



NUI Galway
OÉ Gaillimh

Research Matters

National University of Ireland, Galway

ISSUE 2 · AUTUMN 2011



Research Matters

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

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

nuigalway.ie



Bringing Sea and Sky
Research to Life

Journey on
the Wild Side

The Future
is Creative

[↑ CONTENTS PAGE](#)

[← PREVIOUS PAGE](#)

[NEXT PAGE](#)



[ZOOM IN +](#)

[ZOOM OUT -](#)

Letter from the VP for Research



Professor Terry Smith,
Vice President for Research

Welcome to the second edition of Research Matters from NUI Galway. The Research Office is proud to have the opportunity to showcase recent achievements of NUI Galway researchers, draw your attention to upcoming events and highlight the impact of our research. This publication represents a strong commitment from our university to communicate the relevance and impact of our research activities to our students and staff, key stakeholder groups, as well as the wider community.

Autumn marks the start a new academic year and I wish to extend a warm welcome to all of the new members joining our research community, including students on the PRTLI-5 Structured PhD Programme, and the Hardiman PhD Scholars, starting in October. I would like to encourage each of you to be an active member of our university research community and to explore opportunities for engaging with the local community to communicate the research you will be conducting.

NUI Galway has always strived to be nationally and internationally competitive and has succeeded in this objective in our selected priority areas of research. As stated in our Strategic Plan, significant engagement with the wider community is also a priority for us. A great deal of effort is being made in this area, much of it through the exemplary work of the CKI, as highlighted in this issue. Also I would like to take

this opportunity to offer my congratulations to Professor Andy Shearer and the team organising the upcoming EU Researchers' Night which is featured as this issue's cover story. This marks the very first EU Researchers' Night in all of Ireland and we look forward to this dynamic showcasing of NUI Galway's research to the general public. I would like to encourage even greater participation in these public events such as the ESOF 2012 Dublin City of Science to be held next summer. I am pleased to see a number of proposals put forth from NUI Galway and hope to see that enthusiasm continue with future calls for participation.

The Research Office is committed to providing support for our research community and has recently taken a number of important steps to provide an integrated Research Support Service to our researchers. One very important development to report is the relocation of the Research Accounts Office team to office space adjacent to the Research Office, which will enable us to work more closely together.

I look forward to working with you all in the upcoming academic year to ensure the continued success of research at NUI Galway.

From the Editor

Welcome to the second issue of Research Matters. Reaction to our first issue published in April was overwhelmingly positive and as such we've already seen the magazine increase in size and breadth. A special thank-you to the many staff and students who submitted content for inclusion- it has led to a wonderfully diverse collection of articles.

As a new academic term gets underway it is encouraging to see the range of research areas being pursued by our community. Most encouraging is the trend that weaves its way through a number of articles in this issue- that of research having a positive and significant impact here and abroad. NUI Galway research is helping

to improve lives both in our local community through projects such as CORA and DREAM as well as communities as far away as Asia and Africa through the work of Camara and 'Engineering for Humanity'. That so many of our researchers seek opportunities to put their research into action is both inspiring and reaffirming.

Please continue to be in touch with your comments and recommendations as well as article suggestions. It is through ongoing communication with our readers that the magazine will continue to grow and improve.

What's Ahead for September - December

- Sea2Sky Event, Leisureland, Salthill September 23rd
- Open Day September 30th & October 1st
- Galway Science and Technology Festival November 20th
- SU's Festival of Ideas October 10th - 13th

Contents

Featured Articles:

As I See it: Futures for the Ocean can Begin at Home



03

Bringing Sea and Sky Research to Life



04

Working to Address Bone Disease & Injury



06

Journey on the Wild Side



08

Profile: Zoë Popper



12

Editorial Board

Lindsay Deely
Éithne O'Connell
Dr Sarah Knight
Dr Meghann Drury

Valerie Parker
Dr Paul Kavanagh
David O'Connor
Dr Patrick Lonergan

Dr Paul Breen
Dr Jim Duggan
Sinéad Ní Neachtain

As I See It: Futures for the Ocean can Begin at Home

Many assessments of the future for the environment are negative, so much so that a report calling for action barely merits attention in the news. Recently, however, the results of an international workshop in Oxford had global press coverage. What the report conveyed was a sense of ocean experts coming together from across the globe to share experiences and yet all having the same message: things are as bad as the 'worst-case' scenario and many of the individual impacts, like climate change and overfishing, are acting together to produce even more negative outcomes.

Jeremy Jackson, a professor at the Scripps Institute of Oceanography in California, coined the phrase the 'rise of slime' to help explain the changes in the ocean. In the predicted slimy future, large fish and habitats like seagrass beds and coral reefs are absent from the seas, replaced by decaying mats of algae and jellyfish.

The global nature of some of the threats to the ocean can induce a sense of helplessness but a recent article suggests that we can address

some of the issues locally. Writing in the journal *Science*, Kelly and co-authors point out that ocean acidification can be affected by quite local processes. For example, run-off from the land, sewage outflows, changes in land use and a number of other processes can all affect the pH of coastal waters. In many cases, the solutions to these problems are already known, such as to improve and conserve wetlands that act to buffer nutrient flows. In other cases a little creative thinking is required, for example to reuse shell waste from aquaculture to buffer the pH in coastal sediments. What is encouraging is that the policy and legislative background are often already in existence to facilitate solutions. For example, the Water Framework Directive links processes in freshwater catchments with the state of coastal waters.

Of course, few communities or regions can rally around a piece of legislation. Progress on finding solutions at the regional scale to some of the challenges facing us requires means of engagement with individuals. This has been recognized even in such apparently clumsy

and bureaucratic structures as the Common Fishery Policy (CFP). The CFP is widely held to fail everyone as politicians cut deals over quotas, fishers face uncertainty and a top-down direction of their business, fish are wasted as discards and stock assessments continue to report examples of fish being overexploited. Reform of the CFP is looking to involve fishing communities more closely in co-management of stocks. A recent review gives an interesting overview of what makes co-management work. The most important factor is leadership: strong, respected individuals, with entrepreneurial skills who make personal commitments to the fishery. Also important is social cohesion, based on shared values and trust. The authors conclude that investments should be made to identify (and train) leaders and to build social capital.

I find the reduction of some of the issues to a local level reassuring. Research on what seem fairly local aspects of social and environmental issues may yield solutions that can be applied at the right scale to make a difference.

www.stateoftheocean.org
www.sciencemag.org/content/332/6033/1036.full
www.nature.com/nature/journal/v470/n7334/full/nature09689.html

by Professor Mark Johnson,
Ryan Institute

Bringing Sea and Sky Research to Life

On Friday 23rd September 2011 Ireland will host 'Sea2Sky' - its first ever European Researchers Night - in Salthill, Galway. This one day celebration of science in inner and outer space, is being organised by NUI Galway in collaboration with the Marine Institute and Galway Atlantaquaria and is funded under the European Union's Marie Curie Programme and Discover Science & Engineering.

The Galway European Researchers Night offers the opportunity for the public to engage

with scientists and their research in fun and interactive ways. For one day only these 'ordinary people with unusual occupations' will come into contact with visitors and will present their research work to the general public. Different exhibits exploring marine science, atmospheric science and astronomy will be set up throughout the venue. Participants will have a chance to learn more about whales and dolphins in Irish waters, see a mini-sea exploration vehicle, take a 3-D tour of the universe, check out live demonstrations, take part in a host of hands-on activities, and much more.

Researchers' Night is a Europe-wide event bringing together the public at large and researchers once a year on the fourth Friday of September. This is the first time that a European Researchers' Night event is being held in Ireland.

Sea2Sky is a free event that does not require tickets or advanced booking. Visit Leisureland anytime from 11am-11pm on Friday, September 23rd to take part. For further information visit

www.sea2sky.ie/wordpress

In Brief...



Ann Lyons and Lorraine McIlrath of CKI, on behalf of Campus Engage, published the first national survey giving the higher education sector an opportunity to take a 'snapshot' of civic engagement activities across Ireland.

The survey shows that considerable progress has been made in Ireland to develop civic engagement, albeit with few resources and uneven manifestations of strategic vision. It also demonstrates that it is both urgent and opportune to engage in a dialogue about how to effectively embed civic engagement in higher education in Ireland.

Having invited all HEIs in Ireland to participate, twenty-four higher education institutions took up the offer. This marks the first time that a survey of this nature has been carried out, representing an initial attempt to map the range of civic engagement activities across Irish higher education.

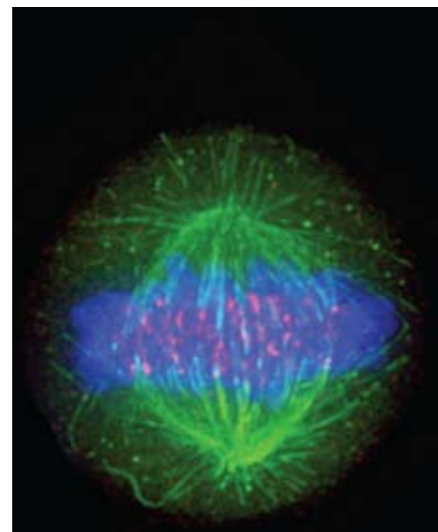
It has happened at a time when civic engagement in higher education is in its early stages of development and has provided individual higher education institutions (HEIs) with an opportunity to document and review the nature of their civic engagement activities.

This survey report is published at a particularly opportune moment, following the new emphasis on community engagement as core business in the National Strategy for Higher Education to 2030, which advocates that HEIs 'deepen the quality and intensity of their relationships with the communities and regions they serve, and ensure that the emergence of new ideas can better inform community and regional development.'

Researchers at the Centre for Chromosome Biology in Galway, led by Professor Kevin Sullivan, have recently published a new study in the online, open access journal PloS Biology.

Genes control everything from eye color to disease susceptibility, and inheritance - the passing of the genes from generation to generation after they have been duplicated - depends on centromeres. Located in the little pinched waist of each chromosome, centromeres control the movements that separate sister chromosomes when cells divide ensuring that each daughter cell inherits a complete copy of each chromosome. It has long been known that centromeres are not formed solely from DNA; rather, centromere proteins (CENPs) facilitate the assembly of a centromere on each chromosome. Understanding how a protein structure can be copied with enough precision to be stable, generation after generation, has been a mystery.

"By understanding the inner workings of this molecular machine at a deeper level, we can now think of how to build drugs that target cancer cell division with much greater precision", says Professor Sullivan. "It's important to see how basic research, aimed solely at understanding how life works, can contribute new ideas that support progress in medicine and therapeutics."



The second phase of the Landed Estates Database Project, covering the province of Munster, was launched on Friday 20th May 2011.

This phase of the database deals with the landed estates of Munster, c. 1700-1920. It contains information and a guide to research sources for over 2,000 estates and some 3,200 historic houses in Munster. The database was created by Brigid Clesham, Archivist, and Marie Boran, Special Collections Librarian at NUI, Galway. The Technical Adviser was Joe Desbonnet. The project was government funded under PRTLI 4.

Commenting on the launch of the database Professor Gearóid Ó Tuathaigh, academic Director of the Project, said: "This major research resource will be invaluable in assisting and supporting researchers - academics and members of the general public - working on aspects of the social, economic, political and cultural life of Ireland, notably rural society, from the early eighteenth century to the eve of the Great War".

A report into the developmental welfare state was launched on May 6th by Minister for Social Protection Joan Burton TD, at the Royal Irish Academy in Dublin.

The research report is entitled 'Community Engagement in Ireland's Developmental Welfare State: A Study of the Life Cycle Approach.' The research was funded by the Irish Research Council for the Humanities and Social Sciences.

"This research demonstrates the understanding that community organisations have of the needs of ordinary people in the current economic climate. It is extremely relevant to Government because it provides a clear picture of the realities of policy-making in challenging times," Minister Burton.

The NUI Galway research report is the product of an 18-month study and consultative research process by researchers at the Irish Centre for Social Gerontology and School of Business and Economics. The result is a highly relevant and timely research report that sheds light on current and future policy priorities for vulnerable groups.

Working to Address Bone Disease and Injury

Various diseases and injuries can cause our bones to fracture, and in many cases these fractures do not repair or cause severe pain and immobility. Tissue engineering strategies can exploit the capacity for biological cells to produce new tissues in the laboratory under conditions that aim to recreate the body's biochemical and physical environment. Such strategies have been successful for regenerating skin and cartilage tissue as clinical treatments, but approaches for recreating bone are not yet successful. A particular limitation is that biologists have come nowhere near being able to grow new bone because they can't get the cells to make strong bone tissue - it's jelly-like and you wouldn't be able to stand on it. Therefore new bone tissue regeneration approaches are needed to develop clinical treatments.

Dr Laoise McNamara, a Lecturer in Biomedical Engineering in the College of

Engineering and Informatics, has secured €1.5 million in funding from the European Research Council to examine how mechanical forces, like stretching and pulling on cells, can affect our bones.

One of the major barriers to advances in the field has been that engineers and biologists have worked separately with little interdisciplinary interaction. Answering these questions lies at the interface between engineering and biology and a major breakthrough in the field now requires a transdisciplinary approach. Dr. McNamara's research group seeks to break through existing barriers by combining engineering mechanics with biology through a number of innovative approaches to understand the complex mechanical environment in which bone cells live and to characterise the response of bone cells to mechanical loading in healthy bones and during diseases such as osteoporosis.



Dr. McNamara says "We need to load our bones; we need to walk around, to climb stairs in order to keep bone healthy. So we are looking to understand how exactly the cells monitor what sort of loads we are applying; how much we are walking and how heavy the weights are that we are lifting. Our understanding should give us an idea about what loading regimes should be appropriate at different stages during life and especially at the onset of osteoporosis - you could advise a patient of a strategy of exercise and loading, that could minimise bone loss. By understanding which cells are most appropriate, and what mechanical loads we put on the cell, we want to try and develop a method to grow new bone in the lab."

by Dr Laoise McNamara, Biomedical Engineering

Official Opening of Engineering Building

An Taoiseach, Enda Kenny TD, officially opened the new Engineering Building recently. The largest School of Engineering & Informatics in the country at 14,200 square metres, it houses 110 staff and approximately 1,100 students. The building is equipped with the latest facilities, providing a working example for engineering students to study.

According to An Taoiseach, Enda Kenny, who studied at the University in the mid-70s: "Engineering has a long and proud tradition

at NUI Galway and this magnificent new building is a fine example of how the University is responding to the changing needs in today's world. This new building begins a new era for engineering students here in Galway and will have far reaching impacts at local, national and international level. The work going on here will further develop NUI Galway's reputation as a major international research centre in the field of engineering. I want to wish all the students, researchers, lecturers and other staff who will work here well in the years to come."



Exploring NUI Galway's Rich History



Alice Jacqueline Perry (1885-1969) graduated with a first class honours degree in Civil Engineering from Queen's College Galway (now NUI, Galway) in 1906. It is understood that she is the first woman to graduate with a degree in engineering in Ireland or Great Britain. Indeed it is possible that she is the first woman to graduate as an engineer anywhere in the world.

Perry was born in Galway in 1885 and came from a family with strong engineering traditions. Her father, James Perry, was County Surveyor in Galway West and, together with his brother, founded the Galway Electric Light Company. Her uncle, John Perry was a Fellow of the Royal Society and was well known for inventing the navigational gyroscope. Sadly,

Alice's father died soon after her graduation in 1906 and this prevented her from continuing her academic career. She was appointed temporary county surveyor by Galway County Council in December 1906 in succession to her father. She held this post for six months until a permanent appointment was made. Her age and lack of experience dictated that she would not have been appointable to the permanent post. The fact remains that she was the first and only woman to have occupied the post of County Surveyor (County Engineer) in Ireland.

by **PAUL BREEN**,
PhD, Electrical and Electronic Engineering

Work in Progress: DREAMing of a Better Future for Disability Law

DREAM, Disability Rights Expanding Accessible Markets is a new Europe-wide network aimed at creating the next generation of disability policy entrepreneurs at European level and to generate research that helps the process of implementation of the disability treaty. The network is being led by the Centre for Disability Law & Policy which was recently awarded a grant of €3.7 million over 3 years to the Marie Curie network of 14 PhDs working on various aspects of the new UN disability treaty.

Professor Gerard Quinn, says: "The aim of DREAM is to create new opportunities, new openings through intelligent use of market forces. Our commercial partner is Digital Europe which is committed to an inclusive information society." The NUI Galway-led network is composed of several leading European universities ranging from Iceland to Spain. The students involved will receive paid placement with leading NGOs such as the European Disability Forum in Brussels. This is the single largest EU Framework 7 grant won by a research centre in an Irish Law School.

by **Professor Gerard Quinn - Director**,
Centre for Disability Law and Policy,
School of Law



Journey on the Wild Side

We talk about the weather incessantly, yet we seldom consider how short-term and longterm changes in weather conditions affect our wildlife. The astounding migration of painted lady butterflies reveals the influence of weather on wildlife.



In 2009, Galwegians were astounded by the arrival of hundreds of painted lady butterflies to their gardens from Morocco. The record migration was caused firstly by heavy rainfall which resulted in plenty of food for the caterpillars, and the timing of the epic journey coincided with a large anticyclone which brought warm, dry sunny weather and south to south-easterly airflow and the butterflies to Ireland. Climate change can affect the distribution and migration of animals in surprising ways. Researchers at NUI Galway are investigating climate change impacts on the timing, life-cycle and ecology of animals such as the Kerry slug or migratory Atlantic mackerel.

The Kerry slug is not considered to be a migratory species, yet climate change may affect its distribution. The slug appeared to be restricted to parts of West Cork and Kerry

until July 2010 when the slugs were found on granite outcrops and on the trunks of trees in a conifer plantation in Connemara. While Rory McDonnell recommended that research on these populations be undertaken to determine if they are distinct from those elsewhere in Ireland, climate change modelling projections by David Bourke indicate that the distribution of the slug could expand northwards, all along the western seaboard, as the number of frost-free days and the land area which is completely frost free will increase.

Migratory Atlantic mackerel have a close relationship with their surrounding environment, in particular, sea temperature. Mackerel seem to use changes in sea temperature to direct the migration in early Spring to the spawning grounds in the south. Preliminary results from Kath Hughes' research

indicate that the rate of the spring warming has a significant relationship with how far south mackerel migrate to spawn. While the North east Atlantic as a whole has been increasing in sea surface temperature in recent years, mackerel appear to be mitigating the effect of warming by tracking the ideal sea temperatures and spawning further north. Climate modelling projections indicate that by 2099 mackerel will have the ideal temperatures north of Scotland for spawning, so long as their food source moves with them! There are always many variables involved with the marine environment, but at least the mackerel can move with the times!

by **Dr Caitriona Carlin**,
Applied Ecology Unit,
Centre for Environmental Science

In the Community: Bridging Community and Research

NUI Galway is the first university in Ireland to offer postgraduate students the opportunity to apply their discipline-specific knowledge and skills to the design, conduct and reporting of a community-engaged research project. From September 2011, PhD students will have the option of working in small teams to address the research needs of voluntary or community organisations, as a credit-bearing module in a postgraduate research programme.



This module is one of the outcomes of the Community-Engaged Research in Action project (CORA), which was led by Dr Padraig MacNeela (School of Psychology), Dr Josephine Boland (School of Education), from the College of Arts, Social Sciences, and Celtic Studies, and Fintan Maher (Director of Development and Communications, COPE Galway). CORA aims to further enhance sustainable and collaborative research partnerships between the university and community – a process which began with COPE Galway.

The CORA research development event attracted participants from local community groups and academics from a range of disciplines at NUI Galway and the University of Limerick, demonstrating the widespread interest in working more closely together in the future. In opening the event, the President of NUI Galway, Dr James Browne, said that “the project offers the opportunity to realise many of the goals of the university in relation to engagement and partnership with our local community.”

“the project offers the opportunity to realise many of the goals of the university in relation to engagement and partnership with our local community.”

The module, “Engaging with the Community: Research Practice and Reflection,” was subsequently designed to support postgraduate students in learning the practice of community-engaged research, bringing together colleagues such as Dr Jamie Goggins (College of Engineering and Informatics), Dr Anne McFarlane (College of Medicine and Health Sciences), and Tomas and Mary De Brun (Centre for Participatory Studies).

This research initiative further builds on the international reputation NUI Galway enjoys for supporting civic engagement. The Community Knowledge Initiative (CKI) and ALIVE volunteering programme support thousands of students each year who work with community and voluntary groups. With the implementation of this module, we aim to build on this success by developing PhD students’ research skills in an applied, real world setting to meet a community need.

by DR PADRAIG MACNEELA,
School of Psychology

The Future is Creative

In the midst of economic and financial gloom a positive message is emerging from the west of Ireland.

What people want is authenticity; they want a product with a story, with a culture, something that is unique to them – the past was mass production, the future is bespoke, the future is creative”, the words of a representative of the emerging creative economy sector located in the West of Ireland. Ireland and the west are poised to take advantage of the growing international demand for products that are culturally embedded, products that are unique and deliverable across a variety of platforms from the physical to the virtual.

In July 2010, the Centre for Innovation and Structural Change successfully tendered for research work focusing on the economic impact of the Creative Economy in the West of Ireland. The project, commissioned by the Western Development Commission was published in July 2011. The work entitled, CreativeWest 2020, maps out the future growth scenarios for a sector that is internationally recognised as one with high growth potential.

The work was carried out by a research team led by Dr Patrick Collins of CISC. It involved three months of intensive consultation with representatives of the creative sector through research interviews and a survey of the 250 companies operating in the west of Ireland. A scenario analysis was employed to test the prospective impacts of policies to support the sector. The report concludes that with the

correct export and network promotion policies in place, the Creative Sector in the West of Ireland has the potential to double in terms of numbers employed by 2020.

According to Dr. Collins, the creative industries “...are a diverse group of companies that do not conform to the traditional model of the firm, for most, the product is a labour of love, for some the product is a one off, for others once developed its reproduction costs are virtually zero”. The creative sector involves a diversity of industries from graphic design and the visual arts to craft and film and television production. CreativeWest 2020 is an invaluable insight for policymakers concerned with employment creation and balanced sustainable development.

by DR PATRICK COLLINS,
Centre for Innovation
and Structural Change



The Role of Leadership in Public Sector Reform

A comprehensive report entitled *Leadership in the Irish Civil Service: A 360° Review of Senior Management Capability* has shown that “senior leaders are currently managing and leading without the authority, or indeed adequate control mechanisms, to effect real change”, as summarised by President James Browne recently. The project was a multi-level investigation of the nature and impact of human resource management practices on the Irish public sector and was led by Dr. Alma McCarthy of the J.E. Cairnes, School of Business & Economics.

The research was endorsed by An Taoiseach Enda Kenny, who said the Report was “very timely and strategically important as we forge ahead with public sector reform and modernisation in Ireland.”

Findings of the report were recently showcased to over 200 delegates attending the Conference on Leadership in the Public Service: Approaches, Capabilities & Challenges, hosted by the Centre for Innovation and Structural Change (CISC).

Over 140 senior managers from the Public Service participated in the study with over 1,200 leadership surveys completed. It concludes by setting out key recommendations for public sector leadership development and is likely to be of interest to Minister Brendan Howlin as he oversees the new Public Expenditure and Reform Department.

by GRACE WALSH,
Doctoral Student,
Centre for Innovation
and Structural Change

Recent Events

NUI Galway hosted an international European Molecular Biology Organization (EMBO) practical course, “MicroRNA-profiling from in-situ hybridization to next-generation sequencing” in May this year.

MicroRNAs are a class of newly discovered molecules within our cells that control the activity of genes. The regulation and function of microRNAs is still poorly understood, but they are required for the normal functioning of our bodies and when their behaviour is perturbed, disease can arise. As a result, there is enormous interest world-wide in developing microRNAs as diagnostic markers and even as therapeutics to treat a range of conditions.

Dr Howard Fearnhead, (Pharmacology and Therapeutics, School of Medicine at NUI Galway and organizer) said “MicroRNAs

are small RNAs that are critically involved in controlling an enormously wide range of cellular processes through direct posttranscriptional regulation of gene expression. The realization that these, and other small RNAs, are so important has driven an explosion of research activity that aims to identify, characterize and understand microRNA regulation and function. With this increase in interest comes the need to provide training in the cutting edge research technologies. The course at NUI Galway fulfils this requirement very well by bringing together highly motivated non-experts and a team of international experts to study, discuss and share a fascinating area of modern cell biology.”

Dr Niall Ó Dochartaigh of the School of Political Science and Sociology co-organised the Annual London Irish Studies symposium

at King’s College, London on 17 June on the theme, “The Provisional IRA: new perspectives”.

The Centre for Disability Law and Policy (CDLP) partnered the University of Harvard Law School Project on Disability to hold its third International Summer School on campus in June. Over 90 participants from 19 countries took part in the week-long School which was entitled The United Nations Convention on the Rights of Persons with Disabilities - From Paper Rules to Action.

Director of the CDLP, Professor Gerard Quinn commented on the purpose of the School, “It was all about restoring power to persons with disabilities over their own lives and giving them knowledge and skills based on the new UN convention on the rights of persons with disabilities.”

Profile: Dr Zoë Popper



school I belonged to a local nature club, including activities such as listening to the dawn chorus and bat watching, and helped (to some extent at least!) my parents in the garden.

Why did you become specifically interested in Botany?

Probably like many people I became interested in plants because of their structure and diversity - many are of course aesthetically pleasing. But, I also remember my brother and I growing plants in the kitchen (until they flowered) whose flowers emitted a really horrible smell. We also travelled a bit and so I came across durian fruits that also didn't smell too great, many different sizes, shapes, colours and scents of orchids (infinite variation within a single family), bottle trees, parasol pines, and many others which while being different from the deciduous woodland and meadow plants at home also shared some characters making them e.g. recognisable as a fern, a member of the daisy family. Naturally I wanted to know why such diversity existed and what its function was. This led me to an interest in plants at an ecological, cellular, and biochemical level (diversity at completely different scales!). I studied Plant Science at University and was extremely lucky in having many inspirational lecturers as well as the Botanics (The Royal Botanic Gardens Edinburgh) within walking distance.

What do you find most enjoyable and rewarding about your work?

It is never boring! There are a vast range of activities that I am involved in terms of both research and teaching. For example I might have a class of school children learning how to extract DNA from bananas, be lecturing an undergraduate class, be in the field identifying a plant with a PhD student, or in the lab using monoclonal antibodies to identify and localise specific sugars surrounding plant and algal cells.

Image caption: SIMON POPPER
I'm Not As Green As I'm Cabbage Looking, 2008

Acrylic on canvas
140 x 110 cm
Photo courtesy Galleria Lorcan O'Neill Roma

by DAVID O'CONNOR,
Ryan Institute

Some of the most interesting research going on in NUI Galway is literally in your gardens and on your plate. Dr Zoë Popper, a lecturer in Botany and Plant Science in the School of Natural Sciences, NUI Galway has edited a book entitled *The Plant Cell Wall: Methods and Protocols*. This book focuses on methods of research currently used to analyse cell walls; an area of research which has importance for food, fuel and fibre as well as being of interest because it controls how plants grow and how they interact with the environment.

Plant cell wall research is highly relevant to agriculture (the cell wall controls plant growth and is a major target of many commercial herbicides), the textile- and paper-making industries (cotton and paper are largely composed of cellulose, the main cell wall

component), and with regard to timber, food and fuel. For example the crunchiness of an apple is dependant on the properties of its cell walls. Additionally, the plant cell wall represents one of the main renewable sources of energy and is currently being investigated for exploitation for this purpose by many researchers worldwide. Furthermore, since the cell wall is the first line of defence for a plant's interaction with the environment it has been modified during evolution e.g. to be less digestible to herbivores and pathogens.

What interested you in science in the first place?

I don't really remember not being interested in science! However, my interest was certainly supported by excellent teachers and I very clearly remember a couple of classes at primary school; one in which we dissected a fish and another in which we drew crane flies. Outside

IDEAS | Creating Opportunities for Studentpreneurs in NUI Galway

SEEN, NUI Galway's student enterprise support service, launched a hot-desk facility for the summer of 2011. SEEN provides NUI Galway students who want to progress their business ideas the benefit of networking with like-minded students and on-campus support and resources.

The hot-desk facility was managed by the Technology Transfer Office (TTO) and SEEN. SEEN is a student run network which encourages entrepreneurship among the student populace. Since January 2011, SEEN has worked with students to bring their business and social concepts and ideas to a commercial reality.

Paddy Melia from the SEEN team adds, "We are delighted at the possibilities of this new facility. This space will act as a springboard for students with ideas and demonstrates how NUI Galway is leading the way in developing a culture for 'studentpreneurs' on campus." SEEN has also launched their website,

www.seen.ie, which is a first point of contact for students. The site provides NUI Galway students with the latest news, opportunities, and connections as well as details on how to access the hot-desk facility. The website and hot-desk facility demonstrate NUI Galway's commitment to entrepreneurship and enterprising students on campus. With the announcement of this additional support available to students, Professor Chris Curtin, Vice-President for Innovation & Performance says, "We are preparing the students of NUI Galway to drive forward the society and economy of the future."

by PADDY MELIA,
Postgraduate Student, Engineering

US microRNA therapeutic company collaborates with Surgery researchers

Breast cancer researchers in the Discipline of Surgery at NUI Galway have recently engaged in an exciting collaboration with Regulus Therapeutics Inc, San Diego, CA. Arising from a 2010 publication in the *Annals of Surgery*, "Circulating microRNAs as novel minimally invasive biomarkers for breast cancer" by HRB Clinical Research Fellow Dr Helen Heneghan and colleagues, Regulus approached the breast cancer research team to collaborate on the next stage of this study. The high-impact publication reported that increased levels of miR-195 and let-7a were present in the circulation of breast cancer patients and

that levels decreased to those comparable with control subjects following tumour removal. Regulus Therapeutics Inc. is a biopharmaceutical company leading the discovery and development of a new class of high-impact medicines based on microRNAs. Regulus is focused exclusively on the development of microRNA therapeutics. In June 2011 a license agreement between both research teams was reached with the assistance of the NUI Galway Technology Transfer Office.

MicroRNAs are small non-coding, stable RNA molecules that play critical regulatory roles in a wide range of biological and

pathological processes. Their role in cancer is of immense interest to researchers in this field. MicroRNA research has been ongoing in the surgery laboratory since 2006 under the direction of Dr Nicola Miller and Professor Michael Kerin. It is being continued by a team of researchers thanks to the financial support of the National Breast Cancer Research Institute (NBCRI), the Health Research Board and Molecular Medicine Ireland.

by EMER HENNESSY,
Disipline of Surgery



Research in Action - Students 'Engineer Humanity' Abroad

Providing students with the knowledge and skills to pursue their field of choice is central to the university's mission. Every so often however, programmes come along that enable students to put their training to use in ways that benefit communities. Such opportunities enhance the student's skill set, but also provide a vital opportunity to see the impact of one's degree firsthand. 'Engineering for Humanity' is just such a programme. A joint initiative between NUI Galway, Alan Kerins Projects and Foundation Nepal, it sees students from the College of Engineering & Informatics spend 7 weeks in Zambia and Nepal putting their engineering skills to work on projects of local interest. The programme is part of the Engineering Experience Programme, and is organised by Dr. Jamie Goggins of Civil Engineering. Students have been placed in Zambia for the last three years and have travelled to Nepal for the first time this year, through a new association with Foundation Nepal.

As Dr. Goggins explains: "The projects are framed by a research orientation, commitments to civic engagement and building university-community partnerships and partnerships with NGOs, so that community users can provide real learning problems and contexts for students and researchers and benefit from the results. Transfer of knowledge between our engineering students and the local communities in Zambia and Nepal is a key aspect of this

programme. Our students return with a richer knowledge of engineering and the community within which engineers work. Our students facilitate engineering education workshops to encourage school children to explore the world of science and engineering. They may inspire young people to pursue a career in this area. This could potentially lead to up-skilling of the local workforce and increasing employment in the area."

Past participants have worked on projects ranging from the design of a water upgrade for Cheshire Homes orphanage in Kaoma, Zambia to reporting on current block making facilities in Kaoma and Mongu, which aided Alan Kerins Projects (AKP) in their decision to set up a micro-enterprise block making project in Kaoma where they train up locals in how to make blocks, as well as aiming to make a profit from the sale of blocks. Students currently on placement in Nepal are working on earthquake engineering and disaster risk reduction and a feasibility study on upgrading a water harvesting network.

Peter Mahady participated in the programme and has the following to say about his experience: "What can I say about Zambia and my personal experience there? Well first I'd have to dispense with the clichéd opinion that a trip to Africa will completely change your life. You could say the same about a well produced documentary about the place. I guess what the experience did give me was the opportunity to

see the practicalities involved in the everyday functioning of a charity working in Zambia. It isn't a romantic undertaken at the best of times. It's about changing nappies, feeding 80 young kids, cleaning snotty noses and dealing with water cuts and power outages.

So what did this teach me? I suppose the obvious lesson would be that we shouldn't take for granted the everyday utilities which make our lives that much easier. Unfortunately this wasn't the main feeling I took from the trip. To be honest I was quite envious of the lives the Zambians I met lived. Now I'm not saying I would like every aspect of their lives, a lot of it is pretty desperate to say the least, but what I was envious of was the sense of community and sharing that permeates every aspect of Zambian society. People have time, time enough to chat to one another, grow and maintain gardens (probably more a necessity than a pass time to be fair) and generally have a laugh. Again it isn't exactly as simple as a utopian society with no money and plenty of time for one another. Like any society there's deception, greed and fear at the heart of the public consciousness, probably more so in Zambian society but you can't help but find their outwardly contentment and general good humour infectious."

by LINDSAY DEELY,
Editor

Celebrating Success

The Royal Irish Academy has elected three of NUI Galway's top academics for admission in recognition of their academic achievement. NUI Galway's Professor Peter McHugh, Professor Colin O'Dowd and Professor Donal O'Regan were among twenty-three scholars who joined the ranks of Ernest Walton, Erwin Schrödinger, Seamus Heaney and Mary Robinson by becoming Members of the Royal Irish Academy.



Dr. Shane Darcy, a lecturer at the Irish Centre for Human Rights, has been awarded the prestigious Journal of International Criminal Justice Prize 2010. The prize is awarded annually for the best article by a younger scholar in this leading international journal. Dr Darcy's article was entitled 'Prosecuting the War Crime of Collective Punishment: Is It Time to Amend the Rome Statute?'

Drs Maura Grealy, Pharmacology and Therapeutics, School of Medicine, Lucy Byrnes, Biochemistry, School of Natural Sciences and colleagues have been successful in obtaining €250,000 funding from the Health Research Board for their project to develop a model of ARVC in zebrafish in order to further understand the congenital heart defect which is a leading cause of sudden adult death. The aim is to develop strong models for diagnosis and treatment.

Natalie Hastrup, a PhD student at the National Centre for Laser Applications (NCLA), School of Physics was the winner of the Graduate Student Award for the paper submitted to the 2011 E-MRS Spring Meeting. Natalie presented her work on nanoparticle generation during laser ablation of thin metal films to the Symposium. Natalie's PhD research is funded by an IRCSET embark fellowship and is supervised by Dr. Gerard O'Connor in the School of Physics.

Dr. Anne MacFarlane, lecturer in Primary Care in the Discipline of General Practice, School of Medicine, NUI Galway, has been awarded an EU-FP7 grant worth € 3 million to lead a large collaborative research project known as RESTORE (REsearch into implementation STRategies to support patients of different ORigins and language background in a variety of European primary care settings).

Dr. Liam Glynn, Senior Lecturer in the Department of General Practice at NUI Galway and Clinical Director of the "WestREN" Network is a principal investigator in a recent award from the European Northern Periphery Programme (NPP) of €2.3 million. With collaborators Prof. Andrew Murphy of the Department of General Practice and Prof. Gearoid O'Laighin of the Department of Electrical and Electronic Engineering, NUI Galway will administer €420,000 of this award.

Saravanan Rengaraj, a PhD student in the Biomolecular Electronics Research Laboratory was recently awarded first prize in the poster competition during, "Eirelec'11: Electrochemistry the Future?", an international meeting held in Adare Co. Limerick in May 2011.

Celebrating Success Lisbon Treaty Award

Dr. Laurent Pech was recently awarded a European prize for outstanding research on the Lisbon Treaty along with Dr. Peter van Elsuwege, Professor of European Law at the University of Ghent. The award ceremony took place in Brussels on June 17.

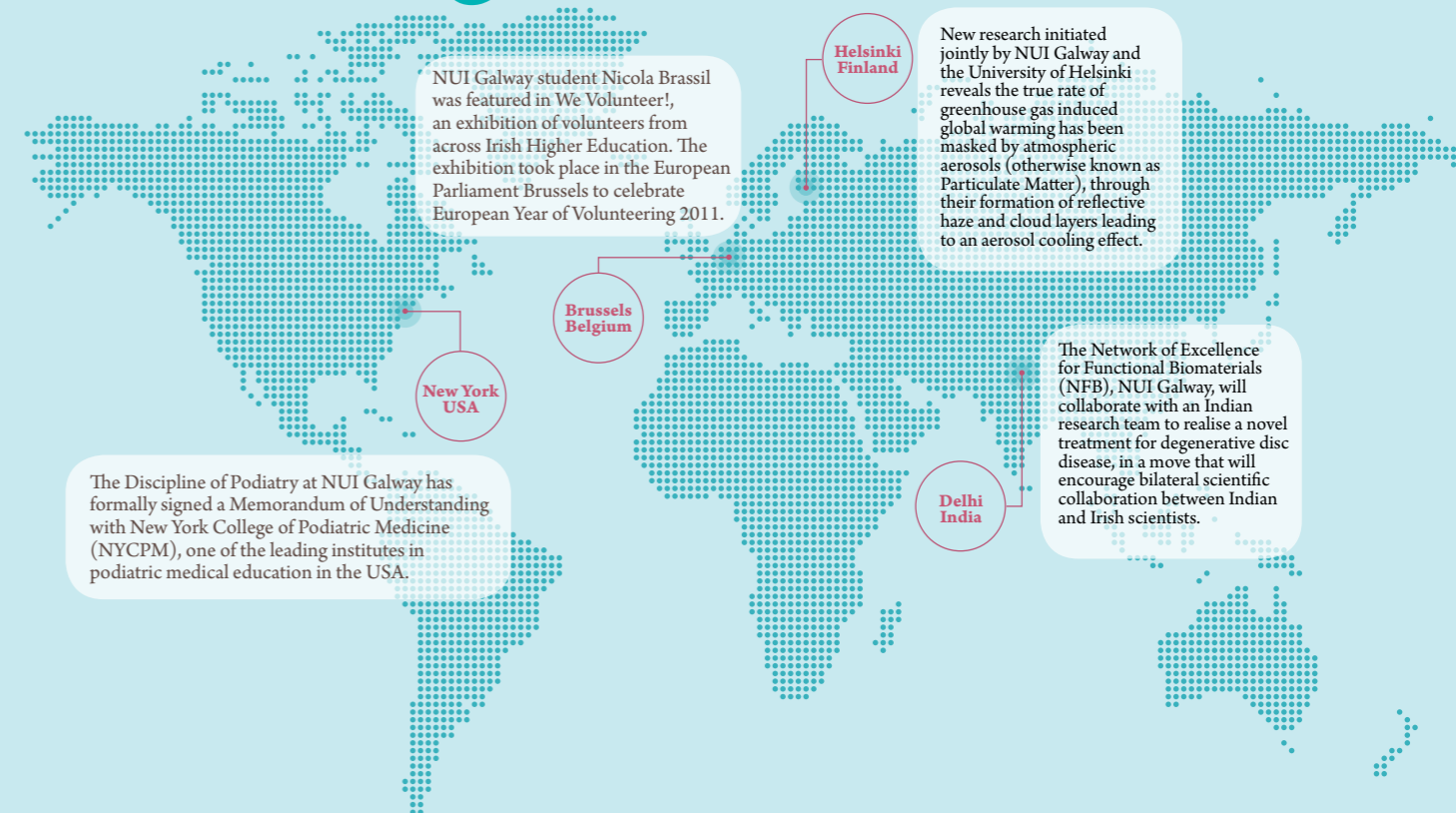
education and research from 32 countries, including the 27 EU Member States. Applicants from all disciplines were invited to apply.

The selection committee, presided by Professor Brigid Laffan (Jean Monnet Professor of European Politics in the Department of Politics, UCD), considered Dr. Pech's book on The EU and its Constitution (Clarus Press, 2008) as an outstanding example of interdisciplinary scholarship and an important contribution to

the literature on the legal and political nature of the EU in the post-Lisbon context. The committee also proved sensible to Dr. Pech's considerable scholarship on particular aspects of the Treaty of Lisbon and was of the view that his research has contributed substantially to the state of the art of research on the Treaty of Lisbon and has significantly influenced academic and political debates in Europe.

This is the first ever research prize awarded by a European academic network dedicated to European integration studies (www.lisboanet.net) which regroups 67 institutions of higher

Charting our Reach



Support Service News:

ARAN opens Access to Research at NUI Galway

The University recently marked the occasion of the 1000th item deposited in ARAN, the University's open access repository of peer-reviewed and scholarly literature. An article co-authored by David Collings and Hugh Scullion with Michael Morley (UL) which was published in the *Journal of World Business* in 2007, 'Changing patterns of global staffing in the multinational enterprise' happens to be the most heavily downloaded journal article in ARAN. It has been downloaded 1225 times since January. Gwen Ryan spoke to David to discover how ARAN is assisting in making his publications more accessible in the field of human resource management.

David Collings is Head of the Discipline of Management at the J.E. Cairnes School of Business & Economics. His current research interests focus on human resource management in multinational corporations and he has a particular interest in staffing and talent management. He has published over 100 books, journal articles, book chapters, and conference papers to date.

David hadn't been aware that this article had been so heavily downloaded, but wasn't surprised at the news, since this article had been the most heavily viewed article on the journal's website up until recently. It is still within the top 10 most downloaded *Journal of World Business* articles. It is also the second most cited article of articles published in the journal in the past 5 years, attracting 58 citations to date.

The second most downloaded item in ARAN just so happens to be another paper co-authored by Collings: "Strategic Talent Management: A review and research agenda" This article is published in another Elsevier journal and is currently one of the top 5 most

downloaded articles from the Human Resource Management Review website. It has been downloaded 955 times from ARAN since January.

David explained that ARAN has definitely made his publications more accessible to readers who did not have access to the fulltext on Science Direct. Access to research has changed over the past few years and many researchers are availing of the convenience that Google Scholar offers. He will often read Open Access versions of work himself that he finds via Google Scholar where access to the publisher version is restricted or requires authentication off-campus.

On the role of institutional repositories, David acknowledges the fact that Irish researchers are extremely privileged in terms of access to resources in comparison to our international counterparts. He regards institutional repositories and subject repositories as having a vital role to play in making research accessible to those who aren't fortunate to have access to the wealth of resources we enjoy here in Ireland.

David was sceptical about the value of ARAN initially and his biggest concern was that his work would be incorrectly cited, an anxiety which other potential depositors might identify with. However, in practice, he appears to be receiving full attribution for his work. David advises that he always includes a cover page in front of the fulltext which gives the full and correct citation to ensure proper attribution.

As it happens, the ARAN team is currently working on customising the generation of cover pages for full-text PDFs to automatically include the full citation of the original article and if available the DOI for the original published article.

Researchers have traditionally regarded

acceptance for publication as the end point for a piece of work, and Gwen asked if authors now need to include the final step of sending their accepted post-print version to ARAN to ensure maximum exposure of their work?

David felt that it does require a change of mindset, but knowing that his articles have been downloaded in such magnitudes has convinced David of the benefit of uploading the open access versions of his future articles to ARAN.

Another common concern for authors is that they may be infringing on the copyright of their journal publisher. Most publishers allow authors to archive their post peer-reviewed version in an institutional repository, with a growing number of journals, particularly in the biomedical field, allowing the archiving of the definitive published version. Different publishers have different guidelines and ARAN staff are careful to ensure that each item complies with the publisher's archiving policy before making it available in ARAN.

Depositing your publications in ARAN is also an easy way to satisfy the mandates of public funding agencies to make research outputs available in an open access format.

If you are interested in depositing your own publications in ARAN, you can contact Gwen Ryan, Research Support Librarian, at Gwen.Ryan@nuigalway.ie or register on the ARAN website <http://aran.library.nuigalway.ie> if you would prefer to personally upload your publications.

by GWEN RYAN,
Research Support Librarian,
James Hardiman Library

The Human Touch: Using Technology to Deliver Education to Disadvantaged Communities



Camara Education is a volunteer organisation dedicated to using technology to deliver education more effectively to disadvantaged communities in Africa, Jamaica and Ireland. The charity has just sent out its 25,000th computer. Deirdre Lee, a research associate at DERI, is the Camara NUI Galway Society coordinator. Along with many other local volunteers, she gives her time to ensure the successful collection and redistribution of donated computers to e-Learning Centres in Africa, Jamaica and Ireland. I sat down with Deirdre recently to hear more about Camara work and the reasons she believes so strongly in their work.

Being involved in Camara has been a great learning experience, from working on teams, coordinating events, managing the hub and collaborating with people. It's easy to get wrapped up in the day to day running of Camara Galway, but it's important to take a moment to realise the impact that Camara has on students in Africa, not only providing computers, but providing educational tools.

Camara Education operates as a social enterprise in two distinct business lines: 'Education Delivery' and 'Computer Reuse'. The connection between these two, seemingly disparate activities is TECHNOLOGY. We take in used computers from Irish companies and individuals, wipe their hard drives of data, refurbish and load them with educational software before setting them up as e-Learning Centres in schools in Africa, Jamaica and Ireland. We train teachers to use these computers as tools to improve the delivery of education to their students and produce computer training and educational multimedia

materials for use by teachers and children.

We work in six African countries – Zambia, Ethiopia, Rwanda, Kenya, Lesotho, and Uganda and have set up local Education Hubs that act as partners in delivering the Camara educational model directly to schools. Camara's European Centre is in Chapelizod, Dublin and our African Service Centre is in Mombasa, Kenya.

In 2007 and 2008 I travelled to Zambia and Ethiopia respectively with the Summer volunteer programme, where we worked with local teachers in how to use computers as tools to improve the delivery of education to their students. These were amazing experiences (why I returned the second year) that really brought home for me the impact of the work that Camara does. We worked directly in schools, but also in the local Camara Education Hubs, community centres, training colleges, etc.; wherever was most suitable to reaching and training a large amount of teachers. The teachers had varying levels of technical expertise and English, but all were enthusiastic and eager to take advantage of this opportunity, which led to a relaxed and fun learning environment for us all.

When I moved to Galway in 2008, Camara Education already had hubs in Dublin, Belfast and Cork. Galway is a large city with a lot of industry and public organisations, so we decided to set up a Galway hub to facilitate local computer donations. While the other regional hubs are standalone entities, we thought that setting up a university society would be a sustainable approach for Galway. With the support of NUI Galway, GMT, and the DERI Outreach Programme, the Camara NUI Galway Society launched in February 2010. On the first Wednesday of every month from 10am-6pm, we hold a public drop-off for computer donations.

We also organise fundraising and volunteering events to raise the awareness of Camara locally. The drop-off centre at NUI Galway has been a huge success, with more than 300 PCs, 250 monitors, and 20 laptops donated from local individuals, businesses, organisations and the university since its foundation.

Readers can help Camara Galway either by donating computer equipment or becoming a member of the society. We accept computers from private individuals on the first Wednesday of every month from 10am-6pm and from NUI Galway departments (contact the Buildings Office). If you are a business or organisation, we will collect, wipe all data to military standards, issue asset and serial numbers for computers with your recycling certificate and all at an affordable price. Our current clients include Abbott Ireland, PricewaterhouseCoopers, AOL and VHI Healthcare.

By joining the Camara NUI Galway Society, you have the chance to volunteer at university events and drop-offs, meet lots of new people from different disciplines, visit Ireland on our weekends away, and contribute to this beneficial charity. Undergraduates, postgraduates and staff are all welcome.

Camara NUI Galway Society,
18 Distillery Road,
National University of Ireland, Galway
camara@socs.nuigalway.ie
www.camara.ie
+353 91 495336
+353 87 4139367

by DEIRDRE LEE,
DERI

Spotlight on Outreach



SESE 2011 gave 42 senior secondary school students the opportunity to engage in a range of activities with scientists at NUI Galway. Students from 15 counties, including winners of the BT Young Scientist Exhibition, performed laboratory experiments, saw research in progress through tours of research laboratories, talked with NUI Galway graduates about careers in Biology, Chemistry, Maths and Physics and heard about the latest research discoveries at NUI Galway. As one participant said, “SESE changed my opinion on career opportunities. I hadn’t known the link between science and business and what researchers aim to achieve.”



Earth and Ocean Sciences postgraduate student Aisling Smith (pictured) has been doing some outreach for the Ryan Institute, and most recently visited with second class students of Mervue Boys National School. Aisling guided the student scientists in a fish dissection of whiting and farmed sea bass

before discussing the importance of aging and fisheries stock assessment. Commenting on the experience, Aisling noted “as a Postgrad, I found this to be such a positive experience to get to speak about my passion, the ocean, to a group who were hearing of some of its wonders for the first time. Lucky me...”



Research in Focus: Change

Joanne Finnegan, a Postgraduate Researcher in Civil Engineering submitted this image which shows a windthrown tree from a site in the Burrishoole catchment in Mayo. She is working on assessing the impact of harvesting forestry from upland peat sites on sediment and nutrient release to watercourses, acidification and greenhouse gas (GHG) emissions, and to

determine the effectiveness of two types of riparian buffer: (1) a naturally regenerated peatland buffer and (2) a standing mature coniferous forest. The tree was located in forest that is currently being harvested. It has been in the middle of the forest but due to the harvesting operations the trees around it were cleared leading it to fall over during a storm as it wasn’t used to standing on its own.

Featured Publications

The following list of papers and reports were recently published by those individuals featured in this issue of Research Matters.

McGinty, N., Power, A.M. and Johnson, M.P., 2011.

Variation among northeast Atlantic regions in the responses of zooplankton to climate change: Not all areas follow the same path. *Journal of experimental marine biology and ecology*, 400(1-2), pp. 120-131.

De Luca, A., Marelli, M., Mignani, R.P., Caraveo, P.A., Hummel, W., Collins, S., Shearer, A., Parkinson, P.M.S., Belfiore, A. and Bignami, G.F., 2011.

Discovery of a faint X-ray counterpart and a parsec-long X-ray tail for the middle-aged, γ -ray-only pulsar PSR J0357+3205. *Astrophysical Journal*, 733(2).

Kerry, P., Kramer, M., Littlefair, S.P., Lyne, A.G., Mignani, R.P. and Shearer, A., 2011.

A search for optical bursts from the rotating radio transient J1819-1458 with ULTRACAM - II. Simultaneous ULTRACAM-Lovell Telescope observations. *Monthly Notices of the Royal Astronomical Society*.

Prendergast, L., Van Vuuren, C., Kaczmarczyk, A., Doering, V., Hellwig, D., Quinn, N., Hoischen, C., Diekmann, S. and Sullivan, K.F., 2011.

Primitotic Assembly of Human CENPs -T and -W switches centromeric Chromatin to a mitotic state. *PLoS Biology*, 9(6).

Community engagement in Ireland's developmental welfare state: a study of the life cycle approach (2011).

Dublin: Irish Centre for Social Gerontology.

Jennings, D.J., Carlin, C.M., Hayden, T.J. and Gammell, M.P., 2011.

Third-party intervention behaviour during fallow deer fights: The role of dominance, age, fighting and body size. *Animal Behaviour*, 81(6), pp. 1217-1222.

Boland, J.A., 2011. Positioning civic engagement on the higher education landscape: Insights from a civically engaged pedagogy.

Tertiary Education and Management, 17(2), pp. 101-115.

Colleran, A., Ryan, A., O'Gorman, A., Mureau, C., Liptrot, C., Dockery, P., Fearnhead, H. and Egan, L.J., 2011.

Autophagosomal I κ B α degradation plays a role in the long term control of tumor necrosis factor- α -induced nuclear factor- κ B (NF- κ B) activity. *Journal of Biological Chemistry*, 286(26), pp. 22886-22893.

Paranjape, T., Heneghan, H., Lindner, R., Keane, F.K., Hoffman, A., Hollestelle, A., Dorairaj, J., Geyda, K., Pelletier, C., Nallur, S., Martens, J.W.M., Hooning, M.J., Kerin, M., Zelterman, D., Zhu Y., Tuck, D., Harris, L., Miller, N., Slack, F. and Weidhaas, J., 2011.

A 3'-untranslated region KRAS variant and triple-negative breast cancer: A case-control and genetic analysis. *The Lancet Oncology*, 12(4), pp. 377-386.

Heneghan, H.M., Miller, N., McAnena, O.J., O'Brien, T. and Kerin, M.J., 2011.

Differential miRNA expression in omental adipose tissue and in the circulation of obese patients identifies novel metabolic biomarkers. *Journal of Clinical Endocrinology and Metabolism*, 96(5), pp. E846-E850.

Sharif, F., Hynes, S.O., McCullagh, K.J.A., Ganley, S., Greiser, U., McHugh, P., Crowley, J., Barry, F. and O'Brien, T., 2011.

Gene-eluting stents: non-viral, liposome-based gene delivery of eNOS to the blood vessel wall in vivo results in enhanced endothelialization but does not reduce restenosis in a hypercholesterolemic model. *Gene therapy*.

Grogan, J.A., O'Brien, B.J., Leen, S.B. and McHugh, P.E., 2011.

A corrosion model for bioabsorbable metallic stents. *Acta Biomaterialia*.

Gantt, B., Meskhidze, N., Facchini, M.C., Rinaldi, M., Ceburnis, D. and O'Dowd, C., 2011.

Wind speed dependent size-resolved parameterization for the organic enrichment of sea spray. *Atmospheric Chemistry and Physics Discussions*, 11(4), pp. 10525-10555.

Pieper, H.-., Clerkin, P. and MacFarlane, A., 2011.

The impact of direct provision accommodation for asylum seekers on organisation and delivery of local primary care and social care services: A case study. *BMC Family Practice*, 12.

Pieper, H.-. and MacFarlane, A., 2011.

"I'm worried about what i missed": GP registrars' views on learning needs to deliver effective healthcare to ethnically and culturally diverse patient populations. *Education for Health: Change in Learning and Practice*, 24(1), pp. 1-13.

Mulqueen, J. and Glynn, L., 2011.

Joined-up thinking in reduction of cardiovascular risk. *The Lancet*, 377(9779), pp. 1747-1748.

COLLINGS, D.G., DOHERTY, N., LUETHY, M. and OSBORN, D., 2011.

Understanding and supporting the career implications of international assignments. *Journal of vocational behavior*, 78(3), pp. 361-371.

A New Discovery 3,000m Deep in the Middle of the Atlantic

A field of hydrothermal vents were recently discovered by a team of scientists, including our own Patrick Collins of the Ryan Institute, on the Irish-led 'VENTuRE' expedition to the mid-Atlantic ridge. These vents - sometimes called black smokers because of the plumes of precipitated metal sulphides erupting from chimneys up to 10 m tall - are important because they replenish the depleted ocean with fresh minerals and support an array of unique lifeforms.

