



NUI Galway
OÉ Gaillimh

Research Matters

National University of Ireland, Galway

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Research Matters

National University of Ireland, Galway,
University Road, Galway,
Republic of Ireland

T: +353 9149 5312
E: researchmatters@nuigalway.ie

nuigalway.ie



Beyond Research

The EU App Economy

Young Researcher Profiles



VP Letter



Welcome to Issue 7 of Research Matters. The following pages give a snapshot of some of the important research activities in the University in recent times. This issue's theme, 'Beyond Research', broadens the focus somewhat in terms of coverage of the research horizon and its many facets.

Undoubtedly, it is a very exciting time for research at NUI Galway. Numerous successful funding applications have created a confident and thriving research atmosphere. In a variety of disciplines, we are now recognised as world class leaders. Recent successes include EU Marie Curie Awards - SphereScaff, Kinseed, Rhak, EpicS and Gendowl. NUI Galway was also awarded 31 Irish Research Council New Foundations Awards, such as Genesis, ShorTIE, Choices, newSpeakers, Neander150 and Blooms2Feeds. Further funding and awards have also come from Enterprise Ireland, EU FP7 and SFI.

From a strategic planning perspective we are currently engaging with the campus community to develop a Research and Innovation Strategy bringing us to 2020. As we move forward through the strategic consultation and planning process we are looking forward to the various contributions that will influence the future of research at NUI Galway. We are confident that the University Research and Innovation strategy

will help build on the success of previous plans and contribute significantly towards the University of the future.

I am also pleased to share our recent successes in terms of improving research supports at NUI Galway. In February we launched the Research Support Services Initiative, created to support researchers at all stages of the research lifecycle through the introduction of a support desk, an integrated website and additional support workshops and events. Research Support Services also hosted the first meeting of the Research Support Committee, a new group focused on developing a community of practice and harnessing the knowledge and expertise that exist across NUI Galway with respect to research support.

This month we launch the Online Grant Management system to support research project management and administration. Furthermore we will grow our Research Support team in May through the appointment of our new H2020 advisors. These supports will all contribute toward a stronger research support footprint for NUI Galway.

Professor Lokesh Joshi,
Vice President of Research

From the Editor

This issue looks at some of the external forces affecting 21st century professional research. "Beyond Research" is the theme underpinning Issue 7 and in the introductory piece I talk to VP for Research Prof Lokesh Joshi about current challenges and opportunities. Like a ship navigating its way through a storm, the lighthouse can often be one's saving grace. In the last number of months NUI Galway has upped its game to make itself that lighthouse for its researchers by offering improved support structures.

We will also feature various fascinating research areas, some of which have not been covered here before. From the world of Applied Maths to the goings on at NUI Galway's Centre for Irish Studies we showcase some very interesting work indeed. In addition, a number of the University's younger researchers have been profiled to show just how much promising talent there is on the way up. Enjoy.

John Holden,
Editor

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Beyond Research

While research and experimentation are the primary focus of academics, inventors and innovators, there's a whole lot more to 21st century enquiry. RM Editor John Holden interviews Vice President of Research Professor Lokesh Joshi about some of the main challenges facing NUI Galway's research community.

Introduction

The days of innovators like Robert Boyle, Francis Beaufort, Ernest Walton and even NUI Galway's Vincent Barry may be well and truly over.

Modern research in any field – scientific, social or artistic - is routinely interrupted, influenced and shaped by extenuating factors. Funding applications, commercialisation, internationalisation, social embedding and societal impact are just some of the issues that are affected by modern research outcomes. One could be forgiven for thinking that time spent filling out forms and paperwork to justify research is now competing with the task at hand.

However, the increasingly structured approach has its advantages. For example, it can lead to more practical outcomes and solutions to real challenges facing society in a number of areas – healthcare, social inclusion, equality, technology deficits, improved meta-analysis etc. In addition, as NUI Galway continues to become known for world class research in specific areas, larger funding doors begin to open as well as opportunities from more interesting collaborations with similar institutes around the world.

Funding

"Certainly funding is essential for research, but what is more important is the impact of that research," explains Professor Lokesh Joshi.

"We can think of this impact in both soft and hard terms: soft might be considered as anything which has long-term value to communities or society at large." [these might be political, social, economic and/or psychological benefits]. "Social embedding is the bedrock of research. We can do great work in the university but if people don't know about it and are not impacted by it, it really is of little consequence."

"The harder impact might relate to the innovation of a new product or service. Issues surrounding commercialisation, translation, industrial interaction: these all relate to harder impacts.

"That being said, research funding is simply a vehicle, which is not required in all areas equally. The engineer, the scientist or the medical researcher might need it at high levels. The economist, sociologist or psychologist (and others in the arts and social sciences) may not require as much funding as the scientist does, yet their research might have just as much of an impact.

"There's no doubt our researchers are under pressure for funding from government agencies and other funding streams but we need to balance funding and impact. From our point of view, funding is the mechanism but impact is the goal."

Commercialisation

"Commercialisation is a very direct way of showing the impact of research coming out of universities that is tangible and measurable," he says. "Any product we use – from a new drug to a smart phone - is the result of many years of hard work by many people. What we want is for our research at NUI Galway to translate directly to products found in the market, to processes that maximise agility and efficiency and to services that drive technological change. The beauty of innovation is its ability to transcend the traditional School and College boundaries and create collaborative opportunities which underpin our research ethos in terms of cross cutting and interdisciplinary research.

"Still we shouldn't get hung up on commercialisation alone," he stresses. "Not everything can be measured this way. Equally impactful research adds to policies which benefit society and government in ways where traditional metrics are less easily defined. What is important to realise for Ireland as a nation - with a huge skill set base - is that we encourage our researchers to think about translating their knowledge through commercialisation to make sure there's an impact on society."

Internationalisation

"Networking is key to a healthy university research environment. The way the globe is moving, the way international funding structures are moving, NUI Galway needs to be plugged into anything that relates to our research, whether it's in San Francisco or Sydney. Likewise, across the world we need to be known for doing certain things well."

by **JOHN HOLDEN**
RM Editor

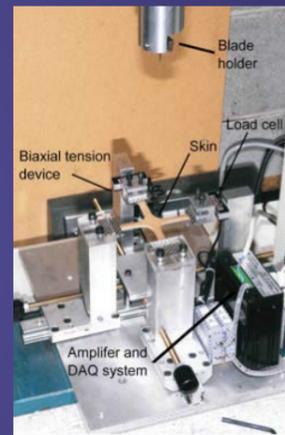


Making a Stab at Forensic Biomechanics

In recent years, the fields of biomechanics and forensic medicine have merged to form a new discipline: forensic biomechanics. This discipline has met the needs of the legal system in particular, with engineers increasingly acting as expert witnesses in courts of law.



Knife puncturing porcine skin



Biaxial tension device

With this in mind, Prof Michel Destrade, Head of Applied Mathematics at NUI Galway, teamed up with the Irish State Pathologists Prof Marie Cassidy and Dr Mike Curtis, and Prof Michael Gilchrist and Dr Aisling Ni Annaidh from the School of Mechanical and Materials Engineering, at UCED to carry out multidisciplinary research on some of the big questions in forensic biomechanics. One such project focuses on the mechanics of stabbing.

"When a stabbing is fatal, the amount of force required to inflict the stab wound is often the source of much debate in court," says Prof Marie Cassidy. "As an expert witness, I am usually asked to quantify the force involved in the stabbing attack. The answer that I give is critical in determining the harmful intent of an assailant."

Traditionally, the pathologist assesses the force used based on the condition of the blade, the extent of the tissue damage, the presence of clothing and the wound itself, and then categorises

the force as either mild, moderate or severe. "The problem with such descriptions is that they are open to interpretation," adds Cassidy. "Moderate could mean something completely different to me than it does to a juror."

It's an unusual research interest for applied mathematicians and engineers, but this work has successfully combined experimental techniques with sophisticated finite element methods to develop a measure of the minimum forces required to puncture human skin. A series of experiments allowed for the investigation of the effect of a number of key variables in stabbings, including the thickness and tension of the skin, the angle of attack, the underlying substrate, the presence of clothing, the speed of the attack and the type of instrument used.

Based on the results, a finite element model of blade penetration was developed. The model replicates the conditions of the stab-penetration test and uses a sophisticated failure criterion to model the puncturing of the skin.

"The chief advantage of developing such a model is that once the development process is complete, the same model can be used to investigate the influence of the many factors associated with stabbing incidents," explains Dr. Ni Annaidh. "This work has led to the development of a stab metric that can indicate the level of force used in a given stabbing incident. It has been disseminated in the best forensics journals including Forensics Science International and The American Journal of Forensic Medicine and Pathology.

"It has been a fantastic adventure to collaborate with such high-calibre experts in engineering and forensics," says Prof Destrade. "I have learned a lot and I'm excited to be able to use applied mathematics for this on-going effort to model the mechanics of stabbing."

by **PROF MICHEL DESTRADE**
College of Science

NUI Galway Maths Research in Focus

Mathematics at NUI Galway is more vibrant than ever with numerous research areas looking for solutions in key areas, particularly medicine and biology.

Mechanics of the Brain

The mechanics of the brain are being investigated in order to gain better understanding of the physical properties of brain tissue – an under-researched area where greater levels of understanding could assist in a variety of medical treatments.

Prof Michel Destrade, Head of Applied Mathematics at NUI Galway, teamed up with Prof Michael Gilchrist and Dr Badar Rashid in Mechanical Engineering at UCED to address this knowledge gap. They conducted a series of experiments on porcine brain matter in order to model and simulate the mechanical properties of the brain. They also studied the microstructure of brain matter

Polymer Free Stents

Eighty percent of global stent production is carried out in Ireland. Stents are a major mechanical tool in the treatment of blocked coronary arteries. Dr Martin Meere from the School of Mathematics at NUI Galway has teamed up with the National Centre of Biomedical Engineering Science (Galway) to propose sound mathematical models of drug release from polymer free stents. They hope to help identify the dominant mechanisms involved in drug release and help quantify how the release behaviour depends on the geometrical and material properties of the

system. Eventually their research should assist in the design of better stents.

Visualising Decision Space

One way to conceptualise how we make decisions is to consider our possible choices as "attractors" in a "decision space". We make a decision when our behaviour reaches the vicinity of one of these equilibria. By tracking how individuals make their choices, for instance through the trajectory of a computer-mouse choice, it is possible to infer the pull towards available responses prior to the eventual response, and in so doing, to infer characteristics of the decision space where these choices exist.

Dr Petri Piironen at the School of Mathematics and Dr Denis O'Hara at the School of Psychology in NUI Galway have devised a method to visualise and analyse decision spaces. They are currently developing new tools to analyse dynamical decision-making, based on the modeling of behavioural experiments conducted at the university. Their preliminary results have just been published in *Nature Scientific Reports*.

Bio-informatics

Bio-informatics research at NUI Galway includes understanding how mutations cause drug resistance in *Leishmania*, a neglected tropical pathogen, from analysis of genome

A drug eluting stent increases the flow of blood through a diseased coronary artery and releases a drug to prevent narrowing of the vessel due to inflammation

sequences; assembly and analysis of the genome of *Hydractinia echinata*, a new model organism that is being used to study stem cell regeneration and cancer at NUIG; analysis of the structure and function of DNA in difficult-to-sequence regions of the human genome that were neglected by the Human Genome Project; development of new probabilistic tools to understand how some human antibodies can control HIV by targeting specific parts of the virus; and understanding how proteins interact with one another, forming complex networks that are an important aspect of how cellular systems work. In many cases we can analyse large amounts of genomics data that are now being shared globally, while also enabling NUIG researchers to benefit from advances in genomics technologies.

Computational Algebra

A de Brún Centre team are using algebra to design and compute shape invariants for proteins, data sets, fractals, networks, medical images, hyperbolic space, number theory, group theory etc.

Biostatistics

Biostatisticians are working to improve and better understand optimum Sugar Cane Growth, anti-malarial drug interactions, HIV outcomes, etc.

ICTM Conference

Comhrá Ceoil and the Centre for Irish Studies were delighted to host the International Council for Traditional Music (ICTM) Ireland conference this year. It is the first time it has taken place at NUI Galway and is an acknowledgement of the research in Irish music and dance studies at the Centre for Irish Studies, through the research network Comhrá Ceoil and in other related disciplines here in Galway.

Dr Lillis Ó Laoire, Head of the School in Languages, Literatures and Cultures. Lillis was Fear an Tí at Oíche ar an Sean-nós on 21 February which took place at An Taibhdhearc in Galway

The theme of the conference - 'Music, Place and Community' - operated at numerous levels during the weekend and there was a notable level of community-building among scholars drawn together by diverse but connected interests.

Throughout the conference, scholars with interests in a variety of music-making and musical experiences - ranging from local, national to international contexts - engaged with topics across the spectrum. Discussions and debates, both at panel sessions and in the corridors of St Anthony's, the conference hub, prompted many questions: no doubt issues from ICTM 2014 will be revisited in other fora. A conference such as this can, and ideally should, operate as a space where discourse is imaginatively and creatively realised. From that perspective ICTM 2014 was a tremendous success.

A diversity of music practices and cultures were discussed through political, psychoanalytical, emigrant and musicological frameworks. This illustrates the vibrancy of the conference and of ICTM as an organisation, which has over the years worked hard at creating an intellectually unquarantined space, where musics of all hues sit easily together.

Forty-five papers were presented and, remarkably, they were all thematically loyal, speaking to the main themes of place, music and community. Whether discussing Lockett's rap in London, or Cypriot emigrants' music in Birmingham, they all connected.

Nonetheless, particular subthemes and tropes were deployed. The tipping point between past and present in music practice was a powerful thread in many and a keen interest in the ways in which music-making moves from the past to the present was also particularly evident. Ethnomusicology, an organising discipline for several of the conference delegates (even those operating in cognate fields), has at times suppressed the historicity of practice, operating in the 'now' as if it didn't have a 'before'. However it was found that the presence of history (musical, social, cultural) was woven into papers presented, illustrating the worth of mining historical context for musical cultural analysis.

Scholars in the field of Music Studies/Ethnomusicology have moved away from a simplistic binary of tradition/modernity and instead many papers grappled with the interstitial space of music-making as it finds itself at a moment in time, moving forward but inextricably tied somehow to its pasts. This was especially true as the subtheme of mediaisation and its various manifestations, effects and

complications (reverting back to processes of modernity), also ran through much of the work presented.

Place and community as articulated, negotiated and worked out in music is of course reciprocal and dynamic: music is worked out in place and by individuals in communities too. Underpinning all of this and mentioned explicitly in some of the papers was the essential role of memory. It is through the prism of memory that the themes of music, community and place relate to each other. A recurring question was: How does music 'become' and how does music 'mean' as it moves through and embeds in the memory of individuals and of communities?

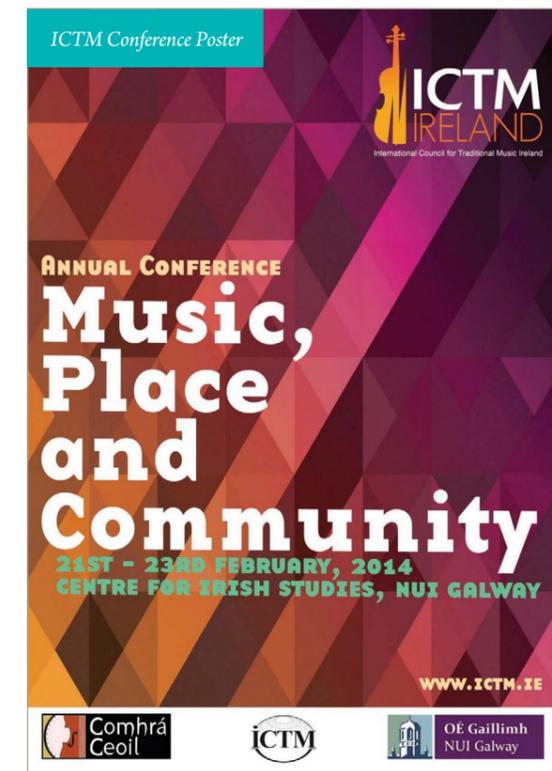
A particularly special event run as part of the conference was Oíche ar an Sean-nós which opened the proceedings on Friday night at An Taibhdhearc. Past and present Sean-nós Artists in Residence at the Centre for Irish Studies performed and in doing so, tied together the themes of music, place and community perfectly. Artists included singers Joe John Mac An Iomaire, Treasa Ní Mhiolláin and dancers, Róisín Ní Mhainín and Gearóid Ó Dubháin.

Our poet laureate, Seamus Heaney, was concerned with many ideas and the themes of

place and community are especially consistent in his poetry. In the same semester as a memorial event for Heaney was held at NUI Galway it was fitting that the conference closed with a reference to Heaney's poem, 'The Forge'. In it he begins with 'All I know is a door into the dark . . .', offering a tantalising glimpse of the possibilities that lie within. A conference offers that glimpse, and the final line of the poem suggests the work that might take place in that place, 'To beat real iron out, to work the bellows'.

*by Dr MÉABH NÍ FHUARTHÁIN
Acting Director, Centre for Irish Studies,
Programme Director, BA with Irish Studies*

The 2014 ICTM Conference was generously supported by Comhrá Ceoil, the Centre for Irish Studies, the Millenium Grant Fund, and Drama, Theatre and Performance at NUI Galway.



Profile: Young Researcher Tara Sugrue



Tara Sugrue

“I am a 25-year old researcher from Killarney, County Kerry. I began my scientific career in 2006 as a Bachelor (Hons) student of Biotechnology at NUI Galway where I became interested in stem cell biology and immunology.

In my final year, I carried out a research project with Prof Rhodri Ceredig (REMEDI) and realised that I really enjoyed academic research. So I decided to pursue a PhD with Prof Ceredig.

“In collaboration with Prof Noel Lowndes – from the Centre for Chromosome Biology - we studied the mechanisms used by mesenchymal stromal cells to deal with DNA damage following irradiation and followed this up by investigating the effect of low oxygen on these processes. As an EMBO Fellow, in 2012

I worked in the laboratory of Prof Antonius Rolink (University of Basel, Switzerland), where I studied the radio-biology of immature T cells.

“From my PhD experience, I gained a great interest in how cancers develop within the immune system and wanted to pursue this further. As a postdoctoral fellow in the laboratory of Prof Freddy Radtke, EPFL, Switzerland, I am now investigating the role of Notch in the development of T-acute lymphoblastic leukaemia and chronic lymphocytic leukaemia.”

The 3-Cities Project



Galway cityscape

The 3-Cities Project has one key aim: to engage in a citizen-led and collaborative process to re-imagine services as a means of maximising participation for children and youth, people with disabilities and older people in their communities and cities and in Irish society.

This three year programme of work, which commenced in October 2013, focuses on older people (aged 65 years and over), children and youth (aged 12 to 18 years) and people with a disability (sensory/physical and intellectual disability) in Galway, Limerick and Dublin cities.

With a work programme that involves service users, services managers and service providers, and that encompasses both in-depth qualitative research and service design and transformation, this project endeavours to go beyond data-collection, focusing on the development of evidence-based policy and social innovation for our communities and cities. The final year of the 3-Cities Project will be dedicated to the development, implementation and evaluation of community-based service models in one community in each city. Through its interconnected work packages, the 3-Cities Project provides a means of linking research, policy and practice to achieve real and valuable outcomes for individuals and their communities.

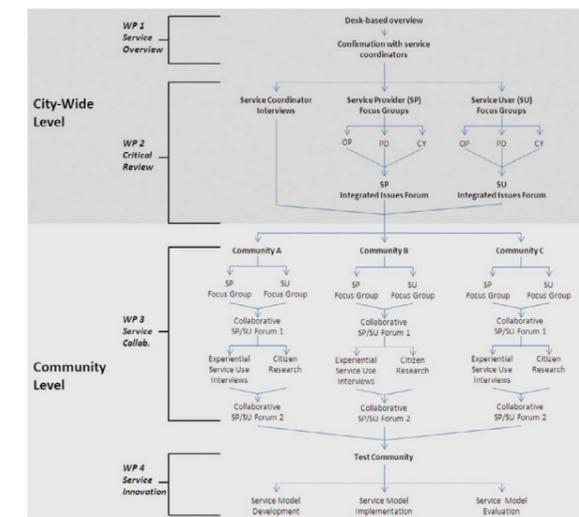
Therefore, the 3-Cities Project is interested in how services can enhance the participation of children and youth, people with disabilities, and older people in our cities, and on how these citizen groups can be involved in the development of such services. More than this, however, the Project will provide insight into the role of neighbourhoods and communities,

and cities in general, in the health and well-being of children and youth, people with disabilities and older people.

The 3-Cities Project marks the first major programme of work undertaken by Project Lifecourse (<http://www.nuigalway.ie/lifecourse/>) and will be led by the Project Lifecourse team (Pat Bennett, Director; Keith Egan, Researcher; Danielle Kennan, Research Associate; Áine Ní Léime, Research Fellow & Kieran Walsh, Senior Research Fellow) with support from the UNESCO Child and Family

Research Centre, the Irish Centre for Social Gerontology, and the Centre for Disability Law and Policy.

by **DR KIERAN WALSH**
Deputy Director
Irish Centre for Social Gerontology



Programme of Works in the City

WP=work-package;
SP = service provider;
SU = service user;
OP = older people;
PD = people with a disability;
CY = children and youth.

Researcher Profile: Dr Patrick Collins



Dr Patrick Collins

Dr Patrick Collins speaking at the Creative Edge conference entitled "How Creative Industries Contribute to and Shape Peripheral Region Societies and Economies" held in An Taibhdhearc in Galway City December 2013

How did you become involved in Creative Economy research?

"As often happens, I found that my research focus was drawn towards the creative economy as a result of work I carried out in a seemingly unrelated domain. After I completed my PhD at the University of Hull, I returned to NUI Galway in 2007 and worked on a PRTLL-funded research project that was concerned with internationally traded service industries operating out of Ireland. Prof Seamus Grimes and I noted some interesting patterns, not least of these was evidence of what we termed 'network embeddedness'; that is foreign-owned corporations in Ireland embedding themselves in the global production network of their corporations but not 'geographically' in Ireland in the traditional sense.

As an economic geographer, questions of industrial location are always to the fore. With regard to foreign direct investment in Ireland, many location decisions can be explained by lucrative tax incentives, but this was not explaining everything. I began to look at the other reasons why some of the world's leading technology firms were setting up in Ireland. Answers such as business environment, an educated workforce and access to the European market all featured, but the terms 'culture' and 'creativity' began to crop up more and more. So managing directors of these large companies were telling me that the cultural associations of Ireland and the creative industries alongside a creative entrepreneurial spirit were active agents in their decision to locate here. That revelation helped me see Ireland and its business offering in a different perspective and pointed me to an emerging area of research in economic geography: the Creative Economy."

Dr Patrick Collins is an economic geographer at the School of Geography and Archaeology and co-leader of the Creative, Liveable and Sustainable Communities cluster at the Whitaker Institute.

You are in the process of wrapping up the €1.1 million Creative Edge project. Explain to us how this project came about and the impact it has had on your research?

"The Creative Edge project came about through a call for interest in funded programmes that sought to sustain the periphery of Europe in economic and social terms issued by the EU's Northern Periphery Programme (NPP) in 2010. My work on the creative economy had an obvious affinity with this so I headed to a meeting organised by the NPP in the hope of finding partners to work with. Ian Brannigan of the Western Development Commission was in attendance and we saw the opportunity to collaborate on a project proposal. We put this to all members present and that was the foundation of the Creative Edge project team. We came together with partners from various backgrounds (regional development agencies, universities and film centres) to form a proposal for promoting the creative economy in our four peripheral regions: West of Ireland, Northern Ireland, Finland and Sweden (for more information see www.creative-edge.eu).

You have also been part of a number of ancillary projects, such as Galway's bid to become an UNESCO City of Film, the Galway Arts Festival and the Volvo Ocean Race economic impact assessment.

"One of the mantras that I have come to recognise as a truism in the world of research funding is that 'money begets money'. Not that all of these were funded projects (indeed most were taken on purely out of research and civic interests). When I think about the chronology, what I recognise is winning a small research grant was the first stated faith in my work. On the back of that I successfully tendered to carry out a project that involved slightly larger funding (an economic impact assessment of the Creative Economy of the West of Ireland commissioned by the WDC).



Dr Patrick Collins and Garry Hynes

That project then opened the door to the Creative Edge funding, which has helped situate me and the university as central in the creative economy debate in Ireland and Europe. I am currently working on a bid for additional funding from the NPP to develop and expand on the research and outputs from the Creative Edge project.

"I should state that I do not believe that research funding is the 'be all and end all'. Research itself is what matters. For me and the stage in my career I was at (working under contracts of indefinite duration) funding helped me to stay working in the research environment. It is not ideal but it is the model that we are working in. I consider myself fortunate as there are numerous pieces of fantastic work that are not getting funded. I was lucky to have the support of colleagues in the Whitaker Institute and the School of Geography and Archaeology that recognised the potential of the work I was trying to do. The Whitaker Institute's Director, Dr James Cunningham, realised the potential of my research pursuits. I would have found it incredibly difficult to carry out any of this work without all the support I've had."

Brain Awareness Week



Galway Neuroscience Centre Reaches Out for Brain Awareness Week

As part of the international 'Brain Awareness Week' event, staff and students of NUI Galway's Neuroscience Centre organised a major public information exhibit in the Aula Maxima, Quadrangle, NUI Galway in March of this year.

Members of the public and children from local schools visited the exhibit to learn more about how the brain and nervous system work. The exhibit consisted of interactive displays where visitors could learn more about the nervous system in a hands-on way. For example, there were various puzzles and tests of hand-eye coordination, visual perception, left/right handedness and creativity.

There was also general information about the brain and visitors had the opportunity to learn more about brain disorders, via a series of large information posters prepared by the staff and postgraduate students of NUI Galway Neuroscience Centre. Approximately 180 million Europeans are thought to suffer from a brain disorder, at a total cost of almost €800 billion per annum. The posters covered a variety of conditions including: epilepsy, Parkinson's disease, pain, anxiety, depression, schizophrenia,

Alzheimer's disease, stroke, brain injury and spinal cord injury. Information leaflets obtained from brain-related charities and organisations were on display and available for the public to take away, such as the DANA Foundation, MS Ireland, Alzheimer's Society of Ireland, Parkinson's Association of Ireland, Aware (relating to depression), Chronic Pain Ireland, Shine (relating to mental health, Acquired Brain Injury Ireland and Brainwave (the Irish Epilepsy Association).

Microscopes were available to view brain cells and brain tissue sections for those interested in seeing what a brain cell and brain tissue really looks like. Additional features included plastic models of the nervous system, and even Play-Doh and colouring books for the very young!

The Galway Neuroscience Centre acknowledges funding from the National Centre for Biomedical Engineering Science and from EXPLORE at NUI Galway, as well as a grant from the DANA Foundation to Dr Una Fitzgerald, which made this event possible. Dr Fitzgerald, together with Dr Karen Doyle (Physiology) and Dr Muriel Grennon

(School of Natural Sciences), played a key role in organising the event. In addition, the Galway Neuroscience Centre's public outreach exhibition has been selected by an International Brain Awareness Week Awards Committee for presentation at this year's FENS Forum in Milan. The FENS Forum is Europe's largest international neuroscience meeting, attracting over 6,000 scientists within the neuroscience community. "This is an excellent achievement and a testament to how our public outreach programme and Brain Awareness Week exhibit has developed," says Leader of the Galway Neuroscience Centre, Dr David Finn. "Special thanks must be given to our members who have supported and contributed to the development of our outreach programme over the years."

by **DR DAVID FINN**
College of Medicine, Nursing and Health Sciences

Community Outreach

There was so much Community Outreach activity over the last year that in this issue we have put together a collection of pictures showcasing a variety of projects.



A school group receives a guided tour of neighbouring Terryland Forest Park. The park is being promoted as an Outdoor Laboratory for university research and as an Outdoor Classroom for local schools



Nuala Dalton (Milltown NS), Professor Tom Sherry (Dean of Science NUIG); Des Foley (Head of the School of Science GMIT) and John McNamara (R&D Director Medtronic) at the vintage classroom exhibit during the Galway Science and Technology Festival Fair held last November in NUI Galway



Brendan Smith of INSIGHT being presented with the inaugural 'IT in the schools' award at the annual ITAG awards ceremony



Dr. Anna Soler (2nd from right), winner of the Ryan Institute's first annual Award for Selfless Cooperation. Pictured here with her colleagues from the Irish Seaweed Research Group after receiving her award at the Ryan Institute's Research Day in September. Alex Wan, Dr. Benoit Quéguineur, Dr. Richard Walsh, Dr. Anna Soler, Dr. Liam Morrison



Nina Walsh from St Senan's Primary School Kilrush Co Clare with her certificate of participation at the Youth Academy Graduation February 2014



Emma Richardson (6) from Galway Educate Together National School at the launch of NUI Galway's 8th Annual Teddy Bear Hospital



Dr Louise Firth of Zoology at Galway Atlantaaquaria for National Science Week November 2013



The ReelLife Science project run by Dr Enda O'Connell, NCBES, with students from St Enda's College, Galway Conor Elliot, Shane Kelly, Sorcha Whyte, Alice O'Donnell and John Ugwu. Photo by Iain Shaw



Gold medal recipients of the 2013 Gaisce Award David McGurran, Oisín O'Carroll, Sarah Kilduff, President Michael D Higgins, Rion Breslin & Christina Quinn



Judges and winners at NUI Galway's THREESIS 2013 competition at An Taidhbhearc Theatre, Galway. John Holden, Irish Times Journalist and Editor of NUI Galway's Research Matters publication; Eithne Verling, Director of the Galway City Museum; Sara Vero, Ryan Institute and THREESIS runner-up; James Curry, Moore Institute and THREESIS winner; Joanne Kenny, Clinical Neuroimaging Laboratory and THREESIS runner-up; Prof. Lokesh Joshi, VP Research NUI Galway



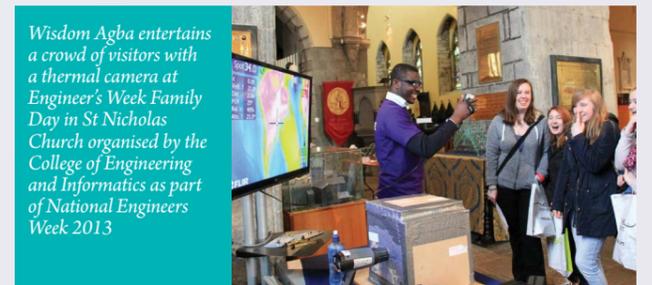
RailGirls Women in Technology Workshops and Conference DERI May 2013



Dr Michel Dugon is joined by junior eco-explorers in "Bug Hunters" an RTE series of 15 mini documentaries on Irish wildlife



Junior Infants in Scoil Iognaid made "Little heart cells" during a Cell EXPLORERS workshop



Wisdom Agba entertains a crowd of visitors with a thermal camera at Engineer's Week Family Day in St Nicholas Church organised by the College of Engineering and Informatics as part of National Engineers Week 2013

Aran Open Access

Maximising the Impact of Your Research through Open Access Publication

NUI Galway's ARAN system publishes the University's research outputs on an open access (OA) basis, thereby maximising recognition, use and citation. The use of ARAN offers benefits and requires limited effort.

Open Access Publishing

OA publishing operates in parallel with conventional publication channels, such as journals, by making research outputs accessible free of charge online and without subscription barriers, sometimes after an agreed period has elapsed since initial publication.

Open Access Publishing at NUI Galway

ARAN (Access to Research at NUI Galway, <http://aran.library.nuigalway.ie/>) publishes University research outputs and is linked from the IRIS system to enable easy deposit of papers, after which Library staff complete the publication process. Download reports per publication can be generated.

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ext. 5959
rosie.dunne@nuigalway.ie

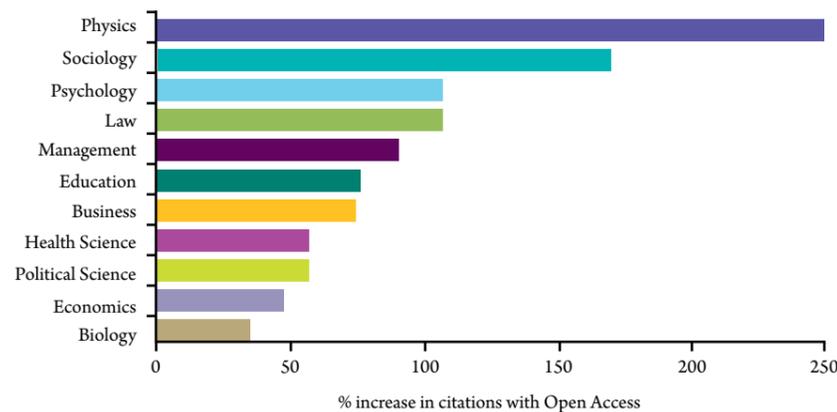
Mike Lynch
Digitisation & Institutional Repository Librarian
ext. 5961
mlynch@nuigalway.ie

To add publications already in IRIS, please see the guide at <http://tinyurl.com/mxa9qxt>

by **JOHN COX**
University Librarian

Advantages of Open Access Publishing

- Studies show that:
 - OA articles are cited more than non-OA articles in the same journal
 - OA articles are cited sooner as well as more often
 - This happens in most disciplines, although at different rates, for example:



<http://eprints.soton.ac.uk/265852/2/serev-revised.pdf>

- Publications can be easily discovered through a variety of sources, including Google and Rian.ie
- OA publishing increases university competitiveness and recognition
- Research funders place increasing emphasis and expectation on the widest possible access to research findings
- OA has the potential to reduce costs for journal subscription if widely adopted

Research Support Services



The goal of NUI Galway's Research Support Services is to promote, develop and enable research activity at NUI Galway.

The service launched in February 2014 and is a collaboration of the Research Office, Research Accounting Office, Technology Transfer Office and Human Resources.

The focus of Research Support Services is to provide assistance to the research community through a new research support desk which will manage general queries for all four offices, the introduction of dedicated research management workshops, the introduction of a new research network for administrators and the launch of

a new website focused entirely on the research lifecycle.

"We are moving toward a stronger and more cohesive support model for our researchers," explains Natalie Walsh, Manager of Research Support Services. "As a group we feel that the introduction of the research support desk - staffed by a team of experienced administrators - is a welcome addition to the existing services we offer. Our intention is to create a stronger research support structure in the university to meet the varying needs of our research

community. Now that we have launched our initial services we are looking to create other supports that make managing a research project an easier task."

The support desk can be contacted at 091 495969, via email at rss@nuigalway.ie or by visiting www.nuigalway.ie/research-support-services

The Activist Researcher - Promoting long lasting change beyond the academy and the potential of Participatory Action Research (PAR)



Few who consider the state of the world would deny the requirement for sustainable change in many areas of society and the environment. An increasingly complex mix of social, environmental, economic and political challenges requires new ways of thinking about and approaching research. The question of whether researchers can do more to consider the long term implications of their work is a long-standing one in the social sciences. In this context, the role of the “activist researcher” and in particular the potential of the methodology of “Participatory Action Research” (PAR) as a route to bringing about progressive change beyond the academy has recently gained prominence among social scientists.

PAR is a form of applied research that involves the study of a particular issue with the full engagement of those affected by it. In essence it is research with, by and for people rather than research on people. PAR emerged

initially during the 1970s as a reaction to traditional ‘extractive’ researcher-led approaches to social science. A fundamental assumption of PAR is that the process of research is crucial to the long-term outcomes of that research. Researchers adopting PAR principles in their work emphasise principles of collective, participatory inquiry as a means to address socially progressive issues and empower communities both during and after the research process.

My work has involved participatory action research with environmental organisations and social movements, such as the Transition Town Movement. When working with any community or stakeholder group it is essential that the research process supports a genuine two-way flow of information. PAR is perfect for this, and as such is broadly used by many other researchers in the field of geography. For researchers who are considering adopting a

PAR approach to their work, NUI Galway’s Community Knowledge Initiative provides a great platform of support for researchers to foster community-engaged research and knowledge exchange.

In essence, PAR represents a research style - an orientation rather than a single methodology. At its very basis is the commitment to using the field of research as an educational and empowerment tool to benefit communities and society to the greatest extent possible. In the context of increasingly complex challenges facing society in the 21st century, the potential of PAR as a means of promoting social change beyond research and the academy should not be overlooked.

by **MARY GREENE**
College of Arts, Social Sciences and Celtic Studies

Measurement Instrument Database for the Social Sciences Goes Global



MIDSS

Measurement Instrument Database
for the Social Sciences

The Measurement Instrument Database for the Social Sciences (MIDSS), hosted by the Whitaker Institute, is an open access repository of shareable assessment instruments used to collect data from across the social sciences.

Researchers worldwide have submitted their measurement instruments, and the database currently holds in excess of 530 instruments. The website has an average of over 11,000 visits and approximately 4,000 instrument downloads per month. The global impact of MIDSS is also evident with the majority of visitors based outside of Ireland - USA: 40 percent, UK: 10 percent, Canada: 6 percent, India: 4 percent and Philippines: 4 percent.

MIDSS was established as a first point of consultation for researchers looking for measurement tools to conduct their own

research. Going on the statistics, it looks like it is well on its way to becoming the go-to repository of shareable assessment instruments across the social sciences.

The development of the MIDSS is supported by the Whitaker Institute through funding by the Irish Social Sciences Platform, funded under the Programme for Research in Third Level Institutions, administered by the HEA and co-funded under the European Regional Development Fund.

For more information, or to upload/download an instrument, visit the MIDSS website: www.midss.org

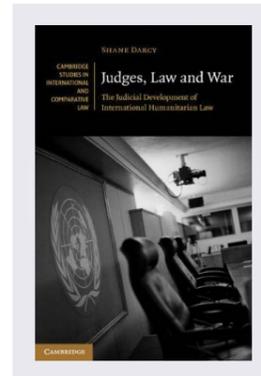
New Publications

Judges, Law and War

Dr Shane Darcy Publisher: Cambridge University Press Summer 2014

A new book by Dr Shane Darcy of the Irish Centre for Human Rights explores the judicial contribution to the development of international humanitarian law. In *Judges, Law and War*, Dr Darcy examines the formative role played by international courts and judicial bodies developing international rules applicable to situations of armed conflict. This substantial research, completed while on sabbatical at Harvard and the University of Queensland, shows how judicial bodies have influenced

the substantive rules and principles of the law of armed conflict, as well as the creation, application and enforcement of this corpus of laws. Dr Darcy also gives consideration to the contemporary place of judicial bodies in the international law-making process, the challenges presented by judicial creativity and the role of customary international law in the development of humanitarian law. The book will be published by Cambridge University Press this summer.

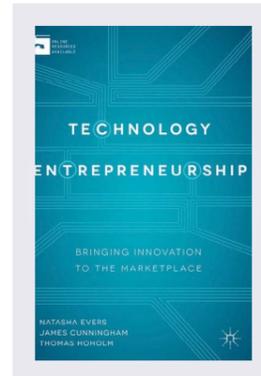


Technology Entrepreneurship - Bringing Innovation to the Marketplace

Dr Natasha Evers, Dr James Cunningham, Dr Thomas Hoholm Publishers: Palgrave-Macmillan London 2014

This book provides students from engineering, technology and science-based backgrounds with the theoretical knowledge and practical skills required to transform innovative ideas into commercially viable businesses for profit and/or social ends. Blending together theory, policy and practice in a manner that is accessible to readers with little knowledge of business commercialisation, it offers a framework for understanding the entrepreneurial process for technological ideas. The book gives students a comprehensive insight into the specialised field of 'technopreneurship'. It provides the

tools and frameworks required for managing, commercialising and marketing technological innovation. With real life examples and case studies from a range of countries and industries, it will equip students with the understanding required to successfully launch their product. A variety of case studies are included from North America, Europe, Scandinavia and Asia in technology-related sectors such as web-based technologies, green technologies, nano and biotechnology, material science, marine food processing, instrumentation and electronics, and information technology.



Social Marketing: From Tunes to Symphonies

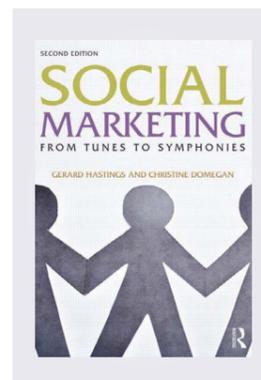
Prof Gerard Hastings & Dr Christine Domegan Publisher: Routledge Press 2013

'Social marketing' involves the application of marketing techniques (usually associated with promoting consumption) to social ends. Beyond this simple definition, social marketing offers an alternative to the standard Western economic model of consumption at all costs.

This popular introductory textbook has been updated to provide greater depth on marketing theory, more on branding, co-creation of value, Community Based Prevention Marketing

(CBPM) and the vital role of critical thinking. In addition, the communications chapter is extended and radically updated to include much more on digital media. The rise of corporate social responsibility is also critically analysed.

The subject of social marketing is brought to life with the integration of case studies from across the world to provide a textbook which is required reading for students at advanced undergraduate and postgraduate levels.



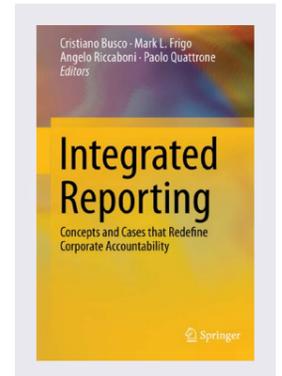
Integrated Reporting: Concepts and Cases that Redefine Corporate Accountability

Prof Cristiano Busco, Frigo M.L., Riccaboni A, Quattrone P (Eds.) Publisher: Springer 2013

Professor Cristiano Busco, joint leader of the Performance Management research cluster at the Whitaker Institute for Innovation and Societal Change, has co-edited a new book entitled *Integrated Reporting - Concepts and Cases that Redefine Corporate Accountability*.

The authors have elaborated on one of the most relevant topics on reinventing corporate reporting in the current business scenario. The book offers a fresh perspective focusing on both theoretical underpinnings and practical challenge and presents a sound redesign to corporate accountability. It focuses on integrated reporting as a contemporary social and managerial innovation where a number

of initiatives, organisations and individuals have begun to converge in response to the need for a consistent, collaborative and internationally accepted approach to redesign corporate reporting. *Integrated Reporting* is a process that results in communication of the annual "integrated report" which describes value creation over time. An integrated report is a concise communication about how an organisation's strategy, governance, performance and prospects lead to the creation of value over the short, medium and long term. This book offers a fresh perspective with expert contributions focusing on both the theoretical underpinnings and the practical challenges for the future of corporate reporting.

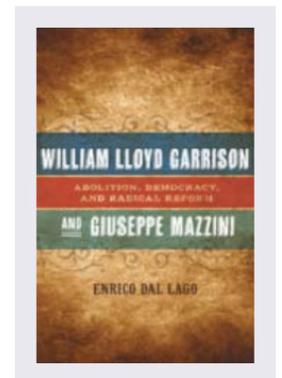


William Lloyd Garrison and Giuseppe Mazzini: Abolition, Democracy, and Radical Reform

Dr Enrico Dal Lago Publisher: Louisiana State University Press 2013

William Lloyd Garrison and Giuseppe Mazzini were two foremost nineteenth-century radicals who lived during a time of profound economic, social and political transformation in the United States and Europe. Both born in 1805, but into quite different family backgrounds, the American Garrison and Italian Mazzini led entirely different lives – one as a citizen of a democratic republic, the other as an exile proscribed by most European monarchies. Using a comparative analysis, Enrico Dal Lago suggests that Garrison

and Mazzini nonetheless represent a connection between the egalitarian ideologies of American abolitionism and Italian democratic nationalism. Focusing on Garrison's and Mazzini's activities and translational links within their milieus and in the wider international arena, Dal Lago shows why two nineteenth century progressives and revolutionaries considered liberation from enslavement and liberation from national oppression as two sides of the same coin.



Translating Health Communication

Health communication activities are recognised as an integral component of efforts to improve personal and public health.

They are increasingly used to support the prevention and control of communicable diseases. In 2009 the European Centre for Disease Prevention and Control (ECDC) commissioned a consortium of universities to undertake a three-year programme of research to assess current evidence and practice in order to inform future developments. The aim of the project was to enhance the optimal use and development of health communication for the prevention and control of communicable diseases across 30 EU and EEA Member States. The Research Consortium was led by the Health Promotion Research Centre in partnership with the Institute for Social Marketing, University of Stirling, Scotland and the University of Navarra Clinic, Pamplona, Spain.

The initial phase of this pan-European research activity consisted of two main strands: primary information-gathering with key European stakeholders (e-survey, telephone interviews and an expert consultation) and synthesis of evidence (series of nine reviews including evidence, literature and systematic reviews). The multiple outputs from these strands were distilled through further synthesis using a Strengths, Weaknesses, Opportunities and Challenges (SWOC) analysis, and the results developed via an online expert consultation process.

Finally, all key project findings were considered against a public health capacity development framework in order to inform future strategic actions required for strengthening capacity for health communication development in Europe. Results indicate: a limited evidence base focusing on health communication and communicable diseases in a European context, although a degree of conceptual agreement is evolving for some areas such as health literacy. While the political, administrative, linguistic and cultural diversity of countries across Europe was identified as a challenge, the opportunity for sharing knowledge, coordination and collaboration within and between countries was recognised. Finally some key action areas for future development were identified such as enhanced evaluation and education/training.

All project activities are now completed and key findings are available in the below report and on the ECDC website <http://www.ecdc.europa.eu>.

Sixsmith J, Doyle P, D'Eath M, Barry MM. *Health communication and its role in the prevention and control of communicable diseases in Europe: current evidence, practice and future developments*. Stockholm: ECDC; 2014.



Further project details from: Prof Margaret Barry, Dr Jane Sixsmith and Ms Priscilla Doyle of the Health Promotion Research Centre.

PhD Student Sara Vero

NUI Galway/Teagasc Research Collaboration Advancing the Irish AgriFood Sector

The agrifood sector is a vitally important contributor to the Irish economy, employing approximately 230,000 people and accounting for almost €10 billion in revenue via exports alone. To achieve the goals outlined in the Food Harvest 2020 Report of increased production by 33 percent over the next six years, Irish farmers must remain at the cutting edge of agricultural technology. This is by no means limited to the primary production aspect, but also to advances in processing, new technology development and the identification and capitalisation of indigenous resources. All this must be realised while also encouraging biodiversity, limiting the carbon footprint and greenhouse gas emissions and maintaining environmental sustainability. Teagasc is responsible not only for disseminating information and advice to farmers, but for conducting research across a range of disciplines. Through the Walsh Fellowship scheme, some 140 PhD students conduct research jointly between Teagasc and various national and international universities.

NUI Galway and the Ryan Institute are active partners in these projects, which range in theme from milk quality to investigating the commercial value of seaweed extract.

One such project is currently investigating the achievability of EU water quality objectives within the designated Water Framework Directive reporting periods. This research, undertaken by PhD student Sara Vero, is a collaboration between Teagasc, Johnstown Castle, Co. Wexford (Dr Owen Fenton) and Civil Engineering and Earth and Ocean Sciences at NUI Galway (Drs Mark Healy and Tiernan Henry). This project investigates the use of numerical models to simulate contaminant movement through the soil profile. It develops novel laboratory techniques for elucidation of critical soil hydraulic properties and conducts field-scale tracer experiments. The outputs of this project should help to guide the expectations of policymakers and stakeholders as regards the efficacy of mitigation measures, identify when trend analysis should be initiated and determine when water quality improvements can be expected.

by SARA VERO
PhD Student



Profile: Sinead Duane

School of Medicine and Social Innovation and Policy cluster at the Whitaker Institute



Sinead Duane

“After completing my Masters in Business Studies at NUI Galway in 2008, I was awarded the inaugural three-year Research Fellowship with SafeFood. During this time I project-managed SafeFood’s first social marketing pilot initiative, which addressed the issue of male obesity on the island of Ireland, whilst completing my PhD in the area of social marketing partnerships.

“On completion of my PhD, I joined the discipline of General Practice in August 2012 as a Social Marketing Postdoctoral Researcher on the SIMPlE study. This project was funded by the Health Research Board through their Interdisciplinary Capacity Enhancement (ICE) award. The focus of the SIMPlE study is the improvement of the quality and quantity of antibiotic prescribing for urinary tract infections (UTIs). Within the SIMPlE study, I have applied my skills as both a social marketer and qualitative researcher to identify the key barriers and facilitators to improved antibiotic prescription and consumption from the perspective of the general practitioner and patient. In collaboration with colleagues in other disciplines such as epidemiology, microbiology, general practice and health economics, these findings have been used to design and implement a complex intervention. For more on the project visit www.nuigalway.ie/simple

“The ICE awards encourage collaborative learning through the adoption of a team-based approach to research, whilst supporting researchers to continue to develop their skills through training and mentoring opportunities. I have recently returned from a three week training visit with the Institute of Social Marketing in Stirling University, where I worked with leaders in the field of social marketing and qualitative research. I plan to participate in similar visits to the USA in the near future to pursue my interests in social innovation and novel approaches to facilitating behavioural change including e-health strategy development.”

The Challenges of Life in a Sentinel Site on the West Coast

With roaring 100 mph winds and 50 foot waves coupled with high tides, the winter weather of 2014 won't be forgotten by many, least of all by the staff of the Ryan Institute's Research Station in Carna. Based on the Connemara coastline about 90 minutes west of Galway City, the Station is a fully integrated, land-based, aquatic experimental unit; it provides a diverse range of holding facilities, rearing systems, services and laboratories in which to conduct larger-scale applied and basic research on a variety of finfish, shellfish and seaweed species. Normally, there are a number of EU and nationally funded research projects operating from this base, and so it is crucial that the supporting facilities, systems and instrumentation remain operational at all times, all year round.

“Carna was initially established in 1976 as a research facility and since then it is essentially a 24/7, 365 day-a-year operation,” explains Kieran O'Halloran, Senior Technical Officer. “As part of the various research programmes, there are stocks and ongoing experiments on site that require a continuous supply of oxygenated seawater. Electricity and seawater sources are our primary lifelines. Being in a remote location we are already prepared for power cuts and the effects of stormy weather, but this winter's extreme weather really saw our ability to keep things operational pushed to its limits.” The

out-of-hours staff were keeping a careful watch during the New Year storms and noted that at 5:30 am on the 3rd of January 2014 most of the site was under water and that several crucial water distribution pipelines had been smashed by floating debris and rafts of seaweed. Next day, as the winds abated and tides receded, the Carna team had to carry out emergency repairs. “We had to ensure that we had restored essential supplies and services so that all stocks and experiments survived unaffected – not a fish was lost!” says Kieran proudly. Later, once the damage was assessed, the staff of the Buildings Office stepped in to provide specialist advice and support on restoring these affected systems. Even now, three months later, the repairs on specialised equipment are still ongoing.

Kieran is one of 12 staff based full-time in the Carna Research Station, including administrative, technical and support staff and a group of researchers who together maintain and operate the site facilities and carry out the research work. This is a dynamic and challenging environment and the staff based here have to work as a single team and combine a range of skills and competencies to achieve a common goal. “I joined NUI Galway in 2005; prior to that I was a commercial fisherman,” he says. “Sometimes this job brings me back to my days aboard a boat. With 3 or 4 people working together as a crew, everyone has to pull

together. Here in Carna there is a huge amount of cooperation and goodwill required to keep everything running smoothly.”

RESEARCH at Carna
There is a diverse range of research projects being conducted at the Carna Research Station. The **EIRCOD** National Cod Broodstock and Breeding Programme, established in 2008, which explores the development of a commercial cod farming sector in Ireland.

Nephrops – an EU funded INTERREG IV project - is taking an innovative look at ways to improve the commercial fishing sector, in relation to wild prawns.

Large-scale seaweed culture is another important area of research for the Carna Research Station. Led by Dr Maeve Edwards, they are a partner in multi-national INTERREG IVB North West Europe funded project called **EnAlgae** (www.enalgae.eu), which focuses on culturing seaweed as biomass for a viable algal bioenergy industry. In another area of seaweed research, PhD student Alex Wan, working on the **Nutramara** project (www.nutramara.ie), is examining various algal extracts to see which are of nutritional and economic benefit for inclusion as supplements in farmed salmon diets.

