#GlobalAmbition

BIG IDEAS
INVESTOR-READY START-UPS

2019

ENTERPRISE IRELAND

where innovation means business

INSPIRING GLOBAL AMBITION
Welcome to Big Ideas 2019, a showcase of cutting-edge technologies and deeptech spin-outs born in research institutes in Ireland

Innovation is a driver of success — economically, intellectually and socially. As we evolve to become a deeply interconnected global community, innovation is more critical than ever. Now in its 11th year, Big Ideas provides investors and other research commercialisation stakeholders with a close-up view on the diverse, life-changing and disruptive research that is emerging from academic institutions all over the country. This is an annual opportunity for the investor community to encounter the next cohort of emerging spin-outs and get in early on what could be the next big things to come out of Ireland.

The innovative ideas presented here are the result of collaboration between third-level researchers, Irish companies, technology transfer offices and external entrepreneurs, all supported by Enterprise Ireland. It is one thing to have a great idea — it is another to bring it to life. For innovation to thrive you need an ecosystem that can support the transformation of an idea into something truly impactful.

Enterprise Ireland has helped to nurture the development of the innovations you will hear about today through an integrated mix of supports that drive the commercialisation of State-funded research. Our research commercialisation specialists work closely with researchers and the technology transfer offices in the higher education institutes to explore challenging and relevant ideas for inspiring and innovative projects. We do this by connecting Irish companies with researchers and by helping to identify, capture and protect the outputs of that research.

Enterprise Ireland’s growing network of overseas offices uses innovation as a key differentiator in winning business in competitive global markets. In addition, our specialists facilitate the spin-out process and guide and support early-stage companies on their commercial journey.

The commercialisation of research resulting in new technology-based spin-out companies is a key priority for Enterprise Ireland. These spin-outs are an important element of the overall mix of new High Potential Start-Ups (HPSUs) that are the lifeblood of our future indigenous sector. They make an invaluable contribution to our core strategies of employment and regional economic development. New innovations commercialised by way of spin-out companies are a means of increasing the competitiveness of industry in Ireland, putting investor capital to good use, leveraging EU Research & Innovation funding and driving a return on the State’s investment in research.

To ensure that the business environment is conducive for the ‘seeding’ of new commercial spin-outs, Enterprise Ireland supports the development of the start-up and business ecosystem through incubators, accelerators, hackathons, funding, business associations, specialist programmes and bootcamps.

We celebrate the commitment to excellence demonstrated by the emerging spin-outs presenting today and encourage investors to get in early and accelerate the growth and development required to help these companies to grow and scale.

Disruptive technologies are certain to have a major impact on the way we live, work and communicate – we present these opportunities to you today as an insight into our shared futures.

Julie Sinnamon,
Chief Executive Officer, Enterprise Ireland

BE PART OF THE NEXT BIG IDEA
biological markers of Alzheimer’s disease pathology. detecting early disease states and converge with studies which focus on demonstrating that the Dublin, neurology clinics and Clinical Research Cortex Cognition is working with Trinity College medical and healthcare costs. Association International (2018), early and accurate diagnosis of dementia. According to the Alzheimer’s a form of dementia. There is a need for cost-effective receive a formal diagnosis and 1 in 3 seniors die with dementia is the biggest healthcare challenge of the 21st century. In the U.S. and U.K. 1 in 2 people never populations targeted are machining and strong industry links in this area. The specific manufacturing processes targeted are machining processes used to manufacture quality-critical mechanical components, where the market for cutting tools used in machining processes is approximately €17 billion. These machining processes and cutting tools are used in the milling and turning processes used to manufacture aeronautical components or medical prostheses such as hip joints. iSentioLabs cutting tools are instrumented with a sensor which allows the measurement of the cutting forces experienced during the machining operation. The data from this SMART tooling solution can be used to optimise tooling consumable usage and costs, automate process supervision and labour cost, reduce process cycle times and reduce scrap rates. The iSentioLabs solution disrupts the status-quo by making standard tools into SMART tools, and readily displaces competitors’ solutions that either require new sensors on the sensor side or are less sensitive to the process. Similar opportunities for the application of iSentioLabs technology exist in mining, energy, and structural health monitoring. The iSentioLabs technology has been developed at Trinity College Dublin (TCD) by the research group led by Dr Garret O’Donnell, and was supported by funding from the Commercialisation Fund in Enterprise Ireland.
Output Sports shrink lab-grade athlete performance analytics into a wearable system so coaches can truly understand athletes and optimize performance. Output Sports is an end-to-end system designed to streamline the off-field athlete performance optimisation process. It is capable of testing an athlete’s performance profile (strength, power, balance, speed, mobility etc.) and tracking their exercise programmes rep by rep. This is completed using off-the-shelf wearable sensors and applying sophisticated signal processing and machine learning applications to the sensor data. This brings unprecedented portability and efficiency to the athlete testing space.

The system automatically amalgamates and analyses data to ensure that coaches and medical staff truly understand their athletes. The collection of high-performance data over time allows for key insights to be obtained, thereby optimising training interventions, improving performance and mitigating injury risk.

The idea was developed by Dr. Darragh Whelan, Dr. Martin O’Reilly, Julian Eberle and Prof. Brian Caufield in the UCD School of Public Health, Physiotherapy and Sports Science and advanced commercially via an Enterprise Ireland Commercialisation Fund project in 2018.

The product has been refined through design processes with end users. The team have interviewed over 60 Strength and Conditioning coaches, Physiotherapists and Sports Scientists and developed the product idea based on his own experience as a firefighter - and Principal Investigators Dr. Conor Brennan and Dr Derek Molloy, both from the School of Electronic Engineering in DCU.

Output’s long term vision is to bring this level of understanding to the recreational gym user to allow Output’s long term vision is to bring this level of sensor hardware to sports performance coaches.

 Martins Trainor

Output Sports
DARRAGH WHelan

Pathfinder
MARTIN TRAINOR

Pathfinder is an innovative hardware and software technology solution to help save firefighters lives, while also reducing the time needed to rescue individuals trapped within burning structures.

Firefighters need to enter burning buildings to extinguish a fire and to rescue people who have become trapped. One of the major causes of firefighters’ deaths is becoming trapped, lost or disoriented within burning buildings. Despite industry efforts, a workable solution has yet to be developed. The Experimental Forum to Advance First Responder Innovation (IAFRI) identified this problem as their number one Global Capability Gap.

Many solutions have focused on locating base stations around the perimeter of the building. This is used to track a signal emanating from the lost firefighter within the building, an “outside-in” approach. These solutions have inherent problems, particularly with loss of signal strength through concrete and steel structures. This is further compounded with elevation in height and below ground penetration. In addition, the set up time to initiate the system not only requires a level of technical ability but it also delays the firefighters’ mission.

Pathfinder overcomes these issues by deploying a broadbrum concept based on an “inside out” approach. On the way into the building firefighters will landmark their route using easily deployable wayfinders, effectively leaving a trail to follow on the way out.

The wayfinders create a localised ad hoc mesh network within the structure. The mesh network is then used to reliably track the progress of firefighters through personalised digital ID tags. It also provides enhanced situational awareness information on the internal environmental conditions to the incident Commander (IC), located outside the building.

Ultimately, Pathfinder reduces the rescue minutes needed to save people in distress while safely tracking firefighters within the building.

The Pathfinder project at DCU is funded by the Enterprise Ireland Commercialisation Fund and the team consists of Martin Trainor, who understood the problem and developed the product idea based on his own experience as a firefighter - and Principal Investigators Dr. Conor Brennan and Dr Derek Molloy, both from the School of Electronic Engineering in DCU.

ProvEye is a UCD spin-out company that enables quantitative prediction of agricultural behaviour through our unique state-of-the-art image correction methods. We can measure properties of land over wide areas that we use to make predictions about farming activity and outcomes, which we can ultimately interpret as behaviour. Optical sensing data are valuable for the digital transformation of agriculture, but the value of such data is limited by quality due to noise masking the important signal during data collection (e.g. UAV missions, satellite overpass or vehicle activity in the field). Poor quality data limits the value of AI and ML tools for digital agriculture. ProvEye has solved the problem of poor-quality images by developing an automated, consistently reproducible image correction methodology that can be combined with predictive models and embedded in an end-to-end solution for quantitative prediction of agricultural behaviour.

Our B2B customers collect and use data about their clients’ farms or farms in a region, so their services are only as good as the data they collect. The use of wide-area image services (satellite remote sensing, drone imaging, vehicle mounted cameras) is a huge market opportunity for our customers, but its value is not currently being realised because the data collected from images is of poor quality for quantitative analysis, modelling and prediction. Our customers have access to high-resolution image data but cannot use it to fully serve their own clients. The can only offer limited services because the data is not consistent and reliable. The ProvEye sensing solution allows a quantitative approach and the ProvEye predictive products convert the “new” quality data into meaningful information (e.g. crop yield and crop quality), enabling reliable prediction of required farm activity and ultimately agricultural behaviour.

ProvEye was cofounded by Tim Buckley (an EI Business Partner), Dr Jerome O’Connell and Professor Nick Holden who are CEO, CTO and Executive Director respectively.

SoloPep Ltd. is a spin-out company from the University of Limerick (UL) that has developed the world’s first disposable OPEP devices to deliver airway clearance therapy.

SoloPep Ltd is committed to Revolutionising Respiratory Care by developing the world’s first range of disposable Oscillating Positive Expiratory Pressure (OPEP) devices.

OPEP devices are used to remove excess secretions from the respiratory tract, reduce mucus plugging in the small airways, and to improve gas exchange in patients with hyperssecretory diseases. Currently, reusable OPEP devices require rigorous daily cleaning to prevent colonisation with potentially harmful pathogens, placing an undue burden and risk on both patients and care-givers.

Up to 40 minutes a day can be spent on cleaning OPEP devices for those at highest risk of infection. Furthermore, these reusable and expensive devices are not compatible with single patient use hospital applications for acute respiratory illnesses or with infection control guidelines.

Our patent protected mechanism allows us to deliver safe, effective airway clearance to patients with Cystic Fibrosis, Chronic Obstructive Pulmonary Disease (COPD), or bronchiectasis in a disposable device.

In comparison to other devices, SoloPep delivers the same mechanical performance but in the smallest form factor of any product already on the market. This affords patients greater discretion to carry out airway clearance whenever and wherever it is required.

In two Health Products Regulatory Authority (HPRA) approved studies of patients with cystic fibrosis and COPD, the results of which were recently presented at the European Cystic Fibrosis Society conference, SoloPep was shown to be as effective at maintaining pulmonary function as the current market leader. Participants replaced their current device with SoloPep for one month, with 100% of patients preferring SoloPep to their current device.

Ideally suited to the acute or home setting, SoloPep is a cost effective and safe way to deliver airway clearance therapy to patients whether it’s for a day, a month, or a lifetime.

ProvEye
TIM BUCKLEY
Summit in Dublin.

international investment pitch event with MedTech

Marshall Space Flight Center.

Engineering with 5+ years of experience at NASA’s

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Almost 1 million operations occur every day. These

all leave a wound that is either closed with sutures or

staples. Sutures yield superior clinical results but are slow, which has a financial cost to the healthcare system and also a clinical cost to the patient undergoing a longer surgery. To save time, surgeons often use skin staples; while these are fast and can save up to 30 mins on an operation, they have worse cosmetic results, double the infection risk and increased pain.

The wound closure market has remained relatively unchanged for decades, predominantly with small incremental improvements to sutures and staples. The QuickStitch will be the first secure way of closing a wound, which has the potential of fully disrupting a multi-billion dollar market.

The company was co-founded by Cyrus Dozor and Travis Davis, who are CEO and CTO respectively. Cyrus is a BioInnovate Fellow who was a Trauma and Orthopaedic surgeon for 11 years in the UK. Travis holds a Bachelor of Science degree in Mechanical Engineering with 7+ years of experience at NASA’s Marshall Space Flight Center.

In April, Starling Surgical won a prestigious international investment pitch event with MedTech Innovator at the MedTech Strategist Innovation Summit in Dublin.

Starling Surgical is developing The QuickStitch, a wound closure device as rapid to use as a skin stapler with the clinical advantages of meticulous sutures.

Starling Surgical is a spin-out company from TCD that is developing a device that will provide superior results to meticulously performed surgical sutures, and at the speed and convenience of a skin stapler. It is the only device that can close wounds as fast as a skin stapler but with all the clinical benefits of meticulous sutures. Operative wounds closed with the QuickStitch will have superior cosmetic results and lower infection rates as well as benefitting from the operative time savings and ease of use. The end users will be surgeons and other operating room staff.

Tympany Medical

Elizabeth McGloughlin

Tympany Medical is a spin-out company from NUIG developing a novel endoscope which will revolutionise how ear surgeons operate.

Tympany Medical began following the Biolnnovate Ireland Fellowship, where Rory O’Callaghan (Medical Device Designer) and Elizabeth observed needs in ENT both in Ireland and the Mayo Clinic, Rochester, MN. The commercialisation fund has supported the expansion of the team with Martin Gallagher and Christina Walsh bringing expertise in ComputerVision and Biomedical Engineering.

Tympany Medical is designing and developing a novel combined access and visualisation device which will enable ear surgeons to ‘see around the corners’ of the ear canal. This will allow surgeons to perform trans- canal ear surgery with a wide endoscopic view of the surgical site, thereby avoiding unnecessarily invasive surgery.

For Patients it will:

- Enable true minimally invasive ear surgery, which can be performed under local anaesthetic
- Reduce mastoidectomies therefore maintaining mastoid function and associated benefits

For Surgeons it will:

- Improve the surgeon’s view of the surgical site
- Create simple access to surgical site with imbedded retraction capabilities
- Maintain the current surgical technique (two-handed)
- Provide ergonomic benefits for surgeons

For Hospitals:

- Shorter procedure times resulting in lower costs to healthcare system
- Reduce number of outpatient appointments

OtoVu™ is an enabling and empowering technology that preserves the two-handed operating technique associated with the microscope.

Tympany’s technology will provide a potential platform for diversification into parallel surgical markets.

Venari Medical

Nigel Phehan

Venari Medical is developing a unique medical device to treat patients with chronic venous disease by utilising the body’s natural healing response.

Venari Medical was co-founded by Biolnnovate 2017 Fellows Stephen Cox, Sean Cummins and Dr. Nigel Phehan and is currently based in NUI Galway supported by an Enterprise Ireland Commercialisation Fund.

Venari Medical is developing a less invasive, more effective medical device to treat chronic venous disease, a highly prevalent condition which affects up to 120 million patients across the US and Europe. Venous disease is caused when veins fail to circulate blood effectively which then pools in the legs. Initial symptoms include painful enlarged varicose veins and progress to aching swollen legs, skin breakdown and ulceration. This is a progressive condition with 5% of patients experiencing worsening symptoms each year. Venous disease is the cause of 80% of all leg ulcers and recent clinical evidence has proven that early treatment to close off the diseased vein leads to faster ulcer healing. This shift in treatment practices will offer a breakthrough for patients who currently undergo regular painful wound dressings and bring significant cost savings to healthcare systems which currently spend 2.5% of the total healthcare budget treating chronic venous disease.

Based on pioneering research into vein wall biological processes, Venari Medical are developing BioVen™, the first pain free and effective treatment for venous disease which utilises the body’s natural healing response to close diseased veins. This proprietary technology has significant potential to disrupt current treatments which require chemical or heat induced burning of the vein adding excessive risk and pain to the procedure. The BioVen™ device has demonstrated strong safety and efficacy results in pre-clinical studies. Venari Medical is currently fundraising to support its clinical development including a First-in-Human trial in 2020 and subsequent US and European regulatory approval in 2021. This will allow commercialisation of the device in well-established US and European markets with existing reimbursement.

Venari Medical is a spin-out company from NUI Galway, specialising in providing energy efficient water and wastewater products, together with high-value services to maximise water treatment performance for the lowest energy cost.

At a high level, the water and wastewater industry is known to account for up to 4% of a developed nations’ total electricity bill which is equivalent to the electricity required by other sizeable sectors such as transport and agriculture/forestry. This is largely due to inefficient, energy hungry technologies and processes which have been in place for decades and are now at the end of their lifespan.

With extensive expertise in fluid dynamics, energy systems, wastewater process control, energy finance and commercialisation, VorTech Water Solutions have developed a novel cyclonic method of mixing air and water to solve energy intensity in the aeration process of wastewater treatment and aquaculture; a global market that is worth at least $8.4 billion annually. With their system, the team can treat wastewater for up to half the cost of traditional aeration methods. This type of proposition has massive value in the modern-day water industry which has come under considerable strain internationally in recent years due to rapid population growth and urbanisation, increased regulation and rising energy costs.

The VorTech project at NUI Galway is funded by the Enterprise Ireland Commercialisation Fund and the team consists of lead inventor Dr Sean Mulligan, Enterprise Ireland Business Partner John Geoghegan, senior lecturer Dr Eoghan Clifford, product design engineer Alan Carty and process control scientist and PhD candidate Peter Leonard. Following over 8 months of VPA operational time banked at a pilot municipal treatment plant in Galway, VorTech are now ready to deliver their technology to the market. The VorTech team will spin-out a company from NUI Galway in mid-2019 with a focus on scaling up and rolling out the technologies and services to the global water and wastewater treatment market.
The Enterprise Ireland Business Partners Programme is a complementary co-founders programme that matches commercially experienced entrepreneurs (“Business Partners”) with individual researchers/scientists who are making good progress with their commercialisation fund project and are now beginning to examine potential routes and options to spin-out a scalable, high-growth company.

Our experience to date shows that spin-out founding teams that have a complementary blend of technical and commercial skills, experience and perspectives maximise their chances of company success in the near and longer term (e.g. better chance of securing equity and non-equity finance, acquiring early adopter customers, strategic partners, talented additional hires, etc.).

The programme has an ongoing process for the identification, screening and onboarding of suitably available and experienced entrepreneurs who are actively looking for new start up, co-founding opportunities. These entrepreneurs are then introduced to a number of projects and teams until they find a match with a specific project team who are open to working with that potential commercial co-founder (and vice versa) for a trial period of 3-6 months.

For Principal Investigators and post docs working on a commercialisation fund project, the Business Partners Programme provides you with a well-established framework and mechanism to safely test and trial (over a 3-6 month time period) a potential co-founding relationship in advance of spinning out.

If the engagement goes well for both sides, then they are free to make a mutual decision on spinning out the company together as co-founders (subject to usual spin-out and IP licensing approval process within the RPO).

If the engagement does not work out (for whatever reason), then both sides can go their separate ways and a new spin-out plan is put in place based on what’s been learnt via the initial co-founding engagement.

The business partners engagement is funded by Enterprise Ireland and does not come out of the commercialisation fund budget.

Our ideal EI Business Partner will have:

- an impressive commercial track record with intent to get hands on involved to make a viable newco spin-out happen
- a founder’s can-do mentality and the ability to work collaboratively with academic and technical cofounders
- previous founding leadership experience
- the ability to identify, validate and de-risk a commercial opportunity from an early-stage technology
- ability to plan and lead an equity fundraising process to secure initial seed capital investment for the company

For entrepreneurs, the programme provides a framework to engage with a national pipeline of state-funded 3rd level spin-out opportunities where e.g.:

- A technically talented team is already in place
- Market assessment is ongoing and IP is being generated and captured (via TTO)
- Trial partners have been engaged and routes to commercialisation are being examined
- Potentially individuals in the research team thinking about (and interested in) progressing a spin-out route and looking to strengthen the founding team accordingly with a commercial co-founder (if there is a good mutual fit)
- Optimisation of problem/solution and product/market fit is ongoing
- The project phase is usually pre IP license, pre-company formation, pre-revenue, pre external equity investment

Here are some examples of the 3rd level spin-out companies that have benefitted from the support of the programme to date: AudioSourcere, Latch Medical, OxyMem, AmbiSense, Solvotrin, Reflective Measurement Systems, Senoptica, Proveye, Head Diagnostics, Vortechn Water Solutions, Nexalus, KantanMT, Azadyne and E-seed.

If you are a researcher/scientist and this programme is of interest to you, please contact your Technology Transfer Office (TTO) and/or an Enterprise Ireland Commercialisation Specialist for further information.

If you are an entrepreneur looking for a new startup opportunity, you can find out more about the programme on the Enterprise Ireland corporate website:
