects under its Disruptive Technologies Innovation Fund (DTIF).

The Government is investing €95 million in the successful projects over the next three years. The 29 ground-breaking projects cover areas such as life sciences, medical devices, ICT, artificial intelligence, manufacturing and environmental sustainability. Of these, one is coordinated at University of Limerick and aims to develop a low-cost, high-performance Na-ion smart battery system using entirely sustainable materials and processes.

UL is a partner on two more projects, one looking at reducing the cost of offshore wind and another at improving maritime security and positioning Ireland as a leader in the field of smart drones. All projects involve collaborations of between three and eight partners, including SMEs, multinational corporations and research organisations.

"The Disruptive Technologies Innovation Fund is a key funding instrument to advance excellent innovative projects" said UL VP Research, Professor Norelee Kennedy. "UL's involvement in three DTIF awards in leading a consortium on battery technology as well as working with colleagues across Ireland in the energy, climate, and sustainability area, demonstrates our commitment to undertaking excellent research that addresses global challenges." Congratulating all involved, Professor Kennedy continued, "The awards also signal the partnerships approach to our research that is fundamentally important to realising the innovations needed for the challenges of the future."

Announcing the successful projects, Tánaiste Leo Varadkar said, "The pandemic and Brexit have combined to bring unprecedented economic challenges and volatility to our enterprise sector. But with every challenge come new opportunities and the Disruptive Technologies Innovation Fund is dedicated to entrepreneurs and researchers working on some exciting ideas to develop solutions to the problems we face. We are funding projects which will have wide-ranging benefits across many areas of society – projects using artificial intelligence(AI) to make factories safer and drones to detect drug smuggling, for example. There are many successful projects in the health sector, which we hope will result in better patient outcomes for thousands suffering from cancer, heart disease and fractured bones among other conditions. There is also focus on sustainability, with a number of projects looking at ways to improve and reduce energy use."

Exploring smart batteries and sustainable materials - TRIDENT

UL's project TRIDENT: A Grid-Ready, Sustainable Sodium-Ion Smart Battery for Stationary Storage, is being coordinated by principal investigator Dr Tadhg Kennedy, a lecturer in the Department of Chemical Sciences and a researcher at UL's Bernal Institute. The goal of the TRIDENT project is to develop a low-cost, high-performance Na-ion smart battery system using entirely sustainable materials and processes. Partners on the project, which has received €3.65m in funding, are Tyndall National Institute, Analog Devices, mSemicon, ICERGi Limited, Glantreo, TisaLabs and Smart M Power. The project has been fully endorsed by MIDAS, the Industry Association for Microelectronics and Electronic Systems Design in Ireland.

The name of the project is derived from the ambition to provide a complete plug-and-play solution for grid-integrated residential battery energy storage systems through development of the three prongs of the TRIDENT:

1. Low-cost sustainable sodium-ion battery chemistry
2. Balance of system hardware (including wireless battery monitoring system and power electronics)
3. Flexible energy asset controller for grid-integration.

The TRIDENT smart battery system will be a plug-and-play solution that can be installed in a household utility room and will empower the consumer to take an active role in the energy market, storing energy in times of low demand and selling back to the grid when demand is high. The innovative solution will introduce flexibility to the energy market, a key requirement for Ireland if the country is to meet its renewable energy targets.

The TRIDENT battery chemistry will be optimised for sustainability and consist of a hard carbon anode derived from biowaste and a cathode derived from iron sulphate (a common food additive).

Dr Tadhg Kennedy, coordinator of the TRIDENT project, explained, “The ecological design of the chemistry will lead to a 50 per cent reduction in both materials cost and global warming potential per kWh compared to Li-ion battery manufacturing. At the hardware level, a complete wireless battery monitoring system will be designed. To couple the TRIDENT smart battery system to the home and grid, a low-cost, high-efficiency grid-tie storage inverter system will be designed and proven. An innovative controller system will also be developed, which will allow the TRIDENT smart battery system to connect to the electricity grid for a range of applications including peer-to-peer trading of energy and peak shaving.”

Sustainability and cost effectiveness will drive component design at all levels, leading to a best-in-class sodium-ion smart battery for residential energy storage. The project goals will be delivered by Irish partners spanning the battery value chain, including materials synthesis, battery management systems and electric power transmission.

Student Showcase

Analog’s HealthCheck Kit (Thomas Minogue)

UL Product Design & Technology graduate Thomas Minogue worked on a new technology being developed by Analog Devices: a sensor that could be used to detect pathogens like viruses and bacteria. His challenge was to find a suitable use case and design how it would function. Through research and ideation, his direction became to design an app and accompanying diagnosis kit that would work together to help recognise a person’s condition by recording symptoms.

The Diagnosis Kit comes with an inner ear thermometer, an otoscope (video camera for throat and ears) and the virus and bacteria test that uses sample-gathering swabs and vials in which Analog’s sensor is embedded. These tools help to confirm the diagnosis as well as to record the results for the GP. Helpful recovery information is available through the app. The facility to contact the local GP is there too, so video call appointments for additional information and prescriptions can be arranged.

Giving Voice

"A university should be the natural home for sustainability, diversity, inclusion, innovation and future thinking. A university should lead the way forward, agitate for change, innovate for the future, inspire, stimulate and question. We take this responsibility very seriously at UL. By putting sustainability at the core of everything we do, we can harness the strength of our institution, our staff, our students, our 117,000 graduates and our surrounding community to affect real change with real impact."

Sheena Doyle, Head of External Communications, UL.

Reduce inequality within and among countries.

10 REDUCED INEQUALITIES

Ambassador of the People's Democratic Republic of Algeria visits UL

His Excellency Mr Mohammed Belaoura, the Ambassador of the People's Democratic Republic of Algeria, visited UL to meet with President, Professor Kerstin Mey, and attend the *Limerick Irish Algerian Friendship Group LIAFG 'My Algeria'* cultural event on 3 November 2021. The aim of the Limerick Irish Algerian Friendship Group is to continue to strengthen relations between Ireland and Algeria and to support the multicultural drive and internationalisation developments of Limerick City and County as well as to follow best practice in PhD education and internationalisation, realising that international student integration is not only a university issue, but a community one. The group regularly holds events to promote integration.

The UL Indonesian PhD Bridging Programme – a pioneering and enriching North/South HE initiative

In November 2021, the first cohort of 19 government-funded academics from universities in Indonesia arrived to take up their places on the first University of Limerick International PhD Bridging Programme (IBP) which would run over the course of the following eight weeks and involve a full-on campus experience. The programme, which was designed and delivered by a UL team involving UL Global (Liam Ryan), Graduate & Professional Studies (Dr Ger Downes), the School of TESOL/Linguistics (Dr Angela Farrell and Michelle Daly) and the University of Limerick Language Centre (Director, Debbie Thompson and teachers), was housed in the Faculty of Arts, Humanities and Social Sciences (AHSS). It provided opportunities for the visiting academics to gain knowledge and upskill in areas such as academic English, PhD research methods, intercultural competence and well-being strategies through a comprehensive and complementary range of lectures, workshops, and language and culturally oriented classes.

The programme was funded by the Directorate General of Higher Education, Research and Technology (DIKTI) within the Ministry of Higher Education in Indonesia. UL Global has worked hard since 2017 to foster a strong relationship with the Ministry including hosting site visits and developing bespoke training programmes such as the IBP to help upskill young Indonesian academics. The overriding objective of the programme was to guide the academics in their preparation of research proposals to support their applications for government-funded PhD study over the course of the next four years, and to assist them in identifying suitable PhD supervisors across the four UL faculties, with a view to returning to UL in September 2022 to begin their PhD programmes. The IBP students were highly motivated and showed great commitment and engagement, availing of all opportunities provided to develop their knowledge and skills, with the overall aim of advancing their academic and professional careers, and the feedback received from the group in relation to their learning experience at UL was extremely favourable. As a testament to the success of the programme, fifteen of the cohort were matched with supervisors from the Faculties of AHSS, Education and Health Sciences, and the Kemmy Business School, with ten of the group applying for PhD study in AHSS.

The IBP was a highly enriching shared learning experience for all involved and it has created vital opportunities to strengthen links between UL and universities in Indonesia and to attract high-calibre, government-funded academics for structured PhD study as a sustainable area for future growth. It will enable AHSS to expand its existing International Structured PhD offering with a view to becoming a recognised international centre of excellence in this area, and to extend its international reach and reputation more widely. The IBP can also contribute to building North/South partnerships and networks with universities in Indonesia and in other developing countries in support of UN SDGs, notably SDG 4 (widening access to high-quality education) and SDG 17 (building global partnerships for sustainable development).

Dr James Carr advises ECRI on opinion piece on the concept of racialisation

A European Commission Against Racism and Intolerance (ECRI) opinion piece on the concept of racialisation was published, following the 87th plenary meeting of the human rights monitoring body on December 8, 2021. Dr James Carr of the Department of Sociology at UL acted as an adviser to ECRI for this document in the context of a larger project specific to the revisions of ECRI's General Policy Recommendation (GPR) N°5 on combating intolerance and discrimination against Muslims, with the revised GPR published in March 2022. The opinion piece suggests that "the concept of 'racialisation' can help to understand better, expose further and address in a proactive manner the very conditions that allow racist thinking, discourse and practices to take root and

spread in today's Europe and beyond. The process of racialisation has contributed to spread prejudices, deepen inequalities, and legitimise exclusion and hostility against specific groups in the most egregious forms. The use of the concept of 'racialisation' has the potential to aid understanding of the processes underpinning racism and racial discrimination and to ensure that the voices of racialised groups are heard and taken into account, in particular in the areas of awareness-raising, education and policy making."

International Human Rights Day celebration

On December 10, 2021, the Irish World Music Café celebrated International Human Rights Day with some music and stories and launched a new action plan for migrant health research, supported by the Health Research Institute (HRI), UL and the Irish Research Council (IRC). The research prioritisation process and action plan were supported by the IRC New Foundations award and developed by stakeholders from migrant non-governmental organisations (NGOs), Irish health services, musicians and health academics. This work was carried out by the HRI-funded PART-IM (Participatory and Arts-Based Research Involving Migrants in Health Research) research cluster and supported by UL's WHO Collaborating Centre for Migrants' Involvement in Health Research.

Standing together – embracing diversity at University of Limerick

University of Limerick is calling on all students to embrace equality, diversity and inclusion on its campus. It comes following the appointment of a new Director for Human Rights, Equality, Diversity & Inclusion at UL. Dr Marie Connolly, the inaugural director, together with Professor Nigel Healey, Interim Provost and Deputy President, has called on students to "stand together and embrace diversity."

In an email to the campus community on Dr Connolly's appointment, Professor Healey wrote that "we need to remember that our university is not just a campus, it is not a list of degree programmes, it is not just your class, your lecturers, or your year group – UL is first and foremost a community of people, a dedicated group of ambitious teachers, learners and researchers."

Professor Healey went on to emphasise that University of Limerick categorically condemns any act of racism or minority discrimination that takes place on or off campus, and that UL students should do likewise. "Details of recent incidents reported by a number of international PhD students are hugely distressing and are being fully investigated. Not all incidents reported were carried out by UL students or involve the UL campus, but I passionately believe that every student of this university should feel supported by their fellow students and that they are part of a welcoming community," he continued. "As such I want to remind you now – a university is a place where young people are positively influenced to be civic-minded, collaborative global citizens ready to positively engage and contribute. As students you have joined the UL community from a huge variety of backgrounds and orientations, and you have the opportunity to graduate not only well educated in your chosen discipline but also in your world-view."

"On behalf of every single member of your student community, it is up to you not to tolerate any act of racism or minority discrimination that you may witness. We are currently developing ways to streamline the reporting processes for UL students to make it easier and quicker. UL Student Life and the Postgraduate Students' Union are also always available to you, should you wish to report an incident."

Professor Healey pointed out that in respect of the incidents reported in the previous number of weeks, the university had taken immediate action to safeguard against any further incidents of discrimination, including increasing security, increased access to student supports (i.e., counselling), direct engagement by himself in addressing the affected students and the development of a community-wide communications campaign to educate students in the coming year. "We are also developing anti-racism training that will be added to the student orientation programme and which will make it very clear to all incoming students that any kind of discriminatory behaviour will not be tolerated and there will be academic consequences for this type of behaviour," he added. "UL was one of the first universities of sanctuary in Ireland and is very proud of the programme, which has enhanced the campus and student population immensely. We have just appointed Dr Marie Connolly as Director of Human Rights, Equality, Diversity & Inclusion at UL to ensure those values are at the core of everything we do."

UL GAA launch first club jersey to carry LGBTQ+ pride colours

GAA President Larry McCarthy has joined with President of University of Limerick, Professor Kerstin Mey, to launch the new UL GAA Club jersey, the first ever GAA jersey to feature the LGBTQ+ pride colours. These will be a permanent feature of the UL GAA Club jersey, which also features the logo of JIGSAW, a free, non-judgemental and confidential mental health support service for young people.

Speaking at the launch event, Professor Mey said, "The UL GAA Club has been in existence since the 1970s and I am very proud that our club jersey is the first in Ireland to feature the LGBTQ+ pride colours. A university is the natural home of equality, diversity and inclusion. Students from all parts of the world, from a huge variety of different cultures, backgrounds, creeds and orientations come together to learn, live, play sport and recreate on our campus. We work hard to ensure that the UL environment is such that our students leave us not only as successful graduates in their chosen discipline but as civic-minded citizens with a global and inclusive mindset."

The University of Limerick GAA Club was established initially in the National College of Physical Education in the 1970s. The club grew and developed through the transformations from Thomond College to the National Institute of Higher Education, to the University of Limerick. UL GAA Club has gone from strength to strength, competing in hurling, football, ladies' football and camogie. It now fields over 17 teams each year and has approximately 1,000 student members.

GAA President Larry McCarthy, former member of the UL GAA Club and UL graduate said, "I am delighted to see that the mantra of the GAA, 'Where We All Belong', is manifested in the ethos and re-design of the jersey of UL GAA Club. Sport, like a university, is a natural home of equality where neither class, nor creed, nor colour, nor orientation, nor ability should impact on participation. Playing the game quickly eliminates barriers between teammates and teams, and the GAA is proud of its philosophy that sport is indeed for all. I commend the UL GAA Club in being to the fore in propagating the GAA mantra."

Student Showcase

PhD student Sandrine Ndahiro featured in 100 Voices: #AllAgainstRacism campaign

Sandrine Ndahiro, activist, writer and artist, has experienced dual identity first hand, being Rwandese and Irish. Sandrine explains, "Whether it was school or social media – just because I was Black, my Irishness was always questioned. That was something I really struggled with, and from time to time I still struggle with it, even though I've been here since I was ten."

Sandrine recently co-directed and co-produced a documentary called 'Unsilencing Black Voices', which was released last year. She also got twenty people across Ireland to talk about a specific moment of racism in their lives. "We wanted to centre Black voices and normalise talking about racism in Ireland, which is still such a taboo topic. I'm now in the process of making my second documentary, on exploring the different shades of Irishness, which I'm hoping to release next year."

Recently, Sandrine published an online literary and cultural magazine, Unapologetic, which she co-edited and co-founded. It features art, poetry, personal essays and academic essays – all talking about different social issues in Ireland. Most of the content focuses on centralising marginalised communities. "I'm trying to reshape the narrative and show how marginalised voices and migrants are contributing to different aspects of society, including the literary and cultural landscape in Ireland," Sandrine explained. "I definitely feel hopeful, because there are so many new, creative projects that are coming out, which are moving away from that homogeneous view of Irishness as just white." On November 30, 2021 Sandrine's voice was captured as part of Hot Press's 100 Voices #AllAgainstRacism.

Student Showcase

UL journalism student wins Journalist of the Year at the National Student Media Awards (Smedias) two years in a row

In 2021, a UL Journalism student won Journalist of the Year at the National Student Media Awards (Smedias) for the second year in a row. Egyptian-born Mostafa Darwish took home the top prize for his work focusing on the challenges facing asylum seekers living in Ireland. The 31-year-old recently completed an MA in Journalism at University of Limerick and was among over 20 UL students shortlisted in the 2021 National Student Media Awards.

Speaking about his success, Mostafa Darwish said, "I am so happy that my stories which tell the stories of asylum seekers have had such an impact and have already effected some much-needed change for this vulnerable community across Europe. I also am so proud that some of these were the stories recognised for this top award. I only spent two years living in Limerick and studying in UL, but Limerick has a huge place in my heart. The university helped me a lot to write in a language that is not my native language. And UL's green campus helped me to have a peaceful time that I really needed after some tough years."

UL Journalism lecturer Kathryn Hayes congratulated all the UL students who were shortlisted in this year's National Student Media Awards. "I am so happy for all the students who picked up awards and incredibly proud to see a record number of nominations for UL students who worked on the Limerick Voice multimedia news project, Prodigy Magazine, An Focal and ULFM. It's a fantastic achievement for students to have their work recognised by key industry leaders and a real testament to their hard work and talent, after what has been a challenging period for all third-level students."

Student Showcase

UL Alumna Mamobo Ogoro Wins Activist of the Year at the Black and Irish Gala Awards

University of Limerick alumna Mamobo Ogoro was named Activist of the Year at the inaugural Black and Irish Awards in December 2021. The ceremony took place in Dublin in the Hilton Hotel where the social psychologist took home the award. The PhD student is also the founder of Gorm Media, a digital media platform that curates common ground on social issues. In 2021, the platform went from strength to strength, holding regular online events and producing a wide range of multimedia content that promotes curiosity, conversation and creativity. One such initiative was 'Them', an online series that sees life through the lens of people from five different backgrounds in Ireland. Mamobo was also honoured at the 2021 Social Entrepreneurs Ireland (SEI) Gathering.

Giving Voice

"In applying my PhD research, I founded Gorm Media, a social enterprise with a mission to unify across social, cultural and political differences. Our mission in Gorm is deeply rooted in SGD 10 (reducing inequalities) and my passion for empowering and creating space for marginalised communities to use their voice. While prejudices, interpersonal/ institutional inequalities continue to spread, we lean on our expert knowledge, community & stakeholders to spark a movement to unify the world."

Mamobo Ogoro, Social Psychologist, Psychology PhD Student, Faculty of Education and Health Sciences, UL.

Make cities and human settlements inclusive, safe, resilient, and sustainable.

11 SUSTAINABLE CITIES AND COMMUNITIES

The 'Fleurir' project, opening the doors to language learning at primary school

The overall aim of the 'Fleurir' initiative is to introduce a foreign language to primary school pupils with a particular focus on schools designated as DEIS (Delivering Equality of Opportunity in Schools). The Access Office at University of Limerick has been working on the development of an academy for primary school children in areas of Limerick experiencing socio-economic disadvantage and has partnered with Our Lady Queen of Peace in Janesboro as a pilot school. The objective of the academy is to foster closer collaboration and stronger links between the university and communities traditionally underrepresented at UL and to enhance children's opportunities to access further education. Through collaborative meetings, the needs of the school were identified. One of these was the introduction of a modern foreign language to assist the sixth-class children in the crucial transition to second level.

The school chose French as it is taught in all the local secondary schools. The collaboration with Catherine Jeanneau, coordinator of the Language Learning Hub in the School of Modern Languages and Applied Linguistics (MLAL) started at that stage. Through harnessing expertise in language teaching and learning, a French programme was designed specifically for the target audience and their needs. The programme comprises 30-minutes classes to be taken over a period of ten weeks as well as a booklet including some class material and creative activities to be completed after each class. The project was made possible thanks to funding received from Post-Primary Languages Ireland (PPLI).

Thirty-nine children took part in the pilot project which ran in spring 2021. As reported by the French tutor and the two sixth-class teachers, the participating children really engaged with their learning and the programme demystified language learning for them. The programme reinforced the promotion of equity, social cohesion and active citizenship by allowing children to discover a new language and a new culture and giving them opportunities they might not have been afforded otherwise. The success of the initiative was such that it received a European Language Label award.

The Fleurir initiative does indeed seek to "provide all students with equality of opportunity to succeed, both academically and professionally" – to flourish, as the name of the programme suggests.

Innovative UL research projects funded under IRC New Foundations scheme

Research projects at University of Limerick were funded to the tune of almost €130,000 under the Irish Research Council (IRC) New Foundations scheme. Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris TD, welcomed the projects that will bring researchers and community and voluntary organisations together to share knowledge and develop new insights to help create a better society for all. Of the 76 IRC projects funded, 12 are based at UL and are among those that will reach out across communities to look at a range of issues, including those affecting carers, senior citizens, young people, migrant communities and the LGBT+ community.

The impact of the COVID-19 pandemic on the wellbeing of different groups in society and on the delivery of services is another significant theme in the research projects. Among the UL projects funded are those led by Dr Lydia Bracken, who will be working with LGBT Ireland on the legal aspects of LGBT+ families, and Dr Jennifer Schweppe, who will be working with GOSHH (Gender Orientation Sexual Health HIV) on the project 50 Years of LGBTI+ Activism in Ireland: Social Forces and Legal Change.

"These research collaborations are helping with some very important community and voluntary sector projects," said Minister Harris, welcoming the fact that the highest ever number of funding awards was being made by the Irish Research Council to support these collaborations. "This vibrant sector plays such an important role in supporting different groups in society, including the more vulnerable or marginalised," he continued, noting that through partnerships with researchers "diverse community organisations can bring new evidence and insights to enhance their services and impact for those that need them."

The New Foundations scheme also includes strands supported by government departments and agencies. In each of the three previous years, a dedicated strand of the call provided opportunities for researchers to work on important areas of policy, including global development, crime, creativity and children.

Welcoming the funding partnership with the Department of Foreign Affairs, Director of the Irish Research Council, Peter Brown, said that this ongoing partnership "continues to build a pipeline of research

collaborations for future projects that support enhanced cooperation between the Global North and Global South, focusing on innovative responses to global challenges within the framework of the 2030 agenda for the Sustainable Development Goals

"Extending partnerships with government departments and agencies is a key action under the Irish Research Council's Strategic Plan 2020-2024. As the COVID-19 pandemic has shown, the expertise of researchers across diverse disciplines is a valuable resource for policy."

Full list of UL projects:

- Anne O'Connor, working with Dyspraxia/DCD Ireland, on a pilot study to determine the feasibility and sustainability of a University-children's' charity organisation research partnership to deliver physiotherapy to children with disability via telepractice
- Ann-Marie Creaven, working with SpunOut.ie, on Exploring Loneliness and Social Isolation in Emerging Adults: Establishing and Partnering with a Youth Research Advisory Group
- Daragh Bradshaw, working with Irish Penal Reform Trust, on Incarcerated Parenting – Evidence and Gap Map
- Helen Phelan, working with Doras, on Research Prioritisation in Migrant Health: Towards a Participatory, Arts-Based Paradigm
- Jennifer Schweppe, working with GOSHH, on 50 Years of LGBTI+ Activism in Ireland: Social Forces and Legal Change
- Kathleen Markey, working with 80:20 Educating and Acting for a Better World, on collaborating on perinatal mental health support for migrant women and their families: networking and connecting the dots
- Lydia Bracken, working with LGBT Support and Advocacy Network Ireland CLG, T/a LGBT Ireland, on LGBT+ Families in Ireland: Legal Recognition of Parent-Child Relationships
- Majka Ryan, working with Doras, on identifying and responding to the labour-market integration barriers among successful female international protection applicants in Ireland
- Mel Mercier, working with Solstice Arts Centre, on Towards an Inter-institutional Model of Best Practice for Arts Practice Research Support
- Owen Doody, working with Down Syndrome Ireland, on inclusive education for people with disabilities in third-level education in Ireland
- Sarah Jay, working with Nepal Leprosy Trust Ireland, on Evaluating Village Alive Programmes in Rural Nepal with a Social Identity Model of Community Empowerment
- Carmel Hannan – The Irish Child Cohort Network 2021.

'Tell your own story' project

'Tell your own story' (TYOS) is a media project initiated by Maria Rieder, AHSS, UL which intends to promote inclusivity and the value of interculturality in UL and in the wider Limerick area. Much of what we read about diverse cultures in the media tends to focus on cultural differences and to put distance between cultures, even create and reinforce stereotypes, but there are so many things which are shared across cultures.

"The impetus for the project was racist incidents that occurred on campus and in Limerick city in 2021 against a group of Algerian PhD students who had just arrived to Ireland. They arrived under very difficult circumstances: Ireland was in lockdown, infection rates were very high and there were a lot of Covid-related deaths. It was very difficult for this group to settle in and to make contact with students and local people. On top of this they were subjected to racist attacks both in the city and on campus on the grounds of their student accommodation" Maria Rieder, Applied Linguistics, AHSS.

A team of 16 UL-based students and staff have partnered with Doras, the non-governmental organisation working to promote and protect the rights of people from a migrant background in Ireland, and they are currently recruiting participants from the city. The project is funded by an Arts, Humanities and Social Sciences (AHSS) Faculty seed fund and the Irish Research Council (IRC) New Foundations fund.

What makes TYOS unique is that the project team members highlight shared experiences and stories rather than focusing on differences. The international team writes about experiences and emotions that everyone can relate to. Their aim is to create understanding and empathy in the community and lead to a reduction of fears of and stereotypes about foreign cultures. TYOS has published a number of stories written by the team in the Limerick Voice and for the I Love Limerick platform. They are currently building contacts with media organisations and are

working towards publications in local and national newspapers. In addition to written contributions, the TYOS team is also working on three one-hour radio productions with community radio station Wired FM.

UL research to build better relationships between young people and youth justice workers

University of Limerick and the Department of Justice have launched a research report aimed at developing effective relationships between youth justice workers and young people. Minister of State at the Department of Justice, James Browne, TD, officially launched the report, which was authored by independent consultants Deirdre Fullerton and Dr John Bamber as well as Dr Sean Redmond, the principal investigator for the Research Evidence into Policy, Programmes and Practice (REPPP) project.

REPPP is a collaboration between the School of Law at University of Limerick and the Department of Justice aimed at improving the evidence base for youth crime policymaking. The report, 'Developing Effective Relationships Between Youth Justice Workers and Young People: A Synthesis of the Evidence', presents up-to-date scientific evidence of how to build purposeful relationships between youth justice workers and young people. Speaking at the launch of the report at University of Limerick, Minister Browne said, "In simple terms, the purpose of youth justice policy is to discourage young people from antisocial behaviour and provide practical support and guidance to encourage pro-social behaviour. Achieving these two objectives would make a significant contribution to community safety and reduce reliance on the formal criminal justice system. The way that policy comes to life for young people involved in the youth justice system is through relationships formed with frontline youth professionals. This is the place in the system where the magic happens, where national policy transforms into personal behaviour change." The Minister continued, "The focus on effective relationship building in youth justice settings will be of interest to specialist youth justice practice and to other child and youth practitioners outside Ireland. This report is an important resource for translating the evidence into workable next steps for programmes and practice."

Dr Sean Redmond, UL School of Law Adjunct Professor in Youth Justice, said the report fills a "clear gap" in research evidence about what constitutes an effective relationship. "The central message from this evidence synthesis is that establishing appropriate levels of trust between worker and young person increases the chances of active engagement, involving cycles of learning, testing and growth," said Dr Redmond. "Over time, and with persistence, positive development can be anticipated. The findings strongly suggest that strengths-based approaches can build on the foundation of trust to instil hope and belief in the possibility of change. This hope provides the basis for working with the young person to identify and achieve goals and targets which increase the young person's sense of being able to effect control of their circumstances. Having high expectations for achievement within warm and responsive 'firm but fair' relationships help young people to accept challenges to their behaviours without prejudicing the relationship.

"The core skills involved in developing effective working relationships with young people include active listening, taking the time to get to know the young person, empathetic responding, advising, guiding, modelling pro-social behaviours, and challenging ideas and behaviours in a non-threatening or judgemental manner. Equally important are worker qualities such as dependability, consistency, and commitment to the young person. In addition, intangible qualities such as warmth and humour are critical. The combination of skills and qualities helps to establish the mutual trust that is essential for developing and sustaining effective relationships," explained Dr Redmond, who has over 30 years' experience of working in the areas of juvenile crime and child welfare as a social work practitioner, senior manager and at policy level.

The REPPP project was originally conceived to improve the evidence base for decision making in the youth crime policy area. It produced the ground-breaking Greentown Project, which provided the first scientific evidence of the effects of crime networks in Ireland. Further studies took place in Bluetown and Redtown, with key findings revealing that approximately 1,000 children across the State were considered to be involved or at risk of being involved in crime networks with adults. The Greentown programme, which won first prize at the European Crime Prevention Awards in December 2020, received a further €4.2m funding to trial a programme for three years to intervene with children caught up in crime networks in two localities, known as Whitetown and Yellowtown.

Works commence on new University of Limerick City Centre campus

University of Limerick President, Professor Kerstin Mey, has announced the start of works on the University of Limerick City Centre campus. Professor Mey said she was "delighted" that works have started on the city centre site. The works will be centred on preparing a portion of the internal space on the first floor of the building to create a new space for the UL FabLab, the +CityxChange project, an innovation lab and community engagement lab. "These are collaborative projects between UL and Limerick City and County Council which will benefit greatly from this new city centre location. The works will also include the development of community exhibition and meeting spaces," said Professor Mey.

This is only the very beginning of the development of the University of Limerick City Centre Campus, using just a small section of the existing building. "Working with our partners in the region, we have great ambition for all that this campus will become in the future," continued Professor Mey. "The University is deeply committed to Limerick and the city centre campus will reflect both the academic excellence we are known for as well as being a vital extension of our beautiful campus in the heart of the city. The site is large, but our ambition for it is even greater. This is truly the start of a significant new chapter in the university's history and one that we are very excited about. It will be wonderful to see it start to take shape," she said.

Building Community Resilience

Building Community Resilience is a collaborative project led by Dublin City Council, which aims to address antisocial behaviour across Dublin South Central. The project started following the recommendations of a report by Dr Johnny Connolly and Dr Jane Mulcahy of the REPPP team in the School of Law at UL. It involves collaboration between University of Limerick School of Law, An Garda Síochána, Dublin City Council, Tusla, local policing forums, residents, youth work, drug and community workers and more to address the challenge to the quality of life of people caused by anti-social behaviour. An evaluation of the Building Community Resilience project was launched on December 15, 2021. The Secretary General of the Department of Justice spoke at the event, as did Dr Connolly.

Student Showcase

Bickley (Ciana Martin)

Bickley, developed by product designer Ciana Martin, weaves links between cycling and Irish urban environments by providing a secure and inviting bike parking solution to commuters in our cities. Environmental sustainability is the core driver behind Bickley. In developing the product, Ciana examined commuter habits: what works for them, what frustrates them and what would make them change their routines to encourage commuter cycling in Irish communities. A lack of effective bike infrastructure, bike security and distance to the workplace are some of the main barriers against commuter cycling in Ireland today. In the past year alone, 6,845 bicycles were stolen in Ireland. Bickley addresses these concerns by providing secure and user-friendly bike parking through an account-activated, dual-locking system. As well as working for the user, Bickley works for the city, as it can be applied to a park and bike system and light pathways and, most importantly, embody a city's dedication to green transport.

Giving Voice

"UL has taught me that sustainability is not limited to a buzzword – it is a mindset that transcends industrial, academic and societal demographics. Whether it's empowering business, environment, science, community activism, politics or education, sustainability will deliver integration and systems-driven change. Recently, we saw decades of change happen in weeks to respond to crises. Let's unite to ensure sustainable change works for everyone today, tomorrow and for the next chapters of our existence. Ní neart go cur le chéile."

Ben Kiely, BA International Business, 4th year undergraduate, Kemmy Business School, UL Student Advocates Sustainability Working Group, UL.

Ensure sustainable consumption and production patterns.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Ecological engineering for reclaiming waste sites

Dr Ronan Courtney, Bernal Institute member and Senior Lecturer at the Department of Biological Sciences, is leading a Science Foundation Ireland (SFI) project that is using ecological engineering to reclaim industrial waste sites. Achieving the goals for a European Green Deal and decarbonisation will require substantial demand for new mining of critical raw materials. However, the extractive operations to process and refine such raw materials generate approximately 300 million tonnes of waste per annum, representing one of the largest waste streams in the EU. Disposed wastes represent significant footprint and require reclamation and landscaping that would put demand on natural soil resources.

The UL-led researchers are creating engineered soils from waste materials that are not only chemically and physically analogous to soils but also create the environment to support soil biodiversity and drive soil function. Working with industrial partners, the group has implemented a number of study sites across Europe and is demonstrating soil functionality in robust ecological communities. Research deliverables have developed best practice, assisted industry to operate their facilities in a sustainable manner and address the circular economy through waste minimisation and reuse. The former industrial sites are transformed to environmentally sustainable, cost-effective sites supporting biodiversity and beneficial land-use.

Bernal Bio Laboratories win international Green Lab Certification

The Bernal Institute BioLabs are the first labs at University of Limerick to be certified by My Green Lab as part of their Green Lab Certification programme, considered to be the international gold standard in lab sustainability. The university is committed to the development and implementation of a holistic approach to sustainable development. In line with this, the Bio Laboratories at the Bernal Institute have evaluated opportunities for energy and water savings as well as chemical and waste reduction. Championed by a coalition of scientists, facility managers and a safety professional, Bernal BioLab members are pursuing sustainability in their laboratories through the adoption of 'Green Lab' practices. The team was awarded the Platinum level 'Green' certificate with the second highest score ever achieved in the programme and has joined a network of hundreds of certified green labs all over the world.

Speaking about the award, Biomaterials cluster leader and neuroscientist, Dr Andreas Grabrucker, said, "Bernal BioLabs are making real and impactful changes to decrease the environmental footprint of research. By empowering scientists to make choices that not only benefit their research but also the environment and communities around them, My Green Lab and Bernal BioLabs are building a culture of sustainability in the laboratory." Bernal Institute Director, Professor Luuk van der Wielen, commented, "I am delighted to see that the Bernal Biolabs team has successfully internalised our strategy focused on developing solutions for grand challenges in health, energy and the environment in their daily works. We are evaluating this or a similar approach for the full institute."

€14m investment in UL-based Dairy Processing Technology Centre

In October 2021, Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar TD, announced significant new investment in the University of Limerick-hosted Dairy Processing Technology Centre (DPTC). The Tánaiste visited the Bernal Institute in UL where he announced the second phase of funding for research in the DPTC. This next phase will see an additional €14m investment through Enterprise Ireland (EI) in new research looking at sustainability and competitiveness in the dairy industry.

The first phase saw the DPTC, founded in 2014, established as a centre of excellence for dairy processing research and innovation. "With our climate law, Ireland is now one of the most ambitious countries in the world on climate," the Tánaiste said. "At the same time, agriculture is one of our largest and most important indigenous industries. We make enough food to feed our population nine times over. That is something we should be proud of, and we want it to continue. This research is crucial as we move to a low carbon society, to ensure our food industry can thrive, modernise and continue to compete globally."

The DPTC brings together Teagasc and leading researchers from the university sector to work with Ireland's largest dairy processors. Backed by EI, the centre focuses on driving future growth and sustainability in the Irish dairy processing sector through advances in processing and sustainable manufacturing. Over the next five years, the €14m investment will see the DPTC focus on key challenges for the sector, including the production of high-value quality products that are cost-

effective and sustainable as set out by international commitments such as the EU 2030 Climate Energy Policy Framework. "The establishment of the Dairy Processing Technology Centre anticipated the significant market disruption that would occur with the removal of milk quotas in 2015," said EI CEO Leo Clancy.

DPTC and VistaMilk collaborate on dairy research and sustainability

The Dairy Processing Technology Centre (DPTC) hosted at the Bernal Institute signed a memorandum of understanding (MoU) with dairy research centre VistaMilk in August 2021. The deal aims to exploit synergies and collaborative opportunities for the benefit of future dairy research between the two leading dairy research centres. Funded by EI, the DPTC is driving future growth and sustainability in the Irish dairy processing sector through advances in processing and sustainable manufacturing. Founded in 2014, it aims to provide a step change to Irish dairy processors with high quality pre-competitive research, delivering significant technical impact and economic value for the sector.

VistaMilk is a Science Foundation Ireland research centre whose primary focus is to be an agent of responsible growth for the Irish dairy and agri-tech industry by being a world leader in fundamental and translational research for precision pasture-based dairying. The MoU – signed on August 9, 2021 – leverages the competitive advantages of both research centres to support high-quality collaborations to the benefit of the entire Irish dairy sector. The DPTC and VistaMilk have common industry and academic partners and therefore active collaboration is highly advantageous and synergistic to all parties. The MoU facilitates alignment of research objectives, to deliver the latest science and technology in dairy processing. A major ambition is to establish the linkages between those factors in production which determine processability of milk and dairy products. The MoU will provide a mechanism for two-way sharing of milk production and processing data in a supportive environment. The signing of the MoU underscores a shared effort to advance open, inclusive and progressive focus on dairy processing research and recognises and reaffirms the synergies between the two research centres. "We recognise the value of the work that VistaMilk is doing and are confident that this MOU will be a key part of the DPTC's broader strategy, enhancing both parties' strategic collaborations, while increasing opportunities for the dairy industry. We look forward to working together," said Dr Anne Marie Henihan, DPTC Director. Speaking on behalf of VistaMilk, Centre Director, Professor Donagh Berry, said, "Both centres have important roles in the dairy research and innovation ecosystem and this strategic alliance will harness the enthusiasm, dedication and knowledge base of both industry-academic consortia to the envy of others globally. I am really excited about this strengthening of collaboration with the DPTC."

DPTC is an academic-industry collaboration and partners include Arrabawn Co-op, Carbery Food Ingredients Ltd., Dairygold Food Ingredients, Glanbia Ingredients Ireland, Kerry Group, Lakeland Dairies Co-op and Tipperary Co-op. DPTC research is allocated among the partner research performing organisations (RPOs). Currently, the centre collaborates with seven RPOs: University of Limerick (UL) (host institution), Teagasc, University College Cork (UCC), University College Dublin (UCD), National University of Ireland Galway (NUIG), Dublin City University (DCU) and Trinity College Dublin (TCD).

Green Vibes: University of Limerick leads the way on composites recycling solution

June 2021 marked the start of the €5.3m VIBES project to develop a green solution to resolve the end-of-life issues of thermoset composites and decrease the amount of non-biodegradable polymers sent to waste by at least 40 per cent. The use of composite materials has grown in recent years. These materials offer high mechanical strength at a light weight. In addition, the lack of corrosion – even in extreme environments – often compares favourably to metals. This has seen these materials find considerable uptake in high-technology applications such as aeronautics, automotive, construction, marine and naval, energy and sports science. As the demand for increased fuel efficiency rises, it seems inevitable that the demand for these light, but strong, materials will also rise to match.

However, these composite materials currently present a problem at end of life. Unlike plastics, they are made up of a combination of materials – a polymer matrix combined with a reinforcing material. This means they cannot be simply melted and recycled, as is the case with most plastics. To become useful, they must be separated into their component parts, a challenging process. The challenge in doing this means that currently most waste composites are simply sent

to landfill or incineration; this accounts for almost three-quarters of waste. With Europe's aspirations to become a circular economy, this is not an acceptable solution. If the increase in their use continues, there needs to be a more effective way of handling waste and making it part of the circular economy.

The VIBES project offers an innovative approach to this challenge. It has developed a technology for the controlled separation and recovery of composite material components by means of developing customised bio-based bonding materials. These new materials can then be decomposed to their component parts using temperature, UV or electrical pulses, allowing matrix to be separated from the reinforcing material, which will assist in the detachment of the polymer chains of the resins. The resulting products can then be used as feedstock for other processes. "The work at University of Limerick specifically addresses the development of sustainable fibres for reinforcement of these next-generation recyclable composite materials," explained project lead at UL and senior lecturer at the School of Engineering, Dr Maurice N. Collins. "Researchers at UL will also be involved in the development of the recycling technology and the testing of the new composites for construction, aerospace and naval applications. These new composites could eliminate waste in end-of-life composites and create a circular ecosystem for these materials," he added.

The VIBES consortium, led by AITIIP Technology Centre (Spain), comprises 13 industry partners across seven EU member states (Spain, France, Ireland, Germany, Belgium, Italy and Greece), three research and technology organisations and Dr Maurice N. Collins and Dr Mario Culebras, School of Engineering and the Bernal Institute, University of Limerick.

Sustainability in the Biological Science labs

The Department of Biological Sciences undergraduate and research labs recently underwent certification by 'My Green Labs'. The aim of this initiative is to reduce the environmental impact of the department's laboratories in four key areas, energy, water, waste and chemical use through a combination of organisational initiatives and behaviour change programmes. This initiative involves scientists working together in efforts to minimise environmental impacts, build a culture of sustainability in the lab, advance sustainability goals and identify waste-reduction opportunities. When compared to non-lab spaces, laboratories are increasingly being recognised as significant energy users, with up to 10 times more energy used and with higher volumes of waste.

The department is delighted to announce the undergraduate labs scored 84 per cent overall, putting them in the Green Certification Level, the highest level attainable. The research labs scored 76 per cent overall, putting them in the Platinum Certification Level, the second highest level on the scoring scale.

The main ethos of this initiative is to implement behavioural changes to make the biggest environmental impact. People pay attention to what their peers do, especially friends, family, co-workers and neighbours. To create norming behaviour in the lab is key to success. A representative from each lab along with the technical team came together to form the department's 'Green Team' where responsibility for sustainability was shared across lab members and staff. The Green Team meets regularly to revisit topics, help train people and explore innovations and is always open to new members and new ideas.

The changes we have implemented to date are a starting point and our aim is that by working together and with Buildings & Estates (UL) and other institutions nationally, we will continue to make impactful changes. These changes can be small, and your lab will be more likely to succeed in starting sustainable practices if new actions are convenient to do. Some of the key points of the Green Labs certification process include identifying 'greener' waste options, increasing temperatures of low temperature storage units and turning off equipment when not in use.

A public sector working group has been set up by the Sustainable Energy Authority of Ireland (SEAI) and the next step is to join the Irish Green Lab Network. The shared ambition of this network is to minimise the negative impact that laboratories are known to be having on the environment. We have also recently signed up to the Optimising Power @ Work scheme run by the Office of Public Works (OPW), which involves monitoring a number of buildings on the UL campus for energy efficiency. The core principle is to work intensively with staff to encourage behavioural change with regard to energy usage, with the overall aim of identifying and eliminating energy wastage.

Student Showcase

EKOY
(Joely Grimes)

EKOY is a food storage container system made from bamboo pulp and silicone, both materials that can be repurposed and recycled easily. Ekoy is an easily assembled and repaired product. It is manufactured in such a way as to allow for each component to be separated for ease of end-of-life disposal. It was designed to be a lightweight, modular and collapsible container, to be utilised for multiple purposes, from storing liquids to dry goods. "I wanted to keep sustainability at the centre of this product, as it is something I am very passionate about. My aim with this product was to help reduce the amount of packaging that enters a person's home. I hope this product will encourage the repurposing of products we already own."

Peel
(Niamh Munday)

Peel is a product-service-system designed to eliminate the use of single-use food labels, reduce food waste in homes and make shopping sustainably far more accessible to supermarket consumers. Peel is made up of three key components:

- The Peel system architecture ensures the functionality of each individual element.
- The Peel app serves as the consumer's digital cupboard. Through this, the user reduces their food waste and becomes a more environmentally conscious consumer. The app also creates a community of consumers within the Peel system.
- The key user touchpoint is the Peel reusable label that enables the communication of all necessary information through radio-frequency identification (RFID) chips, eliminates the use of single-use food labels and ensures the easy separation and recycling of food packaging. After use, the label is returned instore and re-enters this circular economy system.

Student Showcase

aWEAR – 'Become aware of what you wear' (Karen Crowley)

aWEAR is a new and innovative product system for textile analysis and verification using near-infrared (NIR) spectroscopy sensor technology to aid with the project goal of evolving consumer behaviour around textile awareness.

The aWEAR device is used alongside the aWEAR app providing unique features for three different target groups:

- Industry – aWear aids buyers when researching across different regions for appropriate textiles. The quick verification, storage and analysis of the data acquired from the scan improve efficiency and usability.
- People with SPD – Sensory processing disorder (SPD) affects thousands of people globally. aWear helps people with this condition to identify certain textile triggers of their condition and find suitable materials.
- General users – As the project stemmed from a desire to improve sustainability within the fashion industry, keeping this goal was vital for the designer. aWear assists consumers in identifying what items of clothing are recyclable, synthetic and/or greenwashing.

Giving Voice

"At UL, we are committed to supporting health and sustainability for all our students, staff and wider community. The research we are conducting at UL will aid society in the transition from a fossil fuels-based economy to a future circular bio-based economy whilst transforming our approach to materials usage, waste valorisation and energy consumption."

Professor Maurice N. Collins, School of Engineering, UL.

Take urgent action to combat climate change and its impacts.

13 CLIMATE ACTION

Climate change – the biggest challenge humankind has ever faced

Students on the MSc in Project Management at the Kemmy Business School (KBS) participated in a global hackathon organised by the Project Management Institute (PMI) in 2021. The theme of the Make Reality challenge was 'Disruption for Social Impact'. Teams considered problems related to UN Sustainable Development Goals (SDGs) and proposed creative solutions using citizen developer tools. Over 10,000 students competed and developed applications to address sub-theme problems including COVID-19, climate change, smart infrastructure and education.

The UL student project, addresses SDGs 12 and 13, which relate to ensuring sustainable consumption and production patterns and climate action. The team designed an app aimed at project managers, encouraging them to explore sound management practices and to explore their existing knowledge of sustainable management.

"The project has given us a platform to explore climate change's impact on our lives. Through the development stage, we understood the difference that something like our app can make. Minor changes by everyone will make a lasting difference," said Dr Éamonn Kelly from the KBS. MSc student Colleen Dauwer added, "Gaining feedback from PMI professionals around the world was a unique and inspirational experience that gave us the confidence to take our idea to the next level!"

The MSc in Project Management project was awarded 2nd place in Europe and, along with a cash prize, the students were given the opportunity to showcase their solution at the PMI Virtual Expo, attended by 60,000+ attendees from 175 countries.

Bernal researchers help create 'brain-inspired computing architecture' with the potential to save energy

An international team of scientists including researchers at University of Limerick discovered a new molecule which could further increase ultra-fast decision making in computers. The energy-saving discovery, creating a new type of computing architecture, could have major implications in areas spanning from financial decision-making to bioinformatics. The team at UL's Bernal Institute discovered that a simple molecule made from just 77 atoms provides a new fundamental electronic circuit element in which complex logic is encoded in nanoscale material properties. The new type of brain-inspired computing architecture was created by optimising the electrical properties of soft crystals grown from the molecules.

The finding was reported in the world-leading journal Nature in September 2021. Damien Thompson, Professor in Physics at UL, who leads a research team in predictive materials design at the Bernal Institute, made the discovery using state-of-the-art computer simulations performed on the Irish Centre for High-End Computing supercomputer. He showed that the molecule uses natural asymmetry in its metal-organic bonds to cleanly switch between different states, which allows it to perform ultra-fast decision making. "In the new device, everything is done in one place, so there is no need to keep reading or moving information around," explained the Science Foundation Ireland-supported scientist. "This removes the 'von Neumann bottleneck', a problem that has plagued computing from the very beginning and still hampers technology development. The new molecular circuitry means the computer-processing unit no longer has to fetch data for every operation it performs, and this saves enormously on time and energy costs."

"We are excited about the possibilities because the devices show all the hallmarks of brain computing," Professor Thompson continued. "First, a huge number of tiny, identical molecular processors are networked together and work in parallel. More importantly, they show both redundancy and reconfigurability, which means the device can solve problems even if the individual components do not all work perfectly all the time or in the exact same way every time. The new circuit elements could provide computers that are smaller, faster and more energy efficient, exactly what is needed for edge computing, internet of things and artificial intelligence applications."

The metal-organic molecules were synthesised by collaborators at the Indian Association for the Cultivation of Science (IACS) in Kolkata, made into films at National University of Singapore and tested as circuit elements in Singapore, at Hewlett Packard's AI Research Lab in Colorado and at Texas A&M University.

Methane emission targets must consider food security of individual nations

A study published in Journal of Environmental Management in July 2021 found that global emissions of methane gas need to be cut by at least 24-47 per cent to stabilise the climate. However, because methane is a by-product of the production of milk, meat, eggs and rice, there are food security implications to the different approaches to determine national "fair shares" of global methane emissions in 2050. The authors of the research defined national "fair shares" of global methane emission for the production of methane-intensive food (milk, meat, eggs and rice) across four sample countries: Brazil, France, India and Ireland. Choice of allocation method profoundly influenced national methane quotas. For example, Ireland's "fair share" of methane emissions in 2050 implied a reduction of between 30 percent and 79 per cent from national emissions in 2010.

Speaking about the findings of the research, co-author Dr Dave Styles, a member of the Bernal Institute and lecturer in environmental engineering at University of Limerick, explained, "To withstand international and cross-sectoral scrutiny, the determination of national methane budgets within climate action plans will require careful screening of implications for food security, carbon offsetting and global equity. For example, whilst Brazil and Ireland could maintain some milk and beef exports whilst achieving territorial climate neutrality, India would have to reduce its production of livestock and rice to only 30 per cent of national calorie and protein requirements for its agriculture and land use sector to become climate neutral." According to Dr Prudhomme, agricultural researcher at CIRAD in Montpellier and lead author of the study, "this research demonstrates, for the first time, the implications of methane reduction targets on food production, land area available for CO_2 offsetting and issues of international equity – applying objective data across countries in a transparent and repeatable manner."

The authors downscaled these global emission targets to national "quotas" based on grand parenting (equal percentage reductions across countries), equity (equal per capita emissions), ability (emission reductions proportionate to GDP) and animal protein security (emissions proportionate to animal protein production in 2010). They then calculated the amount of methane-emitting food that could be produced in each country within these quotas and the amount of land this would require. Land is a limited resource subject to many competing uses, so that producing land-intensive livestock food products constrains areas available to sequester carbon and offset CO_2 emissions from other sectors. Thus, for the first time, the authors were able to demonstrate the implications of national methane targets related to different principles of international equity, for national food security and overall emissions balances from land use (emissions minus CO_2 offsets).

SDG and transnational collaboration through Virtual Exchange

This story touches on two different projects offered by the Faculty of Arts, Humanities and Social Sciences (AHSS) within the BA Arts and the BA Business with Spanish programmes. Both projects engage students with issues related to climate change and sustainability.

In the first project, 'Communication Across Cultures', students participated in the Virtual Exchange programme 'Cultural Encounters' to discuss and contribute to the ongoing conversation about climate change. The Virtual Exchange programme is provided by the non-profit organisation Sharing Perspectives Foundation. This programme initiates, stimulates and facilitates international and intercultural dialogue and collaboration to foster skills, knowledge and open attitudes among students. Participants in the online exchanges from around Europe and Southern Mediterranean countries engage in online facilitated dialogue sessions to discuss the topic of climate movement and bring awareness of how different global citizens perceive and experience such a movement.

In the second project, 'Sustainable Tourism', students from Spanish for Business 3 engaged in a virtual exchange between Spanish and Irish students in which the tasks revolved around the theme of sustainability applied to tourism and business. For their final task, students had to create a bilingual video to promote sustainable tourism in two destinations, one from each country. The video was advertised on the institutional web page and circulated on social media.

These two initiatives are teaching based and involve UL staff from the School of Modern Languages and Applied Linguistics and staff from the University of León, Spain. Students, however, participated from many European countries (e.g., France, Germany, Netherlands) and the Southern Mediterranean (e.g., Tunisia, Palestine, Egypt, Morocco, Algeria).

In the words of one student, "This project has been especially useful to me for several reasons. First, I had the pleasure of meeting new people of other nationalities. I can say that I have learned a lot about sustainability in general and practices for sustainable tourism. Before starting this project, I had an idea of sustainability exclusively linked and related to ecology and environmental care, while today I can say that I have understood well other dimensions that form sustainability."

The achievement of this SDG would assuredly be more easily attainable with more transnational and transdisciplinary collaboration. Virtual Exchange can facilitate such collaboration whilst at the same time producing a minimum carbon footprint.

Giving Voice

"This past year has shown us how critical sustainability is in our society; as we emerge from the COVID-19 pandemic, and see issues rise globally through climate change, conflict, and inefficient systems. Students are the next generation of leaders and changemakers in creating a more sustainable and prosperous society, so we must do everything we can to foster this talent and their ideas to bring about the change we so urgently need."

Jack O'Connor, Student Sustainability Coordinator, Futures and Foresight, UL.

Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

14 LIFE BELOW WATER

UL partner project aims to 'disrupt the renewable energy industry'

A project involving researchers at University of Limerick is seeking to develop a new solution for subsea anchoring that could reduce the cost of offshore wind. The consortium heading up the Subsea Micropiles Project (SEMPRE) announced formal commencement of the collaboration in November 2021. The project group includes Irish companies Mincon Group plc and Subsea Micropiles Ltd, along with research centres at UL and UCD. It has an overall budget of €5m.

SEMPRE, which was awarded grant funding of €2.82 million over three years from the Government's Disruptive Technologies Innovation Fund (DTIF), will develop a solution that aims to transform the industry for offshore piling and anchoring. It will include extensive research and testing to address key technical challenges in the development of a new robotic seabed drilling system for the installation, testing and certification of marine anchors using micropile technology. Offshore wind is positioned to become a major sustainable energy in Europe and globally, but its potential will be severely limited without cheaper and less environmentally disruptive approaches to anchors and foundations which can support increasingly larger turbines in more challenging seabed conditions.

SEMPRE will develop micropiles for subsea anchoring use which will lower the cost, have huge environmental benefits and improve seabed access. "We are pleased to be working with such a distinguished team of engineering professionals as we advance commercial solutions for micropiled anchors and foundations," said Derek Robertson, CEO, Subsea Micropiles Ltd. "The grant-funded project provides a welcome focus for the industry to address the pressing need for more cost-effective and environmentally sympathetic solutions to support the growth of offshore wind and other applications," he added. Joe Purcell, CEO, Mincon Group plc, said, "At Mincon, we already focus on making the world's most energy-efficient drilling solutions, lowering both fuel usage and the impact on the environment. We are delighted to lead this effort with Subsea Micropiles and two prestigious Irish universities, with an aim to use our extensive engineering expertise to develop an innovative solution that will disrupt the renewable energy industry and benefit the wider offshore sector."

Micropiling has grown to become a dominant foundation and anchoring solution for onshore infrastructure since the 1950s, as a proven low-noise and low-impact approach to soil interventions. Recent advances in underwater robotics now open the door for low-cost micropiling to be used in the vast market for offshore piling and anchoring.

"It is really interesting to see how our advanced robotics solutions can lead to a novel and less intrusive offshore piling process, especially in the context of the rise of offshore renewable energy," explained UL lead Dr Edin Omerdic, a Senior Research Fellow at the Department of Electronic and Computer Engineering at UL and a researcher at the Centre for Robotics & Intelligent Systems. Vikram Pakrashi, Director of UCD Centre for Mechanics and Associate Professor, UCD School of Mechanical and Materials Engineering, said, "This is an exceptional opportunity to demonstrate how disciplinary barriers are becoming less relevant for some of the grand challenges of our times. Our work in this project will bring fundamental mechanics, sensors and analytics together to create a much-needed evidence base on this topic."

Student Showcase

Flumena: Increasing restorative activity by motivation through data visualisation (Unwana Essien)

Flumena is a citizen science monitoring system for rivers and a platform for organising environmental events. The project is the result of an exploration in river pollution and sustainability. The design has two parts: a web app and Flumen kits. The web app allows users to view the heartbeat of rivers at various locations where the Flumen kits are installed. The heartbeat is a 3d data visualisation generated from data collected in real time from the Flumen kits. These are powered by an Arduino board with sensors with a GPRS/GPS chip attached to it. The web app is also a platform for organising restorative activity events. Users can either choose to set up an activity that revolves around restoration of rivers or join one. The research interest of this project was looking at how data visualisation could be used as a motivator for restorative activity.

Giving Voice

"Sustainable land use is critical to Climate Action and Life on Land. My research group studies greenhouse gas balances and carbon sequestration in forest and peatland ecosystems. This contributes to understanding the role of land use in greenhouse gas emissions and in the development of climate goals. A key future challenge for land use is to balance the multiple social, economic and environmental roles of the sector while achieving climate neutrality."

Professor Ken Byrne, Associate Professor in the Department of Biological Sciences, UL.

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

UL researchers walk amongst the trees to understand carbon solutions

Despite decades of climate change research, many questions remain unanswered, such as how land usage affects carbon emissions and carbon uptake. Over the next four years, UL will collaborate on research to take stock of our understanding of the forest carbon balance through two initiatives: Terrain-AI and AdaptForRes.

Co-principle investigator Dr Ken Byrne of UL's Department of Biological Sciences, School of Natural Sciences, together with post-doctoral and doctoral researchers Dr Caren Jarmain and Ms Blair Ruffing will contribute to these national research initiatives. Terrain-AI is a €5m project funded by Science Foundation Ireland (SFI) and led by Maynooth University. AdaptForRes is a €2.6m project funded by the Department of Agriculture, Food and the Marine (DAFM) and the Department of Agriculture, Environment and Rural Affairs (DAERA) and led by Teagasc. These initiatives are complementary and involve several industry and higher education institution partners, making them ideal opportunities to find carbon solutions.

Terrain-AI aims at improving our understanding of the impact of human activity on land use as a driver of climate change and is in the process of establishing benchmark sites at forest, cropland, grassland, peatland and urban locations. The established sites, including the forest sites UL is jointly responsible for, are already collecting vast quantities of data using field-level sensors, drones, aircraft and satellites. A data platform is collating all the datasets related to greenhouse gas (GHG) emissions and land use to enable further modelling and analysis. Terrain-AI is an initial two-year project and has recently won a Microsoft AI award.

AdaptForRes aims to develop strategies, adapt, mitigate and protect, to increase the resilience of Irish forests so they can be effective natural climate solutions. UL will study the forest carbon balance to assess how the carbon sequestration by the forestry sector can be maximised and GHG emissions curbed. UL researchers, through their contributions to Terrain-AI and AdaptForRes, are helping to find answers to pressing questions on climate change.

Commercial forests can have long-term benefits in climate change fight

A study involving researchers at University of Limerick has demonstrated the vital role that the planting of new commercial forests could play in the fight against climate change. A major finding of the new research is that future deployment of carbon capture and storage technology, that extracts CO_2 from exhaust gases during energy generation and locks it away in old oil and gas wells, transforms wood bioenergy into a 'negative emission technology' capable of removing CO_2 from the atmosphere long-term. The

study, involving researchers at UL's Bernal Institute, Bangor University, Wales and scientists in British Columbia, Canada, was published in June 2021 in the journal 'Nature Communications'. The researchers demonstrated the key role afforestation can play by including new accounting of greenhouse gas mitigation achieved from future use of harvested wood. The study applied a novel, time-dependent assessment to capture the complex dynamics of carbon uptake, storage and partial eventual release back to the atmosphere, alongside product and energy substitution by wood products, over a 100-year timeframe.

Uniquely, the study considered multiple wood uses along multi-decadal cascading value chains (e.g., construction timber to paper to bioenergy) and future projections on wider decarbonisation of substituted products and energy to avoid overestimating future substitution 'credits' derived from use of wood. Dr David Styles, the study's co-author, who is a member of the Bernal Institute and lecturer in Environmental Engineering at UL, explained that carbon capture and storage technology are likely to be in widespread use after 2070. This means that new commercial forestry can be a long-term sink of CO_2 from the atmosphere, even if a large share of wood is burned for bioenergy generation.

However, the study also showed that a large share of carbon removed from forests during harvesting is locked up for many decades in wood products, such as sawn-wood and panel boards used for construction. "Not only does this delay the release of carbon back to the atmosphere, but it 'buys time' for successful commercial deployment of carbon capture and storage technology in the future," explained Dr Styles. "For example, a significant share of wood produced in a forest planted today may not be combusted for another 100 years or more if it is used in a hierarchical value chain that prioritises higher-value use in construction or advanced bio-based materials," he said.

The results of this study counter recent research that suggests commercial forests act only as a short-term sink of CO_2. In fact, these new results indicate that, where forest growth rates are high (e.g., in temperate wet climates), new commercial conifer forests could deliver up to 269 per cent more climate mitigation than semi-natural broadleaf forests by 2120.

However, the authors stress that whilst this evidence supports the planting of new commercial forests in temperate regions as an effective climate mitigation strategy, a range of other considerations needs to be considered for sustainable land use planning. Consideration of wider ecosystem services and biodiversity may favour a mix of forest types, including slower-growing and non-harvested broadleaf forests, and/or stands of mixed conifer and broadleaf species.

Student Showcase

SuccSeed (Luke Taheny)

SuccSeed removes the inconvenience of trying to grasp small seeds and prepare soil, both of which are difficult tasks for many gardeners but especially for those with poor or limited dexterity. SuccSeed is a light handheld seed dispenser which enables all gardeners to have an enjoyable planting experience, avoiding seed wastage and enhancing crop production. SuccSeed is ergonomically designed using durable plastic with soft grips to fit comfortably in the hand of the user.

AgriArmour (Michael Wilson)

AgriArmour is focused on protecting farmers from hazardous noise while still allowing them to be situationally aware and able to communicate. This solution is an improved version of ear defenders. Research made it clear that a huge issue with existing ear protection relates to comfort, which is why comfort is one of the focal points of this product. The product has three adjustability measures for optimal fit on the wearer's head with sufficient ear room inside the ear defender. The product also has a feature which allows the wearer to adjust the level of protection on each side of the ear defender independently.

Giving Voice

"Since I joined the University of Limerick in September 2021, I have been impressed by the work that has already been done in relation to sustainability. It is clear to me that there is a commitment from both staff and students to play a proactive role in helping to deliver the University's ambitions. The University is well placed to build on the existing progress that has been made and we all have a role to play in working collaboratively to embed the principles of sustainability in everything that we do at UL. I am looking forward to working with colleagues, students and stakeholders to continue the journey on which UL has embarked in order to ensure that sustainability becomes central to way in which UL operates."

Gary Butler, Chief Finance and Performance Officer, Finance Division, UL.

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Leading University of Limerick academics win 'Take Action Against Hate' award

Two leading University of Limerick academics have accepted a prestigious award from an American university for their work against hate. Professor Amanda Haynes and Dr Jennifer Schweppe recently accepted the Eva Lassman 'Take Action Against Hate' Award presented by Gonzaga University in Washington State, on behalf of the European Centre for the Study of Hate (ECHS) at UL, of which they are co-directors.

In the citation for the award, the judging panel said the centre had been nominated for this award "in recognition of its commitment to understanding and countering hatred on an individual, community and global scale". The centre's work, including research, policy and practice, was hailed as evident through such initiatives as the 'Call it Out' campaign, engagement with the Coalition Against Hate Crime Ireland and publications such as Alternative Report on Hate Crimes and Related Issues. "Such outcomes stand as significant contributions within the discipline of hate studies, as well as inspiring examples of how knowledge can be paired with action to challenge hate towards those who are marginalised," said the judges.

Professor Haynes and Dr Schweppe accepted the 'Take Action Against Hate' award for the organisational category on behalf of the centre in a virtual ceremony. "It is such a huge honour for the European Centre for the Study of Hate at the University of Limerick to receive this award," said Professor Haynes, Associate Professor of Sociology at UL. "Here at the ECSH, we believe that good scholarship is scholarship with impact, that changes people's lives for the better and that is co-produced with people like Dr Lassman who have direct experience of the harms of hate and with the civil society organisations that represent them." Dr Schweppe, a senior lecturer in law at UL, said "We have admired the work of the institute for many years, and our own centre mirrors that of the Gonzaga Institute in many ways. Taking an interdisciplinary approach to understanding the hate that divides, as well as exploring means by which that hate can be countered and challenged is core to the work of both the institute and the centre. Our research, which centres communities impacted by hate crime, produces scholarly work with policy and practice application."

The UL academics requested that Gonzaga would use the money associated with the Eva Lassman award as a bursary for a Native American student to support their studies. "We hope that this bursary will provide some assistance to an emerging scholar to lead the next generation of researchers in challenging hate," said Professor Haynes.

University of Limerick research offers new hope for children caught up in crime networks

Ground-breaking research published by University of Limerick offers new hope for children caught up in serious and prolific crime. In January 2021, Minister for Justice, Helen McEntee TD, launching this research, announced the commencement of a newly designed community intervention programme based on it.

Since it started in 2016, the Greentown project has lifted the lid on a hidden crime problem in Ireland, uncovering considerable evidence of children's engagement in crime networks. The research indicates that up to 1,000 children across the State could be involved with a criminal network.

The innovative project, a partnership between the School of Law at University of Limerick, the Department of Justice and the Department of Children, Equality, Disability, Integration and Youth (DCEDIY) provides new insights into how criminal networks attract and confine children, encouraging and coercing them to be involved in serious crime and limiting their opportunities to escape their influence. Launching the reports arising from a Greentown study, Minister McEntee thanked Dr Sean Redmond and his colleagues for authoring them. "It is vital that we break the link between criminal gangs and the young people they try to recruit into a life of crime," she said. "We must break the cycle of criminality as early as possible, and the Greentown project gives us the tools we need to stop criminal gangs persuading young people to join their networks. The research and evidence demonstrate that this is a serious issue and one which demands a serious and rapid criminal justice response. The fact that an estimated 1,000 children across the State are engaged with criminal networks illustrates the work we must do. Our plans to outlaw the grooming of children into crime is a clear signal that we are serious about stopping the gangs from leading our young into a life of crime." Minister McEntee also acknowledged the work of officials in

her department, the Department of Children, and colleagues in An Garda Síochána whose flexibility and engagement were invaluable in producing the reports.

Minister of State in the Department of Justice with responsibility for Youth Justice, James Browne TD, noted that much of the crime mentioned in the reports is drug related, which is a problem in urban and rural settings alike. "I look forward to the commencement of the community intervention programme and the further rollout of multi-agency programmes to help steer young people away from a life of crime," the Minister said, adding that he would be launching a Youth Justice Strategy in the following weeks. "A key factor in this strategy will be to bring key stakeholders together to ensure that children can be engaged with before they enter the criminal justice system."

"The recently announced legislation outlawing the coercion of children into a life of crime is another important tool in the fight against crime networks using children as a resource to carry out criminal activity on their behalf." added Minster Browne.

Speaking about the project, Dr Sean Redmond, Adjunct Professor of Youth Justice at University of Limerick, and principal investigator for the Greentown project said, "This is the culmination of five years' work spent trying to lift the lid on how criminal networks in Ireland exploit children to commit crime. The three case studies have dug deep into networks in Greentown, Redtown and Bluetown. We were interested in how they suck children in with promises of bling and a party lifestyle and retain them through debts, obligations, and fear.

"The national prevalence study that we are also launching today, with huge support from Garda juvenile liaison officers, gives us an idea of the size of the problem. We estimate approximately 1,000 children across the state are engaged or at risk of engagement with a criminal network. From a child protection perspective, these children are clearly being exploited by adults. From a law enforcement perspective, they appear to commit a significantly disproportionate amount of youth-related crime. It's really important that we understand what this problem looks like, its size, its shape and what makes it tick before we propose solutions. When we compared the local criminal networks in the three different locations, we found that while there were common features, each one had a distinctive character that has relevance to how you intervene to reduce its influence," Dr Redmond said.

In December 2020, The Greentown Project was awarded first place at the European Crime Prevention Awards. The project was hailed as a good example of a multi-agency approach and the award committee particularly noted that the Greentown project "holds an unparalleled theoretical foundation. It is well designed with a methodological and holistic approach. The project is a good example of a multi-agency approach ... the project is well documented and as a result can be replicated in other countries. Although the project is in its early stages, it is considered one to keep a close eye on in the future."

A new model of intervention

Over a number of years, a research team at University of Limerick has been working with international and national experts in organised crime, youth justice, child welfare and community development to design a new model of intervention which can respond to the many challenges facing children who get caught up in the 'pressure cooker' environment of a criminal network. Interventions with children alone will have limited potential to deal with the potentially toxic eco-system that characterises their involvement in a crime network. Informed by a wide range of evidence, the programme is built on four core elements, responsive to local conditions, delivered simultaneously and sustained over a long period of time.

The new intervention programme will commence work with two local communities to implement the four core elements that make up the Greentown programme:

Network Disruption

By examining the network, the University of Limerick research team will identify the means by which local children are recruited and retained. This element of the programme will identify and target individuals involved in cultivating relationships with children for crime and employ legitimate means to frustrate this activity.

Improving Community Efficacy

Local activities will be designed to improve the ability of the local community to withstand network influence and take back control of public spaces.

Improved Pro-Social Opportunities

There will be a concerted effort to pull out the stops to encourage and incentivise children involved in a criminal network to re-engage with school and training or to secure and sustain employment.

Improved Family Functioning
There will be an intensive case-work relationships with families where children are engaged with crime networks. This element of the programme will seek to improve parenting capacity, acknowledging that parents may have client relationships with key network actors.

What happens next? The programme will commence trials in two communities in Ireland, each overseen by a local advisory committee involving state agencies and community representatives. The locations of the pilots (one in Dublin and one in a provincial town) are not being disclosed to ensure that the work can continue in a discreet manner and without stigmatising individual communities. Lessons learned from the pilots, which will be evaluated after two years, will be a key influence on the development of the Department of Justice policies and interventions in the youth justice area.

New research report: 'LGBTI+ Parent Families in Ireland: Legal Recognition of Parent-Child Relationships'

On November 22, 2021, a new research report authored by Dr Lydia Bracken, School of Law, was launched by Paula Fagan, CEO of LGBT Ireland. The report, which is titled 'LGBTI+ Parent Families in Ireland: Legal Recognition of Parent-Child Relationships', presents the findings of research that examined obstacles facing LGBTI+ parent families in obtaining legal recognition of their family relationships. The launch took place as part of an online seminar, which was attended by policy makers, academics, legal practitioners and stakeholders. The event included presentations from Dr Bracken, Professor Conor O'Mahony (special rapporteur on child protection) and Maeve Delargy and was chaired by Roderick Maguire, BL.

The research was undertaken by Dr Bracken in collaboration with LGBT Ireland and was funded under the Irish Research Council New Foundations Scheme. Research was undertaken to identify the current difficulties facing LGBTI+ parent families in obtaining legal recognition of their family relationships in Ireland and to develop solutions that are centred on children's rights methodology. The objective was to produce a report documenting the legal issues faced by LGBTI+ parent families that could be used by the research partner, LGBT Ireland, in advocacy campaigns. The research, which is published in the report 'LGBTI+ Parent Families in Ireland: Legal Recognition of Parent-Child Relationships', provides an evidence base that shows that existing Irish laws fail to accommodate many LGBTI+ parent families. This evidence can be used as a basis for advocacy campaigns by stakeholders.

The launch of the research findings was attended by policy makers and stakeholder groups and led to an invitation to present the research to the European Commission against Racism and Intolerance (ECRI) Task Force on LGBTI rights to inform the development of a future General Policy Recommendation on LGBTI issues. The research also resulted in the publication of an RTE Brainstorm article to further disseminate the findings. Dr Bracken, principal investigator, stated, "This research shows that, while Irish law embraces a variety of 'new' and 'non-traditional' family forms, it fails to accommodate many others. The experiences of the respondents highlight the pressing need for legal reform to recognise diverse family relationships, but also underline the fact that legal reform alone is not a panacea and that wider issues need to be addressed in order to accommodate all LGBTI+ parent families. The research report presents 10 recommendations to address the key issues identified in the research." As research partner, LGBT Ireland thanked Dr Bracken "for delivering this incredibly important report".

Co-directors of the European Centre for the Study of Hate address Oireachtas Joint Committee on Justice Professor Amanda Haynes and Dr Jennifer Schweppe, co-directors of the European Centre for the Study of Hate at University of Limerick, appeared before the Oireachtas Joint Committee on Justice in November 2021. They were invited to speak to the committee on the General Scheme of the Criminal Justice (Hate Crime) Bill 2021 based on their expertise in this area and their extensive experience researching how hate crimes manifest in Ireland and are addressed through the Irish criminal justice process. Their research work was also reported in The Irish Times, particularly their study which found that just 13.5 per cent of the public would be very comfortable or comfortable living beside someone convicted of vandalism. However, that number was halved to just 7.7 per cent when the vandalism in question was linked to hate crime. Their findings reflect the potential power of hate crime-specific laws.

UL experts to design and deliver Ireland's first witness intermediary programme

In November 2021, Dr Aoife Gallagher and Dr Áine Kearns, School of Applied Health, and Dr Alan Cusack and Professor Seán Redmond, School of Law, at University of Limerick, were awarded a major national contract from the Department of Justice to develop a training and accreditation programme for relevant professionals to be recognised as intermediaries in the Irish criminal justice system.
The contract, which is valued at €222,750 over a three-year period, will witness the creation of a unique, interfaculty programme – a Professional Postgraduate Diploma in Intermediary Studies (level 9, minor award) – that will be delivered jointly by experts from the School of Law and School of Allied Health. Graduates of this new programme will assist vulnerable parties in understanding questions that are asked by members of An Garda Síochána at the pre-trial stage of the criminal process, as well as any questions that are raised in court during a criminal trial.

In representing Ireland's first training and accreditation programme for registered intermediaries, this state-of-the-art interfaculty programme addresses a key recommendation raised in the O'Malley Report (2020) and it is a foundational aspect of the Irish government's vision to create a more accessible criminal justice system pursuant to its Supporting a Victim's Journey (2020) strategy. Accordingly, this recent tender success promises to embed University of Limerick at the forefront of national policy innovation in the direction of securing equal access to justice for vulnerable persons pursuant to the UN Convention on the Rights of Persons with Disabilities (UNCRPD) and the European Convention on Human Rights.

UL experts lead workshop on Easy-Read Notice of Rights for vulnerable suspects

On October 1, 2021, Prof Gautam Gulati from the School of Medicine and Dr Alan Cusack from the School of Law at University of Limerick convened and led a landmark focus group aimed at informing the design of an Easy-Read Notice of Rights form for vulnerable suspects.

The session was conducted with colleagues from University College Cork, National University of Ireland, Galway and the University of Cambridge, and it was attended by national and international experts in the fields of psychiatry, psychology, law, policing and speech and language therapy. Representatives from national disability bodies also attended the focus group and, perhaps most importantly, three active members from An Garda Síochána attended the online seminar, thereby providing important operational input into the design, layout and content of the proposed new Easy-Read Notice of Rights form. Drawing upon the findings of this focus group, a revised Easy-Read Notice of Rights form will now be prepared. This new document will then be reviewed by persons with lived experience of intellectual disability to get further feedback on its accessibility. It is hoped that the final format of the document with be presented to An Garda Síochána in the coming months.

The development of an Easy-Read Notice of Rights can be viewed as an important step in the direction of meeting Ireland's obligations under the UN Convention on the Rights of Persons with Disabilities and the European Convention on Human Rights. It also ensures that Ireland, through the research activism of University of Limerick, is progressing.

Giving Voice

"The aim of the European Centre for the Study of Hate (ECSH) is to understand the hate that excludes and divides, and to provide the tools to respond to hate effectively. An open, inclusive and safe society is under threat from the growing influence of those who wish to exclude minorities from society because of who they are or what they represent. Where hate is politicised, cultivated and spreads across borders, it makes the European way of life unattainable for minority communities. The goal of the ECSH is to inform policy and practice interventions to enhance the sustainability of a safe, inclusive Europe which people of diverse identities can contribute to and benefit from equally."

Professor Amanda Haynes, Co-Director, European Centre for the Study of Hate & Associate Professor in Sociology & Dr Jennifer Schweppe, Co-Director, European Centre for the Study of Hate & Senior Lecturer in Law, UL.

Strengthen the means of implementation and revitalize the global partnership for sustainable development.

17 PARTNERSHIPS FOR THE GOALS

University of Limerick joins Young European Research Universities Network

University of Limerick has joined a network of European universities focusing on research collaboration, it was announced in February 2021. UL and the University of Rijeka (UNIRI) in Croatia have joined Young European Research University Network (YERUN), a cluster of highly ranked young universities in Europe that strengthens and facilitates cooperation in the areas of scientific research, academic education and services which benefit society.

YERUN said it was delighted to announce that UL and UNIRI have officially become members of the cluster, which it said was a "joyful event that marks the beginning of an exciting new era" for the network, as part of its first enlargement process.

"We are delighted to be invited to join YERUN," said UL President, Professor Kerstin Mey. "YERUN is a dynamic, open and innovative network that aligns perfectly with University of Limerick's philosophy and ethos. We are impressed by the breadth of their members' joined-up engagement across the academic spectrum and look forward to working with and learning from our YERUN partners."

In offering a warm welcome to the universities, YERUN said UL and UNIRI would bring "new perspectives, inspiring practices and fresh energies" to the network, and said both institutions were a "natural fit by virtue of their values, ambitions and priorities, which perfectly match those identified by YERUN in its recently launched Strategic Plan 2021-2025."

YERUN President, Professor Bernd Scholz-Reiter, said, "We are impressed by the level of excellence in education and research of UL and UNIRI, as well as by the great deal of attention both institutions dedicate to student support, engagement with society, lifelong learning, innovation and many other areas that greatly resonate with YERUN and are perfectly in line with our new strategy."

YERUN Secretary General, Silvia Gomez Recio, noted that both institutions were currently being led by women. "I am very proud to see our network welcoming new young research universities. Both UL and UNIRI are led by strong women who share our vision and values for the European knowledge area. We wish to offer them a unique opportunity to build the future of Europe's higher education with like-minded universities," she said.

Professor Snježana Prijić Samaržija, Rector of the University of Rijeka, said "It is a true honour to have the opportunity to contribute to the realisation of the vision, mission and strategic goals of YERUN. As a YERUN member, through a partnership aiming to develop inclusive, innovative, connected and open universities that truly work to transform European higher education, we will do our best to contribute to the well-being of all citizens and the sustainable future of Europe."

YERUN members consider that adequate support to human capital is essential to foster the next generations of (European) researchers and innovators. Dedicated support for excellent early-career researchers is therefore a priority for all YERUN members.

UL hosts International Symposium on Cross-Sector Social Interactions

In November 2021, the Kemmy Business School (KBS) at UL hosted the seventh biennial International Symposium on Cross-Sector Social Interactions (CSSI 2020).

Due to COVID-19, the conference moved online and was hosted virtually reaching a large gathering of experts (academic and practitioner) on cross-sector social partnerships in Ireland. CSSI 2020 came to Ireland for the first time at a pivotal moment for the UN's sustainable development agenda and the future of cross-sector partnerships. The event played host to over 100 academics from more than 20 countries, as well as to a range of practitioners, including partnership broker organisations, NGOs and directors of corporate social responsibility (CSR) in a range of multinational organisations.

One of those to speak at the conference was high-profile Ugandan activist and colleague of Greta Thunberg, Vanessa Nakate, who spoke of why black voices matter in the collective response to the climate crisis. She had come to prominence and received an apology from the Associated Press when she was cropped out of a photo following a press conference with other prominent climate activists at Davos. Speaking ahead of her appearance at the conference, Vanessa said, "We are seeing very many young people across the world demanding action. We are seeing the power that is in this global activism and the message is very clear: young people want change, young people want a better future, young people want to be able to live. Many of them have dreams, we have

hopes, we have many things we want to achieve in this world. But how can we be sure we will be able to achieve all these things with a future that is so uncertain?"

Dr Annmarie Ryan, lecturer in Marketing at the KBS – the only school in Ireland championing the UN's Principles for Responsible Management Education – who was chair of CSSI 2020, said, "Vanessa Nakate brings into focus the lived experience of climate change, from the perspective of a young person living in Africa. She teaches us that collaboration is important, collaboration amongst businesses, government and non-profit organisations. But more than this, that this collaboration must be about action and a recognition that the UN sustainability goals cannot be achieved without listening to the voices of those who are affected most."

An important aim of the conference was to enable practice-theory dialogue and harness the expertise of academia to advance practice in this field. The specific theme of the 2020 conference in Limerick was Partnership and Place. "Greater sensitivity to how place constrains and enables organising around issues like climate change can enrich both theory and practice of cross-sector partnerships in settings experiencing inequality and fragility," explained Dr Ryan. "As such, CSSI 2020 aligns well with Ireland's international development policy, A Better World, and, in particular, aspects of capacity, coordination and working in partnership, and it has been supported by Irish Aid, which we are very grateful for," she said.

Irish Aid was the main sponsor of the event and has focused its support on investing in the next generation of scholars in this field through the provision of a new bursary scheme for doctoral and early-career researchers. The bursary scheme will focus specifically on the role of partnerships in localised responses to the COVID-19 crisis.

Digital cancer research centre at University of Limerick to 'transform cancer care'

A research centre at University of Limerick is using personalised digital medicine to transform cancer care and improve outcomes for patients. The Limerick Digital Cancer Research Centre (LDCRC) is a collaboration between UL and the UL Hospitals Group (ULHG) and will use and develop technologies that are revolutionising health care and have vast potential to improve our ability to prevent, diagnose and treat cancer.

Welcoming the centre, Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris TD, noted that "its goals are ambitious – to get a better understanding of cancer at the cellular and molecular level and drive the development of the next generation of digital diagnostics to improve patient outcomes." UL President, Professor Kerstin Mey, said that "UL is well placed to respond, with world-leading expertise in cancer biology, artificial intelligence, big data analysis and digital technologies," adding that the university is "uniquely positioned to deliver a truly multi-disciplinary cancer centre, which can deliver better outcomes for patients and transform cancer care."

Digital cancer research spans the creation of innovative mobile medical apps – software that assists clinical decisions doctors make every day – to the use of statistics, artificial intelligence and machine learning for large-scale mining of genomics and molecular data. With these technologies, it is hoped to provide earlier and more accurate cancer diagnosis and discover new drugs that cure disease and give patients a better quality of life. The LDCRC features a newly created 'Limerick Living Lab', established in partnership with the Health Service Executive's (HSE's) Digital Transformation Unit, Dell Technologies and Akoya Biosciences. Paul Murray, Professor of Molecular Pathology at UL, heads the Living Lab which uses high-powered microscopy and state-of-the-art artificial intelligence to digitally profile biopsies taken from a patient's cancerous tissues. "The technology can learn to predict how an individual will respond to a specific type of drug," said Professor Murray. "This will in future allow clinicians to tailor patient treatment which will improve patient outcome and spare them from potentially life-threatening side effects of the toxic cancer drugs, while at the same time saving the Health Service the unnecessary expense associated with the use of ineffective therapies."

Computational systems oncology or cancer bioinformatics is the research field that builds artificial intelligence and statistical methods that search biological data to better understand cancer. Recently appointed Professor of Cancer Genomics at the UL School of Medicine, Aedín Culhane, who has extensive experience in cancer bioinformatics and is a leader in the field, will spearhead this research in Limerick. Her team develops methods to perform analysis of fine resolution molecular profiles of individual cells in tumours. Single-cell profiling of cancer tissue biopsies provides vast amounts of data, requiring complex maths and advanced statistics but these higher-definition digital tumour maps give a greater

opportunity to interrogate a patient's cancer. "Cancer is a complex disease, and these tools allow us to perform detailed dissection of the molecules in cancer cells, so we can understand how our healthy cells, immune cells and cancer cells are interacting and tailor cancer treatments. This is an incredibly exciting time in cancer research. We are making new insights every day, especially in immune oncology," said Professor Culhane.

Professor Paul Burke, Chief Academic Officer for ULHG and Vice-Dean Health Sciences at University of Limerick, expressed a hope that the centre would be housed in purpose-built accommodation, with state-of-the-art facilities on both UL and UHL sites.

"We want to be at the forefront of these developments in Limerick," said Professor Ruth Clifford, Consultant Haematologist at UHL. "The LDCRC affords us this opportunity. By working closely to develop the Digital Patient, linking clinical staff and scientists working in the area of cancer research across Limerick, we aim to be a leading centre with international impact. The launch of the LDCRC also coincides with the establishment of the new Cancer Services Directorate within ULHG, which will see a renewed emphasis on cancer research, recruiting more staff interested in research and a commitment to improved access to clinical trials."

Irish high-altitude balloon mission to edge of space
Researchers at NUI Galway are leading a Science Foundation Ireland Discover programme team with partners University of Limerick, Met Éireann and Lero, the SFI Research Centre for Software, to deliver school children's projects high into the stratosphere to examine the effects of near space on the experiments. The 'Spaceship Earth' project delivered two space-themed workshops to primary school children in Galway, Limerick and Kerry. At these workshops children were taught about the importance of Science, Technology, Engineering, Mathematics and Medicine (STEMM), how to ask interesting scientific questions and then to develop experiments to find the answers.

The project involves launching five high-altitude weather balloons from Met Éireann's observatory in Valentia, Co. Kerry. The researchers expect these will reach more than 30Km (100,000 feet) and will expose the payload experiments to the extreme environment of low pressure, low temperature and cosmic radiation. After maximum ascent, the space balloon bursts, and a parachute is deployed which ensures a safe landing back to earth. The payload is instrumented with electronics such as GPS, data loggers and tracking technology to accurately find its return location. Once the experiments return, students will engage in analysis and discussion about them that will extend and deepen their learning.

Lero's Professor Derek O'Keeffe, Project Lead and Professor of Medical Device Technology and Director of the HIVE lab at NUI Galway, said, "This exciting Spaceship Earth STEMM outreach project mission aims to inspire and empower students to think big, beyond the horizon, and show them that involvement in Science, Technology, Engineering, Mathematics and Medicine is for everyone." Charles Gillman, Chief Operations Officer at Met Éireann's Valentia observatory, observed that "Met Éireann has a long history of launching weather balloons at Valentia Observatory, with the first launched in the early 1940s. Every day since, these balloons have been providing valuable information on current atmospheric conditions that are essential in helping to produce our weather forecasts in Ireland and around the world." Mr Gillman added, "We are delighted for our weather balloons to play a part in the Spaceship Earth project and look forward to learning the results of this exciting and inspirational STEMM experiment – it really is out of this world."

Potential STEMM experiments for the Spaceship Earth project include:

- Learning about randomised control trial design by taking 10 sunflower seeds and allocating five for spaceflight and five to remain as a control and then monitoring their growth afterwards to see the effect of the intervention (spaceflight).
- Exploring the low-pressure effects of high altitude on the shape of bubble wrap, grapes or marshmallows.
- nvestigating the high-altitude environmental effects on a wet sponge – will the water boil off?
- Examining how zero gravity affects the operation of medical technology.

The Spaceship Earth mission included over 300 students in three schools in the west and south of Ireland: Scoil Mhuire, Oranmore, Galway; Scoil Íosagáin, CBS, Limerick and Scoil An Chroí Naofa, Presentation, Tralee, Kerry. Principal Edel Carney, Scoil Mhuire, said, "Spaceship Earth is one of the best STEMM engagement initiatives I have seen in my career. It makes learning about science fun and has inspired our students." Over 60 student experiments will be launched with the balloon, including mission patch artwork that the school children have made, that will be returned to them as a memento of the historic flight. In addition, the Spaceship Earth team will attempt to achieve the world record for highest altitude paper plane flight.

Dr Patrick Johnson, School of Education at University of Limerick, described the project as "a unique opportunity for schools to engage in a novel and exciting venture that aims to develop students' critical thinking skills, creativity and curiosity, with the additional goal of developing positive dispositions amongst those involved towards STEMM subjects."

As well as experiments, these stratosphere balloons can capture visually stunning pictures of the curvature of Planet Earth with on-board cameras providing an evocative way for people to engage with STEMM and to realise the relationship between STEMM and art. In addition, it reminds everyone that our unique planet is our spaceship in the universe and that we need to focus all our efforts to avert climate change.

Smart City: UL president hails innovation and collaboration at LIVE Confirm event

University of Limerick President, Professor Kerstin Mey, has said that collaboration between education, industry, government and communities "brings innovation to life." Professor Mey was speaking at the inaugural Limerick Innovation Virtual Event (LIVE), held at Confirm, the SFI Smart Manufacturing research centre based at University of Limerick. The two-day event was broadcast from Confirm's bespoke digital manufacturing facility, located within UL's Digital District at Park Point. Described as the 'Toy Show of Tech' in the Mid-West, the event – held under the auspices of Limerick's 'Smart City' programme – saw a gathering of key collaborators in the success story that is innovation in Limerick.

LIVE is part of Limerick City and County Council's Smart Limerick programme, part-funded under the European Union's URBACT 'Find Your Greatness' project – Europe's first strategic brand-building programme for its smart cities. Addressing the event, Professor Mey emphasised the strength of collaboration in Limerick, the level of innovation and the number of stakeholders involved, noting that the project "is really a showcase for quintuple helix innovation, where the city, the government, the businesses, communities and the University all work together in order to change the life of people in the city. The digital transformation," she continued, "is driving change and Limerick is responding to the challenges and shaping the future in a multitude of dimensions." She noted that our FDI partners come to Limerick "because of the rich vein of talent we have here, because of the expertise and indeed the development of advances in the areas of structural materials and global tech, of medical systems and pharma amongst others," and emphasised the importance of bringing everyone along, with the event lending "opportunities for our citizens to become involved and help shape our interventions and advancements."

Mayor of Limerick City and County, Daniel Butler, reiterated the importance of ensuring that digital transformation does not leave people behind and emphasised how collaboration is key to giving Limerick an edge. "Limerick is a success story in innovation and digital transformation because of the level of collaboration," with "so many of the key partners – the local authority, the education institutions, the private sector, civic organisations – all buying into 'digital Limerick'," said Mayor Butler. "When you have all the key partners working together in a way that few others do, you are bound to have an edge in connecting with everyone in society and bringing them on that journey."

"We pride ourselves on being a smart city and part of being a smart city is to use information and communications technology to enhance the quality, performance and interactivity of our services. It is also about making sure we are prepared to respond to challenges by co-designing our future: people, council, business and researchers working together to do this."

The two-day event included an overview of Smart Limerick's journey, a presentation of the success story that 'Film in Limerick' has become and a panel discussion on how the digital transformation is going to play a key role in the revitalisation of Limerick's city centre. LIVE also had Limerick's first ever drone lunch-drop, as well as sessions on 'Digital Transformation & Education' and the need to develop a future-proofed talent supply chain that ensures that the smart sustainable city and innovation momentum is maintained. There were presentations from both UL and the Technological University of the Shannon (TUS) on innovation enterprises, while the Limerick Makers Club outlined its activities and issued an open invitation to other 'makers' to join the growing innovation movement.

Other sessions involved the launch of the All-Ireland Smart Cities strategy as well as research on digital inclusion in Limerick and presentations from Limerick-based multinationals Dell and Analog Devices. Launching the event, Minister of State at the Department of Further and Higher Education, Research, Innovation and Science, Niall Collins TD,

observed that Limerick, steeped in a tradition of innovation, has the infrastructure around researchers who are driving innovation. The higher education institutions, the local manufacturing base and the FDI base have all collaborated and fed into this tradition. The Minister highlighted particularly the huge opportunities for innovation, such as in the Shannon estuary, "where we will now be looking at new technologies, green technologies and the innovations that we're now going to need to meet our climate change requirements."

Also speaking at the event, Chief Executive of Limerick City and County Council, Dr Pat Daly, said that Limerick must be in a position to harness and exploit its innovation strengths. He also revealed that Limerick City and Council is cooperating with UL on a Citizen Innovation Lab to be a focal point for future co-creation activities in Limerick to sustain and underpin Limerick's future.

"This will complement centres such as Confirm, ENGINE at Innovate Limerick in the city centre, the Digital Collaboration Centre, Fab Lab Limerick, NEXUS, and the Hartnett Enterprise Acceleration Centre where people come to create and solve problems which will generate new jobs for the next generation of Limerick people," he said. "We are moving to a common vision for our city and county. We want Limerick to be confident and proud, channelling our edginess and embracing creativity while all the time becoming recognised as the best place in Ireland to study, work, play, live."

Cheaper and better medicines for all with minimal environmental impact – SSPC partners with five major BioPharma companies

In October 2021, the Irish SFI-funded research centre Synthesis and Solid State Pharmaceutical Centre (SSPC) at UL announced a major collaboration with five of the world's leading BioPharma companies aimed at reducing waste, maintaining standards and minimising costs in pharmaceutical processes. SSPC is working with Pfizer, Eli Lilly, Janssen, BMS and MSD to address a global protein A resin shortage. The rising need for early diagnosis of chronic diseases, coupled with growing demand for drugs which work better and have fewer side effects, is largely responsible for the growth of the protein A resin market. Resins are expensive and in short supply. The current global shortage of protein A resin is slowing product analysis across the sector, thus increasing the cost and slowing the rate at which new antibody medicines can reach the patient. This project is exploring the possibility and feasibility of reusing resins, which would make the production of antibody medicines, faster, cheaper and more sustainable.

The project is led by SSPC Principal Investigator Dr Sarah Hudson, Bernal Institute, University of Limerick. Dr Hudson and her team will investigate the multi-product use of a resin in downstream biopharmaceutical production at the Bernal BioLabs. Dr Hudson said, "This is a unique project that has come from an open collaboration between the five industrial biopharmaceutical partners and UL. SSPC is delighted to be able to provide a platform for the different companies to engage and interact with each other with a common end goal that is very much aligned with our own strategic research goals at SSPC and the Bernal Institute, where the work will be carried out: the production of cheaper and better medicines for all with minimal environmental impact."

Student Showcase

The value and impact of higher education student volunteering in Ireland

Student volunteers are a major force strengthening the civic role of Irish higher education institutions (HEIs) and driving Ireland's agenda to create an island of inclusion and engagement. The current COVID-19 health crisis has shone a light on the hands-on approach of our third-level student volunteers and, in particular, those at University of Limerick who are addressing real-world problems through volunteering.

The Student Volunteering National Working Group saw a need to create a publication highlighting the benefit and power of HEI student volunteering right across the country. The Value and Impact of Higher Education Student Volunteering in Ireland 2021 celebrates the exceptional achievements and impact of student volunteers and reflects on the benefits of the first-ever student volunteering online platform for which University of Limerick set the blue print with this student volunteering national database. The report also highlights a series of recommendations for all stakeholders to contemplate about how best to work together to meet future demand and maintain a quality student volunteer experience for all. In the words of UL President, Professor Kerstin Mey, "It has been said that volunteers and their work are the backbone of a community, a region or indeed our country and that through the smallest act of kindness, so much can be achieved. At UL, our students are renowned for that heart and spirit of giving through the President's Volunteer Awards initiative. We have an unwavering spirit and commitment to volunteerism at our institution and it is a commitment that has stood strong in times of prosperity and, more recently, in times of challenge."

During the height of the pandemic, thousands of Irish HE students were at the frontline, applying their skills as volunteer paramedics, supporting vulnerable older people, carrying out peer-to-peer mentorship, contributing to online school support programmes and homework clubs, keeping the most vulnerable members of our society in school and enabling them to transition to further and higher education.

The volunteer activities of these students have helped raise essential funds, with a profound impact on supporting local community services to function. Students' proaction has enhanced their personal resilience, work-ready skills and their sense of well-being and purpose in society. The success of the President's Volunteer Awards at UL reflects the willingness of UL students to step up and give back and the recognition and value placed on student volunteering in the university, with the unequivocal support, encouragement and acknowledgment of former presidents and the current president, Professor Mey.

There is much opportunity, energy and strategic vision on how to build on and maximise the potential socio-economic impact of student volunteering in the Irish context. A coherent nationwide approach to support and promote student volunteering will enhance the reputation and profile of Ireland, Irish HE students and Irish HEIs, and position the country as an international leader in higher education civic engagement and implementation of the UN SDGs in this area.

Giving Voice

"As an academic in a business school, it is vital that we consider market system changes that are required to achieve regenerative futures. To achieve this, we must create spaces to collectively imagine sustainable and regenerative market system futures and, importantly, to create pathways to realise our goals. This requires multidisciplinary and multisector perspectives so that the required balance between people and planet can be achieved."

Dr Annmarie Ryan, Senior Lecturer, Kemmy Business School, UL.

Impact Rankings

University Impact Rankings 2021

Times Higher Education (THE) – SDG Ranking Breakdown

SDG	UL
OVERALL – THE IMPACT RANKINGS 2021 RESULT	**=50**
SDG 7: **Affordable and Clean Energy**	101 - 200
SDG 8: **Decent Work and Economic Growth**	=62
SDG 11: **Sustainable Cities and Communities**	10
SDG 12: **Responsible Consumption and Production**	101 -200
SDG 16: **Peace, Justice and Strong Institutions**	35
SDG 17: **Partnership for the Goals**	=39

International Networks

The SDG Accord
Post-16 education contributing to the Global Goals

UN Global Compact
United Nations Global Compact

PRME
an initiative of the United Nations Global Compact

UI GreenMetric
World University Rankings

EU Gender Charter
Athena SWAN
Bronze Award

Green-Schools
An Taisce

Closing comments

The stories featured in this report are merely a window into the diversity of work that goes on across our campus. This report is not a complete picture. To those whose work we did not feature this year, we would love if you would get in touch and share your story with us for next year's UL Annual Sustainability Report.

It is also important to mention that we have simplified the complex interconnected nature of many of our projects by attaching them to only one goal. This is not ideal as many of the stories connect with multiple goals. The UN SDGs framework is highly interconnected and designed to bring to the surface the complexity of many of the wicked problems we now face locally and globally.

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