



NUI Galway
OÉ Gaillimh

Research Matters

National University of Ireland, Galway

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Smarter Cities – The Future

Research Matters

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

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

nuigalway.ie

Slowing a Runaway Train

Imaging at the Heart
of Research

Turning Science
into Art

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VP Letter



The Research Office continues to build a complete and comprehensive Research Support Service for members. We now have a dedicated facility – in Unit 8 – with five staff, including a Research Desk Manager and a Legal and Contracts Manager. We're well on the way to a joined-up system of supports for the entire University.

We are also delighted to announce the launch of NUI Galway's Institutional Research Information System (IRIS). This will enable researchers and academic staff to maintain and showcase their research output and expertise.

With current constraints on national funding for research we need to maximise our participation in European Programmes. Following on from the excellent workshop by Sean McCarthy on Horizon 2020, we will be rolling out training programmes to help individual researchers negotiate the EU research

funding labyrinth. The first of these training programmes started in the Institute for Business, Social Sciences and Public Policy (formerly CISC) in March. Over the coming months they will be made available in all our priority research areas.

The pages that follow are testament to the quality and quantity of our research – and your willingness to share your stories and showcase your milestones with others inside and outside our University. So, keep those stories coming! Once we know, the rest of the world will too!

**Professor Terry Smith,
Vice President for Research**

Welcome to the third edition of Research Matters. It's our way of communicating the achievements of the many hundreds of researchers at NUI Galway, and of keeping students, staff, and the wider community abreast of our unique contribution to the great and expanding store of human knowledge.

From the Editor

Albert Szent-Gyorgyi said: "Research is to see what everybody else has seen, and to think what nobody else has thought." Staying true to this, the third edition of Research Matters highlights work by NUI Galway researchers who have stayed true to this principle with many exciting developments occurring since our last publication.

This edition examines the many links between engineering, society, medicine and the world around us. One example is the 'quiet revolution' in urban planning and management, as the possibilities of environmental sensors, high-speed networks, coordinated transportation, smart buildings and intelligent software have facilitated the evolution of our traditional metropolis into the smart city. An upcoming seminar entitled 'Smarter Cities - The Future', will highlight much of NUI Galway's capability in this area. Read all about it on Page 3.

Award-winning researchers at NUI Galway are undertaking a 'noisy revolution' of their own in the area of nerve stimulation. A new technique relies on the principle that

the nervous system is an electrically noisy transmission system. The team has found that applying a 'noisy' electrical signal to the affected nerves enhances the nerve signals and their transmission. See the full story on Page 10.

This magazine showcases recent achievements and highlights the impact of our research. Please contact the team with feature suggestions, comments and recommendations at researchmatters@nuigalway.ie and we will do our best to include your contributions.

**Sinéad Ní Neachtain
Acting Editor**

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Smarter Cities - The Future

According to the United Nations, it is estimated that more than two-thirds of the world's population will live in urban areas by 2030, a near five-fold increase on the 14% in 1900. While this growth demonstrates what for many is "the triumph of the city", it has also led to many challenges and difficulties for urban planners and city dwellers. Among these is the continual struggle to manage key services operating in isolation, as there is often a lack of coordination across essential utilities such as housing, transportation, energy, water, waste or public safety. However, a "quiet revolution" in urban planning and management is now underway, as the possibilities of environmental sensors, high-speed networks, coordinated transportation, smart buildings and intelligent software have facilitated the evolution of our traditional metropolis into the smart city.

Smart city services are instrumented, interconnected and intelligent. They exist in a continuum of interacting systems-of-systems, such as transport, energy and water provision. This instrumented and interconnected system presents challenges along many dimensions – and in particular the challenge of addressing interoperability, and coping with extreme volume demands and variability. A smart city fabric provides a unifying platform that supports integrated city operations, providing accessible, transparent and accountable data and service sharing between public services and citizens of the city. Built on top of an open, standard-based architecture, the fabric provides advanced capabilities around collaboration, sharing, mobility, multi-lingual translation, cyber security and privacy.

This fabric can also provide context-sensitive visualisation tools to increase citizen interaction and provide a platform for third-party software developers to create useful new applications that leverage the available data sets and services. Further progress can be made through the use of imaginative and collaborative partnerships between local authorities, utilities, universities and the private sector – whether it is bus companies or software providers. Such initiatives are the defining characteristics of

'smart thinking', according to leading figures in cities around UK and Europe. All agree that so-called 'smartness' – which at its most basic level is about using new technology to improve lives – is necessary to adapt to the demands of urban growth.

Cities, as hubs of the global economy, are also the focal points for this transformation. In the immediate future, three interconnected factors will place even more emphasis on the role of cities in talent-based economic development:

- The world is at an unprecedented level of urbanisation.
- Cities contain an increasingly large share of the world's highly skilled, educated, creative and entrepreneurial population, giving rise to highly concentrated and diverse pools of knowledge and knowledge-creation networks.
- Cities can support large-scale business and investment networks that create economies of scale in absorbing and extending innovation.

To compete in new economic environments, cities will need to better apply advanced information technology, analytics and systems thinking to develop a more citizen-centric approach to services. By doing so, they can better attract, create, enable and retain their citizens' skills, knowledge and creativity.

NUI Galway is research-active in many aspects of the smart cities domain. Dr Michael Hartnett, College of Engineering & Informatics and Ryan Institute, in conjunction with his colleague Dr Stephen Nash, is involved in research in many aspects of hydroinformatics. Recently they have developed a model capable of simulating combinations of river and coastal flooding in urban areas using ultra-high spatial resolution. The model results can be visualised over Google Earth maps to identify individual streets that become flooded. Research is ongoing to develop this into an operational forecasting systems for cities such as Cork and Dublin. Also, a recently deployed radar system on Galway Bay is streaming large amounts of realtime oceanographic data to servers at NUI Galway for updating models and providing data to users of the bay. A major component

of this research is the development of robust data assimilation techniques for ocean/coastal models; this research is being co-funded by IBM. This research is part of the SmartBay research project funded under PRTL V which is being carried out in conjunction with the Marine Institute and other partners. The radar data is also being used to provide information to the MAREN project, which is part-funded by the European Regional Development Fund (ERDF) through the Atlantic Area Transnational Programme (INTERREG IV).

Dr Marcus Keane has extensive knowledge and experience in the development of integrated Building Information Models (BIM) that encapsulate the processes and data associated with holistic environmental and energy management in buildings and industrial processes. Dr Keane founded the Informatics Research Unit for Sustainable Engineering (IRUSE) at University College Cork in 2000 and expanded IRUSE to be a dually affiliated research unit with NUI Galway, where he is now based. IRUSE has developed BIMs for a number of buildings both in Ireland and the US through collaborations with partners in Lawrence Berkeley National Laboratory (LBNL) at the University of California at Berkeley. The BIM models developed by IRUSE are providing major advances in the development of smart buildings within smart cities.

Dr Jim Duggan specialises in policy modelling to support public health planning and responses, and has led an SFI-funded research team in developing computational modelling software that can simulate the outbreak of epidemics, and evaluate the impact of public health responses, such as social distancing, the establishment of vaccination centres, and capacity planning for intensive care units. In the future, this research will be integrated with key smart city environmental and sensor data, and so provide public health officials with real-time decision support capability.

by **DR MICHAEL HARTNETT**
College of Engineering & Informatics
and Ryan Institute

The forthcoming seminar, 'Smarter Cities - The Future', will highlight much of NUI Galway's capability in this area. The event is being promoted through the Information Technology Association of Galway, ITAG, and is being sponsored in part by IBM. The seminar, taking place in May, will highlight current research being carried out within Ireland in this domain and promises to stimulate debate for future direction.

Dr Michael Hartnett

Slowing A Runaway Train

Researchers at the Centre for Chromosome Biology at NUI Galway have found a potential weakness in the armour of the neurodegenerative disease that is Huntington's. Huntington's disease is an incurable, inherited disorder that causes uncontrolled movements, emotional disturbances, and severe mental deterioration. It affects over 100,000 people worldwide, with another 300,000 likely to develop symptoms in their lifetime. There is currently no way to halt progression of the disease, and available treatments are only designed to manage the symptoms.



The new research identifies specific enzymes called HDACs, or histone deacetylase complexes, as positive agents for the mutation that underlies Huntington's disease. When HDACs are active, they promote the disease-causing mutation in cells. The new research found blocking these HDACs with experimental drugs greatly reduced the risk of mutation.

"Ongoing mutations in the brain of Huntington's patients are thought to drive progression of the disease," said Professor Robert Lahue of NUI Galway's Centre for Chromosome Biology, and lead author on the research paper. "Our research examines why a mutant gene gets worse through generations, similar to a runaway train. For the person who has inherited this disease, the train has already left the station and is out of control and during that person's lifetime the train gathers speed.

Our discovery suggests that inhibiting HDAC function slows down the mutation process, and thereby could slow disease progression, similar to impeding the fireman who feeds the train's boiler. A key finding of the research was to pinpoint specific HDACs for selective inhibition." The novel findings were published in *PLoS Biology*, a leading online journal from the Public Library of Science.

Several laboratories in the US are currently testing new HDAC inhibitors in laboratory models for efficacy and safety in related fields. Professor Lahue and his research group hope to work with these US labs to evaluate the effect of HDAC inhibitors on the mutational process.

"Huntington's is a particularly cruel disease, as it is passed from parent to child, often with increased severity or earlier onset," comments Professor Lahue. "With modern genetic testing, people can now establish whether they

received the mutant gene from their parent, but then they live a waiting game for the onset of symptoms, which usually appear around the age of 40."

Professor Lahue emphasised that the HDAC inhibitors are still experimental, and that their development to potential drugs is still some way off. "It is very exciting that basic research at NUI Galway, funded by Science Foundation Ireland, has created a new possibility for helping Huntington's patients and their families."

The findings may also have implications for research into certain other neurological disorders, such as myotonic dystrophy type I, a type of muscular dystrophy caused by the same sort of mutation as seen in Huntington's.

Every Patient is Different

Much of what we know about the human body is described formally as sets of mathematical equations. While these provide a succinct and accurate description of the general behaviour of the system being modelled, they are not attuned to individuals. Every patient in an Intensive Care Unit has different medical problems so, for example, their response to drugs may be quite different from the normal response.

For medical models to be useful in understanding how individual patients will respond, model parameters must be 'individualised'. In the ICU, real-time data from bed-side monitors and lab results are used to tune models to individual patients, but some results are infrequent and there can be errors in data (for example if leads are disconnected or monitors need recalibration).

Researchers at NUI Galway and University Hospital Galway have developed a methodology for automatically mapping systems of equations to a Dynamic Bayesian Network (DBN) representation. The framework re-estimates model parameters efficiently and continuously, based on accumulated evidence. It provides principled handling of data and model uncertainty, and facilitates integration of multiple time-series. It makes a clear distinction

between true and measured values, to account for data uncertainty.

The Researchers have applied their methodology to track and predict blood levels in patients in Intensive Care Units who are in receipt of intravenous glucose and insulin. They have evaluated it on 12 critically ill patients. Their approach out-performed an existing approach whereby model parameters are re-estimated using a non-linear optimisation, very substantially in some cases.

The methodology is effective at accounting for uncertainty in the reactions of unstable patients, uncertainty in measurement errors, and data that is intermittent and must be estimated when it is absent, allowing re-estimation of model parameters and reasoning with sparse and potentially unreliable data. While it has been applied to the ICU patient

monitoring, it has applications in many branches of Science and Engineering.

This is interdisciplinary research funded by Science Foundation Ireland, involves collaboration between Information Technology, Mathematics, and University Hospital Galway.

To learn more about the work, go to <http://datamining.it.nuigalway.ie>

The researchers on this project include Dr Michael G. Madden and Catherine G. Enright, College of Engineering & Informatics; Dr Niall Madden and Nhan Anh Thai, School of Mathematics, Applied Mathematics & Statistics; and Professor John G. Laffey, University Hospital Galway.

by **DR MICHAEL G. MADDEN**
College of Engineering & Informatics

At Your Fingertips

Two IT experts from NUI Galway and a Pharmacist from Galway University Hospital have pioneered computer software that gives doctors and pharmacists more certainty in calculating a prescription for kidney patients, premature babies and cancer patients, whose condition makes them especially vulnerable to drug toxicity.

Like many hospitals, University Hospital Galway (UHG) uses a hybrid system to maintain patient records. Some wards have an electronic health record (EHR), while others are still dependent on paper records.

The continued use of paper records represents a significant risk when it comes to prescribing and managing certain drugs, because calculating the dose involves error-prone, multistep, algebraic calculations. This is a particular risk for patients that are already more susceptible to drug toxicity (like kidney or cancer patients and premature babies).

While drug dosage calculations in this area have been automated for some time, the software solutions do not necessarily comply with local hospital guidelines that undergo constant change. They are often stand-alone calculators that do not provide any further feedback to clinicians. The quality of such calculators varies enormously and transparency of the validation process borders on non-existent.

In an effort to address these issues Dr

Michael Schukat and Mr Bhaskar Rudroju (Department of IT) formed a collaborative project with Clinical Services at UHG pharmacy (led by Acting Chief 2 Pharmacist Mr Peter Kidd). They have now produced a tool that allows pharmacy staff to define and validate complex drug dosage regimes, which are then available to clinicians for drug dosage calculations via a range of platforms (e.g. from a mobile phone to a desktop PC). The software can also report the data to doctors on their rounds, so that at-risk patients may be easily identified.

Presently the tool is being populated for testing with the assistance of the antimicrobial and renal teams. The software will also serve as a teaching aid for medical students prior to their clinical placement in June 2012.

Interest in the software has already been shown by a national cancer authority and a pharmaceutical manufacturer.

**by DR MICHAEL SCHUKAT
College of Engineering & Informatics
and PETER KIDD, University
Hospital Galway**

Research Project on Irish Historical Pageantry

Professor Joan Fitzpatrick Dean (University of Missouri – Kansas City) is a Moore Institute Visiting Fellow 2011/2012. She is currently completing a project on Irish historical pageants, such as the one illustrated in the image opposite. Historical pageantry runs throughout twentieth-century Ireland: from the Gaelic League language processions through the pageants at Castleknock and St. Enda's, the suffrage Daffodil Fete in 1914, the hugely popular military tattoos in 1927, 1929, 1935 and 1945, and pageants staged during the first four Tóstals. These civic spectacles mobilised large numbers of people, including the Army, to impersonate Irish historical figures in festive, often imaginative, presentations of Irish history.



Fionn and his warriors:
Fionn and the Fianna, as represented by members of the Free State Army in the 1927 Grand Military Tattoo. Grand Military Tattoo and Fireworks Display: Lansdowne Road, Dublin September 17, 21 and 24 (Dublin: Dublin Civic Week, 1927).

Research That Hit The Headlines

Super-sized heart valves, seaweed as biofuel, and cornea transplants - just some of the research at NUI Galway that hit the headlines lately.



Research Breakthrough Shows Promise in Offsetting Cornea Transplant Rejection

Success rates for cornea transplants could be greatly improved following a major advance in genetically modifying donor corneas. Scientists at NUI Galway's Regenerative Medicine Institute (REMEDI) have determined a method, in pre-clinical trials, to genetically modify donor corneas so that they are less likely to be rejected by the host immune system. With more than 100,000 procedures a year worldwide, cornea transplantation (keratoplasty) is the most frequent transplant operation. The research team at NUI Galway, funded by Science Foundation Ireland, was led by Dr Thomas Ritter. Mr Gerry Fahy, Consultant Ophthalmologist at University Hospital Galway, was also involved.



Initiative to Develop the Potential of Seaweed as Biofuel

Researchers at NUI Galway's Ryan Institute are involved in a €14 million European initiative to develop the potential of algae as a source of sustainable energy. As a partner, NUI Galway is responsible for the initial step of producing some of the biomass required for conversion to biofuel. Currently, algal bioenergy technologies are immature, but rapid advances are being made. NUI Galway's part of the 'EnAlgae' project is valued at almost €1.2 million, over the next four years. The project will focus on the cultivation of some of Ireland's native kelp species (large brown seaweeds, commonly seen cast up on the beach after a storm). Growth of the seaweed crop occurs in two phases, the first phase of which is being carried out at the Ryan Institute's Carna Research Station, Co Galway.



UCB Pharma and DERI to enhance open source RDB2RDF mapper D2RQ through joint collaboration

UCB Pharmaceutical Company and DERI's Linked Data Research Centre at NUI Galway announced the start of a collaboration to enhance the D2RQ open source software project. D2RQ has long been the software of choice when exposing relational data sources as Linked Data. UCB is pleased to be able to fund the next evolution of D2RQ with the main aim of the project to enhance some core enterprise features and introduce new and exciting product features including alignment with the latest R2RML W3C standards.

<http://d2rq.org>

New Research Report On Older Women Workers' Access To Pensions

Researchers at the Irish Centre for Social Gerontology and the Global Women's Studies in conjunction with co-researchers at Queens University, Belfast recently completed a mixed methods study using an innovative lifecourse approach to investigate the very topical issue of women's access to pensions in Ireland and Northern Ireland. This CARDI-funded cross border research study on older women workers access to pensions highlights that gender norms continue to result in vulnerabilities for women workers. These include interrupted work histories, insecure part-time employment with low wages, and limited pensionable employment opportunities. The study reports recent data from the Department of Social Protection that indicates only 27% of women receiving the contributory state pension receive the maximum rate and that the majority continue to rely on derived benefits (based on husband's contributions). In the context of the current focus on pensions, this study highlights important gaps in terms of women's access that need to be addressed in the reform of the pension system in the Ireland and Northern Ireland.

The authors of the report, entitled Older Women Workers' Access to Pensions: Vulnerabilities, Perspectives and Strategies are Dr. Nata Duvvury, Global Women's Studies, Dr. Aine Ni Leime and Dr. Aoife Callan, Irish Centre for Social Gerontology. Dr. Linda Price and Mark Simpson, Queen's University Belfast

Research That Hit The Headlines

Decoding the Genome of Pigeonpea

A global scientific team, including Science Foundation Ireland (SFI) funded scientists from the Plant and AgriBiosciences Centre (PABC) at NUI Galway, have succeeded in sequencing the entire DNA genome of a legume crop called pigeonpea. Pigeonpea is a staple food for millions of the world's poorest people who live in semi-arid regions where only drought-tolerant crops such as pigeonpea can be cultivated. The international initiative to sequence the pigeonpea genome was led by Dr Rajeev Varshney from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and harnessed the research capacity of research labs from India, China, USA and Ireland. Professor Charles Spillane, Dr Mark Donoghue and PhD student Reetu Tuteja from the NUI Galway Plant and AgriBiosciences Centre (PABC) were scientific partners involved in the international initiative leading to the research breakthrough.



Professor Charles Spillane of NUI Galway discussing the latest plant research results with PhD student Antoine Fort



Super-sized Heart Valve Provides Clues to Blood Flow

Researchers at NUI Galway have developed a super-sized model of a heart valve, which may lead to a new generation of cardiovascular devices. Every year, mechanical valves are inserted into about 125,000 patients worldwide who have heart valve disease. However, the valves can lead to unnatural blood flows, which can trigger a clotting reaction. The work at NUI Galway is trying to better understand how blood flows through prosthetic valves and in particular through the valve hinges, so that the clotting reaction can be ameliorated. Researchers have developed a working model valve, which is six times the size of a normal valve and runs 100 times slower. The work has been carried out by Dr Nathan Quinlan and Dr Alessandro Bellofiore of the Biofluid Dynamics group at the National Centre for Biomedical Engineering and Science (NCBES), NUI Galway.



Researchers Open New Study for Rare but Devastating Cancer

A new clinical study has opened in Ireland for a rare but devastating type of bone marrow cancer. Irish patients with advanced myelofibrosis will be able to participate in a new study of combined oral medications for their disease. Frank Giles, Professor of Cancer Therapeutics at NUI Galway and Trinity College Dublin, is leading the study with Eibhlin Conneally, Consultant Haematologist at St James's Hospital, Dublin. The Irish study is being run in conjunction with centres in France, Italy, and the UK and patients may be enrolled at either Galway University Hospitals or St James' Hospital.

Researchers Make Some Noise

An award-winning research team at NUI Galway is working on a new technique with the potential to treat a wide range of medical conditions.

The new technique relies on the principle that the nervous system is an electrically noisy transmission system. The team has found that applying a 'noisy' electrical signal to the affected nerves, enhances the associated nerve signals and their transmission.

The team have observed that lost sensation in the feet (which is known to lead to loss of balance, foot ulceration and ultimately to amputation), may be partially restored by applying low voltage electrical noise to the affected nerves, through the skin, via electrodes.

If the transmission characteristics of nerve signals can be enhanced through the use of a wearable electrical device, then there is the potential to treat a wide range of medical conditions.

Currently there is no treatment available to restore neural function lost due to aging and diabetes. With the current dramatic rise in both of these populations, the need for such treatments is greater than ever.

This work, funded by the Health Research Board, brings together a multidisciplinary research team including Dr Paul Breen and Professor Gearóid Ó Laighin (Electrical & Electronic Engineering, NUI Galway), Dr Caroline McIntosh (Podiatry, NUI Galway), Dr Sean Dinneen (Diabetes & Endocrinology, UHG and School of Medicine, NUI Galway), Dr Leo Quinlan (Physiology, NUI Galway) and Professor Jorge Serrador (Department of Veterans Affairs, NJ, USA and Neurology, Harvard Medical School).

The team believes this breakthrough may only be the starting point for this research. According to Dr Breen, "What is really exciting is that, while we have shown this to have an effect on the lower limb, theoretically it should work on any nerve. Potentially we could build a whole range of devices for a variety of neural problems".

According to Professor Gearóid Ó Laighin, "This work, funded by the HRB and facilitated by a SFI Walton Fellowship, shows the potential

for producing highly innovative medical solutions, when a team of researchers from diverse disciplines like Engineering, Medicine, Podiatry and Physiology, pool their expertise to solve complex medical problems."

The researchers were awarded a prestigious Wounds UK Award for a presentation given at the 2010 Annual Wounds UK Conference, for the new technique. The Wounds UK awards "recognise the outstanding achievements of those who are improving standards in wound prevention and management, through research, clinical audit and practice development".

Latch On!

Turning Science into Art



Using science to inspire art is a novel way to communicate research and engage people with science. This is exactly what a ceramic artist from GMIT, Veronika Straberger and I did when we paired in Autumn 2011 to create the ceramic street art installation 'Latch On!', inspired by my botanical research.

In my work, I look at native hemiparasitic plants – a curious group of meadow herbs that behave like vampires, yet are positive for biodiversity. The roots of these plants latch on to roots of vigorous meadow grasses using specialised clasping structures called haustoria. In this way they are able to steal water and nutrients from the roots of host plants, having a negative impact on their growth. As a result, weaker species of meadow plants that are not subjected to parasitic attention can gain competitive advantage, thereby recolonising monocultures and increasing plant diversity.

'Latch On!' (latch-on.blogspot.com) is one of two projects commissioned as part of the Guerrilla Science Initiative for the Galway Science and Technology Festival 2011. Guerrilla Science is an NUI Galway/GMIT collaboration, designed and delivered by researchers from the School of Education, Ryan Institute, and Discipline of Marketing as well as the CKI, Research Office, Art Gallery and GMIT's Art

& Design College. The main goal of Guerrilla Science is to translate a scientific concept or aspect of research into a highly visible piece of artwork that will catch people off-guard and encourage interaction, inquiry, and learning.

'Latch On!' fits the Guerrilla Science bill perfectly and Veronika and I worked intensively together for five weeks to create our ceramic artwork. The process involved visits to the field and lab, as well as long hours of clay work in the art studio at GMIT. Microscopic images of haustoria, taken as part of my PhD work, were transferred onto approximately 400 glazed tiles using decals. Mimicking the behavior of haustoria, for two weeks the tiles latched on to buildings around Galway City, challenging the viewer to react. A large, interactive piece was displayed in the Orbsen Building in November, at the Galway Science and Technology Festival Exhibition.

As part of 'Latch On!' the principles of hemiparasitism were successfully translated

into the language of art, and socio-economic parallels were drawn. Colourful tiles latched on to grey walls increasing artistic diversity of blank canvas spaces, just as hemiparasites encourage colourful flowers in meadows. Many small local businesses participated in the project by displaying the tiles and window adhesives, highlighting the importance of economic diversity in the city. Finally, as the usefulness and importance of hemiparasites is a hot topic of scientific debate, so is the value and status of public street art versus a need for its control. Latch-On! was welcomed by Galwegians, encouraged questions from the public, and helped communicate a complicated scientific concept in a creative way. Thanks to everyone in the NUI Galway and wider Galway communities who supported this project.

by ANNA PIELACH, BOTANY
& PLANT SCIENCE AND RYAN
INSTITUTE

Profile: Professor Lokesh Joshi

There are exciting times ahead for researchers within the Glycoscience Group at NUI Galway as they embark on new research into how sugar changes are important for the human body. Glycoscience is the study of the complex sugars which cover all cells in the human body and many of the proteins in the bloodstream.



Professor Lokesh Joshi

These sugars and the proteins they bind to are like glue or velcro, linking our cells together. Understanding how these sugars change as the body grows or as disease develops could lead to several scientific breakthroughs. Some of the challenges being undertaken include improving baby formula, diagnosing cancer and how to maintain a healthy gut.

This area of research is expanding at the University under the direction of Professor Lokesh Joshi.

How did you become involved in Glycoscience Research?

Studying complex sugars (glycans) is a fascinating area because they are the most abundant biological molecules on Earth and are involved in everything from viral infection to fertilisation to cancer and infections. We know so little about these molecules and yet their potential to contribute to clinical and industrial applications is immense.

What are the biggest challenges facing your area of research?

New technologies are desperately needed in this field to understand these complex structures and their functions.

What is the most interesting research within your group at the moment?

All research in the lab is truly interesting! However, to pick among the best, we are developing novel ways to capture surface signatures of cells with huge potential in diagnostic and biomarker discovery fields.

How would you describe your research team?

Glycoscience as a research field is growing very rapidly. In the group, we have expertise in different fields to ensure that we are able to answer Glycoscience-related questions – we have chemists, molecular biologists, biochemists, technologists, bio-informaticians and clinicians in the group who work together

on various projects. Scientists working within the Glycoscience Group are exceptional in their fields of expertise. One of the team members, Dr Siobhan Glavey, has won prestigious HRB funding for her research.

Is there much competition in this area?

We believe in collaboration as opposed to competition. We have built a very strong Glycoscience community in Ireland (GlycoScience Ireland). The Glycoscience Group is very competitive nationally and globally and we have attracted significant funding from SFI, EU FP-7, HRB, DAFF, IDA, EI as well as industries from Europe, Asia and USA.

Another Look

The Complex Systems Workshop 'Self-Organization, Emergence and Nonlinearity in Physical, Natural and Social Systems' was held in NUI Galway in October 2011. The workshop was organised by Dr Srinivas Raghavendra and Dr Petri Piironen of the Complex Systems Research Centre (CORE), NUI Galway, with the Mathematics Applications Consortium for Science and Industry (MACSI) at the University of Limerick, the COST Action MP0801 and the expanded Institute for Business, Social Sciences and Public Policy (formally Centre for Innovation and Structural Change).

A unique aspect of this workshop was the ease with which scientists from natural, physical and social sciences discussed their research problems with one another as if they were talking to peers in their own fields. The experience was invigorating as it showed that beneath all the apparent separation of various knowledge domains and their sub-domains, different disciplines grapple with similar issues and face similar methodological challenges. It was also inspiring to listen to

presentations by eminent scientists from Ireland, Europe and the USA covering topics from cell biology, statistical physics, sociology, urban geography and IT, to economics and finance, and to see for the first time, that their questions and their research methods could be applied to questions within the business and social science disciplines. While these methodologies are 'new' to those accustomed to survey-based quantitative analysis, they present refreshingly new ways of thinking about research

problems. Such multidisciplinary research may seem challenging, but the workshop has clearly shown that significant developments have taken place and opportunities exist for those who want to explore these alternative pathways.

by Dr ELAINE WALLACE
Marketing Discipline
J.E. Cairnes School of Business
and Economics

Bright Ideas – Great Synergy

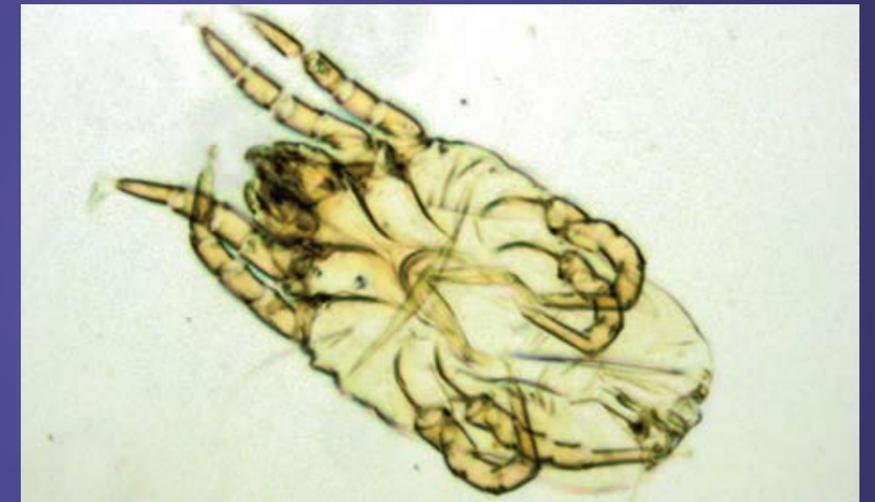
The hot topic at NUI Galway this term is 'The Synergy Project' - an interactive forum offering postgraduate students a platform to discuss present and future research with experienced academics, as well as their own peers, across disciplines.

The aim is to strengthen academic collaboration within and across disciplines to add value, build on current practices, and enhance the scope and quality of the research production process. The Synergy project aims to fulfil a number of criteria including: increasing the number of funded research projects; informing and assisting students on the pathway of progression, supporting inter-college collaboration; promoting collegiality;

broadcasting funding opportunities to the wider postgraduate population and improving on the current modality of how research is conducted. The launch of the Synergy Project took place in February and included ten postgraduate researchers from across the J.E. Cairnes School of Business and Economics, who showcased their work to date. Each College held events in March, sponsored by Bright Ideas, the Firelighter Group, and a University event is being organised for June. For more information log onto www.nuigalway.ie/bright-ideas

Research In Action: Because it just mite be a problem ...

In a joint collaboration between the Applied Ecology Unit and the Ryan Institute's Centre for Health from Environment, research is underway in an attempt to bridge the knowledge gap on dust mites in Ireland.



House dust mites are one of the smallest members of the Arachnids, or spider family, and to many people's surprise (and disgust!) inhabit almost every modern home. They feed primarily on shed human skin scales and other detritus material, which accumulate readily on furnishings, clothes and beds.

There are a number of allergens associated with house dust mites, and in this regard not all house dust mites are created equal, with some species producing more problematic allergens than others. When these allergens become airborne they can easily be inhaled, causing or aggravating conditions such as dermatitis, eczema and asthma. This is especially significant for young children, who are most susceptible to developing those conditions.

To date, much research has been conducted on dust mite ecology and epidemiology in the US, Asia, parts of Eastern Europe and Britain. Dust mite species and typical

seasonal population structures have been well studied in conjunction with their associated epidemiological risks. However, little or no comprehensive dust mite research has been carried out in Ireland.

PhD candidate David Clarke (co-supervised by Dr Mike Gormally and Dr Miriam Byrne) is leading the dust mite research effort at NUI Galway. In addition to establishing typical species composition and population structures in the primary habitats of dust mites (mattresses and furniture), he has also initiated a novel study investigating the presence of dust mites in child car seats. The aim of the study is to determine whether levels of dust mite populations, in conjunction with time spent by children in cars, is sufficient to elicit an allergic response in children that may be susceptible to contracting the associated health problems such as asthma and eczema.

A fourth-year project by Erica Dix, an Environmental Science student, is also

underway investigating species composition and population structures of dust mites in pet beds, and whether the presence of pets in a home have any influence on the mite fauna of house furnishings such as beds.

Since mite-associated diseases like eczema and asthma are ever present and even rising in Ireland, it is hoped that the results of this research will be used to develop cost effective mite mitigation strategies, ultimately reducing occurrences of the conditions the mites cause.

The researchers will be looking for people to volunteer their homes for study sampling, so if you are interested in taking part please contact davejclarke@gmail.com.

by DAVE CLARK,
Applied Ecology Unit
and Ryan Institute

Celebrating Success

Researcher scoops top Cancer Society Award



NUI Galway breast cancer researcher, Dr Róisín Dwyer, was named the first 'Irish Cancer Society Researcher of the Year' in March. Dr Dwyer scooped the top prize out of three shortlisted candidates for her research that investigated the potential of adult stem cells as vehicles for targeted delivery of therapeutic agents to breast tumours, which aims to significantly reduce tumour growth.

Dr Dwyer, is a postdoctoral research fellow in the Discipline of Surgery with the support of the National Breast Cancer Research Institute, and has worked on projects funded by the Irish Cancer Society.

Dr Dwyer was chosen as the winner for her outstanding research entitled, 'Adult Stem Cells: Have Tumour? Will Travel' which used Mesenchymal Stem Cells (MSCs) or adult stem cells that play an important role in wound healing and tissue generation, to deliver anti-cancer drugs directly to tumours. The study which tracked the migration of the MSCs and used them to activate tumour-killing drugs, resulted in a significant reduction in tumour growth, with no negative side effects observed. The ability to track MSC migration non-invasively before therapy is a major advantage to this novel approach for breast cancer therapy.

Travelling Scholarship Awarded

Biomedical Engineering PhD student Eimear Dolan has been awarded the National University of Ireland Graduate Traveling Studentship. This scholarship supports NUI postgraduate students to carry out parts of their research abroad, so they can enrich the learning community within NUI when they return. This studentship dates from 1910 and Eimear is one of five recipients in the sciences in 2011. Eimear, from Claremorris, Co Mayo, is doing her PhD studies in collaboration with Stryker Instruments at the NCBES at NUI Galway, under the supervision of Dr Laoise McNamara. Her research will add to our understanding of the effects of surgical orthopaedic cutting on cell and tissue integrity to optimise post-operative bone repair.

Smart Technology Scoops National Award

A new laser machining tool being perfected at NUI Galway, and being used to embed components on electronic payment cards, identity cards and ePassports, is one of this year's winners at the Irish Times InterTradeIreland Innovation Awards.

The tool, from the National Centre for Laser Applications at the School of Physics and the Spiddal-based AmaTech Ltd., is used to produce electronic inlays enabling contactless communication via radio-frequency identification. RFID is a technology that records the presence of objects using radio signals.

The NCLA-AmaTech initiative, led by Alan Conneely, focuses on precise laser machining of inlay substrates (e.g. synthetic paper) to enable the electronic sub-components (antenna coil, IC) to be directly embedded in the inlay.

It won the 'Organisational Systems and Process Innovation Award' at the Enterprise Ireland-supported Irish Times InterTradeIreland Innovation Awards.

Award-Winning



In a first for a scientist in the field working outside the US, one of Ireland's leading experts in stem cell therapy research has received the 2012 Marshall R. Urist Award for Excellence in Tissue Regeneration Research. Professor Frank Barry, Director of the National Centre for Biomedical Engineering Science (NCBES) receives the award from the Orthopaedic Research Society.

Recent Events

Writers' Development Programme and Retreat

As a mid-career academic I was well aware of the importance of publishing frequently and strategically but struggled to fit writing within an already very full semester. The Writer's Development Programme (October 2011) and Retreat (December 2011), organised by the Institute for Business, Social Sciences and Public Policy (formally Centre for Innovation and Structural Change) and the School of Business and Economics, was just what I needed to provide valuable perspective and focus in maximising my writing and publishing opportunities. The Programme dealt with very practical issues, such as targeting appropriate journals, dealing with peer review comments and that great enemy of authors, 'writers block'. Much more than that, however, the Programme and Retreat provided a supportive and encouraging environment, enabling me to develop much more productive writing practices.

by SHIVAUN QUINLIVAN,
School of Law
NUI Galway



EU Commissioner for Research, Innovation and Science, Máire Geoghegan-Quinn, met researchers from the Centre for Disability Law and Policy (CDLP) in Brussels in November 2011. The meeting was arranged by the CDLP as part of its EU FP7 DREAM (Disability Rights Expanding Accessible Markets) Initial Training Network. Professor Gerard Quinn and the DREAM consortium offered the Commissioner an overview of their project and she, in turn, spoke to them about the next round of the EU's Horizon 2020 research funding.

Campus Brainstorm

In February, BioInnovate and Bright Ideas combined to bring over 25 staff, students and engineers together to brainstorm with Dr Kevin Byron. This fun activity gave the mixed teams an opportunity to use some of the Brainstorm tools firsthand whilst challenging our existing patterns and at the same time creating new concepts. The feedback was very positive with most attendees looking for 'more' brainstorming and having found tools and techniques they can apply while the group interaction provided a forum where staff, students and industry employees could share their experience and insights.

Click on www.bioinnovate.ie or www.nuigalway.ie/bright-ideas for more information.

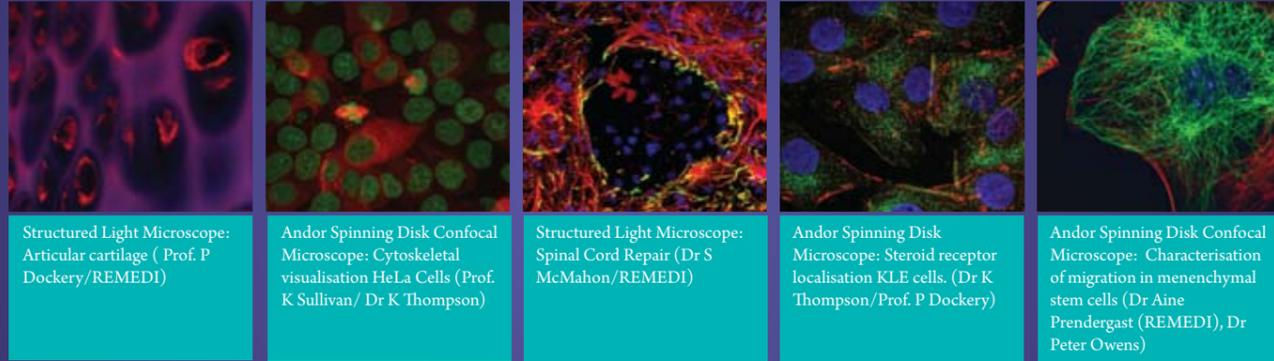
Moore Institute Visiting Fellows

The Moore Institute is hosting 16 Visiting Fellows from the Czech Republic, Holland, Ireland, Italy, Sweden, UK and US, for up to six months. The scheme is supported by the Library, the College of Arts, and Galway University Foundation.

Fellows are working on a range of topics, from the very broad – such as Groningen Professor Raingard Esser's work on 'Region, Memory, Agency in Eastern and Western Europe' – to the very specific, such as a project on the 1924 Olympic Games and the new Irish State by Professor Claire Culleton of Kent State University. Other topics include Irish drama and fiction, regional development, colonial settlement, the Troubles, the place of Ireland in Medieval Francophonia, and more.

Fellows will be giving seminars during their time at NUI Galway – see www.mooreinstitute.ie for more details.

Imaging at the Heart of Research



Structured Light Microscope:
Articular cartilage (Prof. P
Dockery/REMEDI)

Andor Spinning Disk Confocal
Microscope: Cytoskeletal
visualisation HeLa Cells (Prof.
K Sullivan/ Dr K Thompson)

Structured Light Microscope:
Spinal Cord Repair (Dr S
McMahon/REMEDI)

Andor Spinning Disk
Microscope: Steroid receptor
localisation KLE cells. (Dr K
Thompson/Prof. P Dockery)

Andor Spinning Disk Confocal
Microscope: Characterisation
of migration in menenchymal
stem cells (Dr Aine
Prendergast (REMEDI), Dr
Peter Owens)

Imaging is one of the fundamental tools underpinning nearly all aspects of modern Biomedical Research. With the explosion of physiological and molecular information in all branches of biology, appropriate imaging is essential for placing this functional information in a structural context.

For NUI Galway to be a centre for world-class biomedical research, it must have a coherent and complete Imaging Research Infrastructure including people and instruments. Providing and ensuring access to quality imaging technologies is an essential component of the research activities of the NCBES, REMEDI and NFB.

The Centre for Microscopy and Imaging, in Anatomy at NUI Galway, offers scientific research partners access to a variety of high-end light and electron microscopes and cutting-edge imaging software and analysis tools. The CMI is run by:

- Professor Peter Dockery, Facility Director;
- Two Facility Scientists: Dr. Peter Owens and Dr. Kerry Thompson (Funded via the recent PRTLIS stream Advancing Medicine through Discovery);
- Core Staff in Anatomy: Mark Canney and Pierce Lalor; and
- Core Staff in NCBES: David Connolly, Eadaoin Timmons.

CMI is a key node in the National Biophotonics and Imaging Platform. (www.nbpireland.ie)

Current research at the Centre includes investigations into the differences between the function and structure of the muscular layer

of the uterus of obese and non-obese women. During childbirth, obese women experience an increased risk of miscarriage, bleeding and caesarean section. This may be due to differences in the contractile muscular layer of the uterus. Researcher Eva Sweeney, under the supervision of Professor Peter Dockery, Anatomy, and Professor John Morrison, Obstetrics & Gynaecology, has examined tissue biopsies taken during caesarean section under light and electron microscopes to show tissue and sub-cellular structures. The team will also analyse the effect of adipocytokines, hormones secreted by fat cells, on the function of the muscle.

Dr Kerry Thompson is currently exploring the alterations induced in the female reproductive system after short-term exposure to environmental oestrogens and other Endocrine Disrupting Chemicals or EDCs. Previous research has suggested that these chemicals may contribute to conditions such as Infertility, Endometriosis and Dysfunctional Uterine Bleeding. This work includes analysis of the potential raid signalling and cell communication mechanisms, along with reorganisation of the internal cellular contents, that are sometimes employed by these chemicals to exert their effects. Future studies hope to analyse a broader range of these EDCs which may in turn aid our understanding of the

effects of these compounds on the reproductive tissues.

The primary base of the Centre for Microscopy and Imaging is within Anatomy but comprises of research teams from Chemistry, Physics, Biochemistry, MRI, NFB, REMEDI and the NCBES, all of which are based at NUI Galway and all of which are involved in Microscopy and Imaging. The aim of the Centre is to provide access to the Microscopic Imaging technologies available at NUI Galway that can be used to develop solutions in both the academic and industrial domains.

The development of this Centre will allow the University to harness the full potential of the arsenal of Imaging resources that exist on campus and nationally. The proper integration of complementary Imaging resources will greatly enhance efficiency and productivity in these important areas of research. The provision of core and development of core technologies/technologists will greatly enhance the research infrastructure at NUI Galway. This will ensure that the recent investments in research equipment and buildings translates to an increased efficiency of usage which in turn will provide a solid foundation for development of key research areas.

by **PROFESSOR PETER DOCKERY**,
Facility Director

Deep-Sea Gold Rush

Deep-sea hydrothermal vents are the hot topic of ocean research, and conservation issues a scientific priority. Vent systems face a threat from the mining of metal-rich deposits that are potentially very destructive to biodiversity at these sites, which are of extremely high conservation value.

Researchers from the Ryan Institute are at the centre of conservation efforts, and in April they will host an international workshop 'VentBase' to develop evidence-based criteria for assessing the likely effects of proposed mining activities. Ecological assessment of the effects of mining operations will be key to sustainably exploiting the resources at these very important habitats.

Hydrothermal vents are geological features that form in tectonically active areas of the sea-floor. Most are found in international waters in the deep sea. Seawater is heated by contact with magma and picks up metals in the form of sulphides. The hot water is vented back to the water column where it cools rapidly and deposits the metal sulphides to form clouds of metal-rich black powder and also chimneys surrounding the vents. The sulphide deposits form the basis of a unique ecosystem where many of the animals get food by hosting symbiotic bacteria.

The sulphide deposits are known as Seafloor Massive Sulphides (SMS) and are amongst the richest deposits of copper and gold. Recent

findings that some SMS are rich in rare earth metals (extremely valuable for use in the electronics industry) have increased interest in mining. The sea-floor in international waters is regulated by the International Seabed Authority (ISA), a United Nations body. The ISA has recently granted preliminary exploration licenses to Chinese, Japanese and Russian concerns to study the viability of mining in the Pacific and Atlantic oceans.

At present there is just one site (Solawara 1, Papua New Guinea) where mining is being actively developed by Nautilus minerals, under the guidance of the ISA. This development has led to many calls in the scientific community and in the media for a halt to mining at hydrothermal vent sites because of their high biodiversity value.

Ryan Institute researchers Patrick Collins and Dr Bob Kennedy have recently had the world's first quantitative evidence-based assessment of the possible effects of mining at the Solawara 1 site accepted for publication. It is the only holistic account in the scientific literature of the likely effects of mining at vent

fields, and these NUI Galway researchers are now considered experts on the subject.

The nearest hydrothermal vent site to Ireland, the Moytirra field, was discovered at 45° N at the Mid Atlantic Ridge in 3,300m of water by Patrick Collins and researchers from UCC and Southampton in the summer of 2011. It created great public excitement in Ireland to realise that we had a biodiversity hot spot like this nearer to us than we had imagined, and that we had the capability of exploring it using the Celtic Explorer and Holland I ROV (Remotely Operated Vehicle). Other parts of the Mid Atlantic Ridge (MAR) have been licensed to Russian miners for exploration. While actual mining is probably a decade away in the MAR, now is the ideal time for Ireland to take a central role in managing this unique biological resource.

by **Dr BOB KENNEDY**,
Ryan Institute

Outreach: Galway Science and Technology Festival Exhibition

Hundreds of NUI Galway staff, students and researchers took part in the Galway Science and Technology Festival Exhibition held in November. The event attracted 24,000 visitors to over seventy stands and exhibitions held in the Bailey Allen Hall and Orbsen Building. Industry experts including Cisco, Boston Scientific, SAP, and the main festival sponsors Medtronic along with other contributors such as GMIT, Galway Atlantaquaria, many local primary schools and a pool of volunteers from Taylors Hill secondary school, ensured the day was a huge success.

Images by AENGUS MCMAHON and HANY and CARMEL MARZOUK



Oisín Sammon from Galway Educate Together NS plays the mad scientist at NUI Galway's Biochemistry stand.



Aoife Foley, budding physicist, at NUI Galway's Physics stand.



Brendan Harhen NCBES (on left), Senthilkumar Alagesan REMEDI with Commissioner Geoghegan-Quinn at the Biomedical Engineering stand. Picture: Carmel Marzouk



Commissioner Máire Geoghegan-Quinn with world's youngest App developer Harry Moran (12) from Westport, Co. Mayo. Picture: Carmel Marzouk



Prof. Colin Brown, Director of the Ryan Institute (on left) talking to Commissioner Máire Geoghegan-Quinn and President of NUI Galway Dr. James Browne.



Dáire Smith (on right) of Scoil San Phroinsias, with Mark and Rebecca Gilligan, show off some of Dáire's paper bird sculptures.



The busy Environment, Marine & Energy exhibition space in the Orbsen Building Atrium.



David Hobbins from Medtronic explaining to Commissioner Máire Geoghegan-Quinn how a medical device works. Picture: Carmel Marzouk



Marine Microbiology PhD candidate Gary McCoy talks to visitors at NUI Galway's colourfull and educational Microbiology stand.

In Brief



Theatre Archive Collections

Archivists Vera Orschel, Barry Houlihan and Sarah Poutch have described a number of the University's theatre archive collections and published the descriptions online at <http://archives.library.nuigalway.ie/Guide/CollectionListCath.html#Theatre>.

These include the Druid Theatre Company Collection, Lyric Theatre/O'Malley Collection, Galway Arts Festival Collection, the Frank Bailey/Allen family Collection and the Thomas Kilroy Collection. The lists are done to the International Standard for Archival Description. Anyone wishing to consult the material can do so online, or in the Special Collections Reading Room in the James Hardiman Library. Information on the archives service is available at <http://www.library.nuigalway.ie/collections/archives/>

Pioneering New Publication on Italian Children's Literature

Lindsay Myers, Lecturer in Italian and Director of the BA with Children's Studies, has broken new ground by writing the first ever English-language monograph on the history and development of twentieth-century Italian children's literature. *Making the Italians: Poetics and Politics of Italian Children's Fantasy*, published by Peter Lang, charts the evolution of Italian children's fantasy from its first appearance in the mid 1850s to the present day. It traces the structural and thematic progression of the genre in Italy, and situates this development against the changing backdrop of Italian culture, society and politics. This innovative study, which draws on a variety of disciplines and approaches, is noteworthy for the way it sets a direction and provides a focus for future cross-linguistic research in the field. It was launched by Professor Peter Hunt, Professor Emeritus in Children's Literature at Cardiff University.

Creating Excellence in Dementia Care

An expert report that lays the foundation for dementia care was launched by Dr. James Reilly TD, Minister for Health, at a conference entitled 'Developing a National Dementia Strategy, in Trinity College Dublin in January 2012. The report estimates prevalence rates of dementia in Ireland, quantifies the economic and social costs of dementia, and assesses current service availability for people with dementia and best practice in dementia care nationally and internationally. The report, *Creating Excellence in Dementia Care: A Research Review for Ireland's National Dementia Strategy* – is the result of a joint collaboration between the Irish Centre for Social Gerontology at NUI Galway (Professor Eamon O'Shea) and the Dementia Services Information and Development Centre at Trinity College Dublin and St James' Hospital (TCD Associate Professor Suzanne Cahill and Dr Maria Pierce). The report was funded by Atlantic Philanthropies to provide evidence-based research to support a National Dementia Strategy, which the Government has promised by 2013.

Sales Law Group Report



The Sales Law Review Group Report, commissioned by the Department of Jobs, Enterprise and Innovation was launched by Minister Richard Bruton in October 2011. The culmination of two years of work by the Sales Law Review Group, it recommends major changes to existing legislation. Ms. Caterina Gardiner of the Law School at NUI Galway was a member of the Review Group, whose work is an important step towards updating sales law for the 21st century.

Study Calls Sodium Intake Guidelines into Question

For years, doctors have warned that too much salt is bad for your heart. Now a new study co-led by an NUI Galway clinical researcher suggests that both high and low levels of salt intake may put people with heart disease or diabetes at increased risk of cardiovascular complications. The study, published in the *Journal of the American Medical Association (JAMA)*, found that moderate salt intake is associated with the lowest risk of cardiovascular events, whereas higher intake of sodium was associated with an increased risk of stroke, heart attack and other cardiovascular events while low intake was associated with an increased risk of cardiovascular death and hospitalisation for congestive heart failure. The research was co-led by Professor Martin O'Donnell, Professor of Translational Medicine, NUI Galway and Dr Salim Yusuf, Population Health Research Institute (PHRI) at McMaster University in Canada and Hamilton Health Sciences. Professor O'Donnell is also Associate Director of the HRB Clinical Research Facility at NUI Galway and University Hospital Galway.

Spotlight On ...

Rosie Dunne

Research Services Librarian

Rosie Dunne offers a one-stop-shop of expertise and advice on the information resources and services at the James Hardiman Library. Her primary role is to support the research process, ensuring researchers have the skills and knowledge to exploit the Library to the full.



Rosie Dunne

Rosie runs a range of training sessions aimed at postgraduate research students and research staff, including keeping up to date with the literature; managing information with EndNote; and planning a systematic literature review.

The Structured PhD Graduate Research Information Skills module aims to enable students to develop and acquire a range of generic and discipline specific research skills. Students also gain an understanding of their practical application to the research process. Students who successfully complete the module will be awarded 5 ECTS. The module employs a blended learning approach, including attendance at face-to-face sessions and online courseware via Blackboard. Some 75 students have registered for 2011/2012.

There are regular training sessions on getting published, and Rosie also advises researchers individually. She will cover the publication process - from finding the right journal to submit to, through to assessing the

impact of a researcher's publication output once established as an author.

Bibliometric data are increasingly being used to assess the impact of research, and to track and evaluate research activity. Researchers need to be aware of the impact of their work. Bibliometric data can be used to demonstrate research achievement to inform funding proposals, report on research activity, showcase discipline strengths, and more. Rosie can offer assistance or advice on preparing research performance profiles. She can also compile bibliometric datasets for disciplines and schools on request.

Bhain Rosie leas as ranganna agus cúrsaí Ghaeilge thar na blianta agus ba bhreá léi cuidiú leat trí mheán na Gaeilge más fearr leat.

You can find out more about the Library's services and support for researchers at <http://www.library.nuigalway.ie/support/supportforresearchers/>

Email rosie.dunne@nuigalway.ie

As I See It:

The Creative Edge

The Role of Creative Industries in Economic Recovery

Ice Sculpture inside the Snow Castle (Lumi Linna), Kemi City, taken during a recent Creative Edge project partner meeting in Finland

The Institute for Business, Social Science and Public Policy at NUI Galway is to lead an international project focused on promoting the emerging creative economy in four Northern European regions. The project entitled, 'Creative Edge' brings together universities, development agencies and industry bodies from Ireland, Northern Ireland, Finland and Sweden to identify the current breadth and future scope of the creative economy in peripheral regions. This €1.1 million initiative is funded by the Northern Periphery Programme under Interreg 4C.

The 2008 financial crisis brought with it a drop in global demand, which in turn, resulted in a contraction of international trade that has seen many of the world's economies slip into recession. In Ireland, this has manifested itself in massive public spending cuts, increased company liquidations and longer dole queues. However, the creative economy both here and abroad has had a significantly more positive growth trajectory since 2008. World exports of creative goods and services reached \$650 billion in 2010 - nearly two and half times their 2002 level. Nationally, the importance of industries like film and television production, web design, advertising, publishing and digital media are of increasing importance, having grown from 2.7% to 3% of Ireland's GDP since 2006.

The 'Creative Edge' project is a timely one. The initiative itself has grown out of work carried out by myself and Dr James Cunningham and part funded by the Western Development Commission (WDC), which focused on the economic impact of the creative economy in the West of Ireland. This work pointed to the potential growth of the sector as well as the very positive spillovers to other sectors of the economy. Of particular policy relevance were the constraints highlighted by this research. Consultation with the sector

across a variety of disciplines from craft to App development showed that most people working in the creative sector in the West of Ireland found themselves confined both by access to international markets and their ability to share information and learn from contemporaries here and abroad.

These two shortfalls acted as the initial start point for the 'Creative Edge' project. In partnership with the Western Development Commission, NUI Galway engaged with the Northern Periphery Programme, who recognised the potential and significance of the project. They suggested collaborating with a similar project proposed by Film i Vasterbotten (Sweden) and Kemi-Tornio University of Applied Sciences (Finland). One year later a combined initiative involving Craigavon Borough Council (Northern Ireland) as a full partner, and the University of West Scotland (UK) as an associate partner, is fully formed and has at its core, four main objectives:

- Mapping the creative sector in peripheral European regions: an extensive exercise that will contribute to the growing academic literature on the impact of creativity on economic well-being.
- Creating an Export platform: providing creative industries from

peripheral areas with the opportunity to access international markets via real and virtual presences.

- Developing an Employment bank: for potential employees and employers in an economy where skills requirements vary at an increased rate. This bank will provide virtual and real meeting places for information and knowledge sharing.
- Providing creative places: one of the most obvious impacts of the current economic downturn is the rate of vacancy of high-street outlets. This part of the project seeks to match emerging creative talent with available space to create and showcase their work.

The project is in the initial stages and has received, among others, the backing of the Arts Council of Ireland, the Irish Film Board, and the Crafts Council of Ireland. The consensus is that this project has the potential to create a fertile environment for the creative economy that, in turn, leads to broader positive outcomes in terms of job creation, economic growth and local communities in peripheral regions.

by Dr PATRICK COLLINS
Institute for Business, Social Science
and Public Policy