DCU Research and Innovation – Snapshots from 2015

At DCU, research and innovation seeks to transform lives and societies. 2015 saw continued successes for the University in pursuing research excellence and translating discoveries into impact for better health and more sustainable enterprise, economies and societies.

"More and more researchers in DCU are being successful in attracting external support for their work and in developing fruitful links with enterprises and NGOs," comments Professor Alan Harvey, Vice-President for Research and Innovation at DCU. *"The continued growth in activity very much supports DCU's commitment to translating new knowledge into benefits for the external world."*

Pursuing academic excellence

In 2015, DCU's research expenditure was €40 million, which supported work to tackle current and future challenges for enterprise and society.

A new blood test for bowel cancer

Researchers at DCU and collaborators at the Royal College of Surgeons in Ireland made a major advance in 2015 with research on a blood test that can signal whether a patient has colorectal cancer. The test, which is expected to cost just €25, could enable doctors to rapidly and reliably prioritise patients for more extensive investigation and treatment. DCU (led by Professor Richard O'Kennedy) and Randox Laboratories are now further developing the blood test and it could shortly be in widespread use in Ireland.

Decline in folic acid consumption linked to rise in birth defects

DCU-led research has linked an apparent rise in neural-tube birth defects (NTDs) in Ireland with a drop in the levels of foods being consumed that are fortified with the B-vitamin folic acid, which can reduce the risk of NTDs developing during pregnancy. The study, led by Dr Mary Rose Sweeney, suggests that fewer bread, milk and dairy spread products in Ireland are now fortified with folic acid, and that discount-grocery stores offer fewer foods fortified with the nutrient.

Enabling new insights into galaxy formation

Through funding from the European Space Agency, in 2015 DCU researchers Dr Regan Watts and Professor Liam Barry worked on technology to help us understand more about our galaxy and how it formed. The photonic-based THz sources being developed at DCU have a small footprint and low power consumption, which are key advantages for payloads in space.

SAILS boost for inquiry-based education

2015 also saw the results from the EU-funded project SAILS being launched at the European Parliament. DCU led the FP7-funded initiative to help teachers adopt inquiry-based science education in their second-level classrooms. The project, coordinated and led by Dr Odilla Finlayson, engaged more than 2,500 teachers, meaning that over 30,000 students in 12 countries have already benefited.

Funding the pipeline of excellent research

DCU continues to attract major funding for research from diverse sources nationally and internationally.

Tripartite US-Ireland award to target pancreatic cancer

Pancreatic cancer is a leading cause of cancer deaths: often discovered at an advanced stage, it can be difficult to treat. In September 2015, Dr Niall Barron of Dublin City University along with researchers at the University at Buffalo and Queen's University Belfast were awarded funding of more than €3.3 million from National Institutes of Health (NIH) in the USA, Science Foundation Ireland (SFI) and HSC R&D in Northern Ireland to develop new formulations of drugs to gain better access to the tumour cells.

SFI Investigators to tackle Alzheimer's disease and cancer

Two DCU researchers, Professor Tia Keyes and Professor Richard O'Kennedy, won major funding for SFI Investigator projects in 2015. Prof Keyes will build advanced models of the cell membrane to better understand how Alzheimer's disease and cancer develop and can be treated. Professor Kennedy's project will look at how freshwater algal microcystin toxins could play a role in the development of colorectal and liver cancers.

Innovative training awards

DCU has had unprecedented success in the Marie Skłodowska-Curie Action: Innovative Training Networks (ITN) awards. Four DCU researchers - Dr Donnacha Ó Beacháin (Coordinator), Dr Andrew Kellett (Coordinator), Dr Niall Barron (Partner) and Dr Brian Kelleher (Partner) - were awarded funding in this highly competitive international programme.

Irish Research Council funding for gender relations study

In 2015, Dr Kenneth McDonagh won an Irish Research Council New Horizons Research Project Starter Grant to investigate how European Union Common Security and Defence Policy (CSDP) missions have impacted on gender relations in Kosovo and Bosnia-Herzgovina.

Horizon 2020 successes

DCU researchers are currently working on more than 20 Horizon 2020-funded projects, and DCU's Research and Enterprise Hubs are providing resources to researchers to maintain a high level of engagement with the European Union Framework for Research and Innovation.

Horizon 2020 projects that launched or were awarded in 2015 include PATHway, CloudLightning, NEWTON and NUCLEUS.

PATHWAY, led Dr Kieran Moran, is a €5 million H2020 award for the project 'PATHway' - Technology enabled behavioural change as a pathway towards better self-management of cardio-vascular disease. Revolving around the concept of Physical Activity Towards Health (PATH), the project is coordinated by DCU and involves nine partners: four other Universities, three SMEs and a hospital.

DCU researchers from the Irish Centre for Cloud Computing in Commerce are part of the **CloudLightning** project, which represents a ground-breaking advance in how cloud infrastructures can be managed by cloud service providers and delivered to cloud consumers to enable new and innovative services.

NEWTON is a large scale European-funded international project which involves 14 partners from seven countries. NEWTON is led by Dr Gabriel Miro-Muntean in DCU's Faculty of Engineering and Computing, and will develop, integrate and disseminate innovative technology-enhanced learning (TEL) methods and tools to create new or inter-connect existing state-of-the-art teaching labs and to build a pan-European learning network platform that supports fast dissemination of learning content to a wide audience in a ubiquitous manner. NEWTON focuses on employing novel technologies in order to increase learner quality of experience, improve learning process and increase learning outcome.

NUCLEUS (New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions), involving Dr Padraig Murphy from DCU, aims to identify, develop, implement and support inclusive and sustainable approaches to responsible research and innovation.

Putting knowledge to work

Research discoveries have the power to transform business, social and cultural enterprise and in 2015, DCU achieved 30 invention disclosures, 14 patent applications and 25 Licence, Option and Assignment Agreements – a testament to the inventiveness of DCU researchers and the activity of the business development team in DCU Invent.

AmbiSense – Smarter detection of environmental gas

AmbiSense emerged from research at Professor Dermot Diamond's laboratory to manufacture innovative smart wireless instruments and networks for monitoring environmental gas. AmbiSense is already generating revenue through its environmental monitoring installations in the UK, Ireland and Australia, and the DCU start-up won the Cleantech Award at European Venture Summit 2015.

Breath-monitoring technology licensed

In 2015, BreathDX reached a worldwide licence agreement with DCU for access to innovative technology developed by Professor Tony Killard during his time at the Biomedical Diagnostics Institute (BDI) at DCU. The AmBeR® breath ammonia measurement technology could lead to painless breath measurements to monitor liver and kidney function, reducing the need for patients to undergo blood tests.

INMINDD: INnovative Midlife INtervention for Dementia Deterrence

Led by Dr Kate Irving, researchers in the School of Nursing and Human Sciences and the School of Computing have developed and translated the first modifiable dementia risk algorithm into a freely available website to support people in improving their brain health.

Award-winning research and innovation

At the institutional level, DCU has been awarded the 'HR Excellence' accreditation by the European Commission in recognition of DCU's commitment to providing a research environment that supports the career development of its researchers. DCU has endorsed the European Charter for Researchers and Code of Conduct Researchers and the principles embodied in the charter will be reflected in the training provided at DCU.

Several members of DCU staff were honoured with numerous prestigious awards in 2015, including being named the Irish HEI research centre or institute with collaborative links with the US corporate sector in Ireland.

The award, from the American Chamber of Commerce Ireland and the Royal Irish Academy, recognises the social and economic impact of ideas originating in Ireland, specifically the work of Professor Oliver Dolly and his team at the International Centre for Neurotherapeutics at DCU on the science of toxins and neurotherapeutics and their translation towards the clinic.

Emma O'Neill of Invent DCU jointly won Knowledge Transfer Achiever of 2015 at the Knowledge Transfer Ireland (KTI) Impact Awards for her work in neuropharmaceutical therapeutics funding and commercialisation.

Professor Dermot Diamond, who works on sensor-based health and environmental monitoring solutions at DCU, was awarded the Boyle Higgins Medal from the Institute of Chemistry of Ireland for his outstanding and internationally recognised research contribution to the advancement of chemistry.

Keeping with chemistry, Professor Apryll Stalcup, School of Chemical Sciences, won the 2015 American Microchemical Society Benedetti Pichler Award for her work in the field of separation mechanisms.

DCU connecting with enterprise

Established in 2013, DCU Alpha, DCU's innovation campus, has become home to more than 35 companies, including Veolia, Shimmer, Fujustu and Siemens. Located at the old Enterprise Ireland site, DCU Alpha hosts not only innovative companies but also conferences, talks and hackathons. Alpha plans to grow to 100 companies and 800 jobs over the next three years.

Vaccinogen and DCU seek to develop cancer vaccines

In 2015, US-based cancer vaccine company Vaccinogen signed an agreement with DCU which giving the company an exclusive two-year option to evaluate and acquire an innovative platform to develop safe and effective cancer vaccines and immunotherapies. The scientific team that developed the Direct Clone Analysis and Selection Technology (DiCAST) technology at DCU, including lead researcher Dr Paul Leonard, has joined Vaccinogen and will spearhead the company's operations in Ireland.

DCU Business Matchmaker forges links

In a world of digital communication, sometimes the most effective way to connect is face to face. In 2015, DCU Invent held its first Business Matchmaker event at The Helix, enabling more than 100 participants from DCU researchers industry to meet in 15 minute one-to-one sessions to discuss potential areas of collaboration. Fruitful links were forged, including collaborations between DCU researchers and companies Oriel Sea Salt and IT Solutions.

IRC New Foundations for Civic and Community Engagement

DCU researchers were successful applicants in this scheme, which supports projects that are focused on civic and community engagement and involve civic society partners.

Dr Niamh Gaynor is collaborating with ActionAid on "Community based approaches to tackling Gender-based violence (GBV) in Malawi: Lessons and challenges of involving women and men"; Dr Walt Kilroy is working with

Kimmage Development Studies Centre in a project on "Civilian protection in peace support operations" that involve field work in Darfur; Dr Emma Murphy is linking with Arthritis Ireland on "Developing Arthritis Ireland's Easy to Use Scheme from pilot project to established trademark scheme"; Dr Debbie Ging is collaborating with GLEN (Gay and Lesbian Equality Network) on "Taking the Temperature: Developing and Piloting an LGBT-Positive School - Climate Evaluation Survey Tool for Post-Primary Schools in Ireland" and Mairead Cooney for dissemination and network building in the area of behavioral nutrition and physical activity.

Look to the future

Alan Harvey states: *"Looking forward, we now have systems in place that provide better support to help DCU researchers win external awards, engage with enterprises, or take steps towards creating their own company. We have also been simplifying our procedures to make it even easier than before for organisations to choose to interact with DCU."*