An Roinn Post, Fiontar agus Nuálaíochta
Department of Jobs, Enterprise and Innovation

# Directory of

Innovation Supports,

Research Centres and

Technology Centres

# 2016

Discover the supports to grow your business

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# Joint Foreword

**Minister Richard Bruton, TD**
*Minister for Jobs, Enterprise and Innovation*

**Minister Damien English, TD**
*Minister of State for Skills, Research and Innovation*

In late 2014, we published the first Directory of Research Centres and Technology Centres, coinciding with our first Innovation Showcase, held in the Convention Centre, Dublin. The Showcase brought together key national research and technology centres of scale. The aim was to make the wealth of research knowledge and expertise more accessible to industry.

The Directory and the Innovation Showcase have proven very popular with industry, both large and small. This updated Directory now sets out the key financial supports for innovation available to companies, as well as updated information on the key national centres of scale. The aim is to stimulate innovation right across all enterprise sectors.

A competitive, innovative enterprise base is at the core of Ireland's future economic development and growth. Our new strategy for innovation, *Innovation 2020*, is based on Ireland becoming a global innovation leader, driving a strong, sustainable economy and a better society underpinned by excellent research. Key to this is ensuring collaboration between the public and private sectors to put research to work for companies in Ireland and for the people of Ireland.

Sustainable economic growth requires our enterprises and entrepreneurs to engage continuously in innovation, developing and improving their products and services to meet the needs of customers in markets across the globe. The Government will continue to support innovation in enterprise, in particular through harnessing the skills in our public research ecosystem to increase collaboration opportunities, and by improving access to innovation supports for enterprises.

This Directory provides a practical guide that is easy to navigate. The supports are explained in a concise, user-friendly manner, highlighting their key features and setting out the various public bodies that can advise you and help you to access these supports. The profiles of research and technology centres give an indication of their key areas of expertise as well as initial points of contact for each centre.

The success of our innovation strategy depends on a high quality of engagement between researchers and industry. Both must play their part. We hope that this Directory will help to turn good ideas into good jobs and better outcomes for all sectors of society.

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# Introduction
## Directory of Innovation Supports, Research Centres and Technology Centres 2016

*Delivering excellent scientific research and impactful technologies for industry in 14 research areas of national priority.*

The Department of Jobs, Enterprise and Innovation (DJEI) acknowledges with thanks the input of its agencies – Enterprise Ireland, Science Foundation Ireland and IDA Ireland – to the production of this Directory.

The Directory is a point-in-time overview of the research, development and innovation (RDI) supports available to companies provided by State bodies, and an overview of the research centres of scale that are supported by DJEI. It is not meant to be an exhaustive inventory of the excellent research, innovation and technology transfer being carried out right across higher education institutions (HEIs) nationally, often in close collaboration with local industry. Information on the quality and relevance of such research is available directly from those institutions (listed at www.hea.ie).

In relation to the research and technology centres listed, the criteria used for this Directory are centres of scale that are: (a) supported by DJEI aligned to national research priorities; (b) in receipt of competitive funding of at least €5m over five years; and, (c) carrying out research of a minimum scale, with a national focus. We have also included institutes and facilities of scale that receive recurrent funding from the State to carry out research aligned to priority areas. The centres are mapped onto six key thematic areas, which reflect the 14 areas of national research prioritisation. Centre profiles outline the full spectrum of research undertake.

Every effort has been made to ensure the accuracy of the information provided in the Directory. Certain editorial choices have been made in the interests of a clear presentation, particularly in identifying which research centres have most relevance to particular national priority areas. Because of technological convergence and the nature of innovation, many research centres can and do offer a range of opportunities beyond those that may be listed in this Directory as their strengths, and we would encourage potential collaborators to engage directly with research centres to identify further opportunities.

It is intended that this Directory will be iterative. The online version will be updated more frequently and should be consulted as the most up-to-date version available at www.knowledgetransferireland.com.

# How to use the Directory

This Directory provides a guide to the key financial supports available from the State to help build research and innovation capacity, specifically in enterprise. It brings together an overview of the current financial supports available, mapped according to where your company is in its RDI journey. Whether you are just starting to develop new products and services, or you are at an advanced stage in your research agenda, you will find details of the key State supports available. They range from those which can help you with short-term, smaller individual research projects, right through to building deeper engagement through collaborative projects involving partnership schemes and advanced world-class research and technology centres.

These supports can help you to fund research programmes across the research continuum from basic experimental research, right through to applied research projects, with the opportunity to successfully build commercialisation into your RDI. Leveraging the expertise of the public research system can help you with increased RDI engagement, and can help to increase significant economic impacts and grow your business.

## The Directory comprises three parts:

**1**

**A concise overview of the key financial supports available.**

The current financial supports are mapped according to your research requirements:
- ■ Do you require funding to build 'in-company' RDI capacity?
- ■ Do you wish to access researchers or build research skills?
- ■ Do you wish to build collaborative research ventures at an advanced level?

The key features of each of these supports are highlighted, with key contacts for further details. In addition, you will find a summary of some of the current sector-specific supports available.

**2**

**Where can you get advice?**

Full details of the key players who can help you to access the public research system are outlined in section E. These bodies can give you general advice, as well as guidance on which financial supports are relevant to your business.
- ■ Agencies of the DJEI and their role – who are they, and how can they help?
- ■ Knowledge Transfer Ireland and Technology Transfer Offices – what are they?
- ■ Technology Networks – what are they and how can they assist industry?
- ■ Horizon 2020 – contacts to help you to maximise your business's collaboration and involvement in the Horizon 2020 Framework Programme for Research & Innovation.

**3**

**Directory of Research Centres and Technology Centres 2016**

This is a compendium of the State-supported research centres of scale.
You will find a map showing the location of public research bodies on page 65.
In addition, each centre has a comprehensive profile of their research areas, describing in detail their activities and industry relationships.

# Background

**The research landscape in Ireland**

We are moving into a new chapter in the research landscape in Ireland. In December 2015, the Government launched a new Strategy for Research and Development, Science and Technology – *Innovation 2020*. The vision of this Strategy is for Ireland to become a Global Innovation Leader, driving a strong, sustainable economy and a better society underpinned by, among other key goals, excellent research performed in strategically important areas, which has relevance and impact for the economy and society.

In recent years, Ireland has successfully built up a strong research capacity and a significant reputation for research excellence, and has an increasing base of enterprises engaging in research, development and innovation (RDI) activity. Our past investment in research and innovation has been instrumental in securing, diversifying and growing our enterprise base, licensing new technologies, creating new companies, and providing the highly educated workforce needed to grow the economy and contribute to society. Since 2012, a more focused approach has been adopted in the public funding of research and innovation activity. Research prioritisation has concentrated the majority of competitive funding on areas deemed most likely to achieve greatest economic and societal impact. *Innovation 2020* builds on this by continuing to support excellent research across the full continuum and all disciplines.

## Supporting innovation in enterprise

A key part of *Innovation 2020* is the critical role that innovation plays in economic development and job creation. We have committed to supporting enterprise in its engagement in RDI. We will facilitate enterprises in progressing from early engagement with RDI to embedding innovation as a key part of their business model in a self-sustaining way. *Innovation 2020* outlines how we will achieve this through a range of measures, from aligning innovation investment with enterprise opportunities to harnessing the skills in our public research system. We will increase collaboration opportunities and improve access to innovation supports. We will also seek to increase innovation-led entrepreneurship, and enhance access to finance for innovation.

## Directory of Innovation Supports, Research Centres and Technology Centres 2016

Among the actions to support innovation in enterprise is the production of this guide – *The Directory of Innovation Supports, Research Centres and Technology Centres 2016*. This is a practical, user-friendly guide, specifically tailored towards the needs of companies. It provides a comprehensive overview of the financial supports available. It highlights key features of these supports, and where to get further advice and information. The Directory includes profiles of the national research centres of scale to promote opportunities for greater utilisation of the research assets of our higher education institutions (HEIs) (see page 27 onwards). There is an overview of the key organisations that can provide advice and help you to access these financial supports. These can also provide guidance towards greater success in translating intellectual property or new thinking into commercial products and services.

# A

## SUPPORTS FOR IN-COMPANY RDI

**These are financial supports to undertake your own in-company RDI projects.**

### FUNDING FOR IN-COMPANY RESEARCH AND INNOVATION PROJECTS

**Tax incentives**
- R&D Tax Credit
- Knowledge Development Box

**RDI grants and funds**
- IDA Ireland RDI Programme and Feasibility Support
- Enterprise Ireland Business Innovation Initiative
- Enterprise Ireland R&D Fund

## 25% TAX CREDIT

### R&D Tax Credit

**What is it?**
A 25% tax credit for qualifying research and development expenditure exists for companies engaged in in-house qualifying research.

**Key focus of research**
Qualifying RDI activity is systematic activity, which:
- seeks to achieve a scientific or technological advancement;
- involves the resolution of scientific or technological uncertainty; and,
- applies to basic, applied or experimental research.

**Who is it for?**
All companies within the charge to Irish tax.

**How much is available?**
25% tax credit set against Corporation Tax liability.

**Application process**
Claim to be made within 12 months of accruing expenditure.

**Further information:**
www.revenue.ie/en/tax/ct/research-development.html

## 6.25% TAX RATE

### Knowledge Development Box

Ireland will introduce the first Organisation for Economic Co-operation and Development-compliant Knowledge Development Box (KDB) in January 2016.

The KDB offers a 6.25% tax rate on income arising from eligible intellectual property assets, and will require that a company evidence the link between RDI activity/expenditure in Ireland, and the income derived from the resulting intellectual property.

The Finance Act will set out further details relating to eligibility and Revenue guidelines will be issued in due course.

## IDA CLIENTS

### IDA Ireland RDI Programme and Feasibility Support

**What is it?**
These are financial incentives to carry out in-house RDI projects. They can also fund company-specific collaborative projects with higher education institutes and industrial partners.

**Key focus of research**
- Research done largely within a company
- Supporting cutting-edge innovation in products or processes

**Who is it for?**
This programme is available to foreign-owned companies (IDA Ireland client companies establishing or substantially expanding their Irish RDI function).

**How much is available?**
All funding is negotiated on a case-by-case basis in compliance with EU and Irish legislation. RDI grants can be funded to a maximum of 40% depending on type of research.
The Feasibility Study Grant is payable at a rate of up to 50%.
Both are typically funded at a lower rate based on budgetary constraints.

**Duration**
RDI grants are typically up to three years in duration. Feasibility grants are typically less than one year in duration.

**Application process**
This is an open call with applications accepted year round.

**Further information**
idaireland@ida.ie
http://www.idaireland.com/how-we-help/resources/

# A

## SUPPORTS FOR IN-COMPANY RDI

### INNOVATION IN BUSINESS PRACTICES

Enterprise Ireland
Business Innovation Initiative

**What is it?**
This is a grant to encourage Irish companies to implement innovative new business practices.

**Key focus of research**
Projects must involve the implementation of an innovative delivery, production or organisational method of doing business.

**Who is it for?**
This fund is aimed at small or medium-sized, established, Irish-based manufacturing or internationally traded services companies, including existing and potential clients of Enterprise Ireland, Údarás na Gaeltachta and Local Enterprise Offices.

Note that this scheme is at a pilot stage, and is open by invitation only. It is expected that if the pilot is successful, a follow-on offer along these lines will be available on a more widespread basis.

**How much is available?**
The grant rate for small or medium-sized companies is 50% based on a maximum spend of €300,000.

**Duration**
One to two years.

**Application process**
Open all year with a monthly call for applications.

**Further information**
Contact your Enterprise Ireland adviser for more information.

### GRANTS FOR RESEARCH

Enterprise Ireland
R&D Fund

**What is it?**
This is a grant to encourage Irish companies to carry out research and development.

**Key focus of research**
Generally, the R&D project will be to develop a new product or process (e.g., product design, new chemical process, new retail food product, or new software product).
At the end of the project the company should have new skills/processes, new product/process designs and new knowledge to enable the firm to compete more effectively and grow their business. In many cases, companies will have a new product or service to produce and sell.

**Who is it for?**
This fund is open to all established companies that are Irish-owned manufacturing or

internationally traded services companies, including existing and potential clients of Enterprise Ireland, Údarás na Gaeltachta and Local Enterprise Offices. Companies of all sizes may apply.

**How much is available?**
The percentage grant aid varies with company size. Grant rates are a maximum of 45%, with an addition 5% 'bonus' available if companies collaborate with other firms in the project.
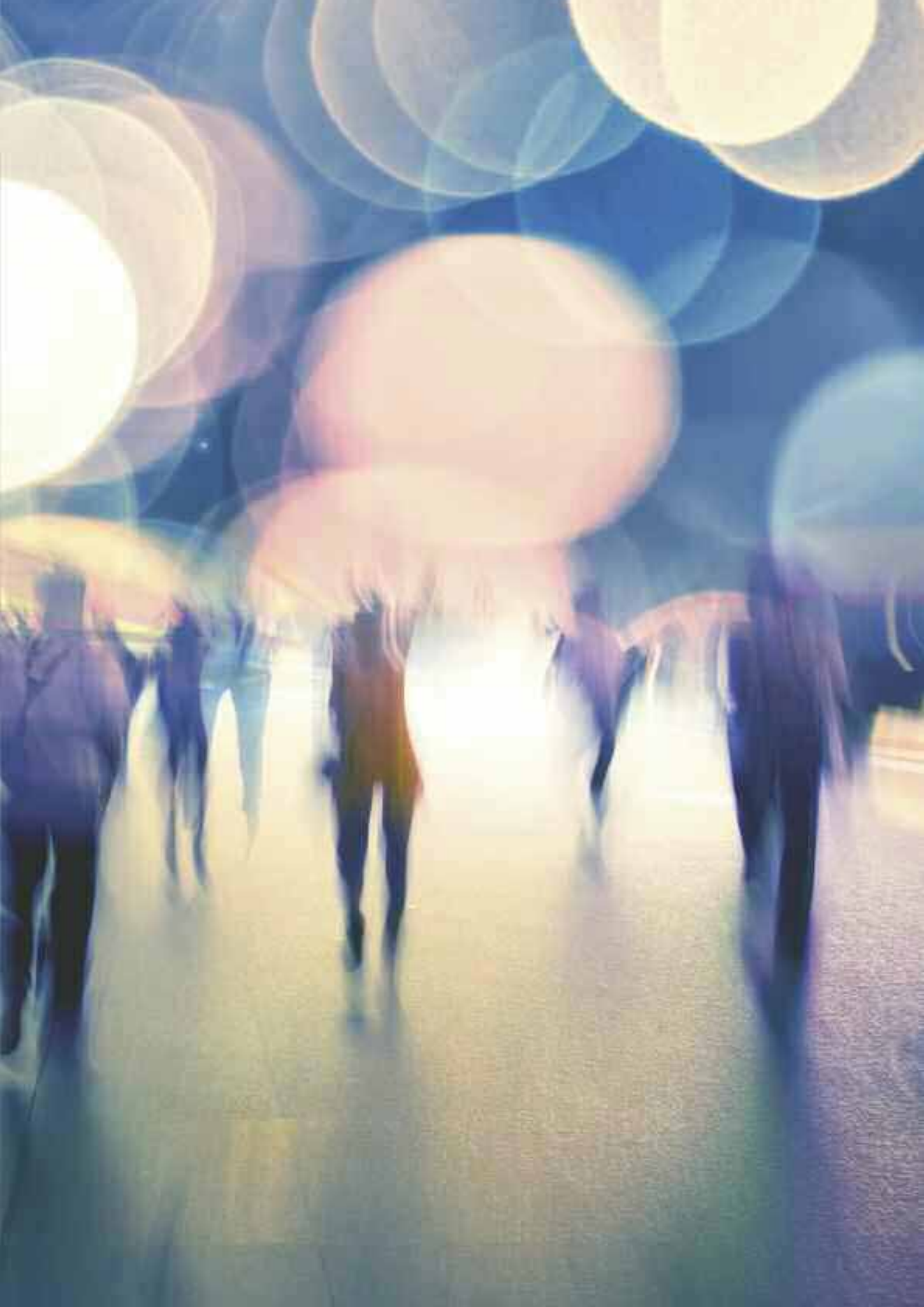
**Duration**
One to three years.

**Application process**
Open all year.

**Further information**
GA-RD@enterprise-ireland.com
www.enterprise-ireland.com/RandD

# B SKILLS AND PEOPLE

**These are the key supports available to build research skills in your company through access to highly skilled researchers.**

## WHAT RESEARCH SKILL LEVEL DO YOU REQUIRE?

### Graduate level skills
- InterTradeIreland FUSION Programme

### Postgraduate skills
- Irish Research Council Employment-Based Programme
- Irish Research Council Enterprise Partnership Scheme
- Horizon 2020 Marie Skłodowska-Curie Actions:
  - RISE
  - Innovative Training Networks

### Highly-skilled researchers
- Science Foundation Ireland (SFI) Industry Fellowship
- Horizon 2020 Marie Skłodowska-Curie Actions:
  - Society & Enterprise Fellowships

## Graduate level skills

### ACCESSING NEW GRADUATES

## InterTradeIreland FUSION Programme

**What is it?**
The FUSION programme develops and supports three-way partnerships between companies, academia and graduates. Within each partnership, partners work collectively to develop and implement a solution to an identified technology need within the company.

**Key focus of research**
Twelve-month projects are typically process improvement; 18-month programmes are typically new product/process/service development.

**Who is it for?**
A manufacturing or tradeable services company, located on the island of Ireland, with an understanding of and capacity for innovation. The programme is particularly aimed at SMEs with an established trading history.

**How much is available?**
- €17,800 for a €13,000 commitment from the company, for a 12-month project;
- €24,900 for a €19,500 commitment from the company, for an 18-month period.

**Duration**
Twelve or 18 months, following a lead-in/recruitment period of four to six months.

**Application process**
Five closing dates per year. Approval is normally within six to eight weeks of application.

**Further information**
info@intertradeireland.com
www.intertradeireland.com/fusion

# Postgraduate skills

## FUND A RESEARCHER IN YOUR COMPANY

### Irish Research Council Employment-Based Programme

**What is it?**
This Programme provides students in all disciplines with an opportunity to work in a co-educational environment involving a higher education institute (HEI) and an employment partner. It provides funding support for enterprise with a base in Ireland, in collaboration with a HEI, to employ a researcher, based in the company, to undertake a programme of postgraduate research in an area relevant to the company's mission.

**Key focus of research**
Research carried out under this Programme spans all academic disciplines, industry sectors and degrees of research.

**Who is it for?**
Small or large companies with a physical operational base in Ireland – they employ the scholar for the duration of the award.

**How much is available?**
A maximum of €24,000 per annum is awarded for a one-year Masters (€24,000), two-year Masters (€48,000), three-year PhD (€72,000) and four-year PhD (€96,000). The employment partner is required to contribute a minimum of €8,000 per annum over the duration of the research project.

**Duration**
Optional one, two, three or four years as per type of degree applied for.

**Application process**
Typically a single call per year. From application to project commencement, the indicative timeframe is eight to nine months.

**Further information**
schemes@research.ie
www.research.ie/funding/employment-based-postgraduate-programme-2015

## RESEARCH IN A HIGHER EDUCATION INSTITUTION

### Irish Research Council Enterprise Partnership Scheme

**What is it?**
This programme provides funding support for enterprise to collaborate with a HEI to enable a researcher to undertake a programme of doctoral or postdoctoral research in an area linked with the company mission.

**Key focus of research**
Research carried out under this programme spans all academic disciplines, industry sectors and types of research.

**Who is it for?**
Open to all companies. Companies must be in a position to financially contribute to the research project for the full agreed funding term of the scholarship or fellowship.

**How much is available?**
A maximum of €24,000 per annum is awarded for a one-year Masters (€24,000), two-year Masters (€48,000), three-year PhD (€72,000) and four-year PhD (€96,000). For postdoctoral fellows, a maximum of €45,985 per annum is awarded over a two-year period (€91,790).
The enterprise partner is encouraged to provide a placement period for the scholar or fellow at its facilities, and is expected to cover the cost of all expenses (e.g., travel and accommodation costs) during this placement.

**Duration**
Optional one, two, three or four years as per type of degree applied for. For postdoctoral fellows, the maximum duration of an award is two years.

**Application process**
Typically a single call per year. From application to project commencement, the indicative timeframe is eight to nine months.

**Further information**
schemes@research.ie
www.research.ie/scheme/enterprise-partnership-scheme

# B

## SKILLS AND PEOPLE

## Postgraduate skills

### INTERNATIONAL AND INTER-SECTOR COLLABORATION

### Horizon 2020 Marie Skłodowska-Curie Actions – Innovative Training Networks

**What is it?**

The Innovative Training Networks (ITN) scheme focuses on training the research and innovation employees of the future. A consortium of organisations from different European countries and different sectors of the economy collaborate to train a cohort of early-stage researchers to Masters or PhD level in a specific research area, equipping them with the skills to become creative, entrepreneurial and industry-ready researchers. A consortium can be large, involving eight to ten organisations, or can focus on a one-to-one interaction between a single academic organisation and a company.

**Key focus of research**

All areas of research can be funded in an ITN project, including STEM (science, technology, engineering and maths) subjects, the social sciences, humanities and economic sciences.

**Who is it for?**

ITN applicants can be from academia and from non-academic organisations (in particular SMEs) based in Europe.

**How much is available?**

A typical project budget is from €1m up to €4.5m. The amount allocated to industry partners is about €250,000 per project. There is no requirement for industry co-financing in cash terms.

**Duration**

Four years.

**Application process**

Annual funding call for Innovative Training Networks.

**Further information**

National Contact Point
mariecurie@iua.ie
http://www.iua.ie/irish-marie-curie-office/for-industry/

### INTERNATIONAL AND INTER-SECTOR COLLABORATION

### Horizon 2020 Marie Skłodowska-Curie Actions – RISE

**What is it?**

The RISE (Research and Innovation Staff Exchange) scheme facilitates research co-operation between different countries and different sectors of the economy, via exchange and upskilling of research and innovation staff. The focus is on sharing of knowledge and ideas from research to market (and vice versa) for the advancement of science and the development of innovation.

**Key focus of research**

All areas of research can be funded in a RISE project, including STEM subjects, the social sciences, humanities and economic sciences.

**Who is it for?**

RISE applicants can be from academia and from non-academic organisations (in particular SMEs).

**How much is available?**

A typical project budget is from €200,000 up to €1.5m. The amount allocated to industry partners depends on the number and duration of the exchange visits involving their staff. There is no requirement for industry co-financing in cash terms.

**Duration**

Two to four years.

**Application process**

Annual funding call for research and innovation staff exchange.

**Further information**

National Contact Point
mariecurie@iua.ie
http://www.iua.ie/irish-marie-curie-office/for-industry/

# Accessing highly-skilled researchers

## PLACE A TOP-QUALITY POSTDOCTORAL RESEARCHER IN YOUR COMPANY

### Science Foundation Ireland Industry Fellowship

**What is it?**
The Industry Fellowship award supports a post-PhD researcher to either go from academia to industry or from industry to academia, on either a full-time basis for between one and 12 months, or part-time over 24 months.

**Key focus of research**
Research carried out in the programme can span most areas of STEM, and is open to all industry sectors.

**Who is it for?**
It is open to Irish or internationally based research-performing companies and academic partners from institutions in Ireland. There is no necessity for the company to have an existing Irish base.

**How much is available?**
The maximum SFI contribution to an Industry Fellowship award is €120,000 in direct costs over a period of between one and 12 months full-time, or between two and 24 months part-time.
There is no requirement for industry co-funding of this programme.

**Duration**
Full-time: between one and 12 months; part-time: between two and 24 months.

**Application process**
There are two fixed call deadlines annually, one in June and one in December. Submitted proposals are subject to international peer review.

**Further information**
partnerships@sfi.ie
www.sfi.ie/working-with-enterprise/programmes-with-industry.html

## INTERNATIONAL AND INTER-SECTOR COLLABORATION

### Horizon 2020 Marie Skłodowska-Curie Actions – Society & Enterprise Fellowships

**What is it?**
The Society & Enterprise Fellowships offer the opportunity for experienced researchers (typically PhD graduates) to carry out a targeted research training project for up to two years, hosted outside of the traditional academic sector in companies (especially SMEs), civil society organisations, cultural bodies, etc. The project should be in line with the organisation's research needs and designed to capitalise and build on the researcher's strengths and experience.

**Key focus of research**
All areas of research can be funded in a Fellowship project, including STEM subjects, the social sciences, humanities and economic sciences.

**Who is it for?**
Suitable companies are those based in Europe who have a strong level of research/innovation activity and can provide the appropriate environment for the research project.

**How much is available?**
A typical project budget is €100,000 p.a., including the researcher's salary, employer's costs, research budget and management/overheads costs. There is no requirement for industry co-financing in cash terms.

**Duration**
One to two years.

**Application process**
Annual funding call for individual fellowships.

**Further information**
National Contact Point
mariecurie@iua.ie
http://www.iua.ie/irish-marie-curie-office/for-industry/

# C COLLABORATIVE VENTURES

**Collaboration supports help companies to overcome skill gaps, risks and costs associated with in-house RDI. Such collaboration also affords companies access to a breadth of high-quality research equipment that may be too expensive for the company to purchase.**

- These are supports tailored to your business size and sector.
- They range from supports to work on specific projects to building alliances for deeper engagement.
- They provide opportunities to access expertise in the public research system (colleges and public research bodies).

Close to market ▲ EI Innovation Vouchers

EI Innovation Partnership Programme

EI & IDA Technology Centres

SFI Strategic Partnership Programme

SFI Research Centres

Early-stage research ▼ SFI Spokes Programme

## QUICK TECHNICAL SOLUTIONS FOR SMES

### Enterprise Ireland Innovation Vouchers

**What is it?**
A voucher that companies can use to access publicly funded knowledge providers (universities, institutes of technology, etc.) to work together on specific innovation questions and projects related to the company's needs.

**Key focus of research**
Innovation vouchers can be used for any kind of innovation, such as:
- new product/process development;
- new business model development;
- new service delivery and customer interface;
- new service development;
- tailored training in innovation management; and,
- innovation/technology audit.

**Who is it for?**
SMEs.

**How much is available?**
A standard innovation voucher with a value of €5,000 or, if co-funded by the company, up to €10,000.

**Duration**
Typically two to three months.

**Application process**
Three open calls per year, usually in quarters one, two and three.

**Further information**
innovationvouchers@enterprise-ireland.com
www.innovationvouchers.ie

## EXPERTISE FOR COMMERCIAL ADVANTAGE

### Enterprise Ireland Innovation Partnership Programme

**What is it?**
A Progamme for Irish-based companies to work with Irish research institutes. Companies can access expertise and resources to develop new and improved products, processes and services, and generate new knowledge. The company benefits in terms of its growth, the evolution of its strategic RDI, and the creation of new knowledge that it can use to generate commercial advantage.

**Key focus of research**
Innovation Partnership projects can be used for the following types of research projects:
- new product/process development;
- new business model development; and,
- new service development.

**Who is it for?**
Innovation Partnership is open to all sizes of company. You must be a registered client company of one of the following State development agencies: Enterprise Ireland, IDA Ireland, Údarás na Gaeltachta, or a Local Enterprise Office.

**How much?**
Under the State aid guidelines, funding rates can vary from 40% to 80% depending on the size of the company and the type of research.

**Duration**
Guideline maximum: two years; average: 15 months.

**Application process**
Open call.

**Further information**
ipp@enterprise-ireland.com
www.enterprise-ireland.com/ipp

# C

# COLLABORATIVE VENTURES

## MARKET-LED CENTRES

### EI and IDA Technology Centres

**What is it?**
Industry-led collaborative research centres. Each centre is formed around an agreed common research programme for a number of companies. They are resourced by highly qualified researchers undertaking market-focused strategic RDI for the benefit of industry.

**Key focus of research**
An agreed common research programme.

**Who is it for?**
The programme is open to all companies. The key criterion is that a technology centre is formed around a significant group of companies, which can agree on a common research programme for their sector or area of interest, and which can express the impact that successful research activities would have on the companies involved.

**How much?**
€1-3m per annum, depending on the scale of the centre. Over time (five to eight years), the company group is expected to match the State investment through cash and in-kind co-funding of research. The co-funding levels increase over time from the initial investment to achieve this level; however, a minimum level of 10% cash co-funding is required at the outset. Membership arrangements allow for smaller companies to participate at lower initial fees to MNCs.

**Duration**
Five to 10 years.

**Further information**
Technology.Centres@enterprise-ireland.com
http://www.enterprise-ireland.com/en/Research-Innovation/Companies/Collaborate-with-companies-research-institutes/Technology-Centres.html

Centre profiles are included in Section F

## WORLD-CLASS RESEARCH PARTNERS

### Science Foundation Ireland Strategic Partnership Programme

**What is it?**
A flexible mechanism for industry to engage with world-class academic researchers, and have access to infrastructure and intellectual property.

**Key focus of research**
This Programme can fund most areas of science, technology, engineering and mathematics (STEM) of relevance to companies. It is particularly suitable for, but not limited to, higher risk research. It is aimed at supporting stand-alone initiatives of scale with strong potential for economic and societal impact for Ireland.

**Who is it for?**
Any research-active company is eligible to apply, regardless of the size or scale.

**How much?**
This is a shared risk funding model, in which SFI matches the investment made by industry (50:50). There is no minimum or maximum award size, although the programme does intend to support unique research opportunities of scale (i.e., in excess of €200,000).

**Duration**
There is no minimum project duration. The maximum project duration allowable is subject to negotiation with SFI and will depend on the objectives, scale and long-term goals of the specific partnership.

**Application process**
This Programme is always open and can be applied to via a rolling call mechanism. Proposals are first submitted as an expression of interest, following which a full proposal is submitted and undergoes international peer review.

**Further information:**
partnerships@sfi.ie
http://www.sfi.ie/working-with-enterprise/programmes-with-industry.htm

## LARGE-SCALE RESEARCH CENTRES

### Science Foundation Ireland Research Centres

**What is it?**
Twelve world-leading, large-scale research centres focused on thematic areas of research that are considered to be of major economic impact for Ireland, including pharmaceuticals, software, digital content, big data, telecommunications, photonics, medical devices, nanotechnology, marine and renewable energy, functional foods, perinatal research and applied geosciences.

**Key focus of research**
The initial 12 research centres are focused on areas of STEM that are of major economic importance to Ireland. These areas are:
- pharmaceutical manufacture;
- software;
- digital content;
- big data;
- telecommunications;
- photonics;
- medical devices;
- nanotechnology;
- marine and renewable energy;
- functional foods;
- perinatal research; and,
- applied geosciences.

**Who is it for?**
SFI research centres can form collaborations with both Irish and international research-performing companies (SMEs and MNCs). There is no requirement for the company to have an operating base in Ireland.

**How much?**
SFI funds up to 70% of the overall budget of a research centre, while industry is expected to fund a minimum of 30% of the centre's budget, at least one-third of which must be cash.

**Duration**
Six years.

**Application process**
A two-stage application and review process, normally taking 12 months. The next call for proposals will be in Q1 2016.

**Further information**
partnerships@sfi.ie
http://www.sfi.ie/investments-achievements/sfi-research-centres.html

Existing SFI centres: see Section F

## ENGAGE WITH WORLD-CLASS RESEARCH CENTRES

### Science Foundation Ireland Spokes Programme

**What is it?**
A flexible mechanism for industry to engage with academic researchers at the SFI research centres.

**Key focus of research**
This Programme can fund areas of STEM that are aligned with the focus areas of the SFI research centres. The current 12 research centres are focused on: pharmaceutical manufacture; software; digital content; big data; telecommunications; photonics; medical devices; nanotechnology; marine and renewable energy; functional foods; perinatal research; and, applied geosciences.

**Who is it for?**
Any research-active company is eligible to apply, regardless of their size or scale.

**How much?**
Spokes run in two programmatic forms: a fixed call and a rolling call. The fixed call, which runs once a year, requires 30% minimum company co-funding to a 70% SFI contribution.
The rolling call is always open and requires 50% minimum company co-funding to a 50% SFI contribution.

**Duration**
There is no minimum project duration. The maximum project duration allowable is subject to negotiation with SFI and will depend on the objectives, scale and long-term goals of the specific partnership.

**Application process**
The Spokes Fixed Programme is a one-stage application process with an annual deadline.
The Spokes Rolling Programme is open throughout the year with no annual deadline, which allows research centres to apply for new collaborative projects with industry partners at any time.

**Further information:**
partnerships@sfi.ie
http://www.sfi.ie/working-with-enterprise/programmes-with-industry.html

Centre profiles are included in Section F

## There are also a number of supports available which are industry specific. Examples include:

### Sustainable Energy Authority of Ireland (SEAI)

**SEAI RD&D Programme**
- This aims to stimulate the deployment of sustainable energy by accelerating the development and deployment in the Irish marketplace of competitive renewable energy products, processes and systems.
- It is open to a wide range of proposal types, including technology RD&D, field research, and feasibility studies.

**Contact:** Energyresearch@seai.ie

**Ocean Energy Prototype Development Programme**
- The focus of this Programme is on stimulating the development and deployment of ocean energy devices and systems through industry-driven research.
- It involves a cluster of key university and industrial partners dedicated to solving the main scientific, technological and socio-economic challenges related to marine renewable energy.
- The level of funding is decided on a case-by-case basis. The industry co-funding required varies depending on research category from 25%-80%.

**Contact:** Ocean.Energy@seai.ie

### Environmental Protection Agency (EPA)

**EPA Research Programme 2014-2020**
- The EPA has a stautory role in co-ordinating environmental research. EPA research is built around three pillars of climate, water and sustainability.
- The EPA research programme is open to industry as well as researchers in higher education institutes. The programme funds not-for-profit research intended to generate knowledge for public good purposes, but can provide green economic opportunities for business.

**Contact:** research@epa.ie

### Marine Institute of Ireland

**Marine Institute Industry-Led Research Programme**
- To enable companies in the marine sector to undertake research that will grow or expand their business.
- Research performed in HEI or company or both.
- Funding is to a maximum of 75% for small/medium-sized companies, and to a maximum of 50% for large companies (MNCs).
- The next call is due in 2016.

**Shiptime Programme**
- Grant aid available to researchers to access ship-time on board the national research vessels (*RV Celtic Explorer* and *RV Celtic Voyager*).
- Facilitates research projects/programmes and further develops the national potential for executing world-class multidisciplinary marine research.
- Open to all companies in a marine-related industry (particularly SMEs).

**Networking and Travel Awards**
- These are grants to host marine-related conferences or workshops in Ireland (up to €2,000 per event), or a grant to fund overseas travel for marine-related activities (up to €1,000 per trip).
- These are available to companies as well as the higher education sector.

**Contact:** funding@marine.ie

# E

**In addition to the contacts at the end of individual supports, there are bodies that provide companies with advice and guidance on supports to build RDI.**

## Accessing RDI in higher education institutes

### Knowledge Transfer Ireland (KTI)

KTI is operated by Enterprise Ireland in partnership with the Irish Universities Association.

Working with Ireland's universities, institutes of technology and research centres can improve business productivity, sales, and performance in product, service and process innovation. Companies and entrepreneurs benefit directly from the sharing of knowledge and expertise, and accessing technology and intellectual property. KTI is the national office that helps business engagement with State-funded research. Through KTI, companies can find in one place:

- searchable information on Irish research expertise and technology licensing opportunities;
- an interactive map of all the universities, institutes of technology and research centres in Ireland;
- up-to-date contact details for the right people to talk to;
- a range of useful tools and resources, including:
  – model agreements covering situations such as licensing, collaboration and confidentiality, which simplify contracting between enterprise and State research organisations; and,
  – practical guides that explain intellectual property and considerations in legal contracts;
- information on upcoming events to share best practice and network with technology transfer professionals to source new opportunities to innovate; and,
- a comprehensive collection of useful publications about research and innovation in Ireland.

KTI is also responsible for the National IP Protocol, which sets out the Irish Government's policy and the practical framework that underpins how industry can benefit from State-funded research and development.

**Contact:**
info@knowledge
transferireland.com
www.knowledgetransfer
ireland.com

### Technology Transfer Offices

Ireland's universities, institutes of technology and many of its research institutes have local technology transfer offices (TTOs) that support existing companies and new enterprises through:

- understanding the business need and finding academic partners for research collaboration, contracted services and consultancy;
- identifying and protecting new technologies and intellectual property (IP); and,
- drafting and negotiating the contracts that underpin industry–research collaboration, licensing and spin-out company formation.

The majority of people working in technology transfer in Ireland have a background working in companies, from multi-nationals to start-ups, and understand the issues that businesses face when seeking to innovate. Technology transfer teams have scientifically trained business managers and act as sector experts, able to translate the needs of business and to identify exciting new commercial propositions.

**Contact:**
http://www.knowledgetransf
erireland.com/Research_in_I
reland/Research-Map-of-
Ireland/

## Accessing RDI in higher education institutes

### Technology Gateway Networks

**Providing access to RDI in higher education institutes**

- This is an open access mechanism for industry to harness technological expertise within the institutes of technology.
- The role of the Gateway staff is to manage the interaction between the companies and the institute, to help the companies to source funding where necessary, and to ensure that projects are delivered successfully.
- This research can be funded through supports such as the Innovation Voucher or Innovation Partnership, or directly with cash from the company.

The national network of 12 Technology Gateways:
- delivers technology solutions for Irish industry close to their market needs;
- is an open access point for industry of all sizes;
- acts as a local access point to the wider resources in the Irish research infrastructure;
- has a proven track record of delivering for industry; and,
- completes more than 250 industrial projects per year.

technologygateway@ enterprise-ireland.com
www.enterprise-ireland.com
www.technologygateway.ie

## Agencies of the Department of Jobs, Enterprise and Innovation

### Enterprise Ireland

- Enterprise Ireland (EI) is the State agency responsible for starting and growing world-class Irish companies, targeting global markets.
- In addition, EI has a central role in promoting foreign direct investment in natural resource sectors such as agri-food and wood processing.
- EI operates a range of programmes to foster entrepreneurship and drive innovation: supporting the commercialisation of research, new business creation and quality research spin-outs; driving participation in international research programmes (e.g., Horizon 2020, European Space Agency); providing direct support for in-company R&D, innovation and business process development; and, building market-led enterprise collaborations that harness the talent in the Irish public research system.

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Enterprise Ireland
East Point Business Park
Dublin 3
D03 E5R6
Tel: +353 (0)1 727 2000

**National Regional Headquarters**
Enterprise Ireland
4500 Atlantic Avenue
Westpark
Shannon
Co. Clare
V14 Y177
Tel: +353 (0)61 777 000

Client.Service@enterprise-ireland.com
www.enterprise-ireland.com

# Agencies of the Department of Jobs, Enterprise and Innovation

## IDA Ireland

- IDA Ireland is the State agency responsible for the attraction and development of foreign direct investment in Ireland.
- IDA partners with over 1,100 companies in Ireland, helping them to develop and grow their businesses.
- IDA has a network of offices throughout Ireland – details can be found on www.idaireland.com

**Head Office**
IDA Ireland,
Wilton Park House,
Wilton Place, Dublin 2
Tel: +353 (0)1 603 4000
idaireland@ida.ie
www.idaireland.com

## Science Foundation Ireland

- Science Foundation Ireland (SFI) is Ireland's national foundation for investment in scientific and engineering research.
- The Foundation's legal remit is to promote, develop and assist the carrying out of oriented basic and applied research in strategic areas of scientific endeavour that concern the future development and competitiveness of industry and enterprise in the State.
- SFI strongly encourages research collaboration between SFI-funded scientists and engineers and industry. Such interactions can lead to SFI scientists and engineers becoming more informed about industrial priorities and research needs, and lead to industrial collaborators being informed about important new science and engineering research developments in Ireland.
- SFI plays a complementary role to that of its sister agencies IDA Ireland and Enterprise Ireland in assisting foreign and indigenous industry.
- SFI specialises in addressing companies' needs through its support of researchers in Ireland's HEIs.
- SFI provides researchers with funding, helps to link them with companies that are working on relevant projects and provides the supportive environment that is so essential for collaborative work.

Science Foundation Ireland,
Wilton Park House,
Wilton Place,
Dublin 2
Tel: +353 (0)1 607 3200
info@sfi.ie
www.sfi.ie

## European supports

### National Contact Point Network (NCP) for Horizon 2020

- Horizon 2020 is an €80bn European research funding programme, running from 2014 to 2020. Ireland's track record in European research programmes is well recognised throughout Europe and beyond. The National Support Network for Horizon 2020's goal is to build on that track record, providing hands-on assistance to Ireland's researchers and companies to actively participate in Horizon 2020.
- This network, led by Enterprise Ireland, is made up of 32 national delegates and national contact points covering all areas of the programme. The network is drawn from 10 State agencies and Government departments, and is the main structure to provide guidance, practical information and assistance on all aspects of participation in Horizon 2020 from Ireland.
- Applicants to any part of Horizon 2020 are strongly encouraged to contact the Irish Horizon 2020 team in order to explore potential opportunities across the programme.

For further information see www.horizon2020.ie

### EURAXESS Ireland industry web portal

The EURAXESS Ireland industry web resource is a portal for industry to access RDI funding. It brings together resources that allow companies to:
- access the fast track research visas system;
- search for RDI funding;
- advertise vacancies; and,
- search an online database of researcher CVs.

The RDI funding search facility allows businesses to search for all funding supports for their business and research activities.

For further information see http://euraxess.ie/business/default.aspx

### European Space Agency (ESA) through Enterprise Ireland

- Ireland's membership of the European Space Agency (ESA) allows industry and researchers to participate in European space industry programmes, which support almost 60 Irish companies and over 30 researchers in RPOs. The key objectives of Ireland's membership of ESA are to: support the development of a high technology industrial sector in Ireland; support the development of a dynamic space research community; and, promote the use of space-based systems for commercial and societal needs.
- Ireland is focused on facilitating innovative Irish companies and researchers to develop space industry technologies and to exploit commercially their ESA participation, leading to increased exports, sales and employment.
- EI co-ordinates Ireland's participation in ESA programmes, which in turn promotes co-operation among European States in space research, technology and applications. EI's role is to assist Irish companies to bid successfully for ESA contracts. EI provides expertise for Irish companies in developing and executing space strategies, as well as being a point of reference for the space industry to identify relevant sources of space-related expertise within Ireland. Irish companies and researchers work on space activities ranging from rockets and satellites to Earth observation.
- Irish industrial participation is primarily in engineering, aerospace, software, electronics, optoelectronics and telecommunications. Opportunities also exist in developing products for the related ground segment systems, and end-user equipment, services and applications that utilise space-based systems.

For further information see www.enterprise-ireland.com/EI_Corporate/en/Research-Innovation/Companies/Access-EU-Research-Innovation-reports/Space-Industry-Directory/Overview.html
www.space-ireland.com

# Research Centres and Technology Centres

Centres are mapped by principal areas of expertise. Please see centre profiles for full spectrum of research undertaken.

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6 themes

14 priority areas

**Engaging Content**
Engaging People

# ADAPT
# Centre for Digital Content Technology



**Prof. Vincent Wade**
Centre Director

**Research areas**
- Analysing media, content and customer interactions
- Enabling global reach via innovative machine translation
- Transforming and delivering personalised content
- Extracting actionable knowledge from all forms of digital content and user interactions
- Empowering innovative customer engagement and interaction across multimodal media

**ADAPT Centre**
O'Reilly Institute
Trinity College Dublin
Dublin 2

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E collaboration@adaptcentre.ie
www.adaptcentre.ie

The Centre for Digital Content Technology (ADAPT) is Ireland's global centre of excellence for digital content and media innovation. ADAPT's cutting-edge technologies enable businesses in all sectors to harness global digital content and media technologies to achieve unprecedented engagement among customers, companies and communities.

Dynamic digital content interactions are key to valuable customer engagement and enhanced global reach and revenue. ADAPT innovations can help to analyse, personalise and deliver digital content more effectively to drive business in the digital age. ADAPT partners are developing ground-breaking technologies to turn the enormous volume of content into digital revenues by enabling unprecedented levels of global engagement between organisations and customers using world-leading research. ADAPT works with leading enterprises across industry sectors, including: CISCO and Intel to ensure consistent brand voice across global communications; Symantec to identify future online community leaders; and, Xanadu to deliver personalised content for targeted customer segments. We also work with enterprises such as: Welocalize to enhance translation productivity; and, Microsoft to detect offensive content in social media. By enabling deeper customer engagement, ADAPT enhances efficiencies and global reach for industry partners in key priority sectors for Ireland, including ICT, localisation, financial services, eCommerce, media, entertainment and games, life sciences, digital culture and humanities, and eLearning/education.

**Research performed by**
- Trinity College Dublin
- Dublin City University
- University College Dublin
- Dublin Institute of Technology

Science Foundation Ireland For what's next  **Funded by SFI and industry**

BUSINESS PROCESSES

MANUFACTURING AND MATERIALS

ENERGY

FOOD

HEALTH

ICT

# AMBER
# Advanced Materials and BioEngineering Research



AMBER



**Prof. Michael Morris**
Centre Director

Advanced Materials and BioEngineering Research (AMBER) provides a partnership between leading materials science researchers and industry and is funded by SFI and industry. The centre delivers internationally leading materials research with outputs including discoveries in the ICT, medical devices, pharma and industrial technology sectors.

**Research areas**
- 2D materials and composites
- Biomaterials
- Medical devices
- Semiconductor and memory devices
- Polymers and membranes

AMBER combines world-class fundamental and applied research activity within a vibrant culture of industrial engagement and commercialisation. Central to AMBER's research remit are collaborative projects performed with each of our industry partners. The industry partners are diverse, in terms of sectors and scale, covering the four primary sectors of ICT, medical devices, pharmaceuticals and advanced manufacturing technologies. A primary objective of the AMBER centre is to create new knowledge and intellectual property in materials science, collaborate with our industry partners to deliver new processes and products, and so translate the research into economic growth and employment.

The research carried out will be exploited to industry through licensing agreements, staff exchange and formal transfer of know-how, as well as the creation of high-potential spin-outs. We work in conjunction with the technology transfer offices of Trinity College Dublin, University College Cork and the Royal College of Surgeons in Ireland to achieve this. We offer industry the opportunity to cost-effectively access research, innovation and infrastructure underpinned by world-leading human capital.

**Research performed by**
- Trinity College Dublin
- University College Cork
- The Royal College of Surgeons in Ireland

**AMBER**
CRANN Institute
Trinity College Dublin
Dublin 2

T +353 (0)1 896 3030
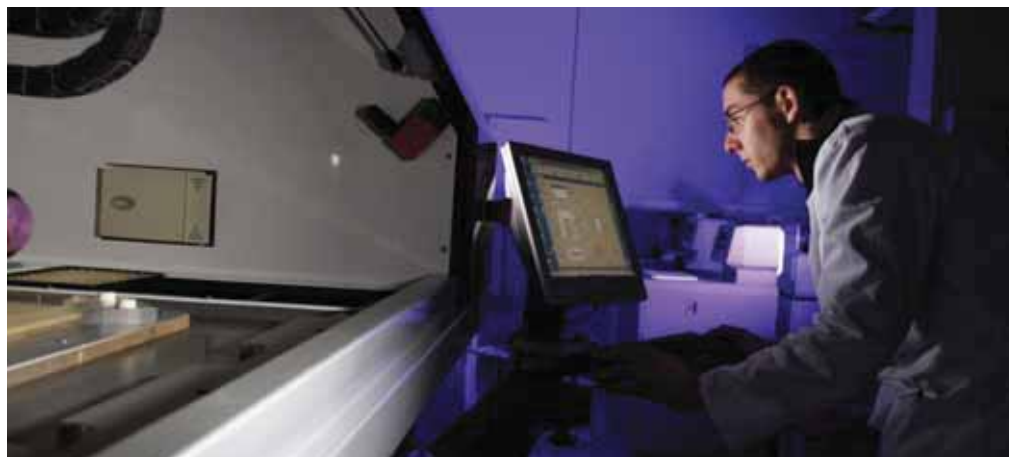E morrism2@tcd.ie
www.ambercentre.ie
@ambercentre

# APC
# APC Microbiome Institute



**Prof. Fergus Shanahan**
Centre Director

**Research areas**

- Mining the microbiota for bioactives for use as therapeutics (e.g., antimicrobials) or diagnostics
- Designing new functional foods across the lifespan, e.g., infants, athletes, elderly
- Exploring links between the microbiota and mental health
- Developing new biomarkers of GI and metabolic disease risk and manipulating risk by targetting the microbiota
- Technology Platforms

**APC Microbiome Institute**
BioSciences Building
University College Cork
Western Road, Cork
T12 YN60

Dr Brendan Curran
Business Development
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E bcurran@ucc.ie
http://apc.ucc.ie

The APC Microbiome Institute (APC) is a gastrointestinal health research centre exploring the role that gastrointestinal bacteria (microbiota) play in health and disease. The microbiota is a target for treatment and prevention of disease, and a source of functional food ingredients, new drugs and disease biomarkers.

Research at the APC Microbiome Institute is relevant to many different industry sectors: food, pharma, biotechnology, infant nutrition, medical foods and veterinary. APC investigators are global research leaders in how the microbiome plays a crucial role in these areas. The APC has also developed a number of technology platforms that can be of significant benefit to industry clients in furthering their own R&D agenda, such as culture-to-product, pre-clinical models, next generation sequencing, bioIT, bioprocessing and human studies.

The APC is very experienced in managing industry interactions and welcomes industry partners through a variety of flexible modalities. The benefits of partnership include the ability to undertake collaborative research with leading experts, access to our technology platforms and our extensive databases, and the reservoir of expertise held by the APC investigators.

The APC works closely with State agencies and can support clients in accessing appropriate State funding mechanisms.

**Research performed by**

- University College Cork
- Teagasc
- Cork Institute of Technology

# ARCH
# Applied Research for Connected Health



**Michael O'Shea**
Centre Director

Applied Research for Connected Health (ARCH) is the centre of connected health research in Ireland. People and technology come together through ARCH to deliver better health outcomes and prove these from economic, clinical, technology robustness and usability perspectives.

ARCH is an industry-focused technology centre providing access to world-class clinicians, academics and patient cohorts to explore and evaluate potential connected health solutions for the global market. Changing demographics coupled with reducing resources are placing increasing pressures on health systems across the globe. New care models must ensure patient quality of life while reducing costs and maintaining or improving clinical outcomes. Connected health is an emerging model of care ensuring stakeholders are 'connected' by means of timely sharing and presentation of accurate and pertinent information regarding patient well-being through smarter use of data, devices and people. Ireland is in a unique position to become a global centre

of activity and excellence in connected health. ARCH is at the centre of an unparalleled connected health education and research infrastructure that spans a range of activities from gathering, analysing and interpreting data, through the development of new knowledge and care models to implementing and evaluating change.

**Research performed by**
• University College Dublin
• University of Limerick

**Research areas**
• How is care delivered today and how might it be improved by connected health technologies?
• How can the barriers to the use of connected technologies be overcome and maximum impact achieved?
• How can large and diverse health-relevant data sets be mined for actionable information and presented to diverse stakeholders?

**ARCH**
NexusUCD
Block 9/10 Belfield Office Park
Clonskeagh
Dublin 4

T +353 (0)1 716 5400
E moshea@arch.ie
www.arch.ie

# BDI
# Biomedical Diagnostics Institute

**Joseph McManus**
Centre Director

### Research areas
- Immunoassay development
- Sensor technology
- Lab on a chip/microfluidic platforms
- Molecular diagnostics
- Assay reagent development

**Biomedical Diagnostics Institute**
Dublin City University
Glasnevin
Dublin 9

T +353 (0)1 700 7658
E joseph.mcmanus@dcu.ie
www.bdi.ie

The Biomedical Diagnostics Institute (BDI) is an academic–business–clinical partnership carrying out cutting-edge research programmes on the development of next-generation biomedical diagnostic devices. Our vision is to develop diagnostic and monitoring devices that directly address specific unmet clinical needs and translate these into the clinical setting.

The BDI comprises scientists and engineers working across five universities, in collaboration with clinicians based in six hospitals in Dublin and Galway. Since its establishment in 2005, this multidisciplinary BDI team has built significant IP and expertise in assay development, molecular diagnostics, lab-on-a-chip devices and high performance sensor development. This may be used to the advantage of industry partners experiencing R&D challenges in biomarker validation, assay development and new diagnostic product development, with a particular focus on near-patient/point-of-care testing. The BDI has a strong project management ethos, employing project managers who ensure clear project scoping and that objectives are met in an efficient manner. Through its clinical collaborators, the BDI has access to patient cohorts in disease areas such as cancer, cardiovascular disease, infectious disease and chronic inflammatory conditions such as rheumatoid arthritis. This facilitates device/assay verification in appropriate patient samples and, importantly, in dedicated clinical research centre facilities.

### Research performed by
- The Royal College of Surgeons in Ireland
- Trinity College Dublin
- NUI Galway
- Tyndall National Institute
- Dublin City University
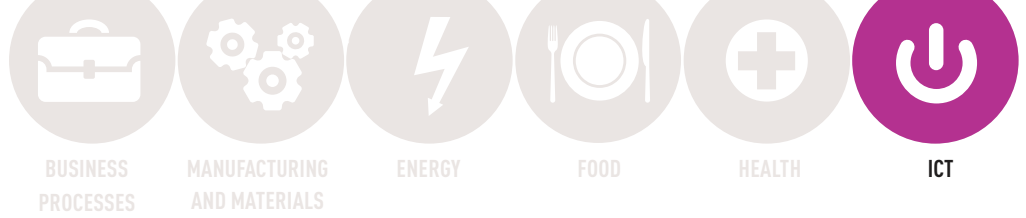
BUSINESS PROCESSES

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HEALTH

ICT

# CeADAR
# Centre for Applied Data Analytics

**Edward McDonnell**
Centre Director

**The Centre for Applied Data Analytics (CeADAR) is a market-led technology centre for the development and deployment of big data analytics technology and innovation, focusing on developing tools, techniques and technologies that enable people, organisations and industries to use analytics for better decision making and competitive advantage.**

The aim of CeADAR is to rapidly prototype and deliver big data analytics technology and solutions to industry from an agenda that is solely defined by the market. The Centre's primary outputs are prototypes, demonstrators and bespoke solutions co-developed with individual industry members. The prototypes and demonstrators are proposed by the Centre's industry and business members and resourced from core funds. In addition, we publish many state-of-the-art reviews of data analytics technology and tools.

Each year the Centre delivers 20 demonstrators to its membership, and in 2015 alone we have 94 separate company collaborations with our demonstrators.

The Centre has an extensive catalogue of demonstrators, IP and big data analytics technology reviews, which are immediately available for evaluation.

The Centre is also the focal point of a large, thriving data analytics ecosystem, delivering conferences, seminars, consultancy and members' networking events throughout the year.

**Research performed by**
• University College Dublin
• University College Cork
• Dublin Institute of Technology

**Research areas**
• Visualisation and analytic interfaces
• Data management for analytics
• Advanced analytics and real-time analytics

**CeADAR Centre for Applied Data Analytics**
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Belfield Office Park
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Dublin D04 V2N9

T +353 (0)1 716 5716
E edward.mcdonnell@ucd.ie
www.ceadar.ie

# CONNECT
# The Centre for Future Networks and Communications

**Prof. Linda Doyle**
Centre Director

### Research areas
- Wireless and optical technologies
- Wireless and optical architectures
- Networking services and security
- Internet-of-things
- Smart devices
- Spectrum management
- Testbeds and experimentation

**CONNECT**
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@connect_ie

The Centre for Future Networks and Communications (CONNECT) is Ireland's flagship research centre for future networks and communications services, applications and technologies.

CONNECT includes 130 world-class researchers in 10 higher education institutes undertaking cutting-edge research underpinned by €60 million in funding from Science Foundation Ireland (SFI), EU and industry sources.

CONNECT research focuses on the internet-of-things, 5G communications systems, next-generation optical networks, dynamic service provision, reconfigurable networks, smart devices, and other emerging communications technologies.

As Ireland's 'one-stop-shop' for networks and communications research, CONNECT works closely with 40 industry partners.

Companies are invited to commission specific projects, from product development to longer-term research. Our research team is dedicated to delivering at the pace and standard demanded by industry.

### Research performed by
- Cork Institute of Technology
- Dublin City University
- Dublin Institute of Technology
- Maynooth University
- Telecommunications Software and Systems Group (TSSG)/Waterford Institute of Technology
- Trinity College Dublin
- Tyndall National Institute
- University College Cork
- University College Dublin
- University of Limerick

BUSINESS
PROCESSES

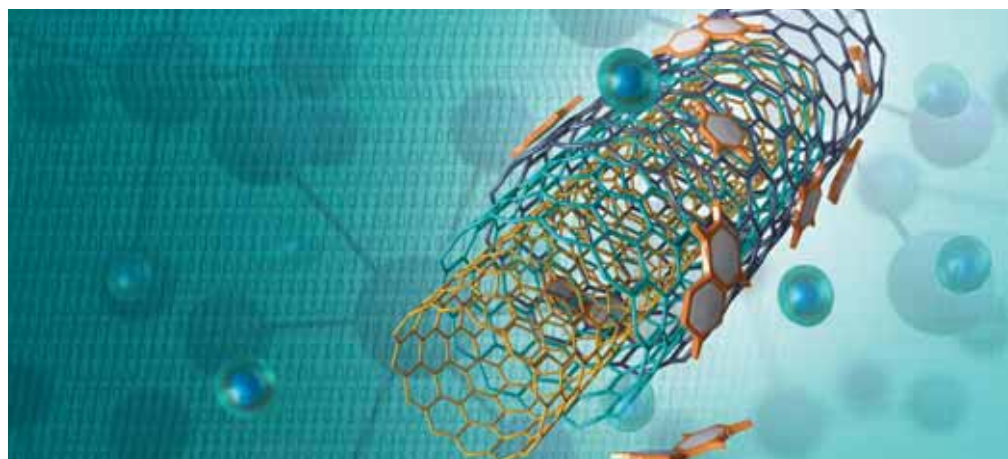MANUFACTURING
AND MATERIALS

ENERGY

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HEALTH

ICT

# CÚRAM
# The Centre for Research in Medical Devices


*Biofunctional nanotube scaffold – courtesy of Dr Manus Biggs' laboratory.*

**Prof. Abhay Pandit**
Centre Director

The National Centre for Research in Medical Devices (CÚRAM) is backed by Science Foundation Ireland and industry funding. Our researchers are designing and manufacturing the next generation of 'smart' medical devices to improve health outcomes and enhance quality of life for patients with chronic illnesses.

**Research areas**
- Combinational and advanced delivery devices
- Enhancement of current implants
- Analytical characterisation and design of devices
- Assessment of implants and devices
- Translation of selected CÚRAM technologies into clinical assessment

With six academic partners and over 35 industry partners, CÚRAM is establishing a global hub of research expertise in medical device technology. The establishment of CÚRAM positions Ireland at the forefront of the world's medical device industry – a leading area of innovation, employment and export in Ireland.

CÚRAM's innovative approach incorporates biomaterials, drug delivery, cell-based technologies, glycosciences and device design to enhance, develop and validate both traditional and new combinational medical devices from molecular design stage to implant manufacturing.

Our devices are developed with strong clinical collaborations to enable rapid translation of research findings to clinical application. Key to this approach has been the establishment of a unique network of national and international collaborations, integrating world-class clinical, academic and industrial partners.

**Research performed by**
- NUI Galway
- University College Cork
- Trinity College Dublin
- University of Limerick
- The Royal College of Surgeons in Ireland
- University College Dublin
- Molecular Medicine Ireland

**CÚRAM**
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Biosciences
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# DPTC
# The Dairy Processing Technology Centre



**Padraig McPhillips**
CEO

## Research areas

- Efficiencies – cost competitiveness in dairy processing
- Process development – next generation dairy processing science and technology
- Product innovation – innovating for value through dairy processing
- Quality and safety – product quality and safety by design
- Environmental sustainability – towards a zero emissions dairy industry

**The Dairy Processing Technology Centre (DPTC)**
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University of Limerick

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**The Dairy Processing Technology Centre (DPTC) is an industry–academic collaborative research centre, hosted by the University of Limerick, with a research agenda driven by the long-term growth opportunities for the dairy sector created by the removal of milk quotas in 2015.**

DPTC has been established as a centre of excellence for dairy processing research and innovation. The Centre will help to fuel growth in the Irish dairy sector by performing research focused on cost-efficient processing, facilitating a step-change in environmental sustainability and creating, validating and commercialising a pipeline of science and technology-based manufacturing platforms for dairy ingredients. The foundation of the DPTC is a strong, long-term industry–academic collaborative partnership that will develop, build and translate the knowledge and capabilities in dairy processing that are needed today and for the long-term growth development of the sector. Current members of the Centre are the industry partners Arrabawn Co-op, Aurivo Co-op, Carbery

Group, Dairygold Co-op, Glanbia Ingredients Ireland, Kerry Group, Lakeland Dairies and Tipperary Co-op, together with Teagasc, University College Cork, University College Dublin, and NUI Galway, and collaborating partner institutions Dublin City University, Dublin Institute of Technology, and Institute of Technology Tallaght.

**Research performed by**
- University of Limerick
- Teagasc
- University College Cork
- University College Dublin
- NUI Galway
- Dublin City University
- Trinity College Dublin
- Dublin Institute of Technology
- Institute of Technology Tallaght

IDA Ireland      ENTERPRISE IRELAND where innovation means business      **Funded by Enterprise Ireland and industry**

# FHI
# Food for Health Ireland



**Jens Bleiel**
Centre Director

Food for Health Ireland (FHI) unites world-class science and industry expertise to improve health through innovation in food. Its purpose is to identify novel ingredients coming from milk to develop functional food ingredients that will offer health benefits to consumers.

**Research areas**
- Technology and healthy cheeses
- Infant nutrition
- Appetite modulation
- Glycaemic management
- Performance nutrition and healthy ageing

FHI links world-class academic research with industry vision for the potential of successful market innovations. The industry-focused research strategy within FHI includes the identification, development and exploitation of novel milk-derived bioactive compounds for improving health and wellbeing. FHI also provides a pipeline for the development of new functional food ingredients and products with validated health benefits for consumers.

The FHI approach is to work with Irish food industry partners and in close connection with scientists. FHI has built a unique bridge between high-class research organisations and industry needs.

FHI also provides a contract research facility for small and large global food companies utilising our competencies, resources and technologies. This service provides a gateway to academic research in Ireland and supports open innovation. FHI has completed over 40 projects of this kind since 2008.

**Research performed by**
- Teagasc Food Research Centre, Moorepark, Fermoy, Co. Cork
- University of Limerick
- University College Cork
- Dublin City University
- NUI Galway
- Maynooth University
- University College Dublin

**Food for Health Ireland**
Science Centre South
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@fhi_phase2

# FMC²
# Financial Mathematics and Computation Cluster

**Prof. John Cotter**
Centre Director

### Research areas
- Robust asset allocation
- Fund performance evaluation
- Algorithmic trading
- Asset pricing and risk
- Portfolio management
- Pension investment
- Real estate

**FMC²**

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**The Financial Mathematics and Computation Cluster (FMC²) is a research collaboration between industry, UCD, DCU and Maynooth University. The group brings together complementary expertise in financial mathematics, financial economics and computer science to create a holistic research programme in asset and risk management.**

The main objective of FMC² is to create a globally recognised research centre that will provide essential support for the future development of the international service sector in Ireland. To achieve this the cluster provides support for innovation activities of Irish-based international financial companies by addressing crucial research questions and expanding the research and development capacity of the financial services sector in Ireland. The cluster also creates a steady supply of highly skilled postdoctoral researchers and PhD graduates, as well as supporting an annual MSc internship programme. This supply of trained personnel aims to facilitate the growth of the sector in Ireland. In addition, the cluster provides a programme of industry-focused events bringing world-class researchers and industry practitioners together to discuss topical issues concerning the sector.

### Research performed by
- University College Dublin
- Maynooth University
- Dublin City University

BUSINESS
PROCESSES
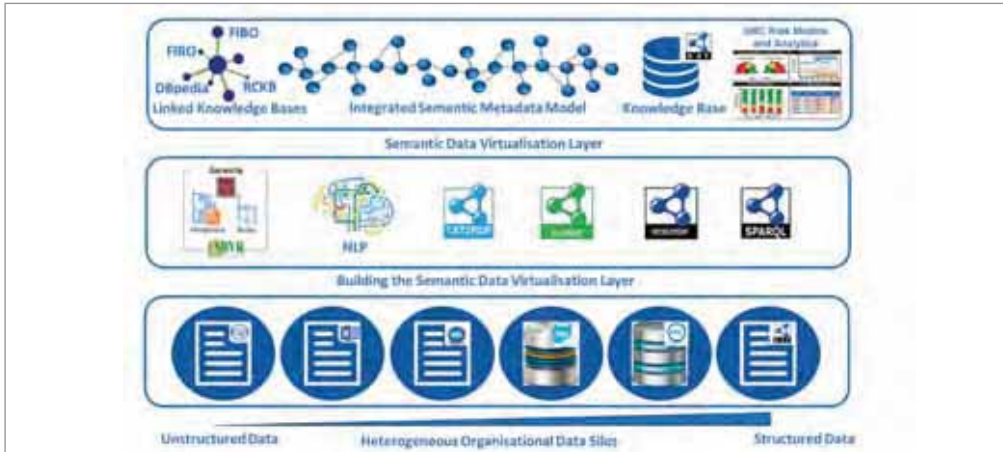
MANUFACTURING
AND MATERIALS

ENERGY

FOOD

HEALTH

ICT

# GRCTC
# Financial Services Governance, Risk and Compliance Technology Centre



**Peter Cowap**
Centre Director

The Financial Services Governance, Risk and Compliance Technology Centre (GRCTC) is a dedicated market-focused research centre, undertaking applied research and innovation in the areas of financial services governance, risk and compliance.

The Centre's purpose is to support its industry partners in resolving the transformational impact of costly regulatory compliance challenges, presented by the velocity, complexity and volume of change, through the development of innovative financial technology ('FinTech')-based GRC solutions. The industry continues to be beset by ineffective processes and inadequate ('traditional') technology, with too many tasks requiring manual interventions, inhibiting its ability to progress to 'smarter compliance', where semantically enriched FinTech provides the potential to shift from machine-assisted human querying and inferencing of data to human-supervised machine exploration.

The GRCTC is positioned in-the-industry-for-the-industry, and is recognised within the global financial services landscape.

The Centre's applied research and innovation project areas are specifically targeted to assist financial services institutions and FinTech players in unpacking often multi-jurisdictional and multi-layered regulation by:

• developing a structured process to ingest regulatory obligations;
• helping to implement regulatory change in a cumulative and consistent manner;
• generating standardised data structures to enable meaning to travel with data; and,
• creating the ability to benchmark these capabilities, and support training and knowledge transfer initiatives.

The GRCTC embodies multidisciplinary expertise located at its host institution, University College Cork, and at University College Dublin and NUI Galway.

**Research performed by**
• University College Cork
• NUI Galway
• University College Dublin

**Research areas**
• Regulatory compliance change management system
• Regulatory compliance interpretation methodology
• Regulatory compliance information system
• Regulatory compliance knowledge base
• Regulatory compliance knowledge management system
• Regulatory compliance capability maturity modelling

**The Financial Services Governance, Risk and Compliance Technology Centre**
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# IC⁴
# The Irish Centre for Cloud Computing and Commerce



**Tony McEnroe**
Centre Director

**Research areas**
• Cloud architecture
• Service lifecycle
• Business research
• Cloud security

**The Irish Centre for Cloud Computing and Commerce**
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**The Irish Centre for Cloud Computing and Commerce (IC⁴) is a multi-institutional, multi-disciplinary research centre whose mandate is to carry out rapid-turnaround, applied research projects in areas of cloud computing that are chosen by its industrial members.**

IC⁴'s mission is to:
i) generate and transfer knowledge and technology to its industry members, in areas they can commercialise;
ii) accelerate the rate at which businesses adopt cloud computing; and,
iii) showcase Ireland's capabilities in cloud computing.

One of IC⁴'s main research priorities is "building trust and dependability in the cloud", with the goal of addressing the need for compliance to standards, quality of service, data privacy, auditability and reliability of service. These issues permeate the cloud ecosystem and are relevant to cloud platform or application developers, cloud service providers, cloud solution resellers and cloud consumers.

IC⁴'s multidisciplinary team of postdoctoral researchers delivers fast-turnaround research under industry-friendly commercialisation terms. Members get access rights to all core-funded research results but can also get exclusive access rights to results on targeted projects that are focused at their specific needs.

**Research performed by**
• Dublin City University
• University College Cork
• Athlone Institute of Technology

BUSINESS PROCESSES

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HEALTH

ICT

# IComp
# Irish Centre for Composites Research



**Dr Terry McGrail**
Centre Director

The Irish Centre for Composites Research (IComp) provides world-class innovative R&D, consultancy and networking opportunities for industry throughout Ireland, across all sectors where there are opportunities to use composite materials and associated technologies.

IComp provides the focal point in Ireland for academia and industry to work together to address some of the critical issues related to the use of composite materials. Research projects are identified by IComp industrial members who include companies from the aerospace, electrical, construction and renewable energy sectors.

IComp's R&D activities include materials innovation and processing, the design of composite components and structures, joining technologies (including adhesive bonding and surface engineering), and damage detection and repair. All areas are supported by a comprehensive programme of modelling, testing and in-depth characterisation.

Additionally, bespoke experimental support, consultancy, networking and information services are provided to industrial members. IComp has well-equipped laboratories with the capability of manufacturing as well as testing and inspecting composite components and structures up to the semi-tech scale. The world-class faculty and research staff at UL, UCD and AIT has many years of experience working in national and international funded programmes.

**Research performed by**
• University of Limerick (UL)
• University College Dublin (UCD)
• Athlone Institute of Technology (AIT)

**Research areas**
• Innovative processing and product development of thermoplastic composites, including recycling
• Liquid resin infusion processes and product innovation for out-of-autoclave manufacture
• Adhesives and adhesion science for bonding and dis-bonding composites and metals
• Surface engineering to tailor composite, polymer, fibre and metal surfaces to optimise performance
• Damage prediction, detection and repair of composites

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# iCRAG
# Irish Centre for Research in Applied Geosciences

| GROUNDWATER | HYDROCARBONS AND MARINE | RAW MATERIALS |

**Prof. John Walsh**
Centre Director
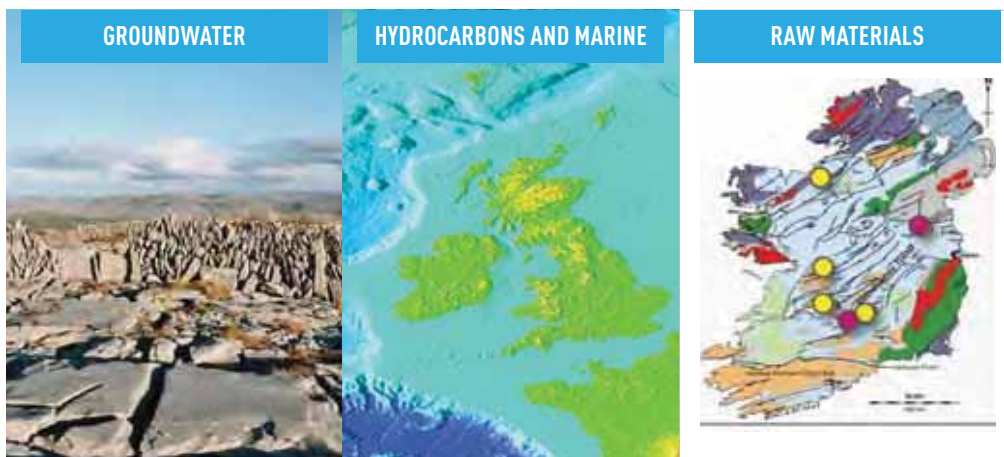
**Research areas**
- Raw materials – mineral/aggregate geoscience
- Marine – ocean geoscience
- Groundwater – hydrogeology/hydrology
- Hydrocarbons – petroleum geoscience
- Geochemistry, geophysics, 3D geological modelling, and public perception and understanding

**Irish Centre for Research in Applied Geosciences**
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The Irish Centre for Research in Applied Geosciences (iCRAG) brings together Ireland's leading geoscience experts on issues underpinning economic development – from safe and secure groundwater supplies to the discovery of mineral/aggregate deposits, and from de-risking oil and gas exploration to educating and informing the public on geoscience-related issues.

Geoscience underpins the discovery of raw materials, water and energy resources that are critical to the world's economy. With increasing demand and diminishing supply, focused innovations in geoscience are of paramount importance globally. iCRAG comprises a team of internationally leading researchers and both large- and small-scale industrial partners that will work to carry out research to find and harness these resources while protecting the environment. iCRAG's overarching objectives are:

1. To significantly de-risk Ireland's offshore and onshore hydrocarbon and mineral resource exploration, thus increasing exploration activities while also increasing the potential of sourcing a secure supply.
2. To ensure safe and secure groundwater supplies and to address geoscience-related 'quality of environment' issues.
3. To engage with citizens and policy makers to explain the nature of resource-related industries and to facilitate the timely progression of identified resources to extraction.

**Research performed by**
- University College Dublin
- Trinity College Dublin
- NUI Galway
- University College Cork
- Maynooth University
- Dublin Institute for Advanced Studies
- Geological Survey of Ireland
- Environmental Protection Agency
- Teagasc
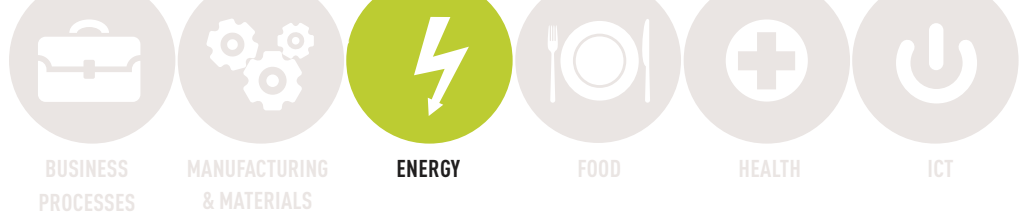
# IERC
# International Energy Research Centre



**Prof. Tony Day**
Executive Director

The International Energy Research Centre (IERC) leads collaborative research to meet global societal needs for secure, affordable and sustainable energy services. It is focused on demand side energy efficiency and embedded energy generation at the building, community and city levels.

The IERC aims to address global societal needs for secure, affordable and sustainable energy services by transforming the efficiency of energy-enabled services and enhancing the quality of people's lives. While a range of solutions exists to help reduce energy use, integrated system thinking is required to provide low-carbon solutions that will deliver efficiently and effectively throughout their lifetimes. The IERC aims to develop a truly collaborative ecosystem delivering economic impact through research and business partnerships. The Centre is developing new products and services that will ensure real energy and carbon reductions across society, while building new knowledge and insight for our partners. The IERC has developed a collaborative research and IP model to engage key stakeholders in delivering high-level integrated, system-level solutions. The IERC is funded jointly by the Department of Enterprise, Jobs and Innovation and the Department of Communications, Energy and Natural Resources.

**Research areas**
- Smart cities and sustainable communities
- Low carbon heating and cooling
- Monitoring, measurement and analysis of energy
- Embedded and micro generation systems

**Research performed by**
- Cork Institute of Technology
- Dublin Institute of Technology
- Dublin City University
- Limerick Institute of Technology
- NUI Galway
- Maynooth University
- Tyndall National Institute
- University College Cork
- University College Dublin
- University of Ulster

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# Irish Manufacturing Research

**Barry Kennedy**
CEO

**Research areas**
- Manufacturing informatics
- Industrial energy efficiency
- Operational excellence
- Industry 4.0
- Intelligent systems
- Additive manufacturing
- Supply chain

**Irish Manufacturing Research**
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**Irish Manufacturing Research is an independent manufacturing and industrial energy efficiency research centre focused on delivering solutions for the manufacturing ecosystem throughout Ireland. Our passion is to make Ireland a world leader in advanced manufacturing operations.**

As an independent research centre, Irish Manufacturing Research offers manufacturing industry a unique environment to collaborate with peers across all manufacturing sectors, and to inform and guide manufacturing research that not only addresses industry problems but also visions for future factories. We are a cross-sectoral research centre with partner companies in semiconductors, ICT, pharmaceuticals, medical devices, food, energy services, aerospace and other areas. We work closely with academic, Government and industry partners, and through bringing this cross-sectoral interaction around one table, we establish best in class knowledge and behaviours as the starting point for future research. Under the shared brand of Advanced Manufacturing Ireland, Irish Manufacturing Research in partnership with the industry network organisations, ICMR and i2e2, have

demonstrated productivity improvements and efficiency savings opportunities in excess of €20m for member and partner companies through embedded pilots. It has achieved this through delivery of enterprise-ready solutions in areas such as schedule optimisation, operations simulation, metrology, HVAC (heating, ventilating and air conditioning) commissioning and energy-efficient production. We are open to all levels of collaboration with Irish-based SMEs and large/MNC manufacturers.

**Research performed by**
Irish Manufacturing Research and through collaborations with most of the universities and institutes of technology throughout Ireland.

# INFANT
# The Irish Centre for Fetal and Neonatal Translational Research





**Prof. Louise Kenny**
**Prof. Geraldine Boylan**

The Irish Centre for Fetal and Neonatal Translational Research (INFANT) is focused on making pregnancy safer and improving health outcomes for mothers and babies on a global scale. The centre is based in Cork University Maternity Hospital.

The centre is an international leader of discovery and innovation in perinatal healthcare, undertaking world-class collaborative research and partnering with a diverse array of national and international industries and academics.

INFANT addresses unmet worldwide clinical needs for effective screening tests for the most common complications of pregnancy and the most significant problems for newborns. One in five pregnancies is complicated by pre-eclampsia, pre-term birth or fetal growth restriction. These conditions can progress to serious illnesses for both mum and baby if they are left undetected. For the baby, birth is a perilous journey. Some 5% of newborns experience asphyxia at birth, which can later develop into brain injury and seizures. The creation of next-generation devices to facilitate point-of-care and remote monitoring and diagnostics will transform antenatal and neonatal healthcare and service delivery on a global level, and position Ireland at the forefront. Access to world-first technologies allows INFANT's industry partners to deliver innovative solutions to global markets, creating exciting economic opportunities and delivering sustainable high knowledge value jobs in Ireland.

**Research performed by**
• University College Cork
• The Royal College of Surgeons in Ireland

**Research areas**
• Biomarkers for screening and diagnostics in pregnancy
• Innovative cot-side monitoring
• Medical devices
• Maternal and infant nutrition
• Perinatal clinical trials
• Connected health
• Monitoring platforms
• Newborn brain injury

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# Insight
# Centre for Data Analytics



## Oliver Daniels
CEO

### Research areas
- Linked data and semantic web
- Machine learning and statistics
- Media analytics and personal sensing
- Optimisation and decision analytics
- Recommender systems

**Insight at UCD**
O'Brien Centre,
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**Insight at DCU**
School of Computing
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Glasnevin, Dublin 9
**Insight at UCC**
Western Gateway Building
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**Insight at NUIG**
IDA Business Park, Lower
Dangan, Newcastle, Galway

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**At Insight Centre for Data Analytics we undertake high impact research in data analytics. We derive value from 'Big Data' and provide innovative technology solutions for industry and society by enabling better decision making.**

The Insight Centre for Data Analytics is a joint initiative between researchers at Dublin City University, NUI Galway, University College Cork, University College Dublin and other partner institutions. Insight brings together more than 350 researchers from these institutions with over 40 industry partners, to position Ireland at the heart of global data analytics research. Insight offers data analytics solutions for a broad range of industry partners in ICT, healthcare, retail, finance, media and public services. Insight's expertise includes the whole data value chain from the integration of multiple heterogeneous data sources, to discovering patterns and trends in data and making sense of them. Innovative solutions include using data to:

- develop products and services based on matching the short- and long-term needs of individuals and organisations to a real-time picture of information, opportunities, and services;
- understand customer behaviour to increase customer satisfaction, experience and loyalty;
- drive recommendations and support decision-making;
- find optimal solutions to complex problems; and,
- automate business processes.

### Research performed by
- University College Dublin
- Dublin City University
- NUI Galway
- University College Cork
- Maynooth University
- The Royal Irish Academy
- Tyndall National Institute
- Trinity College Dublin

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# IPIC
# Irish Photonic Integration Centre



**Prof. Paul Townsend**
Centre Director

The Irish Photonic Integration Centre (IPIC) brings together over 100 researchers from four institutes to develop new light-enabled technologies. Targeting the ICT, medical devices and diagnostics sectors, IPIC works with 20 industry partners to develop the next generation of highly compact and miniaturised photonics devices.

Photonics is the generation, manipulation and utilisation of light and is a key enabling technology that underpins the internet and impacts diverse industries such as medical devices, renewable energy, manufacturing and environmental monitoring. It is also an industry where Europe has significant global presence with 20% market share, equivalent to €60bn per annum, and with the global market expected to grow to over €600bn by 2020.

IPIC's integrated research team has capabilities from the theory of novel light-emitting materials right through to the design of devices and systems. This includes the unique ability to accelerate transfer from laboratory to market by delivering concept demonstrations, including low volume manufacturing of prototypes, exploiting IPIC's advanced fabrication and packaging capabilities.

IPIC's facilities include modelling and design, materials growth, device fabrication, packaging, device characterisation and systems testing.

**Research performed by**
- Tyndall National Institute
- Cork Institute of Technology
- Dublin City University
- University College Cork

**Research areas**
- Enabling continued growth of the internet through faster, more energy-efficient devices
- Delivering smart medical devices for improved treatment of disease
- Developing highly compact instrumentation for point-of-care diagnostics
- Developing systems for food and environment monitoring

**Irish Photonic Integration Centre**
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# IVI
# Innovation Value Institute



**Martin Delaney**
General Manager

## Research areas

- Defining and presenting the capability that organisations need to use the opportunities presented by technology and information management
- Developing the tools and training needed to allow organisations to use our research output
- Defining and developing an IT capability framework for SMEs
- Using the IVI capability framework to address current business challenges
- Developing a European framework for ICT professionalism for the European Commission

## Innovation Value Institute

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The Innovation Value Institute's (IVI) contribution to Government and industry is the availability of a body of knowledge that directs those managing information and technology in the most effective practices dedicated to optimising their investment and delivering business outcomes and value.

The IVI researches, develops and disseminates empirically proven and industry-validated IT best practice through a unique open collaboration between leading academic and industry practitioners. The IVI facilitates a collaborative community of like-minded peers committed to investigating, advancing and disseminating the frameworks, tools and best practices associated with managing IT value and IT-enabled innovation. The IT-Capability Maturity Framework (CMF) has been used by over 500 global organisations to enable and measure improvements in key areas:

- IT capability measurement and improvement;
- IT organisational design and capability management;
- IT business alignment and leadership;
- organisation benchmarking and best practice;
- IT risk management – data protection; and,
- enabling digital processes across all business departments.

The IVI represents a 'triple-helix' support and innovation model across academia, Government and industry, and facilitates a thriving international consortium, which now includes over 100 organisations globally. This collaboration provides the stable foundation and ecosystem to transform the way public and private sector organisations manage IT for value and innovation.

### Research performed by
- Maynooth University

BUSINESS PROCESSES

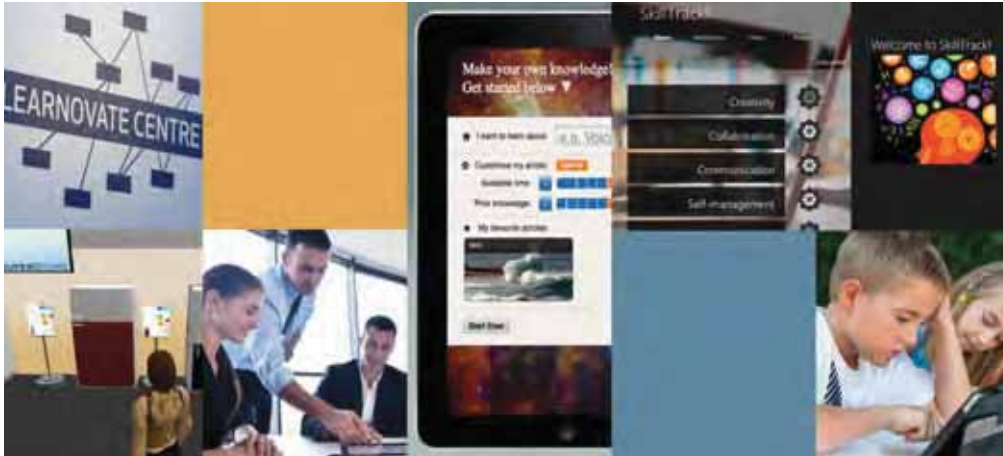MANUFACTURING AND MATERIALS

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HEALTH

ICT

# Learnovate Centre

LEARNOVATE CENTRE



**Dr Martyn Farrows**
Centre Director

**The Learnovate Centre is leading learning innovation to provide real impact for our industry partners and position Ireland as a global leader in learning technologies.**

The Learnovate Centre is an industry-focused centre of excellence for research and innovation in learning technologies, hosted by Trinity College Dublin. Our mission is to enhance the competitive advantage of Ireland's learning technology industry and position Ireland as a global hub for innovation in Edtech.

Through targeted research projects and a series of industry-focused services we provide innovation support, driving growth and job creation. Our research projects are focused on investigating areas of interest to our industry partners, from schools/K12 through higher education and into corporate learning.

Our world-class team employs a multidimensional approach to research. The team has a core of technology-enhanced learning expertise from TCD, UCD, NUIG and WIT. In addition, the Centre provides a wealth of experience across disciplines including pedagogy, learning design, psychology, user interface design and software development. Commercial experience is embedded throughout our team to ensure that we remain industry focused.

**Research performed by**
• Trinity College Dublin
• University College Dublin
• NUI Galway
• Waterford Institute of Technology

**Research areas**
• Personalisation and adaptive learning
• New assessment methods
• Learning analytics
• Mobile and informal learning
• Social and collaborative learning
• Immersive learning experiences
• Game mechanics for learning

**Learnovate Centre**
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# Lero
# The Irish Software Research Centre



**Prof. Mike Hinchey**
Centre Director

**Research areas**
- Methods and standards for high integrity software
- Autonomous and adaptive systems
- Software performance
- Adaptive security and privacy

Lero – The Irish Software Research Centre
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**The Irish Software Research Centre (Lero) brings together leading software teams from universities and institutes of technology in a co-ordinated centre of research excellence with a strong industry focus.**

Ireland has a vibrant and successful software sector. Nine of the world's top 10 multinational technology companies have a significant presence in Ireland. Many companies not classified as software companies utilise software as a key component of the products and services they offer. Competitive advantage accrues to companies who get their products to market sooner and whose products have superior quality in the eyes of their customers. Adopting the best software engineering processes and methodologies relevant to their field of activity can help Irish companies to boost productivity, while process certification can open access to new markets and increase sales. Higher reliability and higher integrity software can reduce the risk

of software-driven disasters. Lero has raised the level and profile of Irish software research with such effect that it is now one of the best known and highly regarded software research centres in the world.

**Research performed by**
- University of Limerick
- Dublin City University
- Dundalk Institute of Technology
- NUI Galway
- Maynooth University
- Trinity College Dublin
- University College Cork
- University College Dublin

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# MaREI
# Marine Renewable Energy Ireland



**Prof. Jerry Murphy**
Interim Centre Director

Marine Renewable Energy Ireland (MaREI) is a marine and renewable energy-based research, development and innovation hub. We combine the expertise of a wide range of research groups and industry partners, with the shared mission of solving the main scientific, technical and socio-economic challenges across the marine and renewable energy spaces.

MaREI is an SFI Research Centre, which originates from well-established marine and renewable energy-based research entities distributed throughout Ireland. The PI team comprises internationally recognised experts in these fields who have complementary research backgrounds key to providing the underpinning research necessary for Ireland to achieve commercially successful marine and renewable energy industries. The multidisciplinary nature of these groups reflects the breadth of expertise required to create a national-scale Centre to support the R&D requirements of the marine and renewable energy industries, both in Ireland and abroad. A primary focus for MaREI is the development of strategic long-term relationships with industry partners achieved by providing them with access to world-class researchers and test-bed infrastructure, and subsequent co-production of knowledge. This industry-centred approach provides a focal point to enable over 45 companies to participate in the development of a vertically-integrated supply chain, and to promote and enhance cross-fertilisation of ideas between industry and academia in the marine and renewable energy sectors.

**Research performed by**
- University College Cork
- University of Limerick
- NUI Galway
- Maynooth University
- University College Dublin
- Cork Institute of Technology

**Research areas**
- MRE device modelling, design, testing and optimisation
- Novel materials and structural testing
- Energy conversion and demand side optimisation
- Observation, monitoring and operations
- Marine and coastal management
- Energy systems modelling

**MaREI**
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# MCCI
# Microelectronic Circuits Centre Ireland

**Donnacha O'Riordan**
Centre Director

**Research areas**
- Analogue and mixed-signal circuits research
- Sensors
- Communications
- Smart medical devices
- Smart agri-food devices

**MCCI (Microelectronic Circuits Centre Ireland)**
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www.mcci.ie

The Microelectronic Circuits Centre Ireland (MCCI) is an industry-led technology centre focused on world-class research into analogue and mixed-signal circuits. Our R&D activities deliver circuits that push state-of-the-art and optimise across cost, performance, power and functionality for a range of industry-directed end applications.

MCCI is a technology centre focused on executing microelectronic circuit research for the benefit of industry. MCCI is a world leader in analogue and mixed-signal integrated circuit research and has a pool of over 45 researchers spread across six institutions. Microelectronics is a key enabling technology for many diverse applications. MCCI is working with medical companies on new ultra-low power implantable microchips to monitor the human body, with smart food companies on microchips that can detect if a beef burger contains horsemeat, and with energy companies to reduce the power in data centres.

With over 20 industry partners, MCCI conducts both multi-party collaborative research and confidential bilateral projects. The world-class circuits that we design allow companies to differentiate their products. In the last two years alone there have been six commercial licences from MCCI, 50% of MCCI staff have transferred into industry, and our member companies have created over 1,000 new jobs, with 120 of those jobs attributed to MCCI.

**Research performed by**
- Cork Institute of Technology
- Institute of Technology Carlow
- Maynooth University
- Tyndall National Institute
- University College Dublin
- University of Limerick
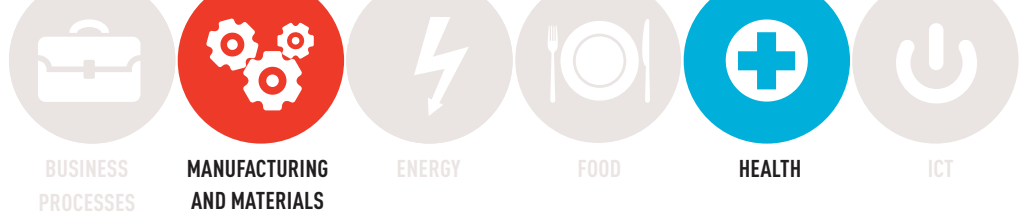
# PMTC
# Pharmaceutical Manufacturing Technology Centre



**Dr Chris Edlin**
Centre Director

The Pharmaceutical Manufacturing Technology Centre (PMTC) is a leading industry-informed research centre focused on developing advanced technology solutions for all stages of pharmaceutical manufacturing. The Centre accesses state-of-the-art research facilities capable of delivering molecule to patient solutions through its Irish academic members.

The PMTC is hosted at the University of Limerick with core funding from the Irish Government; this is supplemented with co-funding from industry in addition to leveraged research funding. The Centre is co-ordinated by an industry–academia Steering Committee with an industrially driven research programme. Members, including indigenous SMEs and MNCs, inform the research agenda. Market-focused research delivers solutions to contemporary issues facing the pharmaceutical industry. The recently launched "Good Cleaning Validation Practice (GCVP)" document is a concrete example of this objective in practice. The integrated guidance document was developed to directly and quickly address a pressing collective membership need.

Our member base benefits by having unrivalled access to core capability and skills in continuous processing, mathematical modelling, statistics and process optimisation, and unrivalled awareness of research programme outputs. Other benefits include: pre-agreed project agreements; professionally managed, timely access to IP and research outputs; opportunities to identify talent for future recruitment; and, access to members-only networking forums and events.

**Research performed by**
• University College Cork
• University of Limerick
• Institute of Technology Tallaght
• Waterford Institute of Technology
• Cork Institute of Technology
• NIBRT
• SSPC

**Research areas**
• Advanced rapid micro-analytical techniques
• Enabling and control of continuous processing by process analytical technology (PAT)
• Soft sensor modelling tools
• Active pharmaceutical ingredient (API) real-time release PAT
• Pharmaceutical packaging technologies
• Cleaning, validation and verification

**Pharmaceutical Manufacturing Technology Centre**
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www.pmtc.ie

# SEES
# Sustainable Electrical Energy Systems



**Prof. Mark O'Malley**
Centre Director

**Research areas**
- Power systems engineering
- Modelling
- Economics and policy
- End use

The Electricity Research Centre (http://erc.ucd.ie), which hosts the Sustainable Electrical Energy Systems Cluster (SEES), and the broader Energy Institute (http://energyinstitute.ucd.ie), with the major new initiative the Energy Systems Integration Partnership Programme (ESIPP), are unique multi-institutional collaborations between academia and research.

**Electricity Research Centre**
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D04 V1W8

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www.erc.ucd.ie
www.energyinstitute.ucd.ie

Ireland's success in integrating renewable energy, particularly wind energy, onto our electricity grid is remarkable by international standards, with wind often providing close to 50% of our electricity. This is due to a number of factors, including our location and the ambitious mindset of the industry and other key stakeholders. Researchers, working in close collaboration with industry, pursue a portfolio of projects on the impact of key drivers on the power system, and increasingly on energy systems integration. Industry collaborators, through the Electricity Research Centre Industry Affiliates Programme, gain access to the breadth of research undertaken – time to interact with

researchers and PhD students is often the most valuable aspect of the relationship. Facilities include a real-time digital simulator with hardware in the loop test capability. There are many opportunities to contribute and formally link to relevant existing ERC research projects and new proposals, as well as the opportunity to inform future Electricity Research Centre research direction.

**Research performed by**
- University College Dublin
- Trinity College Dublin
- The Economic and Social Research Institute
- University of Limerick
- Maynooth University

# SSPC
# Synthesis and Solid State Pharmaceutical Centre



**SSPC**
SYNTHESIS AND SOLID STATE PHARMACEUTICAL CENTRE
Innovation Through Collaboration



**Prof. Kieran Hodnett**
Scientific Director

The Synthesis and Solid State Pharmaceutical Centre (SSPC), is a global hub of pharmaceutical process innovation and advanced manufacturing.

**Research areas**
- New frontiers in pharmaceutical synthesis
- Crystal growth and design
- Drug product formulation and manufacture
- Advanced biopharmaceutical technologies
- Automation in manufacturing (med device, pharma, fine chemicals)

The SSPC is a unique collaboration between 24 industry partners, nine research-performing organisations and 12 international academic collaborators. The SSPC transcends industry and academic boundaries, and is the largest research collaboration in Ireland, and one of the largest globally, within the pharmaceutical area.

The SSPC leads the way for next-generation drug manufacture and spans the entire pharmaceutical production chain from synthesis of the molecule, to the isolation of the material, and the formulation of the medicine. The role of the SSPC is to link experienced scientists and engineers in academia and the pharmaceutical industry to address critical research challenges. The aim of the SSPC is to deliver industry-relevant solutions, which result in job growth and retention within the pharmaceutical industry.

**Research performed by**
- University of Limerick
- University College Cork
- University College Dublin
- Trinity College Dublin
- Dublin City University
- NUI Galway
- Athlone Institute of Technology
- Waterford Institute of Technology
- National Institute for Bioprocessing Research and Training

**Synthesis and Solid State Pharmaceutical Centre**
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National institutes
and facilities

BUSINESS PROCESSES

MANUFACTURING AND MATERIALS

ENERGY

FOOD

HEALTH

ICT

# HRB CRCI
# Health Research Board Clinical Research Coordination Ireland



**Health Research Board Clinical Research Coordination Ireland (HRB CRCI) became operational in May 2015 as a partnership of five university-based Clinical Research Facilities/Centres and their associated hospitals, and is supported by the Health Research Board, Enterprise Ireland and Molecular Medicine Ireland (MMI).**

The mission of HRB CRCI is to advance healthcare by enabling a co-ordinated system with the specialist skills, expertise and infrastructure to design, conduct and analyse clinical trials and other intervention studies in Ireland, undertaken by networked clinician investigators and/or industry. HRB CRCI is a national integrated system supporting clinical research, with the CRF/Cs providing infrastructure and specialist staff and a central office giving overarching support and expertise to facilitate and co-ordinate activities.

The organisation's aims are as follows:

• advance the care of patients by enabling a connected and co-ordinated clinical trial network;

• enhance Ireland's capacity for conducting innovative high quality clinical research for the benefit of people's health and the economy;

• provide the skills, expertise and infrastructure to design, conduct and analyse multi-centre clinical trials involving human participants in Ireland; and,

• support both academic and industry-initiated clinical trials involving pharmaceuticals, nutraceuticals or clinical care pathways, as well as clinical investigation of medical devices and diagnostics.

For more information on HRB CRCI, please contact:

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# ICHEC
# Irish Centre for High-End Computing



**Prof. J-C Desplat**
Centre Director

**Research areas**
- High-performance computing
- Near mission-critical infrastructure
- Energy-efficient computing
- Renewable energy
- High-performance data analysis
- Earth and ocean observation
- Oil and gas

**Irish Centre for High-End Computing (ICHEC)**
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http://www.ICHEC.ie
https://Industry.ichec.ie

**The Irish Centre for High-End Computing (ICHEC) is Ireland's national advanced computing centre. ICHEC exploits high-performance computing techniques and novel technologies to deliver efficiencies and innovations across a wide range of domains in industry and academia – 'Delivering high-performance solutions'.**

High-performance computing (HPC) is a key tool for improving efficiency, cost-effectiveness and reducing time-to-market. Some 97% of companies that have adopted the technology said they could not compete or survive without it (IDC, 2014).

Having engaged with over 80 companies and public sector organisations, ICHEC is continuously innovating in such domains as renewable energy, financial services, satellite, Earth observation, data science, energy-efficient computing and precision agriculture.

ICHEC's competence at delivering near mission-critical HPC and cloud-based services, coupled with its multidisciplinary team of world-class technologists, makes it an ideal candidate to co-create tailored solutions with both MNCs and SMEs. The Centre's industry programme combines domain experts with software engineers and accredited project managers. ICHEC operates Fionn, Ireland's supercomputer, as well as a number of dedicated test and production platforms. Operated as a near mission-critical service, Fionn offers unique capability in Ireland to those industry clients with the most demanding computational requirements.

**Research performed by**
- NUI Galway (ICHEC's host)
- University College Dublin and Dublin Institute for Advanced Studies (iCRAG)
- University of Limerick (Lero 3)
- Dublin City University and the Royal College of Surgeons in Ireland (BDI)
- Tyndall National Institute
- Waterford Institute of Technology

# Marine Institute



**Dr Peter Heffernan**
Chief Executive Officer

The Marine Institute is the State agency responsible for marine research, technology, development and innovation. We support the sustainable development of Ireland's vast marine resource through research, monitoring, strategic funding programmes and national marine research platforms.

We carry out research aligned to statutory monitoring programmes to safeguard Ireland's marine environment, ensure seafood safety, and meet national and international requirements. We also provide scientific and technical advice to Government to help inform policy, resource management and licensing decisions. We promote, co-ordinate and catalyse marine research, guided by national and European research strategies. Our research supports the work of development agencies to maximise the economic potential of existing and emerging marine sectors. We support the development of the emerging ocean energy sector through oceanographic, seabed mapping, data management and other technical services. Our laboratory facilities, and unique catchment and climate change research facilities are complemented by Ireland's national multi-purpose research vessels – *RV Celtic Explorer* and *RV Celtic Voyager*, and an unmanned submarine, *ROV Holland 1*. In partnership with SEAI we operate a quarter scale wave energy test site and the planned full scale Atlantic marine energy test site, and promote the operation of the SmartBay test and demonstration facility for marine technologies.

## Research performed by
- Dublin City University
- Dublin Institute of Technology
- Galway-Mayo Institute of Technology
- NUI Galway
- Maynooth University
- Queen's University Belfast
- Trinity College Dublin
- University College Cork
- University College Dublin
- University of Limerick
- University of Ulster

## Research areas
- Fisheries and aquaculture including ecosystems approach to managing resources
- Marine environment and seafood safety
- Biodiscovery and functional foods
- Physical and chemical oceanography
- Renewable ocean energy
- Marine technology

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# NIBRT
## National Institute for Bioprocessing Research and Training



**Dominic Carolan**
Centre Director

### Research areas
- Biopharmaceutical manufacturing
- Bioanalytics and product characterisation
- Process analytical technologies/quality by design
- Process development and optimisation
- Customised training and education programmes

**National Institute for Bioprocessing Research and Training (NIBRT)**
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The National Institute for Bioprocessing Research and Training's (NIBRT) mission is to support the growth and development of all aspects of the biopharmaceutical industry in Ireland by becoming a global leader in biopharmaceutical manufacturing research, education and training.

NIBRT performs high-impact, world-class, industry-aligned research in all aspects of bioprocessing, biopharmaceutical manufacturing, therapeutic protein characterisation, compliance and regulation. Research is conducted via a wide variety of industry-friendly mechanisms including consultancy, contact and collaborative research programmes. The Institute's research partners include MSD, Lilly, Sanofi-Genzyme, BioMarin, Pfizer, Waters and Agilent. NIBRT also designs, develops and delivers best-in-class education and training solutions for biopharmaceutical manufacturing across all levels to national and international students and workforces. Training clients include Amgen, MSD, Lilly, Sanofi-Genzyme, Regeneron, BioMarin, Jazz and Alexion. NIBRT provides state-of-the-art

biopharmaceutical manufacturing facilities (6,500m$^2$) for research, process development and training activities. The Institute has won numerous national and international awards including: the ISPE/Interphex Facility of the Year Award; Bioprocess International Manufacturing Collaboration of the Decade, Waters Centre of Innovation; and, the Taoiseach's Public Service Excellence Awards.

### Research performed by
- University College Dublin
- Trinity College Dublin
- Dublin City University
- Institute of Technology Sligo
- NUI Galway
- NIBRT

BUSINESS PROCESSES

MANUFACTURING AND MATERIALS

ENERGY

FOOD

HEALTH

ICT

# Teagasc
# Food Research Centres (Moorepark and Ashtown)



**Mark Fenelon**
Head of Food Programme

Teagasc supports science-based innovation in the agri-food sector and wider bio-economy that underpins profitability, competitiveness and sustainability. It contributes to the national programme of innovation activities, including the creation of commercially-applicable knowledge.

Teagasc is committed to transferring its discoveries from the lab to industry, in a flexible manner, for the benefit of the Irish economy. Developing partnerships and collaborations with industry is central to our strategy. You can engage with us in a number of different ways, including by way of service provision and contract research, to collaborations and commercialisation of intellectual property. We offer specific capabilities, services, know-how and specialised infrastructure that are critical in professional and quality engagement with industry, and we have available technologies developed in house for which we are actively seeking industrial partners for commercialisation. A critical element of our service offering is Moorepark Technology Ltd (MTL), a modern plant containing pilot-scale processing equipment for the dairy industry. The meat industry is served by a meat technology centre, and the new EI Meat Technology Centre initiative, in association with the meat industry, which will be led from Ashtown, will be launched in 2016. The prepared consumer food sector avails of our food processing facility, and specialised laboratories are available in support of the overall food industry.

### Research performed by

Teagasc research centres in partnership with Irish universities and institutes of technology, as well as universities and research institutes in Europe, the USA, Canada, South America, Asia, Australia and New Zealand.

### Research areas

- Food: food biosciences; food chemistry and technology; food safety; food industry development
- Animal and grassland research and innovation
- Crops, environment and land use
- Rural economy and development
- Technical and specialist services

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ICT        HEALTH        FOOD        ENERGY        MANUFACTURING        BUSINESS
                                                   AND MATERIALS        PROCESSES



# Tyndall National Institute



**Dr Kieran F. Drain**
CEO

**Research areas**

- Information and communications technology
- Health and medical technologies
- Sustainable food
- Energy
- Manufacturing and materials

**Tyndall National Institute**
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Tyndall National Institute is one of Europe's leading research centres, specialising in information and communications technology (ICT) hardware and systems. Tyndall is focused on developing technology solutions for health, communications, electronics, energy, agriculture, food, marine and the environment sectors.

Tyndall has 460 researchers, engineers, staff and postgraduate students (120), interacting with over 200 industry partners and generating over 230 peer-reviewed publications annually. Tyndall works through world-class teams performing ground-breaking R&D and innovation on new materials, devices and systems with a philosophy of "from atoms to systems", focusing on impact to the Irish economy. Tyndall is globally recognised in its core research areas of photonics and micronano systems. Hosting state-of-the-art semiconductor fabrication facilities and services, Tyndall delivers prototypes and new product opportunities to industry. Tyndall actively develops strong partnerships with other universities and research bodies to provide multidisciplinary solutions, creating breakthrough product technology for industry. Critical to Tyndall's success is its focus on market-needs-driven research. This distinguishes the Institute from university-based research. Tyndall shares many characteristics and performance targets typical of Europe's leading research technology organisations (RTOs). As the national institute for photonics and micro/nanoelectronics and a research flagship of UCC, Tyndall is host to four industry-focused research centres – IPIC, MCCI, CCAN and IERC.
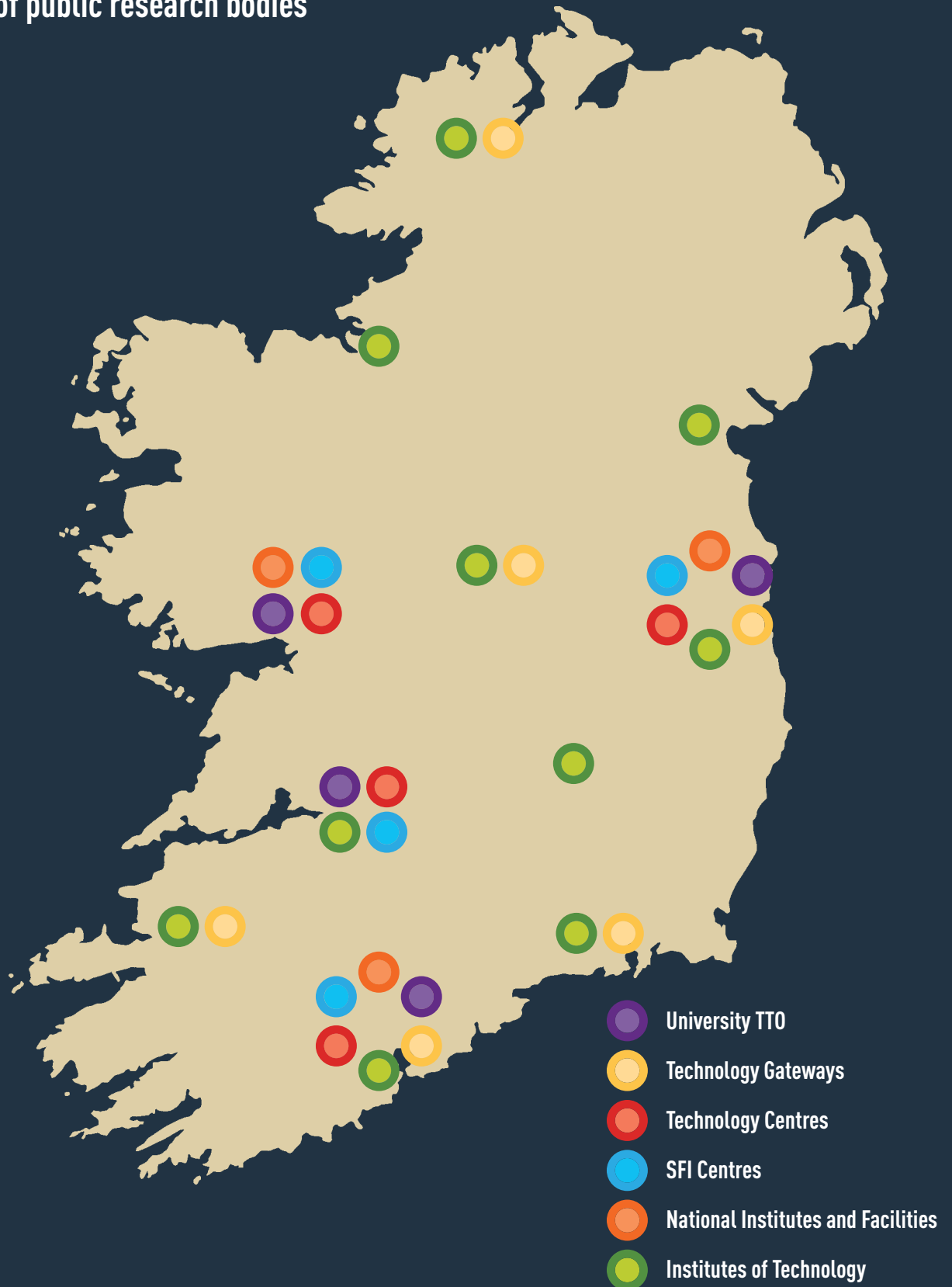
**Research performed by**

- Over 200 research performing organisations

# Location of public research bodies



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