



**#LoveIrish
Research**

Annual Report 2015 Irish Research Council

Minister Richard Bruton TD; An Taoiseach, Mr Enda Kenny; Dr Eucharua Meehan, Director of the Irish Research Council; Professor Jane Ohlmeyer, Chair of the Irish Research Council; Minister Damien English TD.

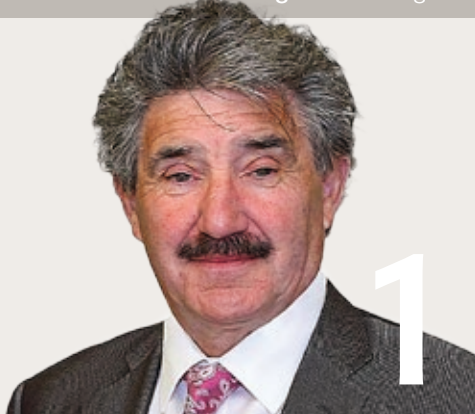


The mission of the Irish Research Council is to enable and sustain a vibrant research community in Ireland. To address the broad skills and research needs within society, we support excellent researchers in all disciplines from Arts to Zoology.





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#LovelishResearch

#LovelishResearch was officially launched at Trinity College Dublin by the Minister for Skills, Research and Innovation, Damien English, TD. Commenting at the launch, he said: "The Government's research strategy, 'Innovation 2020: Excellence, Talent, Impact', positions Ireland as a global innovation leader, with our research efforts driving a strong sustainable economy and a better society. By 2020, we are committed to seeing public and private investment in research reaching 2.5 per cent of GNP, with 40,000 research personnel working in enterprise.

"Investment in research is essential for strengthening indigenous enterprise, securing foreign direct investment, licensing new technologies, establishing new companies and providing the highly-educated workforce needed to ensure the continued development of our economy and society. The #LovelishResearch initiative has an important role to play in communicating the impact of Irish research to the wider public."

Programme of Activities

#LovelishResearch will be comprised of:

Competitions
and awards

Regional
and institutional
showcase events

Monthly
research
themes

A series of
publications

Engagement
with international
events being
hosted in
Ireland



#Lovelish Research

A specific Decade
of Centenaries
programme



Mr Aaron Kinsella; Mr Thomas Earls Fitzgerald; Professor Jane Ohlmeyer; Minister Damien English TD; Dr Eucharia Meehan; Ms Sabina Renken; Dr Luca Coscieme; Ms Lauren McKeown; Ms Lara Cassidy.

Foreword

The Irish Research Council is committed to enhancing Ireland's international reputation as a centre for research and learning, and enriching our pool of knowledge and expertise so as to address Ireland's current and future challenges.

The Council funded a total of 1,147 Postgraduate Scholars and 249 Postdoctoral Fellows in 2015. This Annual Report tells us more about the research awards, profiles some fascinating individual projects, and gives us an insight into the Council's broader mission. This includes cultivating international success for Irish researchers.

In March, the Council launched its strategic partnership with the Wheel, and provided funding for 39 projects designed to cultivate and support effective engagement and knowledge transfer between stakeholders in academia, the community and voluntary sector, and into broader society.

In May, the Council launched New Horizons, a tailored initiative designed to help Irish researchers leverage funding at the European level, and work towards Ireland's target of €1.25bn in European research funding under the Horizon 2020 Programme.

In December, the Council marked 10 years of supporting enterprise research through its suite of employer-facing programmes. The Enterprise and Employment based awards ask private-sector and other employers to co-fund scholars in return for a low-risk, low-cost route to research. To date, the Irish Research Council has partnered with 320 private-sector and other employers, and it is notable that over 70% of the awards given in 2015 went to small and medium enterprises. Participating scholars are given the opportunity to engage in interdisciplinary research and develop transferable skills that can broaden their career horizons.

It is particularly exciting to see how well the Irish Research Council's schemes support its contribution to key government initiatives, including the Action Plan for Jobs, the National Strategy for Higher Education, and Innovation 2020, the government's five-year strategy of Research and Development, Science and Technology.

I congratulate the Irish Research Council on its achievements in 2015.



Mr John Halligan TD
Minister of State for Training and Skills

Charting a vision for the future

The vision of the Council is for a healthy research ecosystem in Ireland which provides a diversity of supports and opportunities and which enables the country to reap the full value and benefits of research. This balanced ecosystem will address the breadth of economic and societal needs and develop the knowledge, understanding and insights required by citizens, employers and government.

The Council will play its part and support the best talent. It will provide opportunities for excellent researchers with excellent ideas, regardless of the discipline or research topic. Through its approach, the Council will cultivate individual thinkers to question and research and in this way contribute to the development of the skills, competencies and expertise required for the future.

To achieve this vision, the mission of the Irish Research Council is to support excellent research and recognise creative individuals with innovative ideas, thus enabling a vibrant research community which enriches Irish research, the economy and society.

Introduction

In 2015, the Irish Research Council continued to consolidate and develop its mission and distinctive role within the research ecosystem in Ireland. Since the Council was formed in 2012 through the integration of the former councils IRCSET and IRCHSS, we have been in the business of talent-spotting excellence, particularly among early career researchers, regardless of discipline or research topic.

The Council supports creative and innovative researchers, empowering them to develop new ideas, flexible skills, and cutting-edge expertise that can be harnessed to yield economic, cultural, and societal benefits at home and internationally. Facilitating collaboration and partnership between researchers and enterprise, government, and civic society continues to form a central pillar of our mission, and we were particularly happy to mark 10 years of supporting enterprise through research in December.

To ensure that we can continue to cultivate a balanced research ecosystem in Ireland, we are also committed to supporting the integration of Irish researchers within the European Research Area and leveraging European-level funding. The Council continues to consolidate and build upon its role within Ireland's national strategy for H2020, enabling research excellence and creative connections across disciplines and national boundaries. In May, we launched the New Horizons initiative to help prime the Irish research community to prepare ideas and projects for competition at the European level. We have also continued to provide direct support to applicants for European Research Council (ERC) awards, and funding to the Irish Marie Skłodowska-Curie Office. As part of a network of Research Councils across Europe, we are developing linkages, on behalf of Irish researchers, within research networks and alliances such as HERA (Humanities in the European Research Area) and NORFACE (a social sciences consortium), and lobbying for the development of research priorities sought by our research community in EU funding calls.

The following report summarises the Council's progress this year, and we would like to thank you for taking the time to read it. If you require any further information, please contact us or visit our website at www.research.ie.



Professor Jane Ohlmeyer
Chair of the Irish Research Council, Erasmus Smith's Professor of Modern History at Trinity College, Dublin & Director of the Trinity Long Room Hub



Dr Eucharia Meehan
Director of the Irish Research Council

3 IRISH RESEARCH COUNCIL OVERVIEW 2015

1396

Funded Researchers

249

Postdoctoral
Fellows



1147

Postgraduate
Research Students



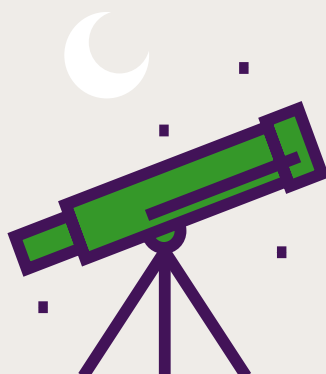
53

Principal Investigator Led Projects

30

 Research
Projects

17

 New Horizons

6

 Research for
Policy & Society

AHSS: Arts, Humanities and Social Sciences
ERC: European Research Council
GOI: Government of Ireland
HEI: Higher Education Institution

INTER: Interdisciplinary
MNC: Multi National Company
MSC: Marie Skłodowska-Curie

RPO: Research Performing Organisation
SME: Small and Medium Enterprise
STEM: Science, Technology, Engineering and Maths



Irish Research Council
Alumni secured



2

Out of 3 Marie
Skłodowska-Curie
Actions COFUND
Excellence Awards



13

Partnerships with
Government
Departments
and Agencies

€31.4m
Exchequer Budget



€3.5m
Leveraged Funding
From Other Sources

New Awards 2015

213 / €16m

GOI Scholar Awards



103



110



195



18

107
STEM

106
AHSS

22
INSTITUTIONS

59 / €5.2m

Enterprise Partnership PG & PD Awards



33



26



49



10

52
STEM

7
AHSS

18
INSTITUTIONS

80 / €6.5m

GOI Postdoctoral Fellow Awards



37



43



66



14

40
STEM

40
AHSS

14
INSTITUTIONS

23 / €2m

New Horizons and Research for Policy and Society Awards



14



9



23



–

–
STEM

23
AHSS

13
INSTITUTIONS

32 / €2.6m

Employment Based PG Scheme



21



11



30



2

20
STEM

12
AHSS

11
INSTITUTIONS

141 / €900K

New Foundation Awards



58



83



–



–

63
STEM

70
AHSS

8
INTER

21
INSTITUTIONS

AHSS: Arts, Humanities and Social Sciences

GOI: Government of Ireland

INTER: Interdisciplinary

PD: Postdoctoral

PG: Postgraduate

STEM: Science, Technology, Engineering and Maths

Irish research in numbers

10th

MOST HIGHLY
CITED RESEARCH
PUBLICATION
OF ALL TIME

10 IRISH RESEARCHERS

among the top 1% of highly cited researchers worldwide



8,000

students on research
programmes



32

PRESTIGIOUS ERC
GRANTS UNDER
HORIZON 2020



SOCIAL SCIENCE & HUMANITIES OUTPUTS
FROM FOUR IRISH UNIVERSITIES RANK IN
THE TOP 1% OF PUBLICATIONS WORLDWIDE

8th

MOST INNOVATIVE COUNTRY IN THE WORLD



Ireland ranked 9th in the world overall
in global scientific rankings

● ● ● ● ● ● ● ● ● ● 1st IN NANOSCIENCES & NANOTECHNOLOGY

● ● ● ● ● ● ● ● ● ● 1st IN IMMUNOLOGY

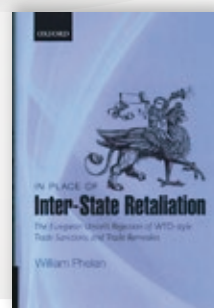
● ● ● ● ● ● ● ● ● ● 1st IN COMPUTER SCIENCE

● ● ● ● ● ● ● ● ● ● 3rd IN NEUROSCIENCES & BEHAVIOUR

● ● ● ● ● ● ● ● ● ● 6th IN MATERIALS SCIENCES

● ● ● ● ● ● ● ● ● ● 6th IN MOLECULAR BIOLOGY & GENETICS

A selection of 2015 publications



'W.B. Yeats and World Literature: The Subject of Poetry', by Barry Sheils

Dr Barry Sheils was awarded a Government of Ireland Irish Research Council Postdoctoral Fellowship (UCD)

'Neolithic and Bronze Age migration to Ireland and establishment of the insular Atlantic genome', by Lara M. Cassidy, Rui Martiniano, Eileen M. Murphy, Matthew D. Teasdale, James Mallory, Barrie Hartwell, and Daniel G. Bradley. PNAS (2015)

Ms Lara Cassidy was awarded a Government of Ireland Irish Research Council Postgraduate Scholarship (TCD)

Prof Daniel G. Bradley is a former Irish Research Council Basic Research Grant awardee (TCD)

'Calvinism, Reform and the Absolutist State in Elizabethan Ireland', by Mark A. Hutchinson

Dr Mark A Hutchinson was awarded a Government of Ireland Irish Research Council Postdoctoral Fellowship (UCC)

'Bernard Shaw's Irish Outlook', by David Clare

Dr David Clare was awarded a Government of Ireland Irish Research Council Postdoctoral Fellowship (NUIG)

'Ireland's Harp: The Shaping Of Irish Identity c. 1770 – 1880', by Mary Louise O'Donnell

Dr Mary Louise O'Donnell was awarded a Government of Ireland Irish Research Council Postdoctoral Fellowship (UL)

'Monitoring one-electron photo-oxidation of guanine in DNA crystals using ultrafast infrared spectroscopy', by James P. Hall, Mr Fergus E. Poynton, Páraic M. Keane, Sarah P. Gurung, John A. Brazier, David J. Cardin, Graeme Winter, Thorfinnur Gunnlaugsson, Igor V. Sazanovich, Michael Towrie, Christine J. Cardin, John M. Kelly & Susan J. Quinn. Nature Chemistry (2015)

Fergus E. Poynton was awarded an Irish Research Council Embark Postgraduate Scholarship (TCD)

'In Place of Inter-State Retaliation', by William Phelan

Dr William Phelan was awarded an Irish Research Council Small Projects Grant (TCD)



'Bees prefer foods containing neonicotinoid pesticides', by Sébastien C. Kessler, **Erin Jo Tiedeken**, Kerry L. Simcock, Sophie Derveau, Jessica Mitchell, Samantha Softley, Jane C. Stout & Geraldine A. Wright. *Nature* (2015)

Ms Erin Jo Tiedeken was awarded an Irish Research Council Embark Postgraduate Scholarship (TCD)

'Accountability for the human rights implications of natural disasters', A Proposal For Systemic International Oversight, by **Dug Cubie** and Marlies Hesselman. *Netherlands Quarterly of Human Rights* (2015)

Dr Dug Cubie was awarded an Irish Research Council New Foundations Award (UCC)

'Willful ignorance and self-deception', by Kevin Lynch. *Philosophical Studies* (2015)

Dr Kevin Lynch was awarded a Government of Ireland Irish Research Council Postdoctoral Fellowship (UCD)

'The end of the Celtic Tiger: an Irish case study on the failure of corporate governance and company law', by Irene Lynch Fannon. *Northern Ireland Legal Quarterly* (2015)

Professor Irene Lynch Fannon was awarded an Irish Research Council New Foundations Award, (UCC)

'The dune effect on sand-transporting winds on Mars', by Derek W.T. Jackson, **Mary C. Bourke** & Thomas A.G. Smyth. *Nature Communications* (2015)

Dr Mary Bourke was awarded an Irish Research Council New Foundations Award (TCD)

'Healthcare in Ireland and Britain from 1850: Voluntary, regional and comparative perspectives', edited by **Donnacha Seán Lucey** & Virginia Crossman. *Institute of Historical Research* (2015)

Dr Seán Lucey was awarded a Government of Ireland, Irish Research Council Postdoctoral Fellowship (TCD) and an Irish Research Council New Ideas Research Grant (UCD)

'Mapping protein binding sites on the biomolecular corona of nanoparticles', by **Philip M. Kelly**, Christoffer Åberg, Ester Polo, Ann O'Connell, Jennifer Cookman, Jonathan Fallon, Željka Krpetić & Kenneth A. Dawson. *Nature Nanotechnology* (2015)

Dr Philip M. Kelly was awarded an Irish Research Council Embark Postgraduate Scholarship (UCD)

A year in the life of the Irish Research Council



JANUARY

BT Young Scientist & Technology Exhibition: Irish Research Council Special Award Winners

Patrick Sweeney, Chloe Daniels and Annette Moran of Carrick-On-Shannon Community School (Leitrim) 'Birdsong and music: Connections between African and Irish music and development of a new music genre based on the Galapagos Island's birdsong'.



FEBRUARY

Irish Research Council & HERA 'Uses of the Past' Workshop

As the handling agency for the Humanities in the European Research Area (HERA), Dr Eucharía Meehan and Professor Sean Ryder held an information workshop to give an introduction to the HERA network and to the €21m call for projects with a 'Uses of the Past' theme.

MARCH

Launch of Strategic Partnership between the Irish Research Council and The Wheel

A strategic partnership between the Irish Research Council and The Wheel has been established to provide a structured mechanism to foster and promote effective engagement and transfer of knowledge and understanding between stakeholders in the academic community, the community and voluntary sector and into society in general. Effective engagement between the higher education sector and the community/voluntary sectors is a key objective of the National Strategy for Higher Education.

APRIL

Science Europe High Level Workshop 2015

This workshop brought together the President of the European Research Council, European ministers and secretaries-of-state and 50 Science Europe member states in Vienna. The plenary session was chaired by the Director of the Irish Research Council, Dr Eucharía Meehan.

Dr Eucharía Meehan, Director of the Irish Research Council, and Mr Denis Randet, Director General of the Association Nationale de la Recherche et de la Technologie, signed a Letter of Intent concerning their industrial fellowships schemes. The signing took place in the presence of An Taoiseach, Mr Enda Kenny and the Prime Minister of France, Mr Manuel Valls.



Irish Research Council launches 'Creating Ireland'

To mark St. Patrick's Day 2015, the Irish Research Council launched 'Creating Ireland', a publication highlighting the contribution of humanities and social sciences to Irish society.





MAY

New Horizons to support Ireland in achieving €1.25bn target in European Research Funding

As Ireland targets €1.25bn in European Union funding for research under the Horizon 2020 (H2020) Programme, the Irish Research Council launched a new tailored initiative to help the Irish research community prepare ideas and projects for competition at European level.

Their Royal Highnesses begin Irish visit in NUI Galway

Irish Research Council Director, Dr Eucharia Meehan met HRH the Duchess of Cornwall at the beginning of a four-day trip to Ireland at NUI Galway.



JUNE

LINDAU Fellow Awards

Six Irish-based researchers chosen to attend prestigious Masterclasses with 66 Nobel Laureates in Lindau, Germany.

'DRI Decade of Centenaries Digital Preservation Award' Winners Announced at DPASSH Conference

Three awards were presented to archival collections which contribute significantly to the national dialogue on the Decade of Centenaries. Sponsored by the Irish Research Council, the award provided winners with the services of professional digital archivists and librarians to prepare their collections for long-term digital preservation in the Digital Repository of Ireland. The collections included material from the Dublin City Electoral Lists for the year 1915; correspondence and papers of Irish Capuchin priests, detailing their involvement with participants in the national struggle during 1916; and pages from the diary of stained glass artist Michael Healy from Easter Week 1916.



JULY

18 European Research Council Awards for Ireland worth over €30m celebrated

The Irish Research Council and Science Foundation Ireland (SFI), the national foundation for investment in scientific and engineering research, jointly hosted a reception at the Royal Irish Academy to celebrate the success of Ireland's researchers in the most recent calls to the highly prestigious European Research Council funding schemes.



AUGUST

Two Irish students reaching for the stars as they take off for NASA

Two successful postgraduate students, Lauren McKeown, a PhD student at Trinity College Dublin, and Conor O'Toole, a Masters student at University College Dublin, had the opportunity to spend 10 weeks immersed in scientific research at NASA's world-renowned AMES Research Centre in Silicon Valley, California.



SEPTEMBER

Global Horizons: International careers initiative, the Department of Foreign Affairs and Trade

Ensuring that sufficient numbers of Irish citizens are employed in, and remain at the heart of, EU institutions and international organisations was the focus of a high level round-table hosted by European Affairs Minister, Mr Dara Murphy, TD in Farmleigh. The round-table was attended by senior officials and recruitment experts from the European Personnel Selection Office, the United Nations, the Council of Europe, the European Central Bank, the Irish Research Council and other leading international organisations, as well as the Public Appointments Service, Government Departments, third level institutions and Grad Ireland.

Minister English appoints Professor Jane Ohlmeyer as Chair of the Irish Research Council

Minister for Skills, Research and Innovation, Damien English, TD announced the appointment of Professor Jane Ohlmeyer as the new Chair of the Irish Research Council. Professor Ohlmeyer is the Erasmus Smith Professor of Modern History at Trinity College Dublin and the Director of the Trinity Long Room Hub.



OCTOBER

Launch of The Digital Irish Famine Archive at NUI Galway: Funded by the Irish Research Council

The Digital Irish Famine Archive is designed to make accessible eyewitness accounts of the Irish famine migration to Canada in 1847-1848 that would otherwise be unknown. It also pays tribute to those who cared for Irish famine emigrants.

Special Event to celebrate awardees of the Andrew Grene Postgraduate Scholarship in Conflict Resolution

The Conflict Resolution Unit of the Department has supported postgraduate research on conflict resolution and peacebuilding since 2008. In 2010, the Scholarship was named for an Irish UN worker, Andrew Grene, who died in the earthquake in Haiti. The 2015 Andrew Grene Scholar is José Antonio Gutiérrez Danton, whose research in Colombia in the field of sociology and conflict is affiliated with the School of Sociology at University College Dublin.

partnering
with
Enterprise

NOVEMBER

Festa National Conference addressed by Dr Eucharia Meehan

'Transforming STEM Realities: Gender Equality', held in the University of Limerick, outlined the importance of the Irish Research Council taking a leadership role in gender in research.

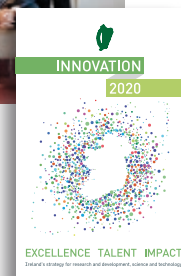
Irish Research Council priming for future success in Horizon 2020

Minister for Skills, Research and Innovation, Damien English, TD, announced more than €2m of competitive funding for 17 research projects under the Irish Research Council's New Horizons scheme. The scheme supports top-class researchers in the higher education system to develop novel and excellent ideas and to build towards seeking further investment in those ideas from the EU's Research and Innovation framework, Horizon2020.

DECEMBER

Irish Research Council closes year by marking 10 years supporting enterprise through it funding programmes

Professor Jane Ohlmeyer, Chair of the Irish Research Council, stated that "working with enterprise and employers is part of the core mission of the Irish Research Council, and its suite of employer facing programmes offers a low-risk, low-cost route to research for enterprises, both large and small. The Council is all about developing people through excellent research. Through collaboration with employers, participating scholars develop a range of important additional transferable and complementary skills which open up new avenues for career development."



Irish Research Council welcomes Innovation 2020: Excellence, Talent and Impact

Innovation 2020 is Ireland's five year strategy on research and development, science and technology. Innovation 2020 sets out the roadmap for continuing progress towards the goal of making Ireland a Global Innovation Leader, driving a strong sustainable economy and a better society.

Two Irish Research Council funded researchers were recognised for their exceptional achievements with two of the top three Marie Skłodowska-Curie Awards

The European Commission made the awards for outstanding contributions to research. David Hoey is Associate Professor of Biomechanical Engineering in TCD and was funded by the Irish Research Council and the European Union's MSCA COFUND. Dr Aiden Doherty was an Irish Research Council Scholar at DCU, and is currently a Senior Research Fellow at the University of Oxford.

Science of Christmas

This supplement presented seasonal themes in a way that highlighted interesting research carried out by, amongst others, Irish Research Council awardees. Why are polar bears white? Are robins born with red feathers? How do reindeer differ from Irish deer?



4

RESEARCHER CAREER PROGRESSION AWARDS – OPPORTUNITIES AND NEW INITIATIVES

Government of Ireland Postgraduate Scholarship Scheme 2015

Irish Research Council
announced that €16.2
million has been awarded
to the next generation of
Irish researchers

Out of a total of 1,200 postgraduate students who competed for €16.2 million over four years, 213 Scholars were awarded funding based on the excellence, novelty and innovation of their projects. These qualities are key drivers for the supply of skilled human capital for academia, industry and public sector. Announcing the awards, Minister for Skills, Research and Innovation, Damien English, TD stated:

"The international research environment is becoming increasingly competitive. Individuals with new ideas and thinking are needed to contribute to economic development and to Ireland's reputation globally. These budding researchers are now well placed to contribute to Ireland's prosperity in the years ahead."

Professor Jane Ohlmeyer, newly appointed Chair of the Irish Research Council said:

"Each year, we are told by the independent international assessors that the calibre of applicants is increasing and we are excited to see what the next intake of scholars will achieve. Last year, one of our former awardees became the youngest ever recipient of an award which is the gold standard internationally – the European Research Council Starting Grant. The Government of Ireland Scholarships offer students the potential for diverse careers in enterprise, civic society, government bodies, in academia – in all walks of life."

Tomb Raiders, Galaxy Mappers and Climate Change Specialists among the next-gen of Irish Researchers

Exploring the origins of zirconium stars, redefining tomb funerary archaeology, modern Irish sculpture and enhancing weather prediction to tackle climate change are a sample of topics by the successful Scholars under the 2015 Government of Ireland Postgraduate Scholarship Awards from the Irish Research Council. Whether it is analysing the self-cleansing power of the atmosphere, cyber bullying, green-synthesis of anti-HIV drugs or the development of seaweed wound dressings, Minister English said:

"the future of Irish research is as bright as it is diverse."



Photo Credit: Daniel Bradley



Higher Education Institution: Trinity College Dublin

Ireland has intriguing genetics. It lies at the edge of many European genetic gradients with world maxima for the variants that code for lactose tolerance, the western European Y chromosome type, and several important genetic diseases including one of excessive iron retention, called haemochromatosis. However, the origins of this heritage are unknown. The only way to discover our genetic past is to sequence genomes directly from ancient people, by embarking on a type of genetic time travel.



Higher Education Institution: Trinity College Dublin

"Children deserve good stories. In fact, children deserve the best stories, and that's what the show is all about – finding the best books in the world for the readers who are dying to read them. We'll have reviews and interviews, we'll talk about the classics and the newest books on the shelf, we'll be searching for the best libraries in the land, we'll have a book club and a writing corner – we'll even have a Book Doctor Clinic for all those reading ailments! This is a show about books – which means it's a show about everything!"

Government of Ireland Postdoctoral Fellowship Scheme 2015

Irish Research Council
announced over €6
million for 80 prestigious
Government of Ireland
Postdoctoral Fellowships

Under this scheme, 80 researchers, out of a total of 535 applicants, were offered these prestigious and highly competitive fellowships.

The Scheme is designed to support researchers at the early stage of their research careers. The Council strongly believes in the importance of encouraging individuals to become rigorous independent researchers. This postdoctoral programme is designed to facilitate researchers' crucial first steps on their career paths while simultaneously facilitating original research. Previous awardees under this scheme have succeeded in obtaining academic positions, a variety of diverse roles, securing European Commission funding, and transitioning into key roles in industry.

Dr Eucharia Meehan, Director of the Irish Research Council, commented that:

"This programme is designed to support researchers on their career paths, enabling them to carry out research in collaboration with internationally recognised mentors and research teams in Ireland. In addition to demonstrating research excellence, the selected projects will provide insights and develop ideas that will contribute to our understanding of the world and to our quality of life."

When announcing the awards Minister for Skills, Research and Innovation, Damien English, TD said:

"One of the principal strengths of this Irish Research Council scheme is that it funds excellent research across all disciplines and ultimately, the awards serve to cultivate creative and innovative people. It is noteworthy that five of the recent European Research Council awardees in Ireland are former Government of Ireland Postdoctoral Fellows from across the sciences and humanities."

Successful Outcomes CARA COFUND

The Irish Research Council CARA Postdoctoral Mobility Fellowship Scheme co-funded by Marie Skłodowska-Curie Actions was established on 1 May 2010. The main objective of the CARA programme was to encourage international mobility amongst Irish-based experienced researchers at the early stage of their career. There were two separate funding calls resulting in a total of 25 fellowships. As a Marie Skłodowska-Curie COFUND scheme, fellowships were co-funded by the EU with 40% of costs provided by the Commission; the total cost of the programme was approximately €6.7m, with a contribution of approximately €2.7m from the EU and €4m from Irish Research Council.

The primary goal of the CARA programme was to provide mobility experience to early career researchers, thus increasing the diversity of their research experience and their overall employability. A total of 29 Marie Curie International Outgoing Fellowships were awarded to Ireland, while the CARA programme provided 25 Fellows with a similar mobility experience during the same time period, clearly demonstrating a significant impact on mobility for early career researchers in Ireland. In addition, the CARA programme contributed to the success of the subsequent ELEVATE programme which, in its first call in 2013, made 15 mobility awards, enhancing the mobility of early career researchers in Ireland.

Separately, another goal of the CARA programme was to increase the employability of early career researchers. The positive effects of the programme on the career development of our CARA Fellows can be clearly observed by looking at the follow-on positions the Fellows secured immediately after finishing their fellowship. The majority of Fellows are currently employed in either permanent or contract research positions, many of which are based in prestigious institutions or organisations.

Thus, in terms of enhancing the mobility and employability of early career researchers in Ireland, CARA may be considered to have left a significant, valuable and lasting imprint on the Irish research landscape.

Summary of the types of follow-on positions taken up by CARA Fellows immediately after the end of their fellowship

FOLLOW-ON POSITION	NUMBER OF FELLOWS
Permanent Research Position	14
Contract Research Position	9
Industry Position	0
Research Management	0
Job seeking	2

Summary of follow-on positions taken up by CARA Fellows according to geographical profile

COUNTRY	NUMBER OF FELLOWS
Ireland	10
England	9
Scotland	2
Wales	1
Germany	1

From CARA to CAROLINE

Based on the demonstrated success of CARA and INSPIRE (a previous COFUND that was purely for STEM researchers), the Irish Research Council submitted an application for a Research Fellowship programme to the 2015 EU Marie Skłodowska-Curie Actions COFUND strand, which has recently been retained for funding.

Postdoctoral Case Studies



Fellow: Dr Róisín Burke

Project Title: Advancing Gender Justice in Conflict-Affected States

Higher Education Institution: National University of Ireland, Galway

In her research, Dr Burke looks at rule of law reform programmes in conflict-affected states, and whether these can be used to advance gender justice, and to tackle structural violations of women's rights, such as access to property and inheritance, and rural women's access to justice.

As Dr Burke explains:

"The intent of my research is to stimulate further interest and debate in academic circles on rule of law programming and gender justice in conflict-affected states. I sincerely hope that research outcomes will be of use to those practitioners working in the area of rule of law programming in the field, at a government level, at the headquarters of various international bodies and NGOs, and at a policy level."

"Gender inequality is prevalent in many societies, permeating legal systems in terms of laws, practices, institutional make-up and policy. Women are more likely to be discriminated against in terms of their civil and economic rights; property and inheritance; and in the family/private sphere. They are also more likely to suffer from various forms of sexual violence. During armed conflict violations of rights of females are generally exacerbated."



Fellow: Dr Sinéad Ryan

Project Title: Putting the Brakes on Alzheimer's Disease

Higher Education Institution: Trinity College Dublin

As Dr Ryan explains:

"Alzheimer's disease (AD) is one of the leading causes of dementia and currently there is no effective cure for the disease. Age is one of the greatest risk factors for developing AD and, with an increasing 'greying' of the human population, there is an impetus in the research community to learn more about the causes of the condition and to develop novel therapeutics to delay the onset of the disease and ultimately develop a cure for this debilitating neurodegenerative disorder."

In recent years, there has been a growing interest in the benefits of exercise, not only for a healthy brain, but also in cases of neurological disease (e.g., stroke), neurodegenerative disease (e.g. AD) and psychiatric conditions (e.g., depression). Dr Ryan's research is assessing the potential benefits of exercise on cognitive function in a mouse strain that exhibits several features of AD.

"Drugs for AD are often only administered when pathology is at quite an advanced stage, a fact which likely reduces the efficacy of treatments in aggressively tackling the disease. My research is investigating the effect of starting an exercise training programme in mice before symptoms appear. I am hoping to demonstrate the value of exercise as an early intervention to delay the onset of AD symptoms or slow down progression of the disease."

Irish Research Council Awardees primed for future success in Horizon 2020

Minister for Skills, Research and Innovation, Damien English, TD, announced more than €2m of competitive funding for 17 research projects under the Irish Research Council's New Horizons scheme. The scheme supports top-class researchers in Ireland's higher education system to develop novel and excellent ideas and to build towards seeking further investment in those ideas from the EU's Research and Innovation framework, Horizon 2020. The scheme represents one of a number of measures implemented by the Council that will contribute towards enabling Ireland to be successful within the European research sphere, and ultimately to reach our national target of winning €1.25 billion of H2020 funding.

Speaking about the scheme, Minister English said that the funding announced will

"provide opportunities for the Irish research community to maintain momentum in what is an incredibly competitive European research funding environment. This scheme taps into the incredible breadth and diversity of expertise in our institutions, and the funding will enable a set of exceptional researchers to carry forward their research and also help to establish a strong track record in interdisciplinary research."

Professor Jane Ohlmeyer, Chair of the Irish Research Council, added that the scheme will:



"nurture outstanding talent and help to promote the development of a research community that is internationally competitive into the future. The awards being announced today represent the outcome of a very rigorous, competitive process underpinned by international peer review. The potential for the awardees to go on and win further funding for Ireland through Horizon 2020 is strong. The scale of European research funding is such that a single award from the European Research Council in the future for one of the successful awardees could outweigh the aggregate cost of all awards being announced today under New Horizons 2015. Given our ambitious target for Horizon2020, these modest investments in future research leaders make a lot of sense on many different levels."

Among the awardees under the scheme are Dr Frank Doyle and Professor Ronan Conroy of the Royal College of Surgeons in Ireland, whose research will investigate the complex reasons behind patients' non-adherence to recommended treatment regimens. Using knowledge of psychosocial predictors of adherence, initially to inhaled medications, this work will attempt to model adherence patterns in order to provide significantly better health outcomes for patients whilst reducing costs for healthcare providers.

Eleanor Denny, an Associate Professor of Economics at Trinity College Dublin, will explore developments in behavioral economics and information systems in her interdisciplinary project on efficient energy. Her data analytical research will ascertain whether providing customers with information on how much electrical appliances cost to run will encourage them to buy more energy efficient products.



Mr Peter Brown (L), IRC Assistant Director; Minister for Skills, Research and Innovation, Damien English, TD; Professor Anna Davies, TCD and European Research Council awardee.

Ireland's performance in Horizon 2020

In 2015 in the European Union's Horizon 2020 programme, four Irish universities entered the list of the 50 top-performing universities. Together they received contracts worth €62 million from Horizon 2020 up to the end of June.

Irish universities had particular success in the European Research Council (ERC) programme in 2014 – a part of the pillar "excellent science" that was significantly expanded in H2020 – notably in the starting grant category. Irish institutions obtained 18 ERC grants in 2014 worth more than €30 million. In the starting grant category in 2014, Ireland ranked second among the 28 EU member countries, up from 20th in FP7. The Irish Research Council and SFI support applications to the ERC.



Roman Stilling (L), Thomas Higgins, Jessica Hayes, Shalini Singh, Owen Byrne and Mariana Bexiga.

Lindau Awards

Six Irish-based researchers chosen to attend prestigious masterclasses with 66 Nobel Laureates in Lindau, Germany.

The Irish Research Council recognises excellence in the natural sciences and honoured six exceptional early stage career researchers under the age of 35 who travelled to Lindau, Germany, to participate in the prestigious Lindau Nobel Laureate meeting.

The researchers won a tough global competition to earn places at the event and they joined over 650 scientists from across the world to engage in a week-long series of lectures, discussions and masterclasses in the presence of 66 Nobel Laureates. The six researchers are drawn from University College Dublin, Trinity College Dublin, NUI Galway, University College Cork and the University of Limerick. The Irish Research Council funded the attendance of the researchers at the event.

Each of the researchers was presented with a specially commissioned award, marking their achievement and the fact that they were representing Ireland, by Philip Walton. Philip, an Emeritus Professor of Applied Physics (NUI Galway), is the son of the late Ernest Walton the celebrated Irish scientist who was awarded the Nobel Prize for Physics in 1951. That same year, the Nobel Foundation held the first Lindau meeting for Nobel Laureates.

Minister for Skills, Research and Innovation, Damien English, TD, commented:

"I am delighted to see these researchers – now Lindau Fellows – honoured today in advance of their participation in what promises to be a hugely beneficial and stimulating experience for them. The nominees have progressed through both a national and incredibly competitive international selection process and have demonstrated the highest standards of scholarship in their respective fields. I am proud that we will have such excellent ambassadors for the Irish research and scientific community at this prestigious global event. The insights gained during the week in Lindau can only assist the awardees in furthering their contribution to their field, as well as the economy and society."

According to Dr Eucharia Meehan, Director of the Irish Research Council:

"Our Lindau awards recognise the importance of supporting the development of research careers, particularly at the earlier stages. This is central to the mission of the Irish Research Council and the awards are one of a range of initiatives and measures designed to provide a pipeline of excellent Irish researchers across all disciplines. During their time in Lindau, the awardees will benefit from the knowledge of leading scientists whilst also having opportunities to network and explore collaborations with their peers from across the globe. This experience will support the Irish participants' progress to the next phase of their research careers."

President of Ireland, His Excellency Michael D. Higgins, is patron of the Irish Lindau Nobel Laureate Meeting Award.

Below are details of the Irish nominees to participate in Lindau 2015

NAME	DISCIPLINE	HEI	RESEARCH AREA
Thomas Higgins	Physics	TCD	Electrochemical applications of nanomaterial composites
Owen Byrne	Physical Chemistry	UCD	Solar cell characterisation
Mariana Bexiga	Molecular Biology	UCD	Cationic nanoparticles
Jessica Hayes	Orthobiologics	NUIG	Fracture healing and osteogenesis
Roman Stilling	Pharmabiotic	UCC	Mechanisms of microbiota–gut–brain gene regulation and behaviour
Shalini Singh	Chemistry	UL	Synthesis & assembly of binary, ternary & quaternary semiconductor nanocrystals

New Foundations

The Irish Research Council's 'New Foundations' scheme supports eligible researchers who intend to pursue research, networking and/or dissemination activities within and across the diversity of disciplines. This scheme provides support for research actions, the development of networks, conference development, conference participation or attendance, creation of workshops and/or more general dissemination activities designed to communicate the outcomes and values of academic research in Ireland and beyond.

141 New Foundations
Awards Announced
Valued at €902,000

The awards announced in 2015 included three distinct strands:

Strand 1:

Engaging Civic Society

This new strand, which is run in partnership with The Wheel, will support small, discrete collaborative research projects between postdoctoral or senior researchers (acting as the applicant to the Council) and a community/voluntary group.



Strand 2:

Marking the National Decade of Centenaries

The Council offered this new strand to support activities designed specifically to contribute to the Decade of Centenaries Programme.



Strand 3:

Enhancing Knowledge Exchange

This strand supports eligible researchers who intend to conduct knowledge exchange and general dissemination activities in the promotion of their research.





Irish Research Council New Foundations Awards: Enhancing Knowledge Exchange Case Studies

Awardee: Dr Gavin Doherty

Project Title: International Technology for Wellbeing Conference

Higher Education Institution: Trinity College Dublin

About the Research Project

This research project involved the planning and hosting of a conference entitled 'Technology for Wellbeing'. The conference was held on 12 November 2015 in The Marker Hotel, Dublin. The programme included presentations from a mix of researchers and practitioners in the areas of technology, mental health and suicide prevention. The audience comprised a mix of academics, students, policy makers, managers and practitioners. Disciplines and sectors represented included: psychiatry; psychology; social work; nursing; youth work; computer science and education.

The theme of the conference reflected the objective of generating constructive and positive discussion regarding the use of technology and innovation in promoting wellbeing and providing support. At a time of widespread public anxiety about internet ethics and cyber safety, the conference showcased online services, technology-based platforms and mobile applications currently available in Ireland and internationally. Speakers included Elaine Geraghty, CEO, Reachout Ireland; Ronan Costello, Twitter Public Policy, EMEA; Colman Noctor, Child and Adolescent Psychotherapist, St. Patrick's Hospital;

Dr John Dinsmore, Centre for Practice and Healthcare Innovation, TCD; Kevin O'Donoghue, Union of Students in Ireland and Naoise Kavanagh, Reachout Ireland. The conference also included the launch of Reachout Ireland's report on mental health and third-level students, "Reaching out in college: Help-seeking at third level in Ireland".

Research Collaboration

This project was a collaboration between the School of Computer Science in Trinity College Dublin and the non-governmental organisation, Reachout Ireland. ReachOut.com has convened and hosted the 2013 and 2014 Technology for Wellbeing conferences, both of which took place in Dublin. The School of Computer Science and Statistics, TCD, was represented at both previous conferences through speakers and conference delegates. Cross-sectoral engagement in this research area is working as a catalyst to ensure that research is being translated into practice while public sector policy is being informed by pioneering services such as Reachout Ireland. The conference organisers were conscious that many mental health conversations and considerable online advice is made available through mainstream platforms, therefore the involvement of platforms such as Boards.ie was important to involve all key stakeholders in the conference.

Research Impact

There was extensive coverage of the conference on Twitter with #T4WB2015 being the highest trending hashtag in Ireland at one point during the day of the conference. The hashtag was used in over 500 tweets reaching an audience of nearly 209,000 people. In The Irish Times, Sylvia Thompson highlighted the contribution of the full range of contributors including psychotherapist Colman Noctor who commented that:

"we don't really know the long-term effects of being online yet. We literally sleep with our phones but the iPhone baby is only six now so we don't know yet the impact on attachment of a mother gazing at a phone."



Awardee: Dr Shane V. Hegarty

Project Title: Brain Research And Individuals Networking for Teaching, Assisting, Learning and Knowledge (BRAINTALK)

Higher Education Institution: University College Cork

About the Research Project

Over 8,000 people in Ireland are living with Parkinson's disease (PD) a debilitating neurological disorder which remains incurable. However, the affected members of the public (patients and their families), the clinicians treating these patients and the scientists researching PD remain relatively isolated from each other. This project, BRAINTALK, developed an informal conference to bridge gaps between public, clinicians and scientists within Parkinson's disease community. The overarching objective of the forum was to encourage interaction between, and contribution from, each of these groups for purpose of exchanging and disseminating knowledge. On 7 September 2015, the 'Parkinson's Community' meeting took place at the Glucksman Gallery in Cork. Over 200 participants, the majority of whom were people with Parkinson's

and their carers, gathered for a variety of presentations by Parkinson's advocacy groups, People with Parkinson's, therapists, neurologists and neuroscientists. The event began with a session on "Living with Parkinson's", which included talks by Margaret Mullarney of Move4Parkinson's Ireland and Dr Jon Stanford of The Cure Parkinson's Trust, UK. The "Understanding Parkinson's" session included talks by Ireland's two leading Parkinson's neurologists, Professor Tim Lynch of the Mater Hospital, and Dr Sean O'Sullivan from Cork University Hospital. The final session involved presentations about the latest research on novel therapies and patient-centered research by Professor Maeve Caldwell of TCD, Professor Aileen Sullivan of UCC and Dr Denise McGrath of UCD. To conclude the event, several people with Parkinson's paired up with neuroscientists for a set-dancing session directed by Pat O'Dea. This dance was a dialogue between those affected by Parkinson's and those working to develop new therapies. After the meeting, the 'Parkinson's Community' art exhibition was launched. This included paintings made by People with Parkinson's in an 'Exploring Parkinson's with Art' workshop held at the Glucksman Gallery on 28 July, as well as photomicrographs showing the ongoing scientific work by Parkinson's researchers in the Department of Anatomy and





Dr Gerard O'Keeffe (L), Professor Aileen Sullivan and Dr Shane Hegarty of University College Cork.

Neuroscience, UCC. Two additional artworks were made at the event on 7 September: the recital of "Live Your Life" was recorded and exhibited by Fearghal Cunningham as an audio waveform in digital print on tracing paper. The dance by People with Parkinson's and researchers was exhibited in a digital video by Brid Corcoran, with the movement and interaction within this piece exemplifying the spirit of the meeting.

Awardee

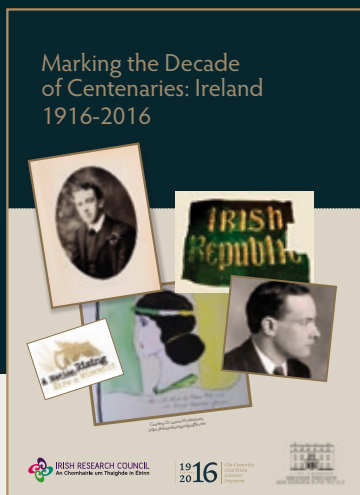
"We were overwhelmed by the positive response, interest, participation and feedback we received during this project, which highlights the need for more of these public engagement events in the future. I believe that through this Irish Research Council-funded project, we have significantly contributed to the creation of an active and interconnected Parkinson's community in Ireland, which together strives to improve the management and research outcomes of Parkinson's disease."

Research Impact

The Irish Research Council New Foundations award acted as a platform to support and facilitate this forum, which gathered all members of the PD community together. The 'BRAINTALK' public engagement events provided an outstanding opportunity for interactions between scientific researchers from different disciplines, specialised clinicians and non-scientific members of the PD community. At the forum, a 'Living with Parkinson's Disease' community was launched to facilitate long-term maintenance of the networks formed at the forum, as well as future actions within this community.



Irish Research Council New Foundations Awards: Marking the National Decade of Centenaries Case Studies



Awardee: Dr Natalie Harrower

Project Title: Assessing and Preserving the Digital Collections at Risk for the Decade of Centenaries (1916 at Risk)

Higher Education Institution: Digital Repository of Ireland (Royal Irish Academy)

About the Research Project

The objective of the Irish Research Council funded '1916 at Risk project' was to assess the scale of vulnerable digitised collections in Ireland, to provide support in digitally preserving these collections, and to create a centralised access point to support their wider dissemination. It aimed to engage with heritage organisations holding material relating to the period 1912-1922. In December 2014, the Digital Repository of Ireland (DRI) announced a call for expressions of interest from custodians of heritage material relating to the Decade of Centenaries wishing to digitally preserve their holdings. Collections from three different organisations were selected – the National Irish Visual Arts Library (Michael Healy Collection), Dublin City Archives (Dublin City Electoral Lists) and the Irish Capuchin Provincial Archives (The Capuchins and the Irish Revolution) – the content of which was considered to make a significant contribution to the national discourse on the Decade of Centenaries, and which was considered to potentially be at risk of degradation and loss. Digital archivists from the DRI worked with the collections to prepare them for deposit with the Repository and to enable long term digital preservation, as well as access and dissemination. The three collections were launched at the Digital Preservation for the Arts and Humanities conference in June 2015, and awards were presented by Dr Eucharua Meehan, Irish Research Council Director.

Research Collaboration

The award has allowed the DRI to engage with a number of new stakeholder organisations who had not previously undertaken any digital preservation processes for their collections. In August 2015, DRI ran a Digital Preservation Workshop for all applicants to the original call, providing training on digital preservation and data and metadata curation. This training allowed other interested organisations to prepare and deposit their data with DRI for long term preservation. Through the award and the subsequent workshop, the team worked with seven organisations who had not previously deposited content with the Repository. As well as providing training to allow participants to deposit with DRI, advice was also provided on smaller scale, in-house digital preservation practice which participants could bring back to their own organisations.

Research Impact

The New Foundations award provided an excellent opportunity to develop close relationships with new and existing stakeholders, and to demonstrate the efficiency, expertise, and capacity of DRI on a number of levels: digital archiving expertise, digitisation, partnership building, collaboration, and national leadership in digital preservation. These benefits clearly feed back into DRI's reputation in the community, and create additional possibilities for future collaborations and leadership. It allowed DRI staff to work with stakeholders directly, meaning that policy and theoretical workflows which the team had researched could be put into practice. The project provided a complementary perspective as, while it reflected on the documentary evidence of the 1912-1922 period and its digital representations, it also looked forward to the bicentenary, considering how the current commemorations could be preserved for examination in 2116.



Awardees: Dr Katherine O'Donnell and Dr Laura McAtackney

Project Title: Revolting Women: Nationalism, Suffrage and Labour, 1912-1924

Higher Education Institution: University College Dublin

About the Research Project

This project looked at the experience of female political prisoners in Revolutionary Ireland between the years 1912-1924, focussing in particular on the prison art, graffiti and personal mementoes held in Kilmainham Gaol and on the collection of personal political papers held in University College Dublin Archives. The website: www.kilmainhamgaolarchive.com gives a comprehensive introduction and overview of the material that was uncovered. The project built on an Irish Research Council-funded postdoctoral project: 'Following the Fighters? Female Experiences of Imprisonment in Early 20th Century Ireland'. Female experiences of political imprisonment during the period of 1912-1924 are infrequently considered and this is surprising given the significant numbers of women imprisoned. The inclusion of papers and material culture from Northern women permitted a wider consideration of the complex politics and identity issues at this swiftly changing period. Bringing these sources together ensures that complexity is added to our knowledge of women's experiences that, significantly, extends beyond borders, into the prisons and bypasses the usual cut-off dates into the post-civil war aftermath.

Research Collaboration

A very successful symposium was held on 16 October 2015 giving an overview of the key findings by invited leading historians of Irish women's history. Speakers included Padraig Yeates, Linda Connolly and Margaret Ward and topics discussed ranged from women and crime in 1916 to women and the Anglo-Irish Treaty. The response to attend was so strong that the venue had to be changed to accommodate the demand and the hashtag #RevoltingWomen trended on Twitter. Dr O'Donnell and Dr McAtackney are collaborating with the Cork History Teachers' Association and they will participate in their seminar series for the academic year 2016/17. The team, in conjunction with Dr Fionna Barber from Manchester University, are developing an exhibition highlighting holdings relating to Constance (Countess Markievicz) and Eva Gore Booth from UCD and the Public Record Office in Northern Ireland. The exhibition will be launched in 2016.

Research Impact

Arising from the project funded by the Irish Research Council, Dr O'Donnell and Dr McAtackney successfully leveraged UCD Centenaries Funding as Dr McAtackney found a significant amount of material within UCD's own archives that had been overlooked by scholars – including notebooks belonging to Constance Markievicz. After a briefing on the team's findings, UCD Archives has committed resources to digitising collections of papers deposited by revolutionary women and making them available online. The strength of the project is the website interface which allows for an accessible on-going public engagement which receives hundreds of visits on a monthly basis. Many are browsers from Ireland but a significant amount are from places associated with the Irish Diaspora such as the UK, the USA and Australia. The list of women who were imprisoned during the Civil War has generated particular interest by local historians and descendants curious about the often vague stories they have heard about their female relatives' involvement.

Ulysses Research programme



16 Projects Awarded for 2015

The "Ulysses" programme is designed to support new collaborations between Irish and French researchers. It is named Ulysses after James Joyce's famous novel to celebrate the Joycean links between Ireland and France. The programme facilitates the exchange of innovative ideas and approaches between Irish and French researchers and the development of mutual research projects involving Irish researchers visiting France and reciprocal visits of French researchers to Ireland.

In Ireland, Ulysses is funded by the Irish Research Council and Teagasc, and administered by the Irish Research Council. In France, it is funded by the French Ministry of Foreign Affairs and administered by the Embassy of France in Ireland and Campus France, the leading French agency for international mobility.

Now in its sixteenth year, the Ulysses programme continues to support Irish and French researchers across a range of mutually important areas. Collaborations have often continued long after the Ulysses award has finished, and in many cases lead to further research funding. Successful researchers each received up to €2,500 to spend a short period in the other country to carry out their research. 285 projects have been funded previously and Ulysses provides a crucial mobility experience for early stage researchers.

A recent example of the success of Ulysses is the collaboration between the University of Limerick (UL) and the University of Limoges, led by UL researcher Gordon Armstrong. Funded by Ulysses in 2012, a collaboration was established between the Irish Centre for Composites Research and Materials & Surface Science Institute and the Ceramics Processing and Surface Treatment Laboratory. The project aim was to develop a method of applying wear-resistant ceramic-metallic ('cermet') coatings to an aerospace-grade composite material in order to save weight in next generation aircraft. Such a development will reduce fuel consumption, operating costs and environmental impact and can be used in aircraft such as the Airbus A350, Boeing 787 and Bombardier C-Series.

"The Ulysses award provided us with an ideal basis on which to build a concrete collaboration, and I look forward to us building on this working relationship well into the future"

The collaboration has already led to several positive outcomes: the project team received the ANORAA trophy for 2013, awarded by the National Association of Reserve Officers of the French Air Force (l'Association Nationale des Officiers de Réserve de l'Armée de l'Air) for innovative applications of benefit to the aerospace sector. The project team also secured funding from the Conseil Régional du Limousin for a PhD student to continue their research programme.

2015 AWARDEES

AWARDEE	FRENCH PARTNER INSTITUTION	PROJECT TITLE	PROJECT LEADER	IRISH PARTNER INSTITUTION
Henri Bachau	Centre des Lasers et des Applications – Université de Bordeaux	Effet des corrélations électroniques dans les puits quantiques en champ laser intense	Lampros Nikolopoulos	Dublin City University
Carlos Bader Faouzi	IETR-Institut d'Électronique et de Télécommunications de Rennes	Generalized frequency division multiplexing (GFDM) for the next generation of wireless systems	Luiz Da Silva	Trinity College Dublin
Margaret Brennan	Bioelectronics – Ecole Nationale Supérieure des Mines de Saint-Etienne	ProtoXplore: Détection polyvalente de changement conformationnel de protéines	Werner Blau	Trinity College Dublin
Thibaud Coradin	Laboratoire de la Chimie de la Matière Condensée (CNRS UMR 7574)	Hydrogels denses composites à base de collagène pour la libération de gènes dans les ulcères du pied chez le diabétique	Abhay Pandit	National University of Galway
Alain De Cheveigne	Laboratoire des Systemes Perceptifs (CNRS UMR 8248)	Joint prediction of audio and brain signals	Edmund Lalor	Trinity College Dublin
Marc Eleaume	Muséum national d'Histoire Naturelle (UMR 7208 Biologie des Organismes et Ecosystèmes Aquatiques)	Assessing Northeast Atlantic deep-sea habitats	Louise Allcock	National University of Galway
Nicolas Franck	Centre de Neurosciences Cognitives	Comprendre et prendre en charge la cognition sociale chez les personnes souffrant de troubles psychiatriques	Gary Donohoe	National University of Galway
Kerry Gallagher	GEOSCIENCES – Université Rennes 1	Nouveaux développements analytiques appliqués à la datation in-situ de l'apatite	David Chew	Trinity College Dublin
Nicolas Guichon	Interactions Corpus Apprentissage Représentations – Université Lyon 2	InteractionS et Multimodalité dans l'Apprentissage et l'Enseignement des Langues (ISMAEL)	Françoise Blin	Dublin City University
Christian Jorgensen	INSERM U844	MIRSTEM	Franck Barry	National University of Galway
Michelle Kelly-Irving	Epidémiologie et analyses en santé publique – INSERM	Le rôle des processus psychosociaux dans le développement des maladies de l'enfant	Richard Layte	Trinity College Dublin
Guillaume Parry	Science et Ingénierie des Matériaux et Procédés – Grenoble INP	Modelling of the direct bonding process of micro-electronics silicon wafers by a cohesive interaction strategy	Patrick McGarry	National University of Galway
Julien Poette	IMEP-LAHC (CNRS UMR 5130)	Millimeter Wave over Fiber System Based on Optical Comb Source	Tong Shao	Dublin City University
Patrick Saulnier	INSERM S-U1066 – Université d'Angers	Formulation and characterisation of spray-dried Trojan particles for pulmonary delivery of anti-effective agents	Lidia Tajber	Trinity College Dublin
Mihai Radu Stancu	Laboratoire Amienois de Mathématiques Fondamentales et Appliquée (CNRS UMR 7532)	Stable biset functors of fusion systems on finite p-groups	Sejong Park	National University of Galway
Olivier Thomas	Institut de Chimie de Nice (CNRS UMR 7272)	SpongOmics	Grace Mac Cormack	National University of Galway



Professor Jane Ohlmeier, Chair of the Irish Research Council, presenting at a GENDER-NET seminar.

Promoting Gender Equality in Research

Irish Research Council Gender Innovation Strategy

The Council has a social responsibility to ensure that it actively works to maximise collective research intelligence, creativity and innovation, and to only fund excellent research which has maximum impact and societal benefit, thus ensuring the quality of the Irish research system.

The Council Gender Strategy includes both sexes, and aims to provide equal outcomes to both men and women so that Ireland can attract and retain the most talented, creative and innovative researchers, thereby maximising its collective research intelligence.

The Council will systematically and consciously work to address gender challenges by:

- ▶ encouraging more equal gender representation in the research population, for example by showcasing relevant role models;
- ▶ acknowledging unconscious gender bias may exist and taking steps to limit any effect on internal processes and procedures to deliver a level playing field for all applicants;
- ▶ supporting the development of national initiatives to remove gender-related structural constraints and barriers in the recruitment, advancement, retention and mobility of all researchers in the Irish research system;
- ▶ increasing awareness of the need to consider whether a potential sex and/or gender dimension is relevant in a research proposal and, where relevant, requiring integration of sex/gender analysis into the design, implementation, evaluation and dissemination of the research.

GENDER-NET

The Irish Research Council are partners in the EU FP7 GENDER-NET project (www.gender-net.eu).

GENDER-NET is the first European Research Area Network (ERA-NET) to be dedicated to the promotion of gender equality through structural change in research institutions, as well as to the integration of sex and gender analysis in research.

GENDER-NET brings together a balanced partnership of thirteen national programme owners from across Europe and North America – i.e. ministries, national research-funding agencies or national organisations – with a shared commitment to gender equality and synergistic expertise in gender and science issues.

GENDER-NET is conceived as a pilot transnational research policy initiative, which will allow for a global vision of the best practices and conditions for success, innovative assessment and knowledge-transfer methods, as well as concrete engagement of partners in the implementation of joint activities, thus breaking new ground at EU-level and contributing to the realisation of ERA.

A strong rationale for the Council's participation in GENDER-NET derives from the leading role it has played in supporting the integration of gender/sex analysis (IGAR) into the research it funds. The Council was among the first research funding agencies in the world to introduce a requirement on IGAR into all its funding schemes. If applicants believe there is no sex/gender dimension to their research topic they are required to explain 'why not'. Where applicants confirm a sex/gender dimension, they are requested to set out how this aspect will be handled. The introduction of IGAR was supported by training and guidance for both applicants and assessors.

Through GENDER-NET the Council has been able to share its leading practice, both within the consortium but also through the consortium's engagement with key groups and stakeholders including ERAC, the H2020 Strategic Configuration Committee, Science Europe and EU Member State Ministries.

5 PARTNERING ON RESEARCH WITH ENTERPRISE, GOVERNMENT AND CIVIC SOCIETY

Employment Based Postgraduate Awards 2015

EMPLOYMENT BASED PG SCHEME	32
STEM	20
AHSS	12
NUMBER OF INSTITUTIONS	11
EMPLOYMENT PARTNERS	32

The Minister for Skills, Research and Innovation, Damien English, TD announced the awarding of €2.6 million to support 32 new enterprise-academia research partnerships through the Irish Research Council's Employment Based Programme.

The Programme supports the enterprise sector in creating employment opportunities for early-stage researchers and nurturing the development of transferable skills as researchers benefit from the supervision of leading experts in enterprise and academic domains.

Announcing the funding, Minister for Skills, Research and Innovation, Damien English, TD said:

"The Irish Research Council's Employment Based Programme is an important instrument through which our enterprise sector, particularly our SME's, can build their research and innovation capacity, through access to high-level research skills."

The funding of 32 new awards marks the fourth successive round of the Employment Based Programme. The awards will support research partnerships over the coming four years in key areas such as Cloud Computing, Cybersecurity, Tissue Regeneration, Sports Performance, Therapeutics, Wastewater Treatment, Bio-conservation, Justice Reform and Community integration."

The Minister went on to say:

"This programme is an effective way for Irish-based enterprise to secure support and resources for their research and development and it supports our research talent pipeline, with these awardees set to become the next generation of leaders at the cutting-edge of innovation. The Programme can also lay the groundwork for companies to potentially tap into future research opportunities under Horizon 2020."

Dr Eucharua Meehan, Director of the Irish Research Council indicated that:

"An objective for the Council is to support the education and skills development of excellent early stage researchers and to offer a range of opportunities to them which support diverse career paths. This programme is key for delivering on that objective, for enabling the development of research capacity in enterprise and for delivering on the Action Plan for Jobs."

In delivering on objectives of the Action Plan for Jobs, the Employment Based Programme nurtures Irish enterprise to yield economic, cultural and societal benefits. In 2015 over 70% of awards went to SMEs. A further 15% went to large indigenous enterprise with over 10% supporting research-based employment opportunities in multinational corporations in Ireland. Employers benefiting from the creation of new research-based positions included: TE Laboratories Ltd, Orbsen Therapeutics, Pilot Photonics, RehabCare, Nuritas, EdenShelters Products Ltd, Sigmoid Pharma Ltd, Irish Rugby Football Union, Fota Wildlife Park, Bell Labs Ireland and Ingersoll Rand International Ltd.





EBP Case Studies

Scholar: Sebastian Ruder

Project Title: High-level Cross-medium Open-set Authorship Identification

Employment Partner: Aylien Ltd.

Higher Education Institution: National University of Ireland, Galway

Research Collaboration

Aylien provides hardware resources that facilitate the compilation of large-scale datasets as well as the data-intensive training of deep learning models; simultaneously it promotes curiosity and the exchange of ideas, not only during the weekly tech talks but on a continuous basis. The Insight Research Institute for Data Analytics at NUI Galway focuses on research on the social and semantic web which will shift with the advent of Cognitive Computing in a more AI-like direction.

Mentor

"At AYLIEN we work on hard problems related to human languages, and enabling computers to understand them better, which will ultimately revolutionise the way we interact with computers. To tackle these problems we need science and engineering to work hand in hand, and the Employment Based Programme along with our partnership with NUI Galway have enabled us to work closely with two top scientists from Germany and Iran, who are pushing the boundaries of science. AYLIEN is proud to host and work with Sebastian under the Employment Based Programme."

Scholar

"The Employment Based Programme for me brings academia and industry together in the best possible way: It enables me to immerse myself and get to the bottom of hard problems; at the same time, I am able to collaborate with driven and inspiring individuals at AYLIEN. I find this immersion of research-oriented people like myself sitting next to people that are hands-on with diverse technical backgrounds very compelling. This stimulating and fast-paced

working environment provides me with direction and focus for my research, while the 'get stuff done' mentality allows me to concentrate and accomplish meaningful things. My supervisor, John Breslin, in particular, having been awarded the Net Visionary award, will provide me with the guidance and vision that will help me succeed."

The rapid proliferation of social media and web technologies have led to the availability of massive amounts of online texts (email, tweets, blog entries, journal articles, etc.). These texts are frequently anonymous or cannot be directly attributed to an author. However, in every text, its author has left a distinct fingerprint, features that – even though left unconsciously – allow the identification of an author and their traits.

Current approaches in authorship attribution only allow a low-level identification and comparison of authors. Enriching an author's signature with semantic features will let us derive a higher-level description of authorial style. This will allow a clearer explanation of an author's stylistic differences satisfying, e.g. the court standards of forensic cases, while the adaption and extension of deep learning methods will enable us to model authorship at a large scale.

Medium-specific idiosyncrasies provide new challenges and call for adaptive approaches, which will in turn allow matching of an author's social media profiles across mediums based on style variations. More nuanced authorship identification will also help to prevent cybercrime by facilitating fraud and identity theft detection, as well as have pedagogical implications by allowing to surface an author's stylistic development over time."

Potential Impact of Research

The ability to extract an author's properties based on text will directly serve to enhance AYLIEN's existing Text Analysis API. Knowing an author's age, gender, personality traits and predisposition towards certain topics proves invaluable to advertisers and allows them to market directly to specific target groups. Improved authorship attribution will help to prevent plagiarism, fraud and identity theft. In an age where everyone is an aspiring writer, understanding what makes a great author will enable people to get better, while language learners would be able to track the development of their style over time.



Scholar: Marie Garvey

Project Title: Molecular Epidemiology of Equine Herpesvirus 1, Genetic Diversity and Disease Expression

Employment Partner: Irish Equine Centre, Co. Kildare

Higher Education Institution: University of Limerick

Research Collaboration

The Irish Equine Centre has the intellectual capacity and specialist equipment required to complete this project. Professor Ann Cullinane, Head of the Virology Unit, is an internationally acclaimed virologist, OIE expert, and holds an adjunct professorship at the University of Limerick.

The University of Limerick and the Irish Equine Centre collaborate across a range of deliverables such as teaching, co-operative industry placements, undergraduate research and shared research projects. Professor Sean Arkins (Head of Life Sciences) and Ann Cullinane have co-supervised MSc and PhD students from the Irish Equine Centre and have published extensively in high impact journals.



Marie Garvey (L); Professor Ann Cullinane, Irish Equine Centre.

Mentor

"In June 2015 the Virology Unit at the IEC was designated an OIE Reference Laboratory for equine rhinopneumonitis (equine herpes 1 virus or EHV-1), one of five in the world. To retain this designation the quality of our research has to be exceptional. The Employment Based Programme allows a key member of our existing team to avail of the academic expertise and emerging technologies in the University of Limerick. It allows Marie freedom from routine duties to spend time with university researchers, to improve her technical and presentation skills and to foster relations between diagnostic and research laboratories."

Scholar

"Having spent twelve years working in viral diagnostics at the IEC, I developed a special interest in the molecular epidemiology of Equine Herpesvirus 1 (EHV-1). My decision to pursue a PhD in this research field was made possible solely by the employment-based postgraduate programme. This programme has given me the valuable opportunity to enhance and expand my knowledge and skills base particularly in the areas of molecular virology, epidemiology and data analysis."

On completion of my PhD, my ultimate goal is to be promoted to research scientist with a primary role in the OIE Reference Laboratory for Equine Rhinopneumonitis."

Potential Impact of Research

This project will assist the IEC in fulfilling the mandate of an OIE reference laboratory for a major equine pathogen. With 180 member countries, the OIE is the intergovernmental organisation responsible for improving animal health worldwide and is recognised as a reference organisation by the World Trade Organization (WTO). The OIE reference laboratories provide advice on disease diagnosis and control, and develop standards for the international movement of animals. This project will improve diagnostic techniques, identify candidate vaccine strains and lead to evidence-based protocols for the prevention and control of abortion and paralysis in horses nationally and internationally.

Enterprise Partnership Scheme Awards 2015

TOTAL NUMBER OF AWARDS	59
STEM	52
AHSS	7
NUMBER OF INSTITUTIONS	18
ENTERPRISE PARTNERS	49

The Irish Research Council's suite of Enterprise Programmes are designed to support Enterprise-Academia-Social engagement through exceptional individual researchers. These programmes are aligned with the Council's mission to fund excellent scholars and fellows across all disciplines, to encourage interdisciplinary research and to promote engagement with enterprise.

The primary strategic objective of the Council centres on building an expertise-driven research system to enhance Ireland's creative and innovation capacity and skills base in a rapidly changing global environment where knowledge is key to economic, social and cultural development. The Enterprise Programmes, being open to all disciplines, contribute significantly towards this remit.

In December the Irish Research Council closed the year by marking 10 years supporting enterprise. Representatives from the first enterprise partners, IBM and Intel, were present as were representatives of the two most recent partners Nuritas (a hi-tech food ingredient start-up) and Aylie (a data mining/analytics start-up).

Minister for Skills, Research and Innovation, Damien English, TD said:

"The Council's employer facing programmes have over the past decade contributed to the development of skills and research capacity for the private sector in Ireland. I recently had the opportunity to meet some of the 320 leading companies who have been involved with the programme as well as researchers who have benefited. It is absolutely critical to the future success of the Irish economy that we apply research and innovation to our business challenges, and provide the necessary supports to enable companies and academic



institutions to work together for mutual benefit. The advantages are numerous, including job creation, increased exports, opening up of commercial opportunities, and the positioning of Ireland as a top-class research and innovation centre."

He further added that the Irish Research Council programmes have a specific role to contribute to the achievement of targets set out in Innovation 2020, Ireland's strategy for research, development, science and technology launched by An Taoiseach, Mr Enda Kenny. Innovation 2020 targets expansion in Masters and PhD output over the period 2015-2020 to address enterprise and other national needs.

Also speaking on this occasion, Professor Jane Ohlmeyer, Chair of the Irish Research Council, stated that:

"Working with enterprise and employers is part of the core mission of the Irish Research Council, and its suite of employer facing programmes offers a low-risk, low-cost route to research for enterprises both large and small. The Council is all about developing people through excellent research. Through collaboration with employers, participating scholars develop a range of important additional transferable and complementary skills which open up new avenues for career development."

Chair of the Council, Professor Jane Ohlmeyer; Minister for Skills, Research and Innovation, Damien English, TD; Director of the Irish Research Council, Dr Eucharía Meehan and awardees from Alltech, Boliden Tara Mines Limited, Intel, Q4 Public Relations, IBM, Aylie and Nuritas.



Enterprise Case Studies

Scholar: Daniel McPartlin

Project Title: Development of an immunosensor platform to detect *Azadinium spinosum* and associated toxin azaspiracid-1, a shellfish poisoning toxin

Enterprise Partner and Enterprise Mentor name:
SmartBay Ireland Limited, Dr Rogério Chumbinho

Higher Education Institute and Academic Mentor name:
Dublin City University & Prof Richard O'Kennedy and Dr Caroline Murphy & The Marine Institute, Galway & Dr Joe Silke

Summary of Research Project

Increasing occurrences of harmful algal blooms (HABs) have been attributed to increased pollution and changing ocean temperatures. In the southwest coast of Ireland, HABs have caused annual closures of coastal fisheries due to the presence of toxic dinoflagellate *Azadinium spinosum*. Shellfish consume *A. spinosum* and the associated toxin (azaspiracid-1) builds up within their systems. Consumption by consumers causes diarrhoea and vomiting. Such occurrences have driven the need for highly-sensitive and accurate 'on-site' monitoring systems.

Current analytical detection methods are expensive and are not conducive to 'on-site' monitoring. Biosensors incorporating recombinant antibodies have emerged as an optimal alternative method of detection as they can allow for inexpensive, 'real-time', 'on-site' monitoring with excellent sensitivity and specificity. During this project recombinant antibodies will be developed in DCU to detect *A. spinosum* and azaspiracid-1.

This project will build on a previously successful Marine Institute project that monitored the movement of dinoflagelates along the southwest coast of Ireland as well as an 'on-site' toxin detection device previously developed in DCU.

During this project, the movement of *A. spinosum* will be validated using the specific immunometric platform. SmartBay Ireland will coordinate with DCU to oversee the 'on-site' marination, deployment and communication requirements of the novel device.

Research Collaboration

The research facilities at the Galway Bay National Test and Demonstration site run by SmartBay include a databuoy equipped with several sensors for operational, meteo and oceanic conditions, along with redundant wireless communications to shore. The buoy has enough power to accommodate novel devices produced by developers. DCU has been, and will continue to be, a user of SmartBay's infrastructure and services for a number of projects, being thus well aware of their potential which led to the present collaboration.

Enterprise Mentor

"This scheme is a very effective way to help bridge the gap between the academic and the industrial/commercial sectors; this has been one of the objectives of the company since its inception over three years ago. By mentoring Daniel McPartlin, SmartBay is contributing to the project in more than one way: firstly by providing access to the marine environment, to test and validate the work produced; secondly by giving advice on design considerations that must be taken into account for operations in the marine; and finally by providing a "real-life" working environment for the student."



Scholar

"The Enterprise Partnership Scheme has provided an excellent opportunity to carry out postgraduate research in collaboration with a leading marine-monitoring and sensor development company, SmartBay Ireland. A collaboration of this kind is hugely beneficial as it will provide guidance and the opportunity to incorporate work carried out in an academic environment into the real-world commercial environment. I will also gain invaluable experience through working with a commercial company. This partnership has also provided excellent connections between DCU and SmartBay Ireland, which will surely allow for further collaboration to address potential future human health and environmental issues."

Academic Mentor

"The Enterprise Partnership Scheme has provided an excellent opportunity for facilitating research collaborations between DCU, the Marine Institute and SmartBay Ireland. The expertise of the partners, combined with the facilities available, has provided the ideal environment for Daniel to work for his PhD and, ultimately, to see the translation of his results into new tests of potential economic value. This collegiate collaboration should also provide us with the potential to seek additional opportunities for research and associated funding both nationally and internationally."

Potential Impact of Research

The development of the proposed 'buoy-deployed' biosensor could allow for the early detection of *A. spinosum* and azaspiracid-1 toxin. This in turn can allow for the early warning of coastal fisheries of the potential contamination of shellfish in the area and the prevention of contaminated material entering the food chain. Accurate knowledge of contaminated areas can allow fisheries to better devote resources to non-contaminated areas. The system can also facilitate the 'on-site' monitoring of annual harmful algal bloom fluctuations which may allow for the development of models for the improved understanding and prediction of their occurrences.

Scholar: Maria O'Brien

Project Title: Integration of CVD Grown 2D materials

Enterprise Partner and Enterprise Mentor name:

Intel Ireland Limited, Christopher Murray

Higher Education Institute and Academic Mentor name:

Trinity College Dublin and Prof Georg S. Duesberg

Summary of Research Project

The simple transistor is an electronic device that is the fundamental building block of modern electronics. In 1965, Intel co-founder Gordon E. Moore described what has come to be known as "Moore's Law". He predicted that the number of transistors on integrated circuits would double approximately every two years, which until now has been incredibly accurate. This has led to a highly reduced cost and improved performance of electronics, in everything from laptops and tablets to smart TVs and fitbits. Unfortunately, following Moore's Law, transistors are now manufactured on the order of mere nanometres, meaning that new materials must be developed to further the capabilities of digital electronic devices, without the interference of quantum tunnelling and other effects associated with the nanoscale.

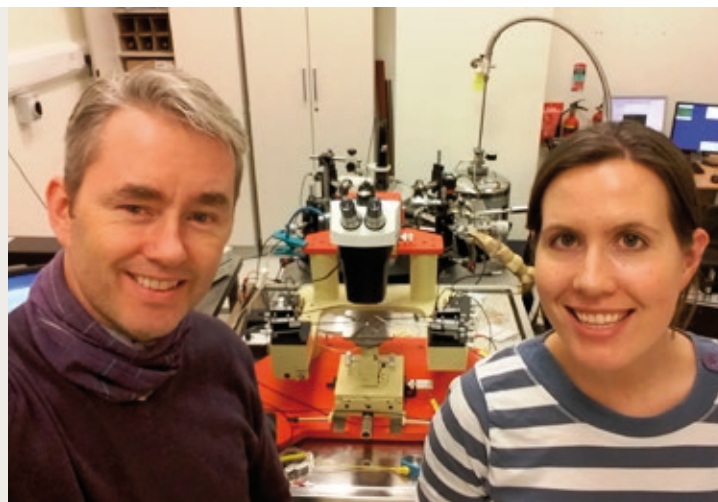
The main aim of the research project is therefore to synthesise novel materials and study their electronic properties, in order to provide realistic solutions for future electronics, while maintaining the device performance and cost of the current market. For this we are focusing on atomically thin materials, or 2D materials, which are sheets of materials over a million times thinner than a human hair. The unique properties of these materials, when isolated in their 2D form, suggest that their implementation into future electronic devices could be a desirable solution for industry, as their potential applications include cheap, fast and light electronic devices.

Research Collaboration

"As part of their dedication to future technologies and innovation, Intel has numerous researchers-in-residence working with several research groups within the AMBER centre. While undergoing a summer research project within Professor Georg Duesberg's research group, I had the opportunity to meet and work with several of these researchers. After a few discussions with Chris Murray, an Intel researcher working at the time on the manufacture of devices from the famous 2D material graphene, we decided to write a proposal to the Irish Research Council for a project based on other emerging 2D materials, as at the time quite little was known about the potential of these materials for future device applications."

Enterprise Mentor

"The Irish Research Council EPS Scheme is the best mechanism to allow first stage collaboration between Intel Ireland and Irish academics. Working with Intel-funded PhD students is mutually beneficial both to the company and to the student, as the company gains a broad and in-depth knowledge into research areas of interest, while steering the student towards technologically relevant and useful research and providing students with access to high level technology leaders from an early stage in their career, through collaborations, meetings, networking events and the Intel Ireland conference. The EPS scheme is of great benefit to all involved, as it allows direct knowledge exchange between companies working at the forefront of the market and students at the cutting edge of research, and can make students an attractive potential hire for the company in future."



Christopher Murray (L), Intel Ireland; Maria O'Brien.

Scholar

"Working alongside a company like Intel allows me to be a part of this research into future technologies, which could have huge social and economic benefits to for Ireland and Europe. Working with Intel researchers during the course of my PhD has also helped me plan and stay on track with my research from the very beginning, as it allows instant feedback on how useful my research could potentially be to future innovations and to industrial adaption. Having Chris Murray as an Intel mentor during the course of my PhD has been invaluable, and attending and presenting my work at the Intel Ireland research conference each year has given me important feedback into my work and the future directions it should take."

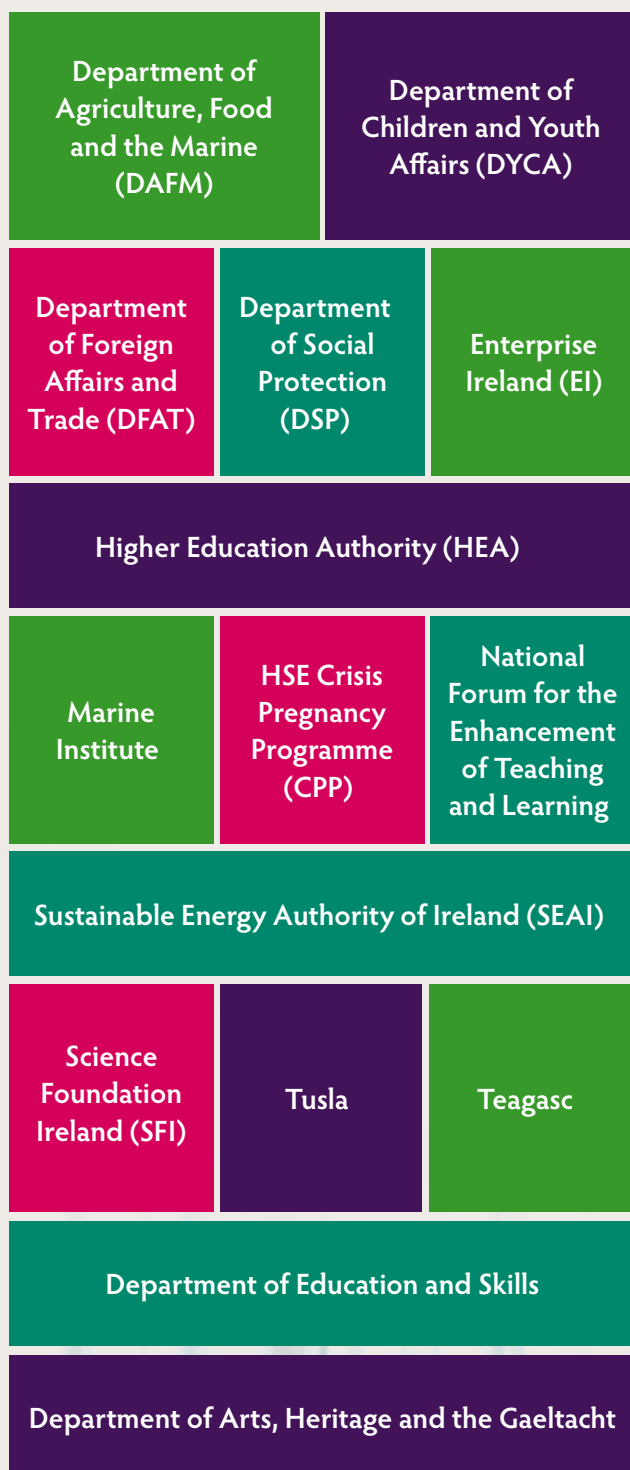
Academic Mentor

"The EPS is a fantastic opportunity for any PhD student, as it allows a student to gain industrial experience from the very beginning of the research project, and allows mentoring and development of projects and ideas in a fast and effective way. The EPS scheme also allows research within universities to align with research initiatives in multinational technology companies, which is of huge benefit to universities and research institutes in Ireland."

Potential Impact of Research

The integration of 2D materials into device structures can reveal new properties of previously unstudied materials, which will in turn produce knowledge in various research fields with potential high impact. This research will generate highly relevant scientific results which will extend Europe's lead in the research of 2D materials, and ideally give Ireland a large boost in the technology and research sectors. Moreover, these materials show huge promise for use in low power electronics, FinFETs and spintronics. This work is also relevant to major graphene initiatives in ICT companies and also within the EU's graphene flagship project. This means that the results of these studies on 2D materials will have huge significance for ICT and future electronics.

Partnering with Government Departments & Agencies



Research for Policy and Society

The Irish Research Council seeks to enrich the pool of knowledge and expertise available and accessible for addressing Ireland's current and future needs, whether societal, cultural or economic, by funding excellent research and researchers. In order to deliver on this mandate, the Council has set out a strategic objective to maximise partnering and collaboration with societal stakeholders, including enterprise, and with a particular focus to be given to government and civic society so as to address their needs.

In 2015, the Council launched a pilot Research for Policy and Society Programme. The aim of this programme was to build partnerships with government departments and agencies in order to enable peer-reviewed research/initiatives to underpin policy decisions, and to assist cultural and societal development.

The 2015 Research for Policy and Society Awardees:

Craig Bullock (UCD), *Opportunities for Mobilising Finance for Biodiversity*

Co-funded by the Irish Research Council and the Department of Arts, Heritage and the Gaeltacht

Jane Gray (Maynooth University), *Supporting low income working families: Enabling Resilience*

Funded by the Department of Social Protection

Pádraig MacNeela (NUIG), *Smart Consent: Evaluating an Intervention to Promote Active Consent on the Part of Young Adults*

Funded by the HSE Crisis Pregnancy Programme (CPP)

Carmel Halton (UCC), *Social & Economic Analysis of Legal Services (SEALS)*

Co-funded by the Irish Research Council and Tusla – Child and Family Agency

Marie Clarke (UCD), *The internationalisation of Irish higher education*

Funded by the Higher Education Authority

Fred Powell (UCC), *Increasing participation: An exploration of the factors which impact on progression to higher education from under-represented socio-economic groups*

Funded by the Higher Education Authority & the Department of Education and Skills

Partnering with Civic Society

Strategic Partnership between the Irish Research Council and The Wheel

A strategic partnership between the Irish Research Council and The Wheel has been established to provide a structured mechanism to foster and promote effective engagement and transfer of knowledge and understanding between stakeholders in the academic community, the community and voluntary sector and into society in general. Effective engagement between the higher education sector and the community/voluntary sectors is a key objective of the National Strategy for Higher Education to 2030.

As part of this strategic partnership an event was held to discuss the impact of the Engaging Civic Society strand of the 2014 New Foundations Scheme and to mark the current cycle of research projects undertaken by academic researchers working with civic society organisations.

Thirty-nine projects were funded under the Engaging Civic Society Strand of the Irish Research Council's New Foundations initiative, run in partnership with The Wheel. The seminar audience heard of the progress of a number of the funded projects.

Speaking at the event, Dr Eucharía Meehan, Director of the Irish Research Council commented:

Peter Brown, Assistant Director of the Irish Research Council.



Deirdre Garvey, Chief Executive Officer of The Wheel.



"We have heard today a number of practical examples of the benefits and key emerging outcomes arising from researchers and community or voluntary organisations working together on a specific problem or challenge. Research is helping to add to the knowledge and evidence base for civil society, benefiting both individual organisations and the sector as a whole. New Foundations' Engaging Civic Society strand also strongly benefits the research community by cultivating cross-fertilisation between academia and other sectors and spreading the impact of research outside the academic domain".

Josephine Boland (L), NUI Galway; Martin Naughton, Aiseanna Tacaiochta Networks; Deirdre Garvey, The Wheel; Jan O'Sullivan TD, Minister for Education and Skills; Dr Eucharía Meehan, Irish Research Council; Cliona Saidleir, Rape Crisis Network.



Irish Research Council New Foundations Awards: Engaging Civic Society case studies

Awardee: Dr Joan McCarthy

Project Title: Implementation and Evaluation of an End-of-Life Ethics Educational Intervention (EduEthics)

Civic Partner: Irish Hospice Foundation

Higher Education Institution: University College Cork

Civic Partner Profile

The Irish Hospice Foundation (IHF) is a national charity dedicated to all matters relating to dying, death and bereavement in Ireland. Their vision is that no one should face death or bereavement without the care and support they need. IHF's mission is to achieve dignity, comfort and choice for all people facing the end.

About the Research Project

The aim of the project EduEthics was to pilot and evaluate an educational intervention that would enable participants to act as facilitators of the Ethical Framework for End-of-Life Care Study Sessions in Irish hospitals and community settings. A blended learning educational programme was developed and delivered to seven healthcare and allied professionals from a range of backgrounds including nursing, speech and language therapy and social work. The inspiration and motivation for this innovative and unique project emerged out of a national initiative undertaken by the IHF, University College Cork and the Royal College of Surgeons in Ireland in 2007-2011. That research culminated in the development of an Ethical Framework for End-of-Life Care (a comprehensive set of ethics educational resources which is freely available to health professionals, allied professionals and the general public at: <http://hospicefoundation.ie/publications/ethics/>). It is anticipated that EduEthics will build the clinical ethics capacity of Irish healthcare institutions and foster and support ethically and legally sound clinical practice in end-of-life treatment and care in Ireland.



Research Collaboration

The EduEthics intervention consisted of 2 two-day workshops that participants attended as well as undertaking 12 hours of online learning. Participants were recruited via The Irish Hospice Foundation's Hospice Friendly Hospital Networks. In the first workshop held in September 2015 the participants completed a five-credit module, Introduction to End-of-Life Decision Making (Level 9 on the National Framework for Qualifications). The content included topics such as breaking bad news; assisted suicide; explaining ethics and rights and limits of autonomy. The second workshop held in October 2015 focussed on the development of facilitation skills for the delivery of the Study Sessions in local settings.

Research Impact

The delivery of EduEthics has enabled seven participants to act as facilitators of the Ethical Framework for End-of-Life Care Study Sessions in Irish hospitals, healthcare and community settings. This will ensure the wide dissemination of the Study Sessions and enable the Facilitators of the Sessions as well as the members of the Study groups in healthcare and community settings to be more informed, confident and collaborative in addressing ethical and legal challenges that arise in the treatment and care of dying patients and their families. All participants discussed how their awareness of ethics in practice has been raised:

"My understanding has changed, I have a good knowledge of ethics – but I have all the answers now. Sometimes in practice, there are situations where I think if we had an ethics committee, it would help. But no, we need to have a guide to apply the principles. It pulled things together for me."

"Ethical principles are more a part of my practice, I now advocate for the patient voice, I am more aware in cases especially if the patient is alone or cognitively compromised."

Participants evaluated the programme positively, suggesting some areas for potential improvement but overall were pleased with their learning experience, outlining that their knowledge, skills and ability to assume a leadership role locally increased post course.

Awardee: Dr Pádraig MacNeela

Project Title: "Sexy Consent": Devising Workshops to Empower Young Adults to Negotiate Consent to Sexual Activity

Civic Partner: Rape Crisis Network Ireland

Higher Education Institution: National University of Ireland, Galway

Civic Partner Profile

Rape Crisis Network Ireland (RCNI) was founded in 1985 as a representative group for Rape Crisis Centres in Ireland. It is a focal point for identifying best practice, advocacy, education and research. Core values include commitment to partnership and collaboration to effect change in the understanding of sexual violence and our societal responses.

About the Research Project

Recent research shows that non-consensual sex and harassment are unacceptably prevalent among young adults. A 2013 survey of third level students found that 5.3% of female respondents reported being raped, 3% described attempted rape, and 10.8% another form of unwanted sexual contact ('Say Something'; Union of Students in Ireland, 2013). A 2013 survey of over 1,000 undergraduates by MacNeela and colleagues found that 51% reported experiencing unwanted sexual harassment and 8% being forced or pressured into sex. Non-consensual sex and harassment are significant threats on campuses now increasingly acknowledged in the UK and US (White House Task Force to Protect Students from Sexual Assault; compulsory consent workshops at Oxford and Cambridge; UK National Union of Students reports on sexual harassment, rape, alcohol-fuelled 'lad culture'). Yet the necessary tools for a preventative, awareness-raising approach are not presently available in Ireland. This collaborative research project with Rape Crisis Network Ireland designed and piloted materials and procedures for "Sexy Consent" workshops with university students.

Research Collaboration

The project leaders were Dr MacNeela and Dr Cliona Saidleir (Acting Director, Rape Crisis Network Ireland). The Steering Group comprised experts such as Dr Ann Hope (alcohol research consultant with Department of Health), Dr Christine Domegan (Social Marketing, NUIG), Ms Cindy Dring (Health Promotion Officer, NUIG Student Services), Dr Michael Byrne (Director, UCC Student Services), Ms Elaine Byrnes (PhD student researching sexual health), Dr Siobhán O'Higgins (sexual health promotion expert, NUIG) and Mr Liam O'Loughlin (Western Regional Drug & Alcohol Task Force). Through a research collaboration with RCNI, the aim of this project was to address that gap through empowerment and peer-to-peer learning. Community education and prevention are integral to the RCNI strategic aim of building a 'whole of society' response through best practice and partnership to prevent sexual violence.

Research Impact

A seminar was held on 3 June 2015 in NUI Galway to discuss the need for evidence-based, theory-led strategies to address sexual assault and promote active consent among young adults. Speakers included Dr Pádraig MacNeela; Dr Charlotte McIvor; Dr Christine Domegan and Dr Siobhán O'Higgins. The presenters reported on the picture of sexual health that emerged from five surveys of students conducted during 2015 – in respect of indicators such as frequency and comfort of engaging in different sexual activities, rates of sexual assault, and how consent is expressed during sexual encounters. In addition, they showed how these quantitative findings, when combined with qualitative exploration of attitudes and expectations for consent, have the potential to be employed in new strategies that promote active consent.



6

LEADING FOR IRELAND IN EUROPE

Introduction

The Irish Research Council is committed to facilitating the integration of Irish researchers within the European Research Area. The Council forms part of a network of Research Councils across Europe which allows countries to relate to each other and collaborate on research agendas.

The Council has developed an international reputation and an expertise on Europe which is reflected in the activities in which we are engaged. Participation in these networks has also been used by the Council to lobby for development and inclusion of research priorities sought by the Irish research community in EU funding. The Council has established effective communication structures with Irish researchers to facilitate this.

On December 11 2013, Horizon 2020 (H2020), the European Union's new research and innovation funding programme designed to enhance and embed the European Research Area, was formally launched. A national strategy on how Ireland would engage with H2020 so as to deliver on its objectives was published shortly thereafter. As H2020 will also contribute to the enhancement of national research and innovation capacity, the Irish national strategy sets an overarching target for Ireland's drawdown from H2020 (€1.25bn). The roles for government departments and agencies, and the expectations of the key stakeholders in the research and innovation community, were also set down. Flowing from the national strategy for H2020, this statement summarises the actions being taken by the Irish Research Council so as to enable delivery of both national objectives and overarching European goals for Horizon 2020. In engaging with H2020, the Council seeks to enhance opportunities for Irish researchers, enhance the quality of research performed in Ireland and enhance the Irish research and innovation ecosystem.

Enabling excellence and creative connections in Horizon 2020 – directly supporting the community

The specific role of the Irish Research Council in H2020 very much aligns with our mission:

"to enable and create a vibrant research community in Ireland"

and furthermore reflects the unique contribution that the Council makes to the Irish research and innovation ecosystem.

The Council plans to develop, as budgets allow, instruments which support the development of a track record for researchers and thus enable all Irish researchers – regardless of their discipline(s) – an opportunity to compete and win funding through H2020.

The actions set out represent, in line with the role of the Irish Research Council, a multi-layered approach to supporting Irish engagement with H2020.

- ▶ As joint national contact point (NCP), enabling and nurturing research excellence across all disciplines by directly supporting applicants to the European Research Council (ERC).

- ▶ As NCP, enabling engagement of researchers to address the societal challenge of 'Europe in a Changing World: Inclusive, Innovative and Reflective Societies' (SC6).
- ▶ Fostering the development of creative connections across all disciplines so as to better prepare the Irish research community for engagements which will contribute to addressing all the identified European Societal Challenges.
- ▶ Enabling and cultivating research excellence through support for researcher education and career development (see Marie Skłodowska-Curie report page 40).
- ▶ Contributing to the delivery of research excellence by supporting the integration of sex and gender analysis into research contents.

In addition to the above five key areas, the Council is strategically utilising its research networks and alliances to develop linkages on behalf of the Irish research community. Such networks and alliances include HERA (Humanities in the European Research Area), NORFACE (a Social Sciences consortium), Science Europe and the ESF (European Science Foundation). To support the Irish community and strengthen the potential for Irish researchers, the Council will also continue its commitment, on behalf of Ireland, to pan-European infrastructures, specifically the European Social Survey (ESS) and DARIAH (the Digital Research Infrastructure for the Arts and Humanities).

Overview of Horizon 2020

H2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Running from 2014 to 2020 with an €80 billion budget, the EU's programme for research and innovation is part of the drive to create new growth and jobs in Europe. H2020 will tackle societal challenges by helping to bridge the gap between research and the market by, for example, helping innovative enterprise to develop their technological breakthroughs into viable products with real commercial potential.

This market-driven approach will include creating partnerships with the private sector and Member States to bring together the resources needed. These measures will aim at breaking down barriers to create a genuine single market for knowledge, research and innovation. H2020's societal challenges advocate collaboration between different fields and disciplines. Challenge 6, 'Europe in a changing world: Inclusive, innovative and reflective societies' invites proposals on a variety of topics, including social exclusion and inequality, memories and cultural heritage, and the EU as a global actor.

Supporting the European Commission's vision of cooperation between various disciplines, the Irish Research Council is encouraging Humanities and Social Sciences researchers to consider the opportunities H2020 holds beyond 'Challenge 6' and find partners and submit proposals for a number of challenges.

The Marie Skłodowska-Curie Actions are a key part of H2020 (see page 40).

Specific Actions 2015

European Research Council

The European Research Council (ERC) is a European funding initiative, set up under the "ideas" pillar of the EU Framework Programme 7. The objective is to fund bottom-up, frontiers scientific/scholarly projects across science, engineering, the humanities and social sciences. The ERC's mission is to encourage the highest quality research in Europe through competitive funding and to support investigator-initiated frontier research across all fields, on the basis of scientific excellence. The ERC provides generous funding for scientists who want to explore new and original ideas. The Irish Research Council Strategy for ERC focusses on building existing research excellence in the humanities and social sciences by cultivating quality applications. General support to applicants is provided in a range of ways, helping to increase the number of successful applications.

- ▶ Guidance on proposal preparation and resolution of technical queries in conjunction with the ERC Executive Agency.
- ▶ Assistance on Enterprise Ireland proposal development support applications and endorsing such applications in conjunction with Enterprise Ireland.
- ▶ Mock interviews for Stage 2 applicants in the Starting and Consolidator grant schemes.

See the Irish Research Council successful applicant case studies on page 42.

Humanities in the European Research Area

Humanities in the European Research Area (HERA) is a partnership between 24 Humanities Research Councils across Europe and the European Commission, with the objective of firmly establishing the humanities in the European Research Area and in the European Commission Framework Programmes. The Irish Research Council is the Handling Agency for this European wide initiative. The third HERA call 'Uses of the Past' was announced in 2015, the call pools funding from research councils in 23 countries plus the European Commission.

- ▶ €21m was available for humanities-led research in "Uses of the Past", including €4m from the European Commission.

The humanities are crucial to the understanding and conceptualising of fundamental changes in contemporary European society. Linking national programmes and launching joint research programmes dealing with all-encompassing social, cultural, political and ethical developments will generate new knowledge and enable policymakers, scientists and the general public to interpret the challenges of a changing world. HERA aims to set new and innovative research agendas and thus enhance the humanities' contribution to the European Research Area as well as to the ongoing debates on issues of particular relevance to European society.

NORFACE

New Opportunities for Research Funding Agency Cooperation in Europe (NORFACE), a partnership between 14 social sciences research councils across Europe, was established in 2004, when the network successfully bid for an FP6 award to coordinate activities. The 12 partners involved are the research councils for the social sciences from Estonia, Denmark, Finland, Germany, Iceland, Ireland, The Netherlands, Norway, Portugal, Slovenia, Sweden and the United Kingdom. Canada and Austria participate in NORFACE as associate partners. This partnership is built on a history of less formal co-operation and joint activities between the Nordic and UK research councils. NORFACE is an ambitious programme of communication, enquiry, sharing of experience and action.

CHIST-ERA

CHIST-ERA funds transformative and highly multidisciplinary research projects in Information and Communication Sciences & Technologies (ICST) exploring new ideas with the potential for significant scientific and technical impacts in the long term. Each year CHIST-ERA launches a call for research proposals:

In the 2015 call, two separate topics were addressed:

- ▶ User-Centric Security, Privacy and Trust in the Internet of Things (SPTIoT)
- ▶ Terahertz Band for Next-Generation Mobile Communication Systems (TMCS)

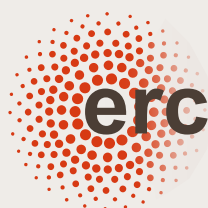
DARIAH-EU

The Digital Research Infrastructure for the Arts and Humanities (DARIAH) is a pan-European infrastructure for arts and humanities scholars working with computational methods. It supports digital research as well as the teaching of digital research method.

The mission of the DARIAH ERIC is to enhance and support digitally-enabled research across the humanities and arts. DARIAH ERIC develops, maintains and operates an infrastructure in support of ICT-based research practices. The Council funds the Irish DARIAH National Coordination office.

EUROPEAN INFRASTRUCTURES

The European Social Survey (ESS) is an academically-driven social survey designed to chart and explain the interaction between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its diverse populations. To support the work of ESS in Ireland, the Irish Research Council appoints and funds a national coordinator to oversee and implement the survey.



The Irish Research Council & Marie Skłodowska-Curie

The Irish Marie Skłodowska-Curie Office (IMSCO), located in the Irish Universities Association (IUA), is funded by the Irish Research Council. The office provides advice and support on preparing applications for Marie Skłodowska-Curie funding and the management of Marie Skłodowska-Curie awards.

Whether one is an individual researcher looking for a fellowship, a Principal Investigator seeking to build a European research network, or any organisation looking to develop their research capacity, there is a Marie Skłodowska-Curie Action to suit.

The Horizon 2020 **Marie Skłodowska-Curie Actions (MSCA)** supports researchers at all stages of their careers, across all research disciplines and in all employment sectors. The actions reinforce cooperation between academia and industry in particular through cross-border and cross-sector mobility of researchers. They focus on

excellent and innovative research training, career development and knowledge exchange. The actions include funding for networks for doctoral training, staff exchange programmes, personal fellowships and co-funding for regional/national/international fellowship programmes, as well as funding to host the annual "European Researchers' Night" event.

MSCA programmes have particular value for a country like Ireland, with a small but well-developed and globally-connected research system, as they enable the exchange of researchers across national boundaries, providing flexible opportunities to work with recognised research leaders and in world-class facilities together with the potential for extended collaboration with enterprise or civic society.

Building on an exemplary performance in the predecessor Marie Curie Actions under FP7, where €115 million of funding was won, Irish organisations have started strongly in the first two years of the Horizon 2020 MSCA. To date, around €52 million (3.5% of the available budget) has been won, making the MSCA the current top-ranked Horizon 2020 area for Ireland. The successful participants include higher education institutions, research organisations, private enterprises, hospitals, public bodies and organisations from the community and voluntary sector.

Irish Marie Skłodowska-Curie Office and EURAXESS Ireland staff at European Researchers' Night in Trinity College Dublin, September 2015.



2015 highlights have included:

€18.5 million of funding secured through the 2015 COFUND call to co-fund almost 200 post-doctoral fellowships. Four Irish organisations, including the Irish Research Council, secured almost 40% of the available call budget, with five out of seven submitted applications being selected for funding. The Irish Research Council's CAROLINE COFUND fellowship programme will roll out in autumn 2016.

- ▶ The TRAIN-ERS Innovative Training Network is coordinated by Professor Afshin Samali from National University of Ireland, Galway. This project is bringing in over €1.3 million to three Irish organisations: NUIG, RCSI and Randox Teoranta.
- ▶ 30 researchers (up from 24 in 2014) successfully secured prestigious personal fellowships through the 2015 Individual Fellowships Call, which received over 8,300 applications from across the world. Five of the 30 successful applications were ranked in the top 10 in their research area panel, including one application from UCD, which was ranked number 1 of 1300 evaluated applications in the Social Sciences and Humanities (SSH) panel. This is the second year in a row that an Irish application was the top-ranked SSH application. The resulting fellowship will allow Dr Clíodhna O'Connor to develop her research career at UCD in the area of youth mental healthcare.
- ▶ A number of successful applications with an "All-Island" partnership at the core, including the SenseCare project which links the University of Ulster with Cork Institute of Technology, a German public research organisation and companies in Spain and Germany.

Apart from successful Call outcomes, the IMSCO was delighted when Irish researchers Dr David Hoey and Dr Aiden Doherty were awarded two out of the three MSCA 2015 COFUND Awards by the European Commission at the MSCA 2015 Conference in Luxembourg in December. David was recognised for the scientific contribution of his research in the area of cell and molecular biomechanics, this having been supported during his Fellowship under the Council's INSPIRE COFUND programme. Aiden has established himself as a research leader in the analysis of sensor data to understand human behaviour, and previously held a Marie Skłodowska-Curie Fellowship co-funded by the Irish Health Research Board. Both David and Aiden are Irish Research Council alumni, with Aiden having received a Government of Ireland Postgraduate Scholarship for his PhD studies.

Overall, the IMSCO are delighted with these strong outcomes and recognition of Irish successes in the MSCA and are looking forward to building on them in partnership with the Council, other research funders and the Irish research community.

For information on the MSCA and the supports offered by the IMSCO, visit <http://www.iua.ie/irish-marie-curie-office/introduction/>.

Growing our success in Europe

The ERC complements other funding activities in Europe such as those of the national research funding agencies, and is a flagship component of H2020, the European Union's Research Framework Programme for 2014 to 2020.

Being 'investigator-driven', or 'bottom-up', in nature, the ERC approach allows researchers to identify new opportunities and directions in any field of research, rather than being led by priorities set by national governments. This ensures that funds are channelled into new and promising areas of research with a greater degree of flexibility.

ERC grants are awarded through open competition to projects headed by starting and established researchers, irrespective of their origins, who are working or moving to work in Europe. The sole criterion for selection is scientific excellence. The aim here is to recognise the best ideas, and confer status and visibility on the best brains in Europe, while also attracting talent from abroad.



ERC Success Stories

Awardee: Dr Mary Rogan

Project Name: Prisons, the rule of law, accountability and rights

Research Area: Law

Higher Education Institution: Dublin Institute of Technology (now Trinity College Dublin)

Project Funding: €1.4 million

Programme: European Research Council Starting Grant



Project Summary

PRILA will create the first account of how mechanisms for securing rights, ensuring accountability and achieving adherence to the rule of law are experienced in European prisons. Prisons are places where considerable power differentials exist, and are unique sites for the expression of the values which underpin public and prison

law. Systems to ensure that prisoners are treated fairly and that rights are upheld are essential to ensure that imprisonment is conducted in ways that are just and promote good order. These are fundamental principles of the 'European' way in penal policy and penal law.

Research Impact

Procedural justice is a key component of in-prison decision making, but broader public law principles concerning appeals, access to the courts, and judicial review also require examination. How mechanisms of redress or challenge on the part of a prisoner impact on prison staff have yet to be assessed. How monitoring of prisons impacts on perceptions of fairness, justice and legitimacy on the part of prisoners and staff has also not been explored. These crucial aspects of penal power are too central to our understanding of prison life to be overlooked. PRILA will address this absence.

Dr Mary Rogan (L), Professor Yvonne Scannell, Máirín de Burca, Dr Micheline Sheehy Skeffington, Rachel Power, Professor Aileen McColgan, Mary O'Toole SC, Orla O'Connor, Professor Ivana Bacik.

Awardee: Dr Martin Sokol

Project Name: GEOFIN: Western banks in Eastern Europe: New geographies of financialisation

Research Area: Economic Geography

Higher Education Institution: Trinity College Dublin

Project Funding: €2 million

Programme: European Research Council Consolidator Grant



Project Summary

'Western banks in Eastern Europe: New geographies of financialisation' will focus on the growing power of finance over societies and economies, which is increasingly recognised as the key feature of contemporary capitalism. The project will pilot a novel approach based on the concept of 'financial chains' which are

understood both as channels of value transfer and as social relations that shape socio-economic processes and attendant economic geographies. A set of interlocking case studies will be mobilised to reveal the different ways in which banks, states and households across post-socialist East-Central Europe are interconnected by financial chains with each other and with a wider political economy. GEOFIN will fundamentally advance our understanding of new geographies of financialisation, opening up new horizons in studies of finance and its future role in the society.

Research Impact

GEOFIN will make an impact on several fields of enquiry, namely financialisation studies (which until now had only very limited engagement with post-socialist contexts and neglected geographical analyses); post-socialist geography studies (which, with few exceptions, have so far overlooked the role of finance in post-socialist transformations); and economic-financial geography (which still lacks a comprehensive spatially-informed framework of financialisation). GEOFIN will fundamentally advance our understanding of new geographies of financialisation and will open up new horizons in studies of finance and its future role in the society.

