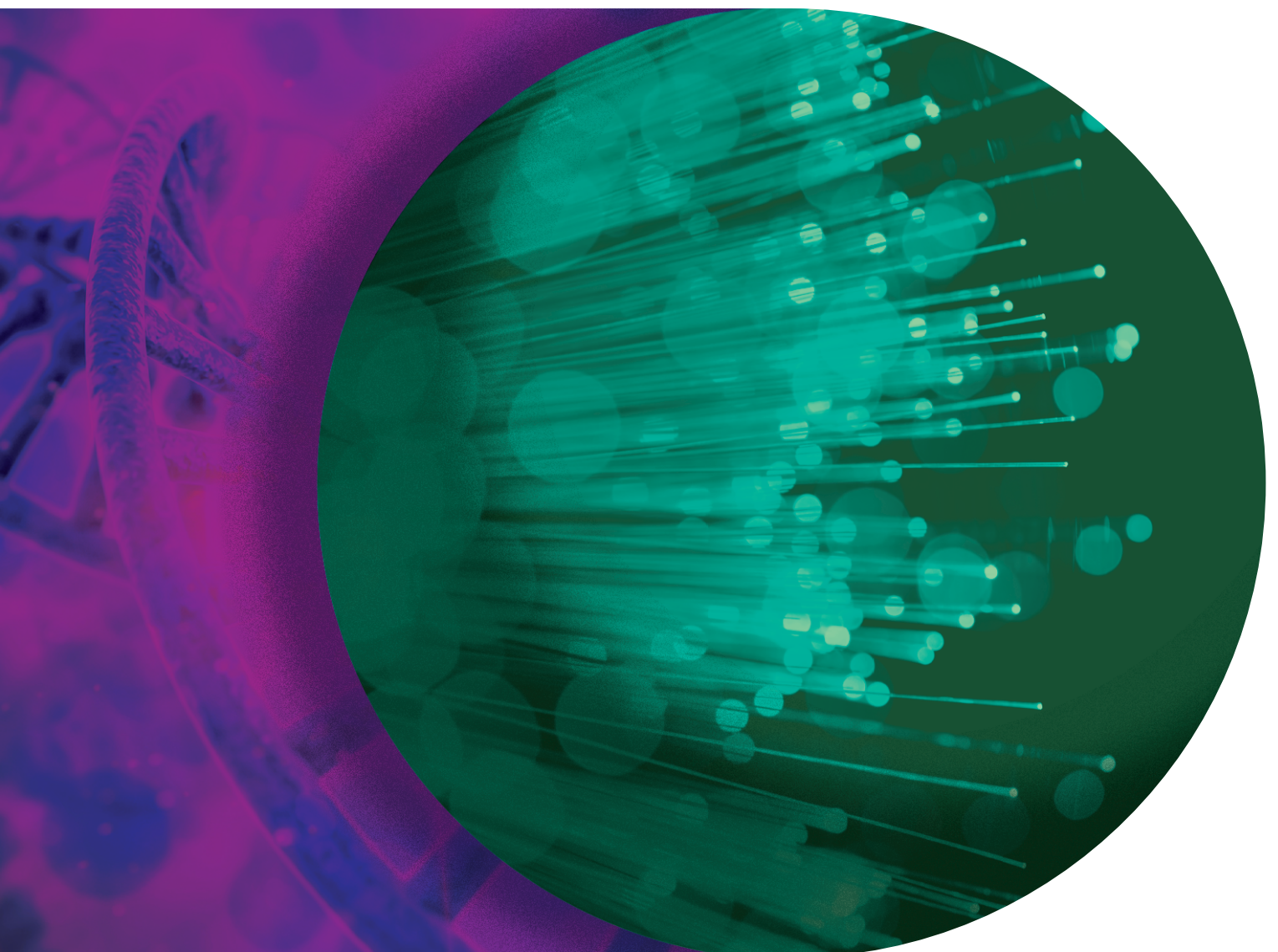
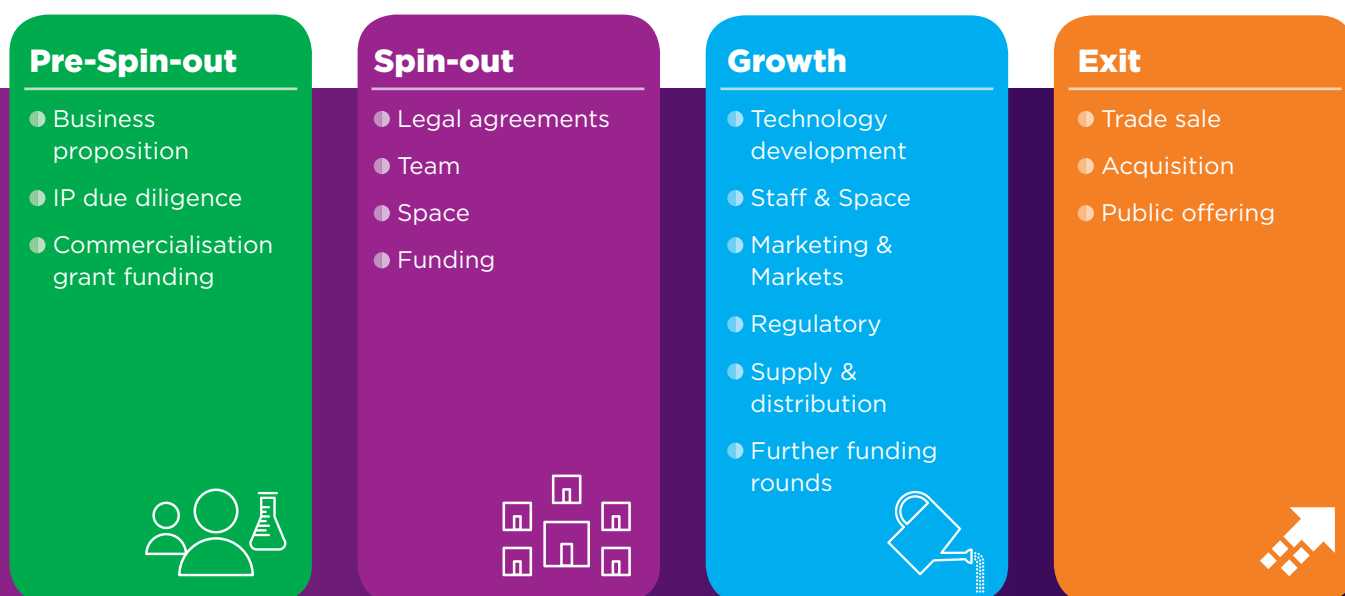


Spin-out Journey to Success



Focus on Spin-Outs



The company development pathway can take many years and often requires many rounds of investment to get the products and services ready for the market. This section presents a high-level overview of the spin-out process and timelines through a snapshot of four spin-out companies that have achieved success.

Commercialisation of intellectual property is an important area of activity for higher education institutions worldwide, supporting their broad mission to disseminate research results.

Spin-out companies are one demonstration of the contribution that excellent research makes to society and the economy. They may lead to the development of ground-breaking new products and services, enhancing quality of life, health and the environment. The growth of these new businesses generates high value employment opportunities and have a knock-on effect on the commercial health of other companies in the supply chain.

A note on investment funding rounds

At company formation, funding begins with seed capital which nurtures the idea for the company. It will support initial market research and development work and will help employ a team to do this work. The seed phase is roughly around €200,000 to €2 million and investors will need to have an appetite for risk. Series A funding will follow if there is enough confidence generated in the business based on performance to date. It may be used for further development and testing and to scale the product. The investors tend to come from more traditional venture capital firms and sums raised may be in the range of approximately €2 million - €15 million. Later stage investments may fall into the Series B and Series C categories which are considerably larger involving a different group of investors. Typically, the company will have grown sufficiently in interest to other parties that it will become involved in a merger or acquisition by another company after several early investment rounds.

Oculus Research Ireland – spin-out acquisition drives creation of high quality R&D jobs in Cork



Commercialisation timeline

- First patent application filed 2003
- Company formed 2011
- First investment 2012
- Acquisition 2016

Summary

InfiniLED Ltd was a University College Cork (UCC) spin-out company based on microLED Display (mLED) technology developed at the Tyndall Institute. mLED ILED Displays are the next generation of energy efficient display technology for applications ranging from wearables to TVs. The company was established in 2011 and took a licence to a suite of patent applications that had been developed by UCC, at Tyndall, the first being filed in 2003. After two rounds of private investment in 2012 and 2015, the company was acquired by Oculus (a Facebook company) in 2016. Post-acquisition the company expanded its operations in Cork to develop the technology. There are now over 40 people in Oculus in high quality research & engineering posts.

Establishment of the company

InfiniLED Ltd was spun out of UCC's Tyndall National Institute in 2011. The technology is based on the patented Micro-LED breakthrough developed by Brian Corbett and Pleun Maaskant from many years research in the field with significant funding support from Enterprise Ireland. UCC staff member Bill Henry joined the company when it was founded. The CEO was Joe O'Keeffe, who had been a CEO of previous UCC spinouts. InfiniLED was housed initially in Tyndall's Lee Maltings complex, a dedicated space for industry partners in their research domain.

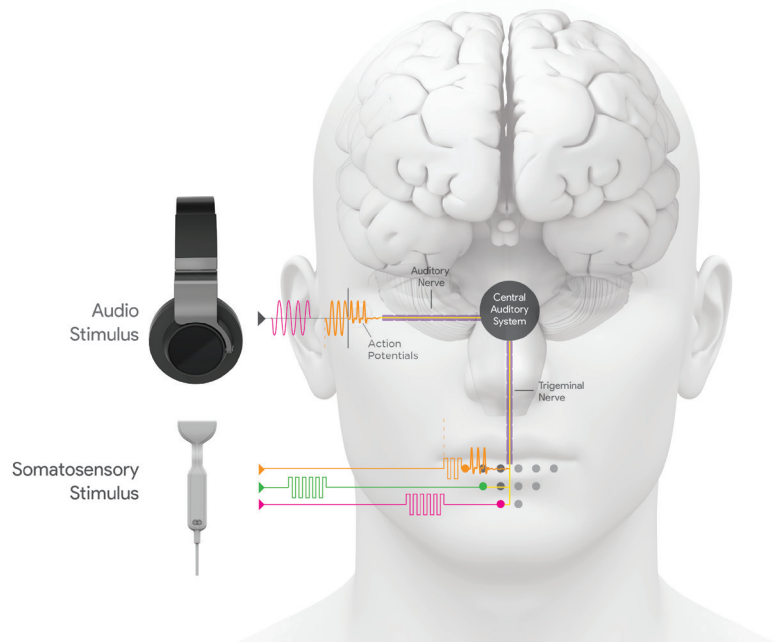
Company progress

The company moved to a city centre premises as it expanded and agreed access to technical facilities in Tyndall to support the company R&D effort through a formal access agreement. Since acquisition, the UCC technology is now being integrated into the Oculus development programme, with high quality research and technology jobs created in the region. The potential for further research opportunities with UCC and Oculus is now being explored.

Investment

InfiniLED secured two rounds of private investment in 2012 and again in 2015. In 2016, the company was acquired by the Facebook owned company, Oculus. Exact amounts of investment are undisclosed.

Neuromod Devices – a spin-out company from Maynooth University developing a new treatment for sufferers of tinnitus



Commercialisation timeline

- First patent application filed 2010
- Company formed 2010
- First investment 2011
- Latest investment, Series A, 2015

Summary

Neuromod Devices is a Maynooth University spin-out company which has brought a medical device for the treatment of tinnitus (ringing in the ears) to the market. The company currently employs 15 FTE in Dublin, consisting mostly of scientists, engineers and clinicians. The company has plans to grow to 30 FTE employees by 2019. The company was created in 2010. It has a licence to two patents - one from Maynooth University and one jointly-owned by Maynooth University and City University New York (CUNY). The company has received over €7.7M in external investment over four rounds from 2011 to 2015.

Establishment of the company

The company was formed in 2010 based on intellectual property arising from research undertaken by PhD student Ross O'Neill working with PhD supervisor Prof Barak Pearlmutter and a directed Proof of Concept project, funded by Enterprise Ireland with the aim of developing commercial aspects of the research. On completion of his PhD O'Neill formed the company. The first investment was raised from private investors in 2011. Two patent applications were licensed to the company - one solely owned by Maynooth University and one filed by Maynooth University jointly with CUNY. Maynooth University negotiated with CUNY to take the commercialisation lead and to share revenue in respect of the joint patent application (as is the international norm). The University took

equity in the company upon formation and granted a royalty-bearing license to the first patent in 2010, and later (2013) granted a royalty-bearing licence to the jointly patented intellectual property.

Company progress

As a Class IIa medical device, the Neuromod tinnitus remediation device needs to go through research and development followed by clinical trials and then regulatory approvals before it can be sold as device for which medical claims can be made. It took five years from company formation to obtain a CE Mark for the device. This is a mandatory certification mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA). Neuromod then began a large-scale multi-site clinical trial of the device in 2016 (St. James's Hospital, Dublin and University Hospital Regensburg, Germany). This trial is due to complete at the end of 2018.

Investment

The degree of R&D and testing to reach the market requires considerable investment. Neuromod Devices raised over €2M in seed funding from 2011-2014. It then raised a further €5.5m from Fountain Healthcare Partners in a Series A investment round in 2015. In each of the investment rounds, the fixed percentage equity that Maynooth University held at the outset was diluted as the value of the company increased and more money was invested by external parties.

Powervation – University of Limerick spin-out operating as a subsidiary of a multinational company headquartered in Cork accessing global markets



Commercialisation timeline

- First patent application filed 2003
- Company formed 2006
- First investment 2006
- Acquisition 2015

Summary

Powervation is a leading innovator in digital power controllers serving high performance computing, cloud and communications infrastructure markets. It employs over 40 people at its headquarters in Cork. A University of Limerick spin-out company, it was established in 2006 and ten years later, after raising over €32M private investment, the company was acquired by a Japanese multinational and operates as a fully-owned subsidiary, and the company's principal digital power design centre, in Cork. The company was based on novel technology from the University. The University licensed several patent applications to Powervation, the first of which was filed in 2003.

Establishment of the company

The science was developed over a number of years from research in University of Limerick's Circuits and Systems Research Centre, within the Department of Electronic and Computer Engineering, leading to a protectable invention in 2003. A second patent application was filed in 2006 and a third the following year. The underpinning research was funded from national and European sources. The company founding team comprised four staff from the CSRC: Dr. Karl Rinne, Dr. Eamonn O'Malley, Antoine Russell and Alan Dunne.

Company progress

The technology is based on digital power management system-on-chip (SoC) solutions. The company developed its proprietary control platform and secured industry leading customers. Through acquisition by ROHM, the combination of Powervation's platform with ROHM's leading analog power technology and global market access has enabled the company to address a broad range of fast growing market opportunities,

Investment

The degree of R&D and testing to reach the market requires considerable investment. In 2006 Powervation raised seed funding of €250K from Shannon Development and this was followed by a Series A round of investment of €7M from a venture capital syndicate the following year. Over the next eight years the company secured a further €25M in capital. In 2015 Powervation was acquired by Rohm Semiconductor (Japan). Rohm C expanded Powervation's Cork office to >40 people in 2017. As the company developed and as the external investment ramped up, the fixed percentage equity that University of Limerick held at the outset was diluted.

OxyMem Ltd. – UCD Spin out company disrupts wastewater treatment market



Commercialisation timeline

- First patent application filed 2008
- Company formed 2013
- Initial seed investment 2013
- Latest round corporate investment 2016

Summary

OxyMem Ltd. is a rapidly growing Irish company that spun out from University College Dublin (UCD) in 2013 with a licence to technology that has the potential to disrupt wastewater treatment. The company has raised in excess of €5.5M investment. It has its headquarters and a 25,000sq ft manufacturing facility in Athlone, County Westmeath and currently employs approx. 30 people in a range of functions such as research, manufacturing, marketing and finance.

Establishment of the company

The technology underpinning OxyMem was developed by Prof Eoin Casey and his team in the UCD School of Chemical and Bioprocess Engineering over an 8-10-year timeframe. Company founders were Prof Casey and Dr. Eoin Syron, whose PhD thesis focused on membrane aerated biofilm reactors. Wayne Byrne joined as a commercialisation advisor and then as managing director on incorporation in 2013. UCD filed the initial patent application in 2008 which was prosecuted to grant in both Europe and the USA. The IP was licensed to the company in 2013. The company raised seed funding in 2013.

Company progress

OxyMem is servicing a compelling market demand for energy efficient wastewater treatment which is an extremely energy intensive process and can use up to 2.5% of all electrical power produced in a developed country. The market for secondary treatment systems for wastewater is in excess of \$30 Billion. In the three years after formation, the company conducted validation field trials with major UK water utility companies. R&D and manufacturing continues. OxyMem has now achieved sales of its Generation 4 product in key markets and is currently working on development of Generation 5. OxyMem is one of the few companies in the world today that can offer process and operational advantages without increasing the cost of the capital equipment.

Investment

The company has to date raised in excess of €5.5M, including a strategic investment by Dow Chemical Company. These investments have taken place in tranches since incorporation, the last significant investment occurring in 2017 by oil giant Saudi Aramco. The net effect of these investments is the dilution of UCD's initial equity stake.

