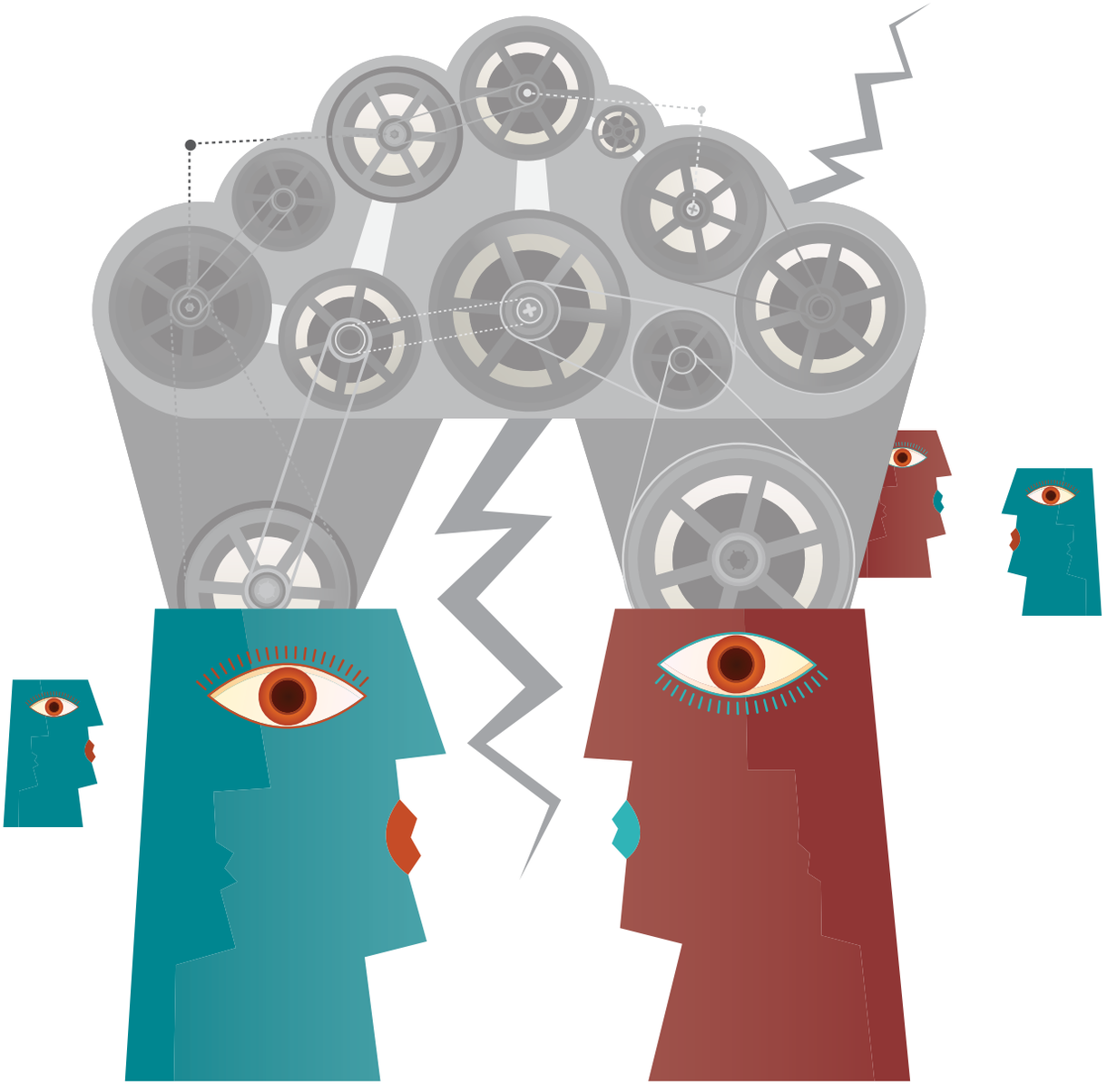
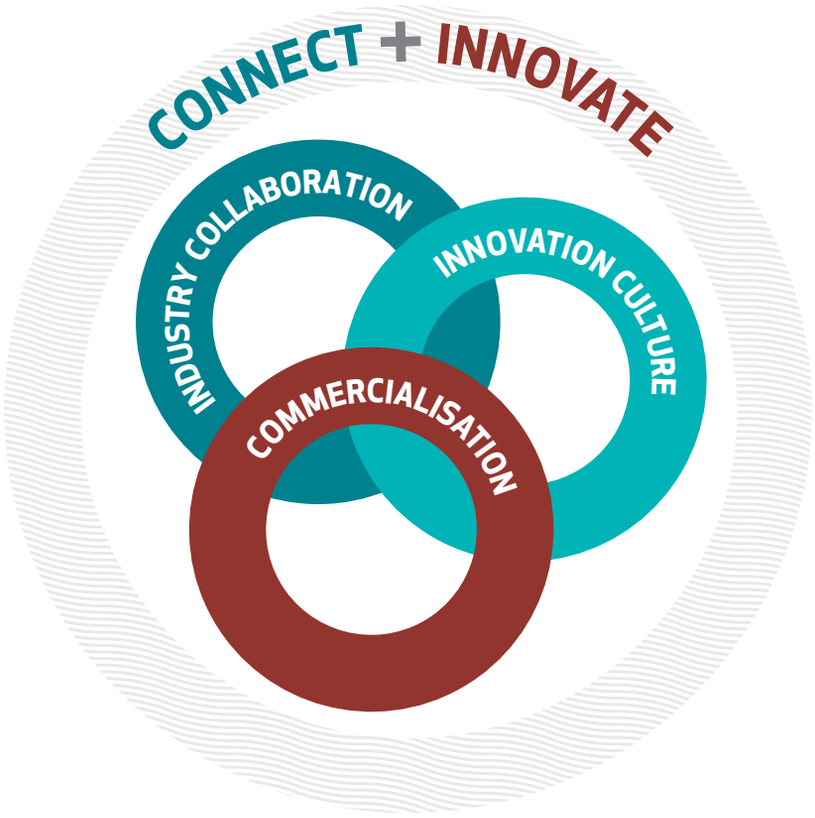
Maynooth University
National University of Ireland Maynooth



# CONNECT + INNOVATE

2017/2018


CONNECT + INNOVATE
INDUSTRY COLLABORATION
INNOVATION CULTURE
COMMERCIALISATION

# FOREWORD

IT IS MY PLEASANT TASK TO INTRODUCE THE 2017 ANNUAL REPORT OF THE MAYNOOTH UNIVERSITY COMMERCIALISATION OFFICE. THE REPORT PROVIDES AN OVERVIEW OF OUR 2017 KNOWLEDGE TRANSFER ACTIVITIES AND INTRODUCES PLANS FOR 2018 AND BEYOND.

The report highlights some of the many successes and achievements in our partnerships with industry, the exploitation of intellectual property developed at Maynooth University (MU) and our support for a burgeoning start-up community; both in the form of MU spin-out and external spin-in companies attracted by the University's excellent overall infrastructure and environment.

MaynoothWorks, our innovation centre, has reached full capacity, highlighting the demand for business innovation space in the region. MaynoothWorks has welcomed and mentored 36 start-up companies since opening its doors in 2015, with 14 new start-up companies entering the incubator during 2017. This is reflective of the demand in the region for the type of supports offered. Importantly, the profile also suggests that the University is acting as an attractor for high value businesses into the peri-Dublin region. Our development of a MaynoothWorks-supported incubator in Naas, in partnership with Kildare County, will further this regional business support, particularly in knowledge related industries where the expertise and skills sets within MU play a critical role.

Of similar regional significance, the knowledge transfer alliance led by MU, which includes partners Waterford, Athlone and Carlow Institutes of Technology, continues to achieve great success as demonstrated by both metrics achieved and engagement with industry.

The Commercialisation Office has been pivotal in developing an embedded culture of research commercialisation and innovation at MU, and has played a central role building effective external relationships that last. It represents a vital part of the overall MU strategy, and will be an important part of the University's future success.

It is sustained performance, and work with our superb research community, carried out over the last decade and more, that leads to the impressive picture presented in this report

Professor Ray O'Neill
Vice President for Research and Innovation

# INTRODUCTION

The Commercialisation Office continues to grow and focus on key activities that drive regional and national development goals, namely:

- Developing a culture of research commercialisation and enterprise at MU;
- Connecting MU researchers with industry and the market place;
- Providing incubation support for our extended start-up community;
- Linking the broad expertise at MU with private and public knowledge seekers;
- Identifying and commercialising the IP developed by MU researchers.

Over the years, our team size has remained constant and now comprises of Dr John Scanlan, Office Director; Lorraine Kane, Operations Manager; a team of three commercialisation executives supporting MU and our TTSI partners - Peter Conlon, Dr Karen Griffin and Dr Paul Tyndall; Joe Moore, MaynoothWorks Manager and Sharon Comerford, MaynoothWorks Admin Support.

The MU 2017 performance metrics are outlined in detail in this report. Against national and international standards and normalised to research expenditure, MU continues to rank in the top percentiles. This performance is down to the outstanding research and the desire of our researchers to see their work make both a scientific and an economic impact.

Between 2017 and 2021 the MU Commercialisation Office leads a five-year programme of the Enterprise Ireland funded Technology Transfer Strengthening initiative (TTSI) in partnership with Waterford Institute of Technology (WIT), Athlone Institute of Technology (AIT), and Institute of Technology Carlow (ITC).

We will continue to work with the excellent academic community at MU and partner institutes on this programme, increasing outputs, serving our internal and external stakeholders and delivering key KT metrics such as engaging with enterprise, technology licensing and spin out company creation.

John Scanlan
Commercialisation Director

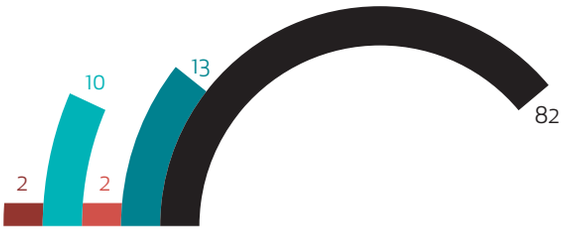
# MAYNOOTH UNIVERSITY PERFORMANCE METRICS

Under the TTSI funding programme all 3rd level institutes work toward achieving a set of target metrics. These metrics are a measure of knowledge transfer (KT) activity, helping to map progress nationally, and include invention disclosures recorded, new patents filed, licence deals completed, collaborations with industry and spinout companies created.

The impact of these metrics and wider knowledge transfer activities are key drivers in generating economic and social returns on State investment in knowledge transfer in the form of economic growth and jobs.

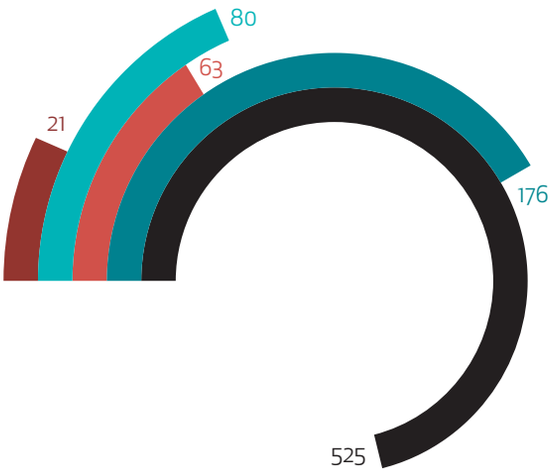
## 2017 PERFORMANCE METRICS

**2 NEW SPIN-OUT COMPANY**
**10 NEW LICENSE AGREEMENTS**
**2 NEW PATENTS FILED**
**13 NEW INVENTION DISCLOSURES**
**82 NEW INDUSTRY LINKS**




## 2005–2017 PERFORMANCE METRICS

**21 SPIN-OUT COMPANIES**
**80 LICENSE AGREEMENTS**
**63 PATENTS FILED**
**176 INVENTION DISCLOSURES**
**525 INDUSTRY LINKS**



# COMMERCIALISATION OF MAYNOOTH UNIVERSITY RESEARCH

## 2017 SPIN-OUT COMPANY ACTIVITY

Maynooth University spun-out 2 new companies in 2017, Empathy Test Limited and YAMSU Technologies Limited.

**YAMSU Technologies**

Founded in 2017, YAMSU is a Maynooth University geospatial technology spin out company comprising; commercial pilots, drone operators, surveyors, geospatial scientists, software engineers and planning consultants. YAMSU aims to make the acquisition of aerial survey data as simple as selecting a bounding area on a map and clicking 'book'. The users booking will then be scheduled on the next overflight of the selected area after which the survey data will be made available to the user. The YAMSU booking and data management platform is built on broad generic technologies developed by Dr Tim McCarthy and his research team over the last number of years. These technologies were non-exclusively licenced to YAMSU.

**Empathy Test Limited**

Empathy Test is a Maynooth University spin out, established in 2017. The company was formed by Dr. Richard Roche (psychology department), Dr Kenneth McKenzie & Conor McCarthy. Empathy Test uses psychological, science-driven, validation for products, services and experiences, with the view to increasing product adoption and reach at launch. The company plans to work with multiple clients on an ongoing basis, carrying out validation and facilitating the refinement of their product. Online learning tools will also be developed, with a view to developing training workshops.

# 2017 LICENSING ACTIVITY

We completed 10 licence deals with companies during 2017. Some examples of the deals we completed include:

**Reivr Fusion Ltd** was established by serial entrepreneur Joe Moore to exploit opportunities in the tracking of assets and people in dangerous environments. To build their product portfolio Reivr Fusion has been working with Dr John McDonald of the Computer Science department. This collaboration identified Kintinuous, a 3D space mapping system, as something that accelerated product development in Reivr Fusion. The Kintinuous technology bundle, comprising a granted US patent and the software necessary for implementation, was exclusively licenced to Reivr Fusion and the R&D collaboration continues.

**Monaghan Biosciences** is part of the Monaghan Mushrooms Group. The company has a skilled team of highly qualified research and development scientists with commercial and industrial experience, working in state-of the-art laboratory facilities, located in Tyholland, County Monaghan in Ireland. Among a wide range of competencies, the company has broad experience in the cellulosic ethanol industry as well as developing industrial enzymes for nutrition, cosmetic and other markets.

The collaboration between Monaghan Biosciences and Dr O'Keeffe (Biology) delivered an enabling piece of technology to the industry partner, reducing the cost and time required to exploit its proprietary technology. The data and technology developed during the project were licensed to the company on a non-exclusive basis. This initial engagement has acted as a confidence builder between the company and the University. Since successful completion of the project, options for creating a strategic partnership to include additional collaborations with key researchers in Maynooth University are under discussion.

**Trinsights** is a spinout company from Maynooth University created as the commercialisation vehicle for an Enterprise Ireland commercialisation project that developed a toolset for HR teams to evaluate the post completion benefit (to both a company and its employees) of undergoing training. This exclusive licence of the software that implements research findings and codifies the know-how of the PI, Dr Paul Donovan, will enable Trinsights to explore exciting sales opportunities with a number of large organisations both inside and outside Ireland.

**PMS Pavement Management Services Ltd.** is a civil engineering consultancy firm specialising in testing, evaluation and management of roads, airports and ports. Dr Tim McCarthy engaged in a training project funded through the SFI Industry Fellowship award. During this programme, Tim helped PMS come up to speed on current and state of the art research thinking on GIS, mapping systems and sensor data acquisition and data fusion. A non-exclusive licence was put in place at the end of the project to ensure that the company has the right to freely use the training material and learnings gained during the programme.

Maynooth University has an ongoing productive licencing relationship with **Code-On Technologies**. Spun-out of MIT, Code-On was created to educate and train licensees on RLNC features and capabilities to foster innovation and the continued growth of network coding-enabled applications and services. Arising from the research work of Prof Doug Leith (formerly MU and now with TCD) Code-On have licenced a patent application related to managing the flow of data in a network by minimising the delays associated with transmitting that data between two nodes via multiple paths.

**Empathy Test** is a Maynooth University spin out, the company has a licence to know-how created by Dr Richard Roche in the area of behavioural and physiological testing in responses to products and brands. The company was formed by taking this IP and complementing it with the entrepreneurial and computer science background of one of the founders, Conor McCarthy, and the client-based experience of Dr Kenneth McKenzie.

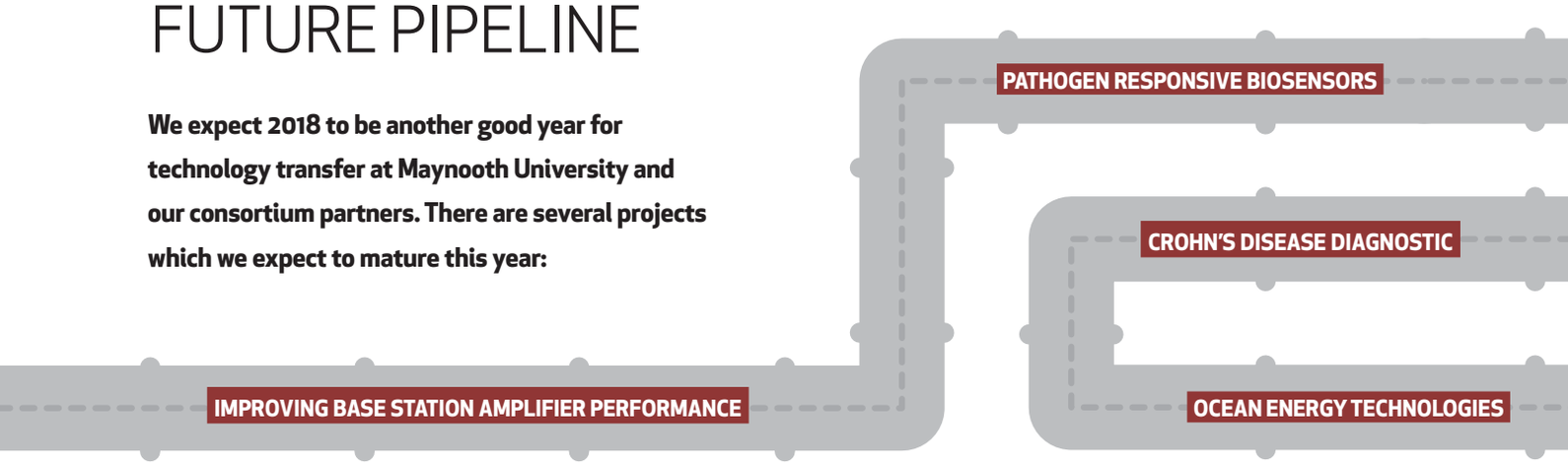
**Other Licences**

Several other licence deals were completed during the year with companies in Ireland and overseas. These include the development of novel sensors, diagnostics and biotechnology innovations. The technologies remain at an early stage of development.


University

# FUTURE PIPELINE

**We expect 2018 to be another good year for technology transfer at Maynooth University and our consortium partners. There are several projects which we expect to mature this year:**




## SMALL MOLECULE THERAPIES FOR INFLAMMATORY BOWEL DISEASE

The incidence of inflammatory bowel disease (IBD) is rising globally with an especially large increase in children. We have developed small molecules with strong anti-inflammatory effects in cell based models, with potential for treating IBD. We propose to further define their therapeutic potential by evaluating their efficacies in preclinical models of inflammatory diseases and in ex vivo clinical samples.

## IMPROVING BASE STATION AMPLIFIER PERFORMANCE

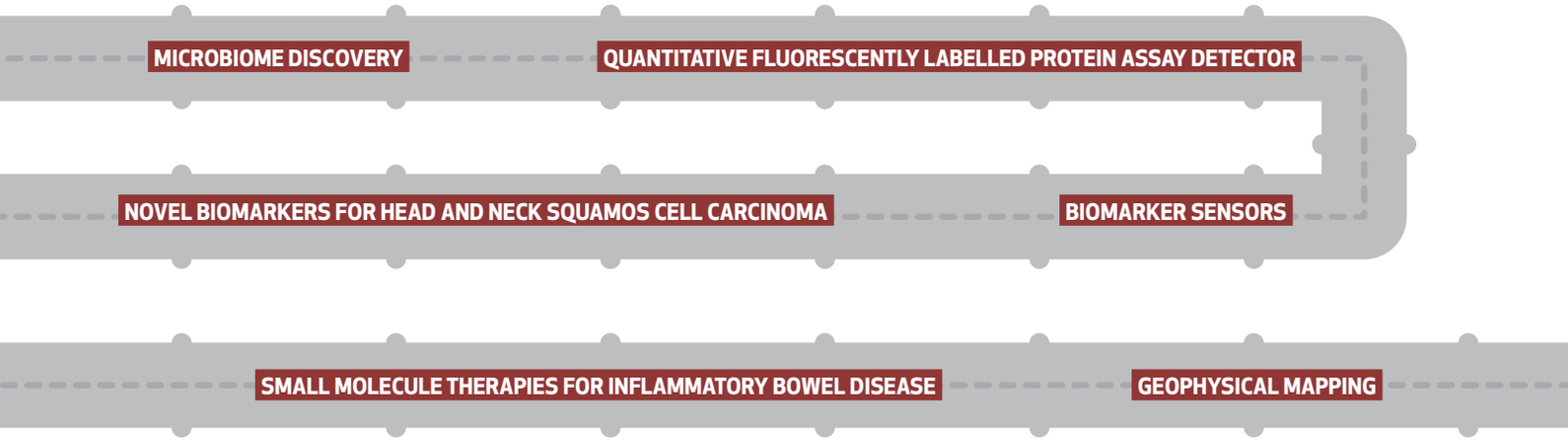
A signal processing stage for a base station amplifier was developed that operates on the principle that it is better to avoid non-linearity rather than the more complex process of correcting it. Their invention addresses two key issues with current out phasing amplifier designs: 1) rapid rate of change of input signal phase and 2) input signal dynamic range. Rapid changes in phase can cause bandwidth expansion (BER). In the invention, signal phase in the amplifiers non-linear region at lower amplitudes is modified, to create a more gradual rate of change of phase. Makes available modelling and control technology to these partners.

## CROHN'S DISEASE DIAGNOSTIC

Inflammatory bowel disease (IBD) splits into 2 major types of disease; Crohn's disease (CD) and Ulcerative Colitis (UC). The definitive distinction between CD and UC is challenging and generally relies on a combination of inputs including clinical presentation, results of radiography, endoscopy and histological findings. We have assessed the levels of expression of Pellino3 protein in colonic biopsy samples from healthy, CD and UC patients. The data demonstrates that the levels of Pellino3 protein are strongly reduced in colonic tissue from CD subjects relative to control or UC subjects. These data suggest that the protein expression levels of Pellino3 may be a strong diagnostic indicator of subjects with Crohn's disease and we propose a Pellino3-based test as the basis for a diagnostic.

## OCEAN ENERGY TECHNOLOGIES

The Centre for Ocean Energy Research (COER) at Maynooth University has core strengths in mathematical modelling, control systems, prognostics and optimization – all focused on ocean energy research. The Centre collaborates with several major players in ocean energy and makes available modelling and control technology to these partners under licence.




## GEOPHYSICAL MAPPING

AIRO is a leading spatial analysis and planning unit within MU. They specialise in socio-demographic analysis, spatial analysis (GIS), spatial planning and data analytics. AIRO provides a suite of public mapping and data visualisation toolkits aimed at improving evidence informed planning and also undertakes contracted applied research and consultancy projects in the area of socio-demographic and economic analysis, spatial planning and environmental analysis.

## PATHOGEN RESPONSIVE BIOSENSORS

The Responsive Systems research group at Maynooth University led by Dr. Rob Elmes are currently developing a highly sensitive and selective approach to the quantitative visual detection of E coli using a responsive fluorescent biosensor platform. The team is currently evaluating a range of lead compounds that will potentially allow real-time, in situ determination of E Coli contamination without the need for expensive equipment or highly trained personnel.

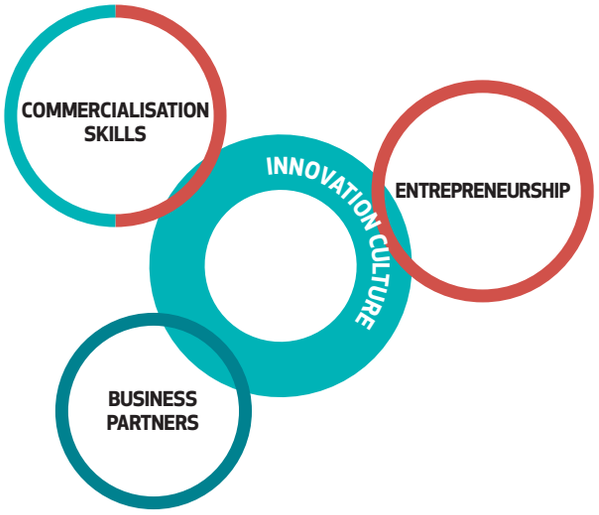
## BIOMARKER SENSORS

We have developed novel biosensors to selectively monitor neurochemicals in the living brain on a timescale from milliseconds to days. The sensors are used to understand the complex functioning of the brain in terms of behaviour and disease. One of the major hurdles to the discovery of new medicines to treat psychiatric and neurological disorders is the paucity of suitable animal models capable of predicting clinical benefit. This is particularly true of disorders associated with cognitive disturbance such as schizophrenia and Alzheimer's disease. The sensor monitoring concept provides a solution to this deficit in pre-clinical drug discovery in that it enables the recording of continuous signals, in freely-moving behaving animals, of the haemodynamic and metabolic consequences of neuronal activation that form the basis of functional brain magnetic resonance imaging in man. The work also has significant potential clinical applications.

# CONNECTING INDUSTRY AND MAYNOOTH UNIVERSITY 2

## INDUSTRY LINKS

2017 saw Maynooth form 82 new partnership contracts with industry contacts. These links are based on research collaborations and range from working relationships with SME's under the Enterprise Ireland Innovation Voucher Programme to collaborations with multinational companies on specific issues for which Maynooth University has research excellence. Maynooth University and its Institutes now has over 175 ongoing industry collaborations across all disciplines which are an indication of the outward facing culture at Maynooth University.




## MARKET PARTNERS

Successful technology transfer or commercialisation is based on the execution of three key tasks; selection of projects with good commercial potential, execution on those projects and securing sufficient capital funding to bring the technology to market. Getting the first two right tend to make the last one easier, and we therefore focus most of our efforts on the first two. Given that we have a relatively small commercialisation team, having expertise in multiple fields and staying market informed is practically impossible, so we must rely on external partners to help in the selection and execution of worthwhile projects.

Our extended team of market partners continues to be a vital part of our commercialisation process. The team now includes more than 100 professionals in various roles such as product development, marketing, legal, IP, business owners, clinicians, investors from organisations of all sizes from small companies to multinationals. This group remain our sounding block to help ensure the commercialisation projects we focus on are "market-informed" and we continue to deliver solutions to "problems that are worth solving".

.

# SEEDING INNOVATION ❸ AT MAYNOOTH UNIVERSITY

## CONNECT EVENT (OCT 2017)

CONNECT is generally hosted annually by the Commercialisation Office and is focused on two objectives: (i) to showcase research expertise and encourage industry to tap into the knowledge base of the University and its partner institutes and thereby develop research collaborations; and (ii) to provide a networking opportunity for delegates to meet and explore how they can work together.

In Carton House in October 2017, we hosted CONNECT coinciding with MU Research Week. This year's programme was about international opportunities for collaboration, specifically in Europe and in regions that are less familiar to us. Business Park and knowledge transfer leaders from Croatia, Estonia, France, Portugal and Romania presented on doing business in their countries, their particular research and technology expertise and opportunities for partnership and investment. Imelda Lambkin, H2020 director at Enterprise Ireland presented on the many opportunities for EU funding open to business, emphasising the funding goal to promote innovation. Pearse Coyle of Corporate Spinouts presented on the possibilities and potential of taking world leading inventions with great commercial value from well-funded blue-sky university research.

A broad panel discussion and open debate followed, developing themes that included investment opportunities, regional supports, university collaboration and international growth. The panel comprised Chris Horn, Atlantic Bridge Partners; Ross O'Neill, founder and CEO of Neuromod Devices; Jacqui McNabb, Head of Enterprise, Kildare County Council LEO; and Professor Ray O'Neill, MU Vice President for Research and Innovation. CONNECT welcomed 150 delegates from local and national businesses, investors and economic development. Several embassy officials also participated from the international guests' countries.


Our visiting institutes

Our panellists (LtoR): Jacqui, Ross, Chris and Ray

Finally, a workshop allowed attendees to have one-to-one meetings with each of our European partners to further develop real opportunities for collaboration.

MU Graduate Studies Office ran a Thesis in 3 minutes presentation series during lunch, which involved enthusiastic audience participation and demonstrated the breadth and depth of postgraduate research at MU.

CONNECT 2017

## INNOVATION AND RESEARCH COMMERCIALISATION MODULE

The Commercialisation Office host an annual Generic Skills teaching programme. Our TT colleague from Waterford IT assisted the MU Commercialsation team in delivering the "Innovation and Research Commercialisation" module. The aim of the programme is to equip researchers with the skills required to commercialise the outcome of their research, to provide them with the ability to interact with industry and to improve their skills to innovate and act with an entrepreneurial mindset.

The course covers the basics of intellectual property, technical marketing, product development, spin-out company formation and research commercialisation contracts. Also included are workshops and exercises, including preparation of a marketing pitch, culminating in a group business plan presentation. These are very useful in informing the student how to present their ideas as a business opportunity rather than as just interesting science, a practical approach which then complements their academic training.

The current climate requires that graduates have the know-how, competencies and confidence to set-up and deliver new commercial opportunities. Our detailed case-studies and practical workshops facilitate this in a relaxed hands-on environment. In recent years MU has opened up the programme to early career researchers from our Technology Transfer alliance partners, Athlone IT, Waterford IT and IT Carlow.

In 2017 students from Athlone Institute of Technology participated in this programme. Participant feedback has confirmed that the programme creates an awareness of commercial opportunities from the early stages of research and identifies/ promotes aspirations of creating start-up ventures in the future.

## COMMERCIALISATION AWARD

Each year the Commercialisation Office recognises excellence in the commercialisation of research at Maynooth University. We consider activity such as invention disclosures recorded, licence deals completed, new patents filed, spinout company creation and developing new links with industry as key factors in bringing research to the market place. The 2017 Annual Commercialisation Awards were presented in two categories (1) Commercialisation of Intellectual Property and (2) Industry Engagement.


Dr Richard Roche of Psychology receives the IP Commercialisation Award from Prof Ray O'Neill, VPR&I with Dr Karen Griffin, Commercialisation Office

**Dr Richard Roche** of Psychology was awarded the Commercialisation of IP Award. Richard formed Empathy Test Limited with promoters Dr Kenneth McKenzie & Conor McCarthy. Empathy Test uses psychological, science-driven, validation for products, services and experiences, with the view to increasing product adoption and reach at launch. The company plans to work with multiple clients on an ongoing basis, carrying out validation and facilitating the refinement of their product. Online learning tools will also be developed, with a view to developing training workshops.


Dr Karen English of Biology with Dr Paul Tyndall, Commercialisation Office receives the Industry Engagement Award from Prof Ray O'Neill, VPR&I

**Dr Karen English** of the Biology Department was awarded the Industry Engagement Award. Karen had a very busy year in terms of engagement with national and international companies including Sigmoid Pharma and ReGenesys. Karen's major focus of research is the translation of cellular therapies for the treatment of inflammatory disorders.

## COMMERCIALISATION OFFICE STAFFING CHANGES

The Commercialisation team has remained constant over the last number of years, with one exception. Owen Laverty has left Maynooth University (after 10 years) to take up a role with the Dún Laoghaire-Rathdown Local Enterprise Office. A new manager has joined our team and is introduced overleaf.

## MAYNOOTHWORKS BUSINESS INNOVATION CENTRE

Joe Moore joined MaynoothWorks as Centre Manager and has responsibility for the development of innovation programmes to support client company development and engagement with industry partners. MaynoothWorks supports the University Commercialisation Office in commercialising research outputs; actively supporting startup companies, as well as attracting spin-in companies that can leverage university intellectual property and know-how. MaynoothWorks also connects with other enterprise and academic centres to promote innovation, entrepreneurship and employment.

Joe has over 30 years' experience in the Mobile Communications Industry and has held senior management and director-level positions in multinational, SME and startup companies. In these positions he had extensive exposure to licensing, developing and selling intellectual property as well as taking companies through different stages of development.

Joe has an Executive MBA from University College Dublin and an HNC in electrical/ electronic engineering from Anglia Ruskin University.


MaynoothWorks Business Innovation Centre

*Our client company,* **Access Earth,** *shares their experience of MaynoothWorks:*

**"Access Earth** is a platform that allows users to rate places like hotels, restaurants and coffee shops by their accessibility for those with mobility needs. We have a strong US presence with three cities mapped currently and partner organisations in place to expand that further."

"Being a Maynooth University graduate and starting Access Earth while a student I felt that it was best to maintain that connection as Access Earth grows. Whether that's getting user experiences from the Access Office to partnering with the ALL Institute: Assisted Living and Learning, or placing Computer Science students on internships. But more than that the advice and support from MaynoothWorks and the Commercialisation Office has set Access Earth on the path from student project to a growing and sustainable business that can help millions of people around the world in the years to come."

Matthew McCann (Access Earth)

## MAYNOOTHWORKS DEVELOPMENT AND PARTNERSHIP PROGRAMMES

Our business incubation and start-up hub MaynoothWorks is now established as a key part of MU, and an anchor for regional development. Not only does MaynoothWorks bring business to MU, but it also drives research links and feeds student engagement with the client companies.

MaynoothWorks is now fully occupied, and we expect it to continue to be a focus for regional incubation of High Potential Start-ups (HPSU) with a strong link to MU research, our facilities, our campus and our students. As companies reach their maturity in the centre and move on we will try to ensure that our pipeline of clients continues to grow and benefit the local and national economy. Part of our plan to support this will be via a MaynoothWorks expansion plan, allowing us to develop local partnerships, expand our reach, and provide solutions to our MaynoothWorks on-campus clients as they expand. Specifically it involves the development of "MaynoothWorks" as a brand and not only as the current location on campus. That brand is a core part of the current offering and represents the partnership with MU, why it works as a location and the benefits to being a client of MaynoothWorks.

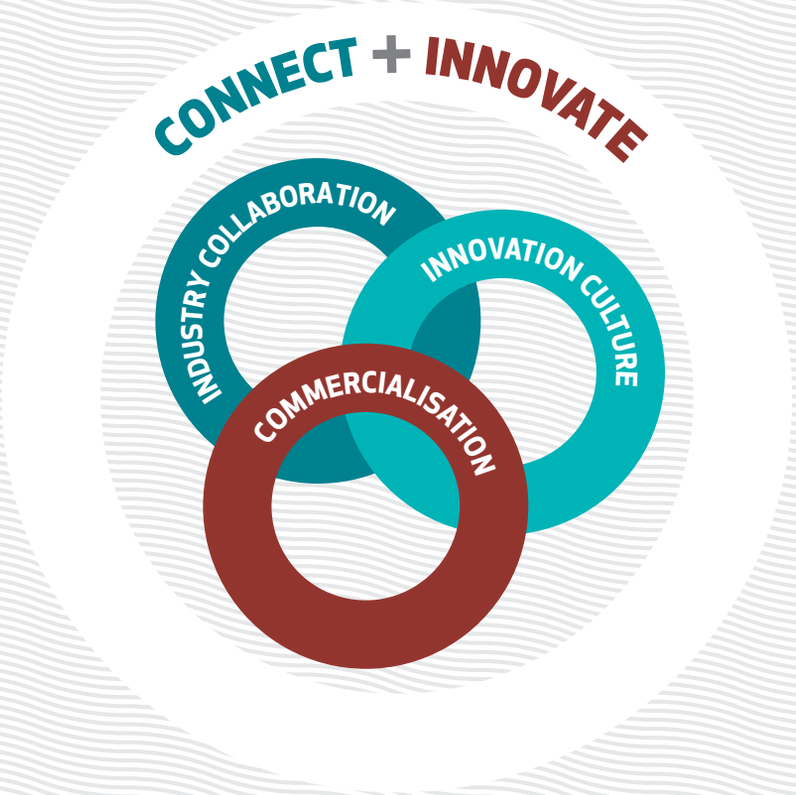
MaynoothWorks as a brand means proximity to MU in all senses: being a technology led company; having HPSU potential; having access to our facilities, programmes and research collaboration; having access to the various investment funds; having access to all the benefits of the on-campus MaynoothWorks clients and enjoying the benefits of the full MaynoothWorks incubation programme. MaynoothWorks is thus much more than a physical location.

Our first success in the development of this concept was announced recently. The proposed Mid East Region Innovation Think Space (MERITS), developed between Kildare County Council and MU, recently won funding of €2m from Enterprise Ireland. MERITS will provide incubation space for new start-up companies and will serve the emerging technology sector by connecting organisations and people, building market relevant solutions in addition to acting as a centre of excellence in supporting innovation within the small businesses across the region, and will employ the MaynoothWorks programme in partnership with MU. Outlining the plans the Chief Executive of Kildare County Council Mr. Peter Carey explained the background to the project: "Our direction has been influenced by the increased demand on the Mid East Local Enterprise Offices from the emerging technology sector for support in their development, the increase in demand from small businesses for support in innovation, the success of MaynoothWorks and a number of actions laid out in the Mid East Action Plan for Jobs in the Kildare County Plan 2017 - 2023. In collaboration with Maynooth University and a number of other agencies we want to continue to develop Kildare as a digital/innovative economy hub and a leadership "hot spot" by building on an existing critical mass in the IT and digital/tech sector, and attracting further investment into the County. This announcement provides immense opportunity to deliver on this."

In addition to this exciting regional partnership, MU has also recently signed an agreement with University of South Florida (USF) business park to develop a partnership that will allow MaynoothWorks clients the possibility to explore either (a) short stays at USF business park to develop a US market strategy and explore US location, or (b) full location at the business park, as an entry to the US market. In parallel, MaynoothWorks here will welcome similar USF clients to explore their entry to Ireland and Europe.

Maynooth University Commercialisation Office
Maynooth University
John Hume Building
Maynooth, County Kildare W23 F2H6
T (01) 7086589
E commercialisation@mu.ie
W maynoothuniversity.ie/commercialisation

ENTERPRISE IRELAND
where innovation means business
KTI Knowledge Transfer Ireland
EUROPEAN UNION
STRUCTURAL FUNDS




Maynooth University Commericalisation Office
T +353 1 708 6589
E commercialisation@mu.ie
www.maynoothuniversity.ie/commercialisation