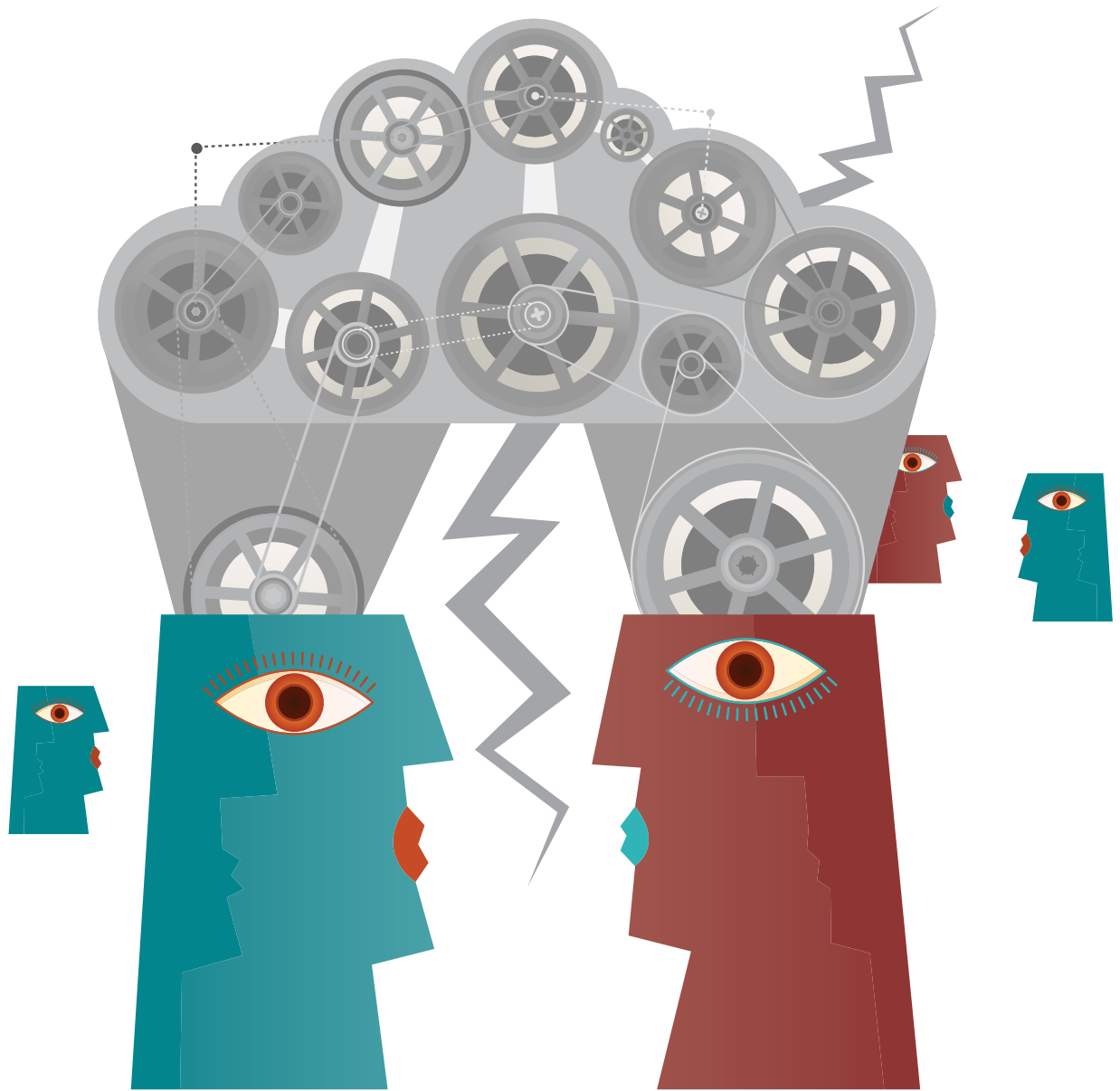


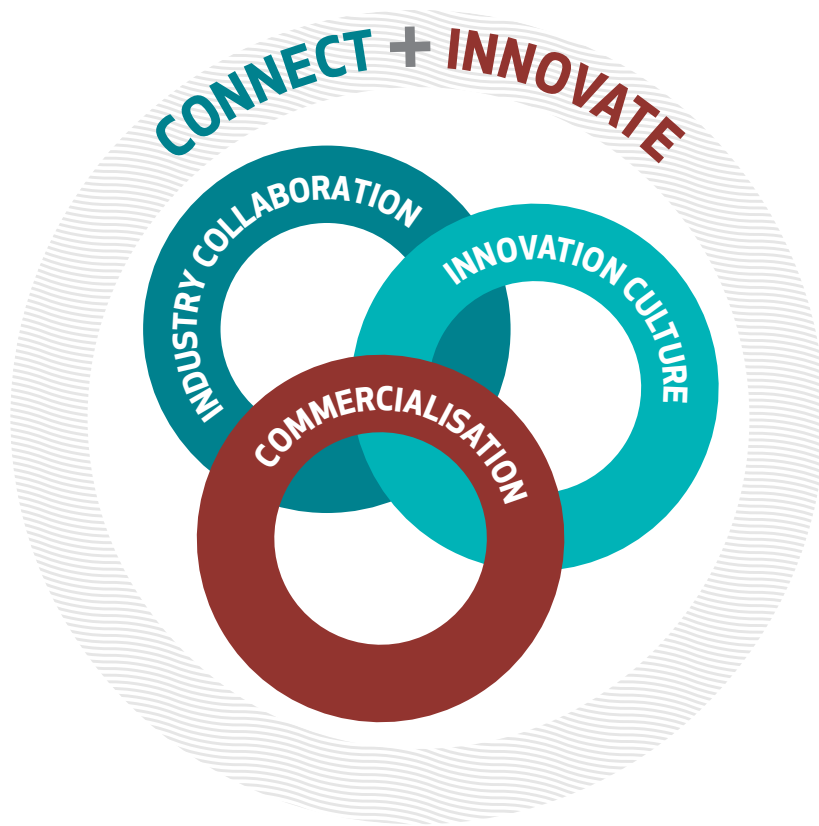


**Maynooth  
University**  
National University  
of Ireland Maynooth



**CONNECT  
+ INNOVATE**

2016/2017



# FOREWORD

IT IS MY PLEASANT TASK TO INTRODUCE THE 2016 ANNUAL REPORT OF THE MAYNOOTH UNIVERSITY (MU) COMMERCIALISATION OFFICE. THE REPORT PROVIDES AN OVERVIEW OF OUR 2016 KNOWLEDGE TRANSFER ACTIVITIES AND INTRODUCES PLANS FOR 2017 AND BEYOND.

---

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

In late 2015, a major milestone was achieved when the University launched a state-of-the-art business incubator. Demand for new business space in MaynoothWorks has exceeded our projections and has grown to a 90% occupancy within one year, now housing 22 businesses. 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.

Of similar regional significance, the knowledge transfer alliance led by MU, which includes Waterford, Athlone and Carlow Institutes of Technology, has been a great success and we look forward to another five-year expansion and development of the programme.

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

It is this 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 has grown considerably, 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; Owen Laverty, MaynoothWorks Manager; Sharon Comerford, MaynoothWorks Admin Support; and Dr Kay McClean, MU Managed Consultancy Programme Manager.

The Maynooth University 2016 performance metrics are outlined in detail in this report. As reported by Knowledge Transfer Ireland (KTI) in the national Annual Knowledge Transfer Survey, MU have consistently topped interactions with industry relative to research spend and have been in the top 3 for 10 years. Against national and international standards and normalised to research expenditure, Maynooth University 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.

2016 was also a great year for our new business incubator MaynoothWorks, which 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.

Between 2013 and 2016 the MU Commercialisation Office was the lead institute of an Enterprise Ireland four-year funded programme, the Technology Transfer Strengthening Initiative (TTSI) in partnership with Waterford Institute of Technology (WIT), Athlone Institute of Technology (AIT), and Institute of Technology Carlow (ITC).

Our office has secured additional investment by Enterprise Ireland (EI) for a new five-year programme, again led by MU with the same partnership alliance and funded by EI. We have also secured funding for a new programme of Managed Consultancy that will allow us to create a new community of broad expertise at MU and with partners AIT and ITC, helping advise both private and public organisations. We look forward to continuing our work with the excellent academic community at MU in both of these programmes.



John Scanlan  
Commercialisation Director

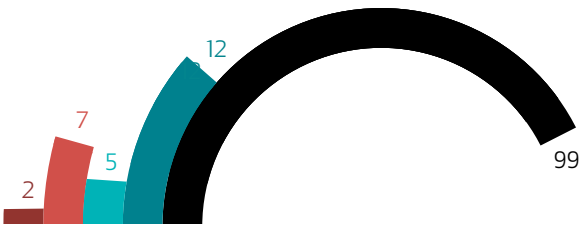
# MAYNOOTH UNIVERSITY PERFORMANCE METRICS

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.

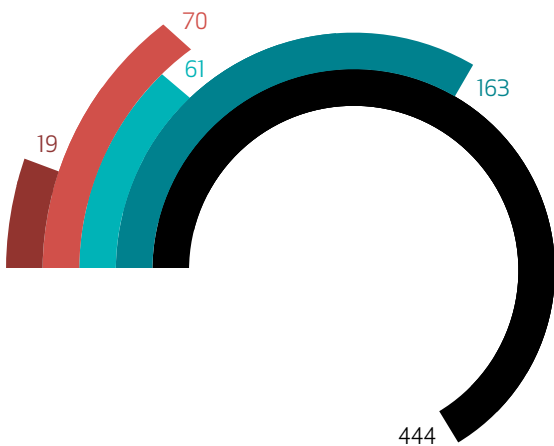
## 2016 PERFORMANCE METRICS

**2 NEW SPIN-OUT COMPANY**  
**7 NEW LICENSE AGREEMENTS**  
**5 NEW PATENTS FILED**  
**12 NEW INVENTION DISCLOSURES**  
**99 NEW INDUSTRY LINKS**



## 2005–2016 PERFORMANCE METRICS

**19 SPIN-OUT COMPANIES**  
**70 LICENSE AGREEMENTS**  
**61 PATENTS FILED**  
**163 INVENTION DISCLOSURES**  
**444 INDUSTRY LINKS**



# COMMERCIALISATION <sup>1</sup> OF MAYNOOTH UNIVERSITY RESEARCH

## 2016 SPIN-OUT COMPANY ACTIVITY

Maynooth University supported the creation of 2 new spinout companies in 2016, Reivr Fusion Ltd and Rosadex Ltd.

**Reivr Fusion Ltd** was formed by serial entrepreneur Joe Moore, to capitalise on market opportunities in augmented systems and data fusion for the tracking of valuable assets. Building on Maynooth University developed IP from a number of research projects, principally created by Dr John McDonald (Computer Science Dept) and licensed to Reivr, the company is building solutions for a number of large multinational corporations in Ireland and abroad.

**Rosadex Ltd** was formed by Prof Kevin Kavanagh (Biology Dept) and promoters Nick Duggan and Padraig Maughan, to develop and commercialise a therapy for Ocular Rosacea. Ocular Rosacea causes irritation to the eye and eyelids and can result in loss of vision. Kevin has identified the method of action involved in the development and recurrence of the condition. He has also recently identified formulations that may represent a novel way of treating this condition.

# 2016 LICENSING ACTIVITY

**Macro Works** is a leading consultancy firm established in 1999, specialising in visual impact analysis and has considerable expertise in both commercial wind energy developments (onshore and offshore) and civil engineering projects. Macro Works worked closely with Dr Marcin Gradziel (Experimental Physics) during 2016 to develop a robust solution to produce an accurate 'Glint and Glare' analysis model for solar panels that generates outputs that are readily understood by planning assessors.

**Reivr Fusion Ltd** funded the research and development of augmented reality techniques that combine a number of different data sources to be used in tracking applications. The results of this project, resulting from the research of Dr John McDonald were licensed to the company for its exclusive use.

## **iGeotech**

iGeotech is an MU spinout with which we have an ongoing long term relationship. As part of that relationship the company identified and requested exclusive access to a particular piece of software developed by the National Centre for Geocomputation (NCG). It is intended that this software will be included as features to the UbiPix product offered by Dr Tim McCarthy (NCG). A licence was negotiated which also consolidated the previous licencing arrangements with the company.

**Rosadex Limited** is developing a new and more effective therapy to treat Ocular Rosacea. The formulations identified by Prof Kavanagh were licensed to Rosadex who plan to develop and commercialise the technology.

**Sigmoid Pharma Limited** is a speciality pharma company headquartered in Dublin, Ireland. Sigmoid develops new therapies for unmet clinical needs in gastrointestinal and immunological disorders as well as for immune-oncology related disorders. Sigmoid is currently working with Dr Karen English (Biology) to progress the development of its Graft-versus-Host Disease (GvHD) programme. Sigmoid Pharma and MU executed a licensing deal to commercialise data arising from the collaboration between Sigmoid and Dr English's team to support clinical development of proprietary SmPill® oral drug delivery formulations.

**Rational Frame Training** is a Maynooth University spin out established in 2013. An original licence was granted for their platform product which comprises of intelligence training modules (based on the research of Dr Bryan Roche of Psychology), which can be adapted and tailored for specific populations. The company initially engaged with the general "brain training" market given that its technology has been shown to raise IQ test scores, improve working memory, and improve scholastic performance among children. A recent study presented at international conferences, and currently in preparation for publication, indicated the benefit of the technology in potentially alleviating Alzheimer's disease symptoms. A new licence agreement has been negotiated by Maynooth University to support the company's efforts in this space.

# ENTERPRISE IRELAND TECHNOLOGY TRANSFER STRENGTHENING INITIATIVE

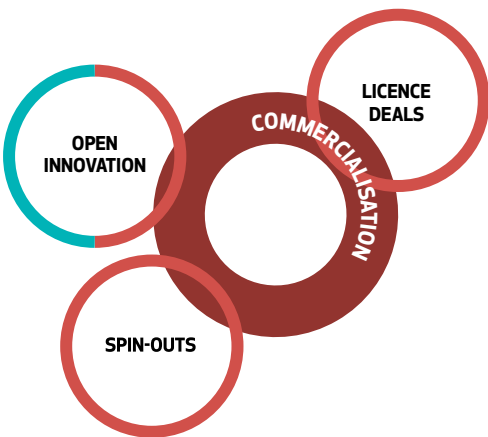
The Commercialisation Office at Maynooth University has just completed the four year Enterprise Ireland funded Technology Transfer Strengthening Initiative (TTSI) (2013-2016) as lead institute in the technology transfer alliance in partnership with Waterford Institute of Technology (WIT), Athlone Institute of Technology (AIT), and Institute of Technology Carlow (ITC).

During the TTSI programme national TT consortia were reviewed by a panel of international experts and our consortium received an A rating (achieved by 2 of the 8 national consortia, comprising 25 research performing organisations). Our consortium was deemed to be *“robust and a consortium that shows trust, engagement, sharing and effectiveness. The sharing of MU established networks with partners is a great example of such trust. There is excellent leadership and mentoring from the lead MU”*.

The review panel recognised our success as a consortium stating that *“this as an impressive consortium that truly sees itself as a team serving four institutions and working together in partnership. A strong KT strategy with effective KT operations is evident. There is also strong evidence of trust, sharing and a good working relationship between the partners”*. The Panel noted that metrics have been met and/or exceeded to date, and admired the attention to quality of output.

Overall the Panel concluded *“that this is a strong consortium and particularly applauded the shared marketing initiatives, transfer of expertise and general collegiality and trust between the partners”*. The panel further noted *“that this consortium represents a genuine partnership delivering value for money and successfully achieves its metric targets. Maynooth University TTO was singled out for the partnership ethos within their consortium in which all members were treated equally, and their excellent leadership and mentoring”*.

The Commercialisation Office secured additional investment by EI for a new five-year programme, again led by MU with the same partnership alliance and funded by Enterprise Ireland. We have also secured funding for a new programme of Managed Consultancy that will allow us to create a new community of broad expertise at MU and partners AIT and ITC, helping advise both private and public organisations. We look forward to continuing our work with the excellent academic community at MU in both of these programmes.







# FUTURE PIPELINE

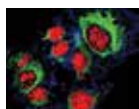
**We expect 2016 to be another good year for technology transfer at Maynooth University and our consortium partners. There are several projects which we expect to mature this year:**

## MICROBIOME DISCOVERY



### MICROBIOME DISCOVERY

The world of antibiotics and antibiotic resistance is not confined to human pathogens. We are investigating different microbiomes (human, animal and environmental) as reservoirs of current and novel antibiotic resistance mechanisms and antibiotics. We are investigating antibiotic resistance from a 'One Health' perspective by analysing the environment of animals and humans for common links to understand the origins of resistance and how it transfers between these microbiomes. In addition, we investigate the bacterial populations within environmental, animal and human niches and how they react to stresses outside and within these niches e.g. transfer through the food chain.



### NOVEL BIOMARKERS FOR HEAD AND NECK SQUAMOUS CELL CARCINOMA (HNSCC)

HNSCC is the sixth leading cancer by incidence worldwide and eighth by death. There are approximately 600,000 new cases a year worldwide with a five-year survival rate of 40-

## NOVEL BIOMARKERS FOR HEAD AND NECK SQUAMOUS CELL CARCINOMA (HNSCC)

50%. Our technology relates to the detection of HNSCC by measuring the abundance levels of specific proteins present in saliva. Human saliva is an increasingly attractive medium for biomarker discovery due to its amenability to non-invasive and repeated sampling, ease of collection and processing, and suitability for single/multiple protein measurements. The ability to monitor specific protein abundance levels in patient saliva, focusing on the detection of recurrence and response to treatment, are significant areas in the management of HNSCC patients.

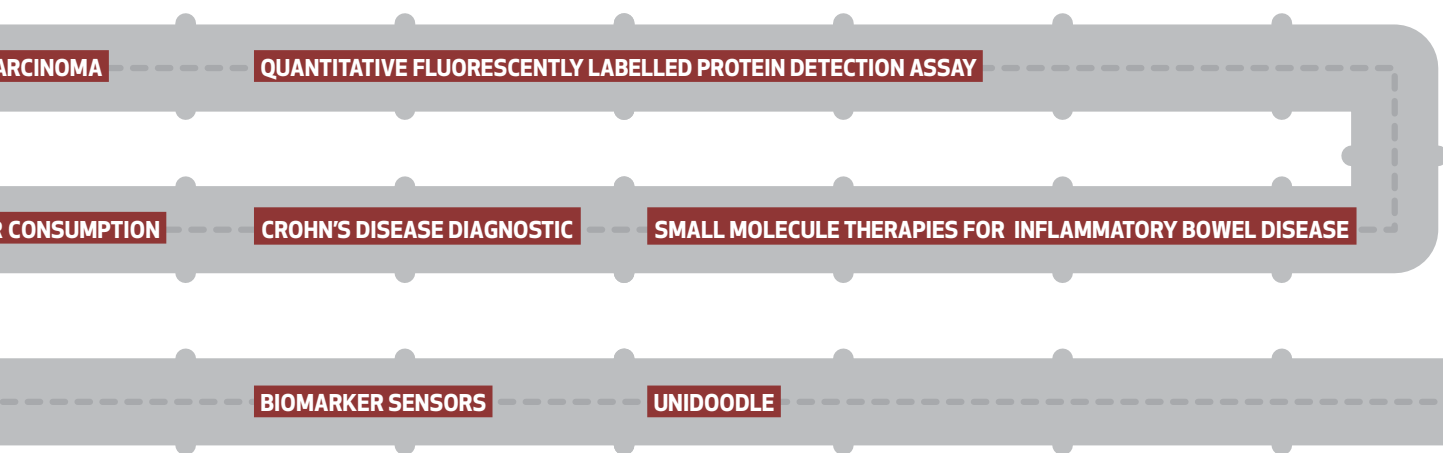


### QUANTITATIVE FLUORESCENTLY LABELLED PROTEIN DETECTION ASSAY

We are developing a fluorescence based assay/kit for measuring cellular concentrations of biomolecules and small molecules. Researchers in industry and academia are currently unable to quantify fluorescently-labelled biomolecules and small molecules in cells and other biological samples. This problem arises because the signal emitted by fluorescent labels, or fluorophores, is dramatically quenched in the crowded molecular environment of a cell or biological fluid. Traditionally, researchers have turned to radioactive labels for quantifying molecules in cells, since radioactive signals are not quenched in these environments. However, there are many

## REDUCING MOBILE COMMUNICATIONS POWER CONSUMPTION

## OCEAN ENERGY TECHNOLOGIES



drawbacks to the use of radioactivity, including legal restrictions, safety measures, the limited availability and high cost of radioactively-labelled molecules, and costly disposal of radioactive waste. In contrast, fluorescence is safe, environmentally friendly and does not require the user to hold a special licence. Furthermore, fluorescence-based assays are inexpensive, can be used to measure over 50 analytes simultaneously and are performed routinely in the average laboratory.



### 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 pre-clinical models of inflammatory diseases and in ex vivo clinical samples.



### 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.



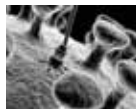
## REDUCING MOBILE COMMUNICATIONS POWER CONSUMPTION

With increasing number of subscribers and subsequent increasing demands for high data rate services in wireless communication systems, power consumption of mobile devices has increased dramatically. Improvements in the efficiency of the device power amplifier is crucial to enabling devices that can last more than a day with normal usage. Researchers in the SFI funded CONNECT centre have developed techniques that allow the reduction of the instantaneous to average power ratio (IAPR). The IAPR is a potentially key way to maintain the device power amplifier operating in the most efficient mode of operation.



## 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.



## 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.



## UNIDOODLE

UniDoodle is a classroom response system app which allows students to quickly sketch-style answers via their iOS or Android device to questions asked by their teacher in class.

Unidoodle presents a commercial partner with a start-up opportunity or the ability to greatly enhance the feature-set of an existing training/ education content and delivery product.  
[www.unidoodle.com](http://www.unidoodle.com)

# CONNECTING INDUSTRY <sup>2</sup> AND MAYNOOTH UNIVERSITY

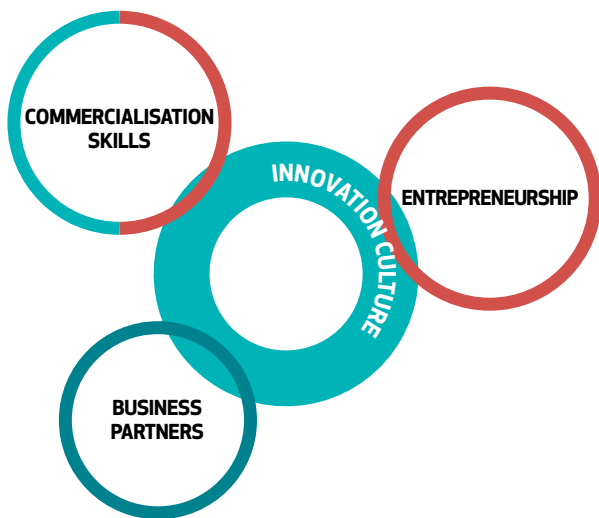
## INDUSTRY LINKS

In 2016 Maynooth University completed 99 new partnership contracts with industry clients. 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 <sup>3</sup> AT MAYNOOTH UNIVERSITY

## CONNECT (APRIL 2016)

CONNECT is an outreach event hosted annually by the Commercialisation Office with two objectives:

(i) showcase MU 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) provide a networking opportunity for delegates to meet and explore how they can work together.

Maynooth University and its technology transfer (TT) consortium partners, Waterford Institute of Technology (WIT), Athlone Institute of Technology (AIT) and Institute of Technology Carlow (ITC) showcased the diverse range of research expertise available to industry.

Our main CONNECT event of 2016 was held in Carton House Hotel Maynooth on April 5th. The programme included a line-up of speakers presenting on topics such as leveraging supports for research collaborations, accessing facilities and opportunities for consultancy and postgraduate student support.

We also hosted five knowledge transfer “partnership clinics”: research collaboration, consultancy, facilities use, postgraduate student supported projects and start-up company incubation. Each one included case studies and hands-on guidance to help our partners navigate the financial supports available nationally to optimise their benefits. The clinics were very well attended, with about 100 of the overall 130 delegates attending the clinics.

Among our guest speakers was Enda Keane, CEO and co-founder of Treemetics, an Irish company which is now the global leader in forest management technology. Enda outlined the story of the company's formation and growth and how it has benefitted from collaborations with universities, speaking glowingly about his work with Tim McCarthy of NCG. The company's collaboration with universities and the availability of supporting funding from EI, SFI and the EU has had a significant impact on the success of their business. Knowledge Transfer from MU presents a real opportunity for business. Recent developments in national policies and associated State supported research funding represent significant opportunities for companies to leverage a broad range of supports from 3rd level institutes.

## CONNECT eHealth (NOVEMBER 2016)

Our second CONNECT event of 2016 was held on November 22nd in the Glen Royal Hotel Maynooth. Over 130 healthcare stakeholders attended CONNECT eHealth. eHealth is a rapidly developing area which attempts to deliver more efficient healthcare through technology. At CONNECT eHealth the focus was how the patient experience can be improved through better interaction with healthcare professionals and the healthcare system.

Dr Graham Love discussed how the HRB is working toward integrating public and patient involvement and the identification and development of the infrastructure and services needed. The benefits for Ireland will include better and safer use of existing data. Trever Vaughn, a product designer and co-founder of Vitamatics, presented an eHealth start-up company.



Vitamatics markets smart, discrete high technology blood pressure and cardiac event monitor designed from the patients perspective. Trevor spoke about the need to engage the patient or end user from the start of the product development process.

The morning session was following by a 90 minute panel discussion. The panelists engaged in a robust and frank discussion around current challenges in the healthcare system and what could be possible in the future to improve the service for all stakeholders.



CONNECT eHealth panelists (top)  
CONNECT eHealth delegates (bottom)

**COMMERCIALISATION AWARD**

Each year we present a Commercialisation Award which recognises excellence in the commercialisation of research at Maynooth University. We consider activity such as invention disclosures, licence deals, patents filed, spin-outs and linking with industry as key factors in bringing research to the market place.

The 2016 Annual Commercialisation Award was presented to Professor Kevin Kavanagh of the Biology Department. Kevin and promoters Nick Duggan and Padraig Maughan formed Rosadex Limited to develop and commercialise a therapy for Ocular Rosacea. Ocular rosacea involves irritation to the eye and eyelids and can result in loss of vision. Kevin recently identified formulations that may represent a novel way of treating this condition.



Prof Kevin Kavanagh of Biology (2nd R) receiving the Annual Commercialisation Award, presented by Prof Ray O'Neill, VP for Research & Innovation,(2nd L) flanked by Paul Tyndall (L) and John Scanlan (R) of the Commercialisation Office.

## **POSTGRADUATE TRAINING MODULE - INNOVATION AND RESEARCH COMMERCIALISATION**

The Commercialisation Office ran its Generic Skills development module on campus in September 2016. This module, entitled “Innovation and Research Commercialisation”, aims to introduce early career researchers to the culture of commercialisation of research and equip them with the skills required to commercialise the outcome of their research, to provide them with the skills to interact with industry and to improve their ability to innovate and act with an entrepreneurial mindset.

The programme 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 and final presentation of their business concept. This module helps the participants to present their ideas as a business opportunity as well as interesting science, a practical approach which then complements their academic training.

The postgraduates should 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 Waterford IT, Athlone IT, and IT Carlow.

This year DesignCore students from the Institute of Technology Carlow participated in the programme. Their product design skills were complementary to the expertise of researchers from the scientific disciplines and they brought a different perspective to the product development element of the business concept presentations. 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.



## **"MAYNOOTHWORKS" BUSINESS INCUBATION CENTRE**

MaynoothWorks currently has 22 clients representing 90% occupancy. Avectas, RaiseYourIQ and UbiPix represent a selection of the University spinout company clients (where University research has been critical to the venture). Recent companies formed by graduates of MU include AccessEarth and MoodleyManor who are also part of the client set.

Companies also locate to MaynoothWorks for access to research supports, and these include Verifly, setup by Hailo founder Jay Bregman (supported by research input from Dr Tim McCarthy); REIVR Fusion (supported by Dr John McDonald); and Aeronet Global (supported by Prof Ronan Farrell). MaynoothWorks offers an accelerator programme "New Frontiers" for very early stage technology companies. This programme is run in conjunction with Athlone Institute of Technology and some success stories include Moodley Manor, Raiseyouriq, Cognikids and UbiPix. We also welcomed our first client from the ESA Space Solutions Centre Ireland, of which MU are an active partner.

Some MaynoothWorks client feedback:

*"My decision to locate in MaynoothWorks has been vindicated by the level of support I have received in helping me prepare my business for funding. The expertise available is second to none and has provided significant clarity and purpose"*

Leslie Turner, CEO Schoolwise

*"The workshop on raising investment was one of the most relevant and important events I've attended as CEO of a growing company. Siofra did a fantastic job of clearing the fog of the investment process and terminology. Even more importantly, she showed why this knowledge was essential for early-stage strategic choices. Highly recommended!"*

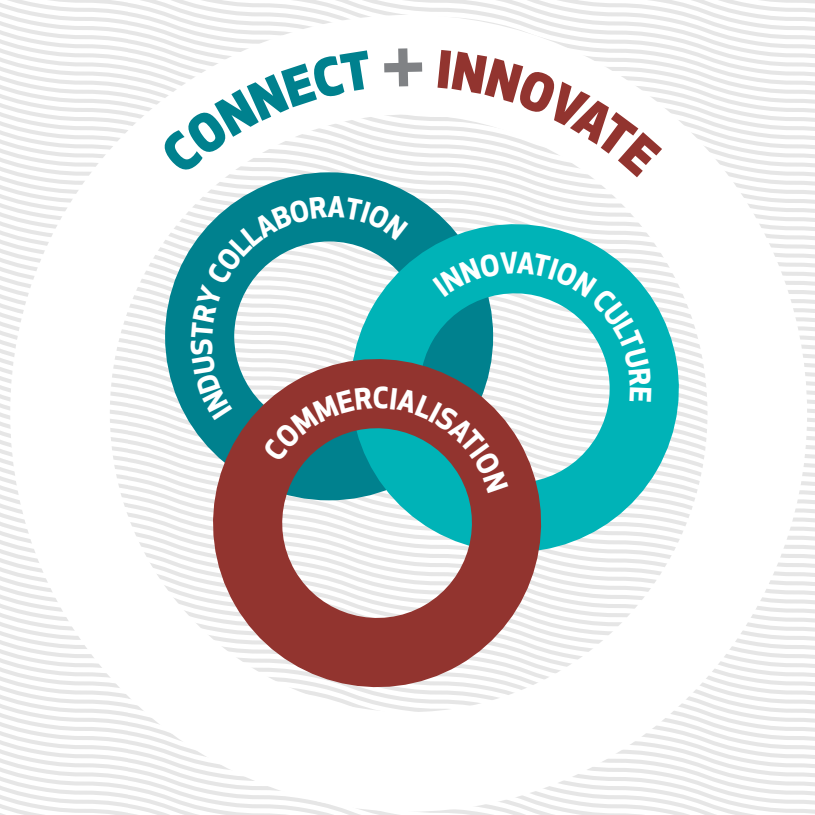
Vanessa Liston, CEO CIVIQ



MaynoothWorks Business Incubation Centre

W [maynoothuniversity.ie/commercialisation](http://maynoothuniversity.ie/commercialisation)





Maynooth University Commercialisation Office  
T +3531708 6589  
E [commercialisation@nuim.ie](mailto:commercialisation@nuim.ie)  
[www.maynoothuniversity.ie/commercialisation](http://www.maynoothuniversity.ie/commercialisation)