



A Journal of the Institute of Chemistry of Ireland

SFI 2018 Science Awards recognise key leaders in the Irish Research Community



Professor John Boland, Trinity College Dublin and SFI Research Centre AMBER, SFI Researcher of the Year

The winners of the prestigious 2018 Science Foundation Ireland Awards were revealed at the annual SFI Science Summit. Joined by over 350 leading members of the Irish research community, Science Foundation Ireland is celebrating their researchers' contributions to Science, Technology, Engineering and Maths.



Institiúid Ceimice na hÉireann The Institute of Chemistry of Ireland

ICI Centenary 1922-2022

Patron: Michael D. Higgins, President of Ireland

The Professional Body Representing Chemists in Ireland

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**School of Chemical and
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A message from the President

December 2018

Dear Colleagues,

This year has been an eventful year for the Institute culminating in the recent Inorganic Chemistry Symposium in Queens University, Belfast on 17th December. Notable events in 2018 included the ICI Congress in May held in Athlone Institute of Technology and the 70th Irish Universities Chemistry Research Colloquium in Queens University Belfast.

The ICI Congress will be held in National University of Ireland, Maynooth on 20th May 2019 with the topic ‘Molecular Sensing and Molecular logic’. Preparations are also being made to host the 71st Irish Universities Chemistry Research Colloquium at the end of June co-hosted by the Technological University Dublin (City Campus) and Royal College of Surgeons in Ireland. Next year will prove challenging with the impending uncertainty caused by Brexit, which has the capacity to change the economic and political landscape. I would like to thank Pat Hobbs for editing this edition of Irish Chemistry News and wish you all a peaceful break and a prosperous new year.

John Cassidy

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Editorial

The end of another year approaches and this is the 4th Issue of ICN in 2018. Some Issues have been much larger than I originally intended resulting in less Issues in 2018. In addition academic papers will no longer appear in ICN but will be published in Chemistry Ireland. Hopefully the inaugural volume will be published in the spring. I have a number of our award winners preparing papers and when I receive a sufficient number Volume 1 No 1 will appear.

The Inorganic Chemistry community have been very active leading up to Christmas with no less than three seminars between November and Christmas week.

I have a report in this Issue on the 2nd Symposium of the Irish Biological Inorganic Chemistry Society – BICS-2 held at NUI Galway on the 2nd November. I hope to have reports on the other two at UCD and QUB in December in the next Issue.

Work is underway for EuChemS 8ECC - Lisbon 2020. Our President Prof John Cassidy will attend a Scientific Committee meeting in Lisbon in early January. Heads of Chemistry Schools and Principal Investigators you need to be planning to send teams to Portugal in 2020 in anticipation of our hosting (ECC in Dublin in 2022. A very strong attendance from Irish researchers is essential in Lisbon. It seems to be that Irish researchers are behind the curve when it comes to attending this growing international chemistry congress compared to other European countries. Let's change this image.

Our cover has a photo is of Professor John Boland, Trinity College Dublin and SFI Research Centre AMBER, SFI Researcher of the Year at the prestigious 2018 Science Foundation Ireland Awards and there is an article about the awards in this Issue.

January 17th sees the annual suite of co-hosted conferences and exhibition at City West Hotel on Sustainability, The National Pharmaceutical and Life Sciences Expo and Lean Productivity hosted by Premier Publishing Ltd and it's free to attend. In 2019 they host the Northern Ireland Manufacturing & Supply Chain Expo in the Titanic Exhibition Centre, Belfast on 13th of February.

EuChemS/IUPAC will celebrate the 150th anniversary, the International Year of the Periodic Table of Chemical Elements (IYPT2019) at UNESCO in Paris and I will attend on behalf of the Institute.

Included in this Issue is a report on the ISTA Senior Science Quiz National Final 2018.

This year, the Year of ITPT, the Irish Schools Chemistry Competition 2018/2019 invites students to submit a poster appropriately titled "The Periodic Table of the Elements". See notice Page 15.

I urge qualified readers and researchers to encourage your colleagues to join the Institute and engage in promoting chemistry. Membership forms are available on our website.

Comments and Responses are welcome and can be sent to:-

info@instituteofchemistry.org

Patrick Hobbs MSc, FICI, CChem, CSci, MRSC.

Editor

December 2018



INORGANIC IRELAND SYMPOSIUM 2018

DATE(S) 17/12/2018 - 17/12/2018 **TIME** 9:00AM - 5:00PM

LOCATION QUB, David Keir Building, 39-123 Stranmillis Rd, Belfast BT9 5AG, UK

This meeting aims to bring together inorganic chemists from across the island of Ireland to discuss the latest developments in inorganic chemistry. We invite contributions on all aspects of inorganic chemistry (e.g. materials, catalysis, electrochemistry, coordination chemistry and medicinal chemistry).

Abstracts for oral presentations should be submitted to [Dr Mark J. Muldoon](#) by October 31st and abstracts for posters should be submitted by November 17th.

Further details about the meeting and abstract template will be available soon.

Plenary Speaker: [Prof. Manfred Bochmann](#), winner of the 2017 RSC Applied Inorganic Chemistry Award.

Organising committee:

Celine Marmion (Royal College of Surgeons in Ireland)
 Aidan McDonald (Trinity College Dublin)
 Grace Morgan (University College Dublin)
 Constantina Papatriantafyllopoulou (National University of Ireland Galway)
 Mark J. Muldoon (Queen's University Belfast)

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For more information, please contact [Dr Mark J. Muldoon](#).



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EuChemS

Chemistry Congress

**30 August to 3 September
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INVITATION TO THE 8th EuChemS Congress

The Portuguese Chemical Society (SPQ), with the support of the Portuguese Electrochemical Society (SPE), has the great pleasure of inviting you to the 8th EuChemS Chemistry Congress (8ECC), to be held in Lisbon, Portugal, from August 30 to September 3, 2020.

The 8ECC will be built under the unifying theme of Chemistry the Central Science, providing an exciting scientific program led by world class experts, and will focus on the central role of chemistry at the interfaces with biology, material and environmental sciences, both for the progress of humankind and for the solution of fundamental problems of modern societies.

This will be an excellent opportunity to enjoy Lisbon, a historic capital full of charm, with more than 800 years of culture blended with modern lifestyle.

The Lisbon Conference Centre, facing the Tagus river, is the perfect place to hold a unique event that will showcase the most recent advances of chemical sciences in Europe and around the world, and will allow fruitful discussions in every area of chemistry.



EuChemS

European Chemical Society

9th EuChemS European Chemistry Congress to be held in Dublin, Ireland, in 2022

<http://www.euchems.eu>

At the recent meeting of its Executive Council, The European Chemical Society (EuChemS) awarded the 9th EuChemS European Chemistry Congress to Dublin. This prestigious congress is held every two years and brings together the leading researchers and industry partners in all chemistry disciplines from across Europe and the wider international arena.



Ireland Section

The organisers expect up to 3,000 delegates from around the globe to attend the event in The Convention Centre Dublin, in 2022. The five-day programme will consist of plenary and parallel lectures, poster sessions, symposia, networking events, and an industrial exhibition, and will also be part of a wider programme of events in 2022 celebrating the centenary of the Institute of Chemistry of Ireland.

The European Chemical Society, was official announced at ECC7 in Liverpool, August 2018. Formerly (2004–2018) the European Association for Chemical and Molecular Sciences (EuCheMS) and before that (1970–2004) the Federation of European Chemical Societies (FECS).

The European Chemical Society (EuChemS) coordinates the work of almost all the European Chemical Societies. As an organization, it provides an independent and authoritative voice on all matters relating to chemistry, and places chemistry at the heart of policy in Europe. Furthermore, EuChemS seeks to develop its members through various activities, workshops and awards.

Under the new EuChemS the next Congress, ECC8 will be hosted by **The Portuguese Chemical Society** (SPQ), with the support of the **Portuguese Electrochemical Society** (SPE), invites you to attend this must go to series of European chemistry conferences, the 8th EuChemS Chemistry Congress (8ECC), to be held in Lisbon, Portugal, from August 30 to September 3, 2020.



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Senior Science Quiz National Final 2018

The National Finals of the annual ISTA Senior Science Quiz took place in the **Tercentenary Hall in Trinity Biomedical Sciences Institute** on **Saturday 24th November**. It was full to capacity with **50 teams** of Leaving Certificate science students representing **20 counties** from all around Ireland and their teachers. Almost 1100 Leaving Certificate students took part in the Regional Finals held during Science Week and the top **150 LC students** were invited to the **BioPharmaChemical Ireland** sponsored **National Final**.

The charity associated with the quiz this year was the **Irish Kidney Association** highlighting organ donation. All attendees received a pen and an organ donor card. Thanks to **Colin White** IKA National Projects Manager for attending the quiz and accepting a small donation. Thanks also to **Enda Dempsey** who represented **BioPharmaChemical Ireland**.

St. Eunan's, Letterkenny, Co. Donegal overall winners for 2018.



St. Eunan's, Letterkenny, Co. Donegal overall winners for 2018.

Gerry Murphy, RTÉ & Met Eireann, (Quizmaster), Conal Bonar, Ben Harkin, Liam Keane.
Mr. Enda Dempsey (BPCI) & Ms. Mary Mullaghy (National Quiz Coordinator).

Thanks to all the local coordinators and their teams in the **14 Branches of ISTA** who facilitated the Regionals Rounds during Science Week. (**Sarah Brusey, Maura Conneally, Brendan Duane, Gary Galvin, Maireád Donnelly, Michelle Lyons, Mary McDonagh, Siobhán McCormack, Triona Mulcahy, Sam Pearson, Seamus O'Donghaile, Aodhagan O'Suilleabhain, Seán Reidy, Maria Sheehan & Brian Smyth**). Thanks also to the **Dublin Branch of ISTA** who organised the Final. A special thanks to **Prof Luke O'Neill** who welcomed us to Trinity College and also presented copies of his book *'Humanology'* as spot prizes for the teachers. Thanks to **John Loughlin**, current Chairperson of ISTA and **Gerry Murphy, RTÉ & Met Éireann** who acted as guest quizmaster, **BioPharmaChemical Ireland** main sponsor, **Trinity College** who provided the venue. Also thanks to **CJ Fallon, Folens, ICI, IoP Ireland, SEAI, StudyClix & TIMSTAR** who provided **spot prizes** and last but not least the students and their teachers who attended.

Congratulations and well done to **ALL** who participated. The top 10 teams this year were:

- **St. Eunan's, Letterkenny, Co. Donegal**
- **St. Louis C.S., Kiltimagh, Co. Mayo**
- **St Columba's, Stranorlar, Co. Donegal**
- **Ardscoil Rís, Limerick**
- **CBS High School, Clonmel, Co Tipperary**
- **St. Mary's CBS Enniscorthy, Co. Wexford**
- **Ardscoil na Trionoide, Athy, Co. Kildare**
- **St Mary's College, Galway**
- **Summerhill College, Sligo**
- **St Gerard's, Bray, Co. Wicklow**



ICI Schools Chemistry Competition 2018/19

First Prize: €100
sponsored by

**The Institute of
Chemistry of
Ireland**

**Irish Chemical
News**, the journal of
The Institute of
Chemistry of
Ireland, may
consider publishing
extracts from the
winning poster.

It may also be
circulated with
**Chemistry in
Action.**

**Two runners-up
prizes: €50 each**

The competition is
supported by the

**Irish Science
Teachers'
Association**



- This competition is open to all second-level students, including transition years, interested in Chemistry.

Students should submit a poster on the theme of *The Periodic Table of Chemical Elements*, suitable for the non-scientist, outlining clearly and accurately any aspects of the topic in an engaging, informative and easily readable manner.

- The poster should be submitted electronically as an email attachment to: info@instituteofchemistry.org
- Sources of information must be cited.
- The name and contact details of both student and teacher, including the school name, should be clearly stated.
- The entrants are strongly encouraged to use good quality graphics/photographs in their poster.
- Only individual entrants are allowed.
- Closing date is **Tuesday 19th February 2019**.
- Failure to abide by rules will mean automatic disqualification.

The Institute of Chemistry of Ireland will nominate an adjudicating panel. Strict adherence to the guidelines will be taken into account when assessing each newsletter.

Winning students will be contacted and awarded their prizes in 2019.



The 2019 National Sustainability Summit will be held on the 17th January in the Citywest Hotel, Dublin.

Firstly, thanks to everyone that made last year's event such a success. Over 1000 delegates gathered to hear from 80 speakers and network with over 50 exhibitors offering cutting edge technology and services.

This year we plan to expand the scope over the event with over 120 speakers. The speaker line up is drawn from senior management from the largest and most influential Irish and international companies who have delivered quantifiable eco results. Speakers come from areas such as pharmaceutical, food, aviation, retail, hospitality, food, construction, manufacturing, IT, logistics and supply chain and energy sectors will deliver compelling case studies that will help you create a sustainable business of your own or adapt your current business model.

Get ahead of your peers, and participate in the National Sustainability Summit for an engaging and thought-provoking event, which will stimulate debate and help you to make the correct decisions to improve sustainability and profitability.

Key topics will include:

Water Management, Energy Efficiency, Sustainable Energy, Recycling, Waste Reduction, Sustainable Construction & Buildings, Sustainable Food, Sustainable Manufacturing, Sustainable IT, Sustainable Technology, Consumer Engagement, Sustainable Packaging, Sustainable Logistics and Supply chain, Regulations and Policy, Sustainable Investment, Tax and Legal issues, Sustainable Transport, And Much More ...

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Irish Biological Inorganic Chemistry Society

The *Irish Biological Inorganic Chemistry Society – IBICS*, officially launched in RCSI in May 2017, aims at gathering researchers working in the field of biological and medicinal inorganic chemistry to build and foster a multidisciplinary community of scientists that crosses the interface between biology, chemistry, physics, medicine and other related disciplines across the island of Ireland. The Society has been already recognized by the *Society of Biological Inorganic Chemistry* (SBIC, <http://sbichem.org/>), it has been granted charitable status (registered number: 20201838), and has grown to nearly 90 members to date.

Following the success of the inaugural symposium co-organized by Dublin Institute of Technology and Maynooth University in November 2017, the 2nd Symposium of the Irish Biological Inorganic Chemistry Society – IBICS-2 - was held in NUI Galway on November 2nd, 2018. This one-day event featured a series of talks, flash and poster presentations, and aimed to show the full breadth, diversity and high quality of biological inorganic chemistry in Ireland. A highlight of the Symposium were two plenary lectures delivered by **Prof. Eva Freisinger** (www.chem.uzh.ch/en/research/groups/freisinger/curriculumVitae.html), an international expert on bioinorganic chemistry from the University of Zurich, Switzerland and **Prof. Geoffrey Gadd** (www.lifesci.dundee.ac.uk/people/geoff-gadd), an internationally renowned biologist from the University of Dundee, UK.

Report to the Institute of Chemistry of Ireland

1. Meeting Details

Name: 2nd Symposium of the Irish Biological Inorganic Chemistry Society – IBICS-2

Date: Friday, November 2nd, 2018

Venue: Institute for Lifecourse and Society, National University of Ireland Galway (Galway)

Local Organizing Committee: Luca Ronconi (Chair), Pau Farras Costa, Constantina

Papatriantafyllopoulou

2. Attendance

51 participants (30 PhD students, 4 postdoctoral researchers, 17 academics)

3. Programme

This one-day symposium started at 9:00 am and included four scientific sessions featuring:

- 2 plenary lectures (fifty minutes each) delivered by the internationally renowned invited guest speakers

- 8 oral presentations (twenty minutes each), 5 of which were delivered by early career researchers (3 postgraduate students in the final year of their PhD, 2 postdoctoral researchers)

- a dedicated session including 6 flash presentations (five minutes each) delivered by selected PhD students to present their work (also featured in their posters)

- a dedicated one-hour poster session (19 posters) was held during the coffee break, so as to allow the poster presenters to discuss their research projects with the participants.

A light lunch was provided (free-of-charge) halfway.

Two *ex-equo* poster prizes were awarded at the end of the symposium.

Monetary support to the symposium was granted by the **Institute of Chemistry of Ireland**, the **Royal Society of Chemistry -Republic of Ireland Local Section**, the **Royal Society of Chemistry - Dalton Division (Scientific Meetings Grant)** and the **Registrar's Office of the National University of Ireland Galway**.

The poster prizes (two books) were sponsored by the Metal Ions in Life Sciences book series and were presented to the awardees by the guest speaker **Prof. Eva Freisinger** who is a co-editor of the aforementioned book series.

4. General Remarks

51 delegates contributed to make this a highly successful meeting. There was a very good spread from the different Irish institutions, and almost all the Irish Universities were represented (TCD, UCD, NUI Galway, DCU, UCC, NUI Maynooth and RCSI), as well as three Institutes of Technology (DIT, AIT and ITT).

The symposium proved an ideal occasion to strengthen existing collaborations and make new ones in order to create a national network with enhanced international visibility. It was especially beneficial to early career researchers who had the opportunity to exchange knowledge and ideas across the Irish bioinorganic community. Most of the oral presentations were delivered by young researchers and, in addition to the usual poster session, there was a dedicated flash presentation session for postgraduate students to present their work. In this regard, two Poster Prizes were awarded to the PhD students David Cullinane (DCU) and Aisling Ryan (RCSI) in recognition of their outstanding poster presentations.

Besides the scientific outcomes, the Annual General Meeting of the Society was held at the end of the symposium, during which new strategies to further develop and expand the IBICS were envisaged and discussed. Twenty new members joined the Society during the meeting, mostly researchers in the early stage of their career.

6. Future Perspectives

The aspiration of the Irish Biological Inorganic Chemistry Society is to consolidate and expand its leading role in fostering a multidisciplinary community of scientists within the field of bioinorganic and medicinal inorganic chemistry across the island of Ireland, as well as to achieve recognition at international level.

The Standing Committee of the Society has already initialized the process to identify the Institution willing to organize the 3rd symposium later in 2019.

Given that the majority of the members are chemists, a major goal is to involve more biologists, pharmacologists and medical doctors in order to effectively strengthen and expand the biological competences and skills of this network.

At a later stage, the Society would also aim at engaging with potential industrial partners interested in the exploitation and (where feasible) commercialization of the technology developed within the network itself.

Dr. Luca Ronconi (on behalf of the Local Organizing Committee, Galway, 26/11/2018)

Plenary Speakers



Prof. Dr. Eva Freisinger

Eva Freisinger studied Chemistry at the University of Dortmund, Germany, and conducted her Diploma Thesis in Bioinorganic Chemistry with Prof. Bernhard Lippert. In the same group she received her doctoral degree for the »*Structural investigation of metal ion coordination to model nucleobases*« with the aid of single crystal X-ray crystallography. Subsequently she worked for three years as a postdoctoral researcher in the Structural Biology group of Caroline Kisker at the State University of New York (SUNY) at Stony Brook, New York, USA, partly funded by a fellowship of the German Research Foundation.

During her stay abroad, she got acquainted with macromolecular crystallography and the methods involved in protein over-expression, purification and characterization.

Since 2003, Eva Freisinger is heading a research group in the field of Bioinorganic Chemistry at the Department of Chemistry (formerly the Institute of Inorganic Chemistry) of the University of Zurich, Switzerland. She started there as an *Oberassistent* and held a *SNSF Professorship* from 2008-2014. After her habilitation entitled »*Spectroscopic and structural investigations of plant metallothioneins*« she continued as a *Privatdozent* and was promoted to Associate Professor for Bioinorganic Chemistry and Chemical Biology in 2018.

Abstract

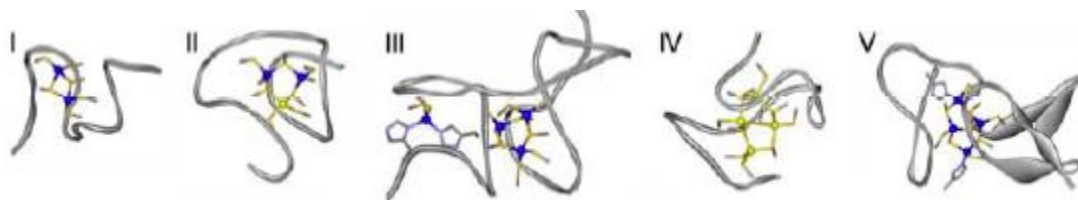
Metallothioneins (MTs) are ubiquitous metalloproteins generally characterized by a low molecular weight, a large Cys content and, as a result, a high affinity for thiophilic metal ions such as ZnII, CuI, CdII, etc. The major lack of secondary structural elements enables the metal-free apo-MTs (or thioneins) to wrap their amino acid chains quite efficiently around the respective metal ions creating metal cluster structures of various sizes (depending on the protein sequence). The resulting large metal ion binding capacities govern the role of MTs in metal ion homeostasis and detoxification, while the high cysteine content accounts for the additional function against oxidative stress. MTs also serve as prime example for

proteins with extraordinary high thermodynamic stability of metal ion binding; however, this is combined with a certain kinetic lability of the clusters allowing to fulfil the homeostatic function.

While mammalian MTs exclusively use Cys residues as ligands, more and more examples from other phylae emerge that show participation of histidine residues in binding, enlarging the great varieties of possible cluster structures even further (Figure 1).

It will be the aim of this talk to provide an overview of MTs and the methods applied for their study with a focus on more recent highlights and insights from the research on non-vertebrate MTs.

Figure 1.



Examples of 3D structures with divalent metal ions (ZnII blue, CdII yellow): I, Zn₂Cys₆ cluster of wheat Zn₆Ec-1 (PDB ID 2L62); II, CdZn₂Cys₉ cluster of rat Cd₅Zn₂MT₂ (4MT₂); III, ZnCys₂His₂ site and Zn₃Cys₉ cluster of wheat Zn₆Ec-1 (2KAK); IV, Cd₄Cys₁₁ cluster of rat Cd₅Zn₂MT₂ (4MT₂); V, Zn₄Cys₉His₂ cluster of cyanobacterial SmtA (1JJD).

Acknowledgements

Financial support from the Swiss National Science Foundation as well as the *Forschungskredit*, the Faculty of Science and the Department of Chemistry of the University of Zurich is gratefully acknowledged.



Professor Geoff Gadd FSB FLS FLSW FRSE

School of Life Sciences,, University of Dundee, Boyd Baxter Chair of Biology, Geomicrobiology Group, Geomycology and Bioremediation.

Abstract

Metals are directly and/or indirectly involved in all aspects of microbial growth, metabolism and differentiation. Many metals are essential, e.g. K, Na, Mg, Ca, Mn, Fe, Co, Ni, Cu, Zn, Mo, whereas others have no known essential biological function(s), e.g. Al, Ag, Cd, Sn, Au, Sr, Hg, Tl, Pb. All these elements can interact with microbial cells and be accumulated as a result of physico-chemical mechanisms and transport systems of varying specificity, independent of, or directly and indirectly dependent on, metabolism.

Virtually all metals, whether essential or inessential, can exhibit toxicity above certain threshold concentrations which for highly toxic metal species may be extremely low, e.g. Ag^+ . Despite this, microbes may employ many mechanisms that ensure survival including extracellular precipitation, complexation and crystallization, transformations including oxidation, reduction, methylation, and dealkylation, biosorption to cell walls, extracellular polysaccharide etc., impermeability, decreased transport, efflux, intracellular compartmentation and/or sequestration. Such processes cause changes in metal speciation, and therefore mobility and bioavailability, and are of global importance being components of major biogeochemical cycles, including microfossil formation, iron and manganese deposition, silver and uranium biomineralization, as well as resulting in transfer to other organisms via food chains.

They are also of relevance to pollutant fate in the environment and biotechnological applications for clean-up, detoxification, element biorecovery and recycling. [1] Solubilization mechanisms enable removal of metals from wastes and by-products, low-grade ores, and metal-bearing minerals, while immobilization processes enable metals to be contained and/or transformed into chemically more inert forms. The latter can also lead to formation of biominerals or metallic elements with catalytic or other properties in nanoparticulate, crystalline or colloidal forms, and these are relevant to biorecovery of valuable elements and development of novel biomaterials for structural, biotechnological, medical and environmental purposes. [1]

Many metal nanoparticles exhibit novel catalytic and physico-chemical properties including antimicrobial activity. This presentation will outline some features of microbial interactions with metals and minerals from an environmental and biotechnological perspective, where possible emphasising the basic physiology and chemistry involved and significance for human health and well-being.

Acknowledgements

Financial support of the Geomicrobiology Group is received from the Natural Environment Research Council [NE/M010910/1 (TeaSe); NE/M011275/1 (COG3)] which is gratefully acknowledged.

References

[1] G.M. Gadd, *Microbiol.* **2010**, *156*, 609.

Organising Committee Members



Prof Celine Marmion President IBICS



Dr. Luca Ronconi Chair IBICS-2

Prizes



PhD students Aisling Ryan (RCSI) and David Cullinane (DCU) with Eva & Luca

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Scope

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The journal has a broad scope which includes spectroscopy, dynamics, kinetics, statistical mechanics, thermodynamics, electrochemistry, catalysis, surface science, quantum mechanics and theoretical developments play an important part in the journal. Interdisciplinary research areas such as polymers and soft matter, materials, nanoscience, surfaces/interfaces, and biophysical chemistry are especially welcomed whenever they include a physico-chemical approach.

PCCP is proud to be a Society journal and is co-owned by 19 national chemical societies. The journal is published by the Royal Society of Chemistry on a not-for-profit basis for the benefit of the whole scientific community.

Impact factor: 4.493*

Publishing frequency: 48 per year

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<http://pubs.rsc.org/en/journals/journalissues/cp#!recentarticles&adv>



USP-NF

Pharmacopoeial Forum (PF)

Pharmaceutical Continuous Manufacturing (PCM) USP Paper Published

In the November edition of the Pharmacopoeial Forum 44(6), the US pharmacopoeia USP has published a Stimuli Article on pharmaceutical continuous manufacturing. A continuous process means the **continuous feed** of input materials, their processing and the **continuous removal** of output materials. This definition is universally valid; however, the paper focusses on the manufacture of oral solid dosage forms (OSD).

Apart from important definitions, the document contains further information that is important for continuous manufacturing. The document includes the following interesting sections:

- Definitions
- Material properties and characterisation
- Risk management, PAT and statistical tools
- Regulatory considerations

The part "Definitions" discusses terminology such as the **batch**, flow rate, residence time & residence time distribution, state-of-control und steady-state and control strategy.

When processes are carried out continuously, material properties in terms of **processability** are of much greater importance than in discontinuous batch production. Therefore, a whole section has been dedicated to this topic which still only covers materials for manufacturing oral solid dosage forms and an example for direct pressing of tablets. Also using the tablet as an example, it shows possible errors in individual process steps and their possible root cause in the form of material properties.

The section "Risk Management/PAT" contains little specific information on risk management; it does, however, contain two concrete examples on the use of PAT (Process Analytical Technology). One example is the non-spectroscopic determination of active substance concentration during the feeding. The second example is a spectroscopic measurement of content uniformity during the process.

The section on regulatory considerations is not very specific; it does show, however, which **key aspects** pharmaceutical companies and (regulatory) authorities should cover in order to secure the quality of continuously manufactured medicinal products. These aspects (e.g. material properties, process dynamics, process monitoring, deviation handling, material traceability, batch definition, quality control and sampling strategy, etc.) should be paid close attention to during the development of a continuous process as well as in the regulatory review.

The article is part of the most recent Pharmacopoeial Forum: 44(6) Stimuli to the revision process: [USP \(Pharmacopoeial\) Perspective for Pharmaceutical Continuous Manufacturing](#)

Access to the document is free of charge, only a free registration is necessary.

Next Issue 4 http://www.usppf.com/pf/pub/data/v446/GEN_STIMULI_446_s202124.xml

Registration required

44(6) Stimuli to the Revision Process: USP (Pharmacopoeial) Perspective for Pharmaceutical Continuous Manufacturing

PF is a free bimonthly online journal in which USP publishes proposed revisions to *USP–NF* for public review and comment.

New issues are posted online every two months at the beginning of the month. The comment period is 90-days and ends on the last day of the month ([View current PF Publication and Comment Schedule](#)).

Information Featured in PF

To make it easier for users to identify and respond to proposed changes to *USP–NF* standards, PF now contains only proposals for which USP is seeking public comment and information, including:

- In-Process Revisions
- Proposed Interim Revision Announcements (IRAs)
- PDG Harmonization Proposals (Stage 4)
- Stimuli Articles

▶ Access PF Online

(Please note: a one-time registration is required to access PF.)

In addition, PF provides access to previously published issues of PF Online dating back to 2002. Other information previously in PF, including official text (final IRAs), is now published on the USP website or in other publications.

<https://www.uspnf.com/pharmacopoeial-forum>



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Citywest Hotel 17th January 2019



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The purpose of the event has a singular focus — Bring together 1000+ senior management from sectors such as Manufacturing, Food, IT, Retail, Hospitality and tourism, Utilities and energy, banking and Finance, Aviation, healthcare etc that have an interest in improving their business performance, productivity and cost performance.

Key delegates will include:

Managing Directors, Operation directors, finance directors, Lean directors, continuous improvement directors, heads of productivity, change directors, sustainability directors, plant managers, supply chain directors, manufacturing directors, senior engineers etc.

The aim is to facilitate knowledge sharing, networking and the demonstration of lean, productivity and continuous improvement trends, technology and innovations.

The speaker line up is drawn from senior management from leading Irish and multinational companies that are leading the way in making their business more efficient and productive.

Key topics will include:

Business transformation, Waste reduction, change management. lean sigma, leadership and culture, continuous improvement, reducing downtime, Data/ IT, decreasing workplace footprint ,business excellence, production optimisation, sustainability, yield management, employee efficiency, process efficiency, quality management, skills and training, cost reduction, OEE, ERP, competitiveness, business intelligence, consumption reduction, inventory optimisation, manufacturing intelligence and much more

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The National Pharmaceutical and Life Sciences Expo is being held in the Citywest Exhibition Centre on January 17th 2019

This gathering of over 1000 senior management from the pharmaceutical and life-sciences sector offers an opportunity for the pharma and life science sector to gather and keep up to date with the latest innovations, best practice and new technology solutions

Over 30 speakers and 50 exhibitors will inform and educate and inform the delegates who have network and listen to key note talks.

Sectors Attending – Pharma
 – Biotech
 – Med-tech
 – Diagnostics
 – Animal health

Why Attend

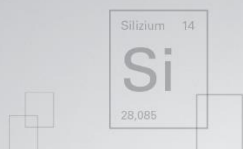
- Educational seminars on the latest industry issues
- Key insights from industry thought leaders & service providers
- First-hand case studies from leading Irish and global pharmaceutical and life science companies
- Hands-on demonstrations of the latest solutions in the technology showcase
- Excellent networking opportunities with peers throughout the day
- Meet over 50 exhibitors that can meet your needs

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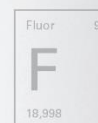


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**The 20th annual Eurachem competition will be
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Opening Ceremony January 29th free to attend at UNESCO in Paris

Registration end January 9th. <https://fr.unesco.org/feedback/rsvp-290119>

In December 2017, the United Nations proclaimed 2019 the International Year of the Periodic Table of Chemical Elements (IYPT2019). The year-long celebration will coincide with the 150th anniversary of Russian scientist Dmitri Mendeleev's 1869 breakthrough in recognising the predictive properties of elements and their compounds. From Mendeleev's initial 63 elements, the Table now comprises a total of 118 elements – ranging from the familiar, such as hydrogen, to the more obscure, like praseodymium.

Today, the Periodic Table stands out as a universally known symbol of science, as well as being itself, an example of science's global language. The UN decision, enthusiastically welcomed by scientists across the globe, offers a unique opportunity to showcase the pivotal role played by science and chemistry over the last 150 years, as well as the importance it continues to play in facing the challenges of today. From the environment to energy, industry to agriculture, health to education, the reach of the chemical sciences is broad and fundamental.

EuCheMS, as the voice of chemistry in Europe, is one of 5 supporters of the **International Union of Pure and Applied Chemistry (IUPAC) initiative**. Along with our Members and Professional Networks, we will actively promote the International Year of the Periodic Table throughout 2019, through articles, social media, games and various activities, but also through many events at both national, European and international level.

We invite you to take a look at [our activities, events](#), as well as how to [get involved!](#) Follow the hashtag #IYPT2019 on social media to follow all the latest news!

Are you a EuChemS Member or Professional Network organising an event related to the IYPT2019? [Fill in our online form](#) to have your event added to our calendar!

Periodic Table of Younger Chemists



In celebration of the 100th anniversary of IUPAC and the International Year of the Periodic Table, IUPAC and the International Young Chemists Network (IYCN) announced the creation of a Periodic Table of Younger Chemists. Beginning in **July 2018** and ending in July 2019 at the World Chemistry Congress and IUPAC General Assembly, a diverse group

of 118 outstanding younger chemists from around the world who embody the [mission and core values of IUPAC](#) will be celebrated. The resulting periodic table will highlight the diversity of careers, creativity, and dedication of the young chemists leading us into the next century. Winners will be profiled on the IUPAC100 website and will receive a certificate from IUPAC. Elements of the Periodic Table of Younger Chemists will be revealed over time in order of scientific discovery ([see Wikipedia](#)). Approximately eight elements will be revealed each month beginning in July 2018 with the final elements being awarded at the **IUPAC General Assembly and World Chemistry Congress in Paris, France in July, 2019**. Don't wait any longer, **nominate a Young Chemist!**

[Read more about this IUPAC and IYCN initiative here.](#)

Periodic Table Song:-

https://www.youtube.com/watch?v=rz4Dd1I_fX0

Sir Martyn Poliakoff made video's about every chemical element:-

<https://www.youtube.com/watch?v=6rdmpx39PRk&list=PL7A1F4CF36C085DE1>



For Limited Time Free Entry- Register Here

Join us at the 2019 Northern Ireland Manufacturing & Supply Chain Expo is being held in the Titanic Exhibition Centre, Belfast on 13th of February to hear from an impressive line-up of manufacturing leaders, academics and government agencies who will engage in a stimulating blend of key note addresses and debates.

Creating an Innovative Manufacturing & Supply chain Ecosystem

New approaches and technology have been introduced in recent years that have created significant organisational and process improvements. The aim of the conference is to showcase such innovative approaches and to disseminate the cutting edge research that underpins them.

The conference will be of interest to senior management, established practicing engineers and researchers together with those that are much earlier in their careers.

Delegates have registered from leading food, pharmaceutical, medical, chemical, electronics and engineering manufacturing sectors.

Manufacturers small and large from across the Northern Ireland will gather to challenge political decision makers to deliver a business environment which manufacturing deserves. Delegates attending the conference will:

- gain industry insights to help their business plan ahead
- share good practice and learn from each other's experience
- connected with senior business leaders to find new business opportunities
- meet with key technology providers in the dedicated exhibition area

Key Topics included:

Procurement, Lean Manufacturing, Control & Automation, Supply Chain Optimisation, Information Technology Logistics, Energy Management, Facilities Management Sustainability, Project Management, Health & Safety Warehouse Management, Materials Handling & Robotics

To book your **FREE** place at the event

SFI-Wellcome Trust Four-year PhD Programmes in Science - Call Open

Call now open

SFI and the Wellcome Trust are pleased to announce that researchers based at eligible host institutes in Ireland can now apply to the recently launched Wellcome Trust Four-year PhD Programmes in Science call.

The Wellcome Trust PhD programmes in Science scheme funds PhD programmes that offer graduates outstanding training in scientific research at eligible host institutions in Ireland and the United Kingdom. This programme also allows for partnerships with eligible organisations based anywhere in the world. Further information on The Wellcome Trust PhD programmes in Science call can be found

[here.](#)

Applications should be made directly to Wellcome. All applicants are strongly encouraged to contact Wellcome for advice in advance of submission. Wellcome is responsible for the application assessment process and the final funding decision, liaising with SFI at each stage. Successful applications to the Wellcome Trust PhD programmes in Science call will be co-funded by SFI and the Wellcome Trust.

The deadline for submission of preliminary proposals is 30th January 2019 at 17:00 Dublin Local Time.

Should you have any queries, please email contact@wellcome-ireland.com or phdcall2019@wellcome.ac.uk.

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Science Foundation Ireland 2018 Science Awards recognise key leaders in the Irish Research Community

Dublin, Ireland, Monday 12th November 2018 – The winners of the prestigious 2018 Science Foundation Ireland Awards were revealed at the annual SFI Science Summit today. Joined by over 350 leading members of the Irish research community, Science Foundation Ireland is celebrating their researchers' contributions to Science, Technology, Engineering and Maths.

Acknowledging the award winners, **Minister for Business, Enterprise and Innovation, Ms Heather Humphreys TD**, said "I am pleased to see the outstanding work of the Irish research community acknowledged through these SFI Science Awards. The recipients are among Ireland's top researchers and the awards recognise the contribution they are making in a number of areas including industry collaborations, entrepreneurship, communication and public engagement. I would like to congratulate each awardee on their tremendous achievements, their discoveries will bring economic growth and societal development in Ireland."

Director General of Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland, Professor Mark Ferguson, also congratulated the award winners, saying *"Every year the Science Foundation Ireland Awards provide an opportunity to highlight some of the excellent impacts and achievements of our research community. I want to congratulate the winners on their dedication and the contribution they are making to Ireland's economy and society. I am confident that their success will be a source of inspiration to their peers and, more importantly, to the next generation of researchers in Ireland. At Science Foundation Ireland we very pleased to see the superb quality of research that our funding enables, and are proud that Irish research continues to be impactful and world-leading."*

SFI Researcher of the Year 2018

The SFI Researcher of the Year Award recognises the accomplishments of a Science Foundation Ireland funded researcher who has contributed significantly to the Irish research community in the year of the award and/or throughout their career. The successful researcher has achieved exceptional scientific and engineering research outputs combined with a clear demonstration of the ability to communicate their research.

Recipient: **Professor John Boland, Trinity College Dublin and SFI Research Centre AMBER**

Prof. Boland received his BSc degree from University College Dublin and PhD from the California Institute of Technology. He is a Professor in the School of Chemistry at Trinity College Dublin and a former Director of the Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN) and AMBER, the SFI Research Centre for Advanced Materials and Bioengineering Research. His current research interests involve the electrical and mechanical properties of nanoscale materials, and the exploitation of nanoscale connectivity in device applications. He came to Ireland as an SFI Research Professor and has subsequently received three SFI Investigator awards. He is Ireland's first Advanced ERC grant awardee in the Physical Sciences.

Commenting on his award, **Prof Boland** said "I am delighted to accept this award from Science Foundation Ireland. Being recognised as Researcher of the Year is no small accolade and I am deeply honoured to receive it. Alongside my own work on nanoscale materials there are many diverse research projects ongoing across Ireland, and it is wonderful to see representatives from those being recognised. I want to thank SFI for this award and would like to congratulate the other recipients on their achievements."

SFI Early Career Researcher of the Year

The SFI Early Career Researcher Award recognises outstanding early career research talent.

Recipient: **Dr Tomás Ryan, Trinity College Dublin**

Dr. Tomás Ryan is Assistant Professor at Trinity College Dublin, in the School of Biochemistry and Immunology and the Trinity College Institute of Neuroscience. Tomás graduated from Trinity College Dublin in 2005 with a B.A. (Mod) in Genetics. He completed his Ph.D. in Molecular Neuroscience with Seth Grant at the University of Cambridge and the Wellcome Trust Sanger Institute in 2009. Following a year as Junior Research Fellow at Wolfson College, University Cambridge, he relocated to the USA to work as a Postdoctoral Researcher in the group of Susumu Tonegawa (Nobel Laureate, 1987) at Massachusetts Institute of Technology (MIT) (2010-2016). He began his independent research group in 2017 at Trinity College Dublin, where he investigates the basic neuroscience of memory storage using a multi-disciplinary approach. Tomás also holds a joint faculty position with the Florey Institute of Neuroscience and Mental Health at the University of Melbourne, Australia and a Visiting Research Scientist at HHMI Janelia Research Campus, USA. The Ryan Lab is supported by a European Research Council (ERC) Starting Grant, a Science Foundation Ireland (SFI) President of Ireland Young Researcher Award (PIYRA), and a Jacobs Foundation Fellowship.

Commenting on his receiving the award **Dr Ryan** said “I am honoured to have been selected as Early Career Researcher of the Year by Science Foundation Ireland. It is both humbling and encouraging to be acknowledged for the work that my team and I are doing together. The neuroscience of memory is a complex and developing field in need of young, independent researchers with appropriate support, and it is reassuring to have SFI behind us. It is a privilege to work in an environment where early career researchers are appreciated for their efforts and long-term potential, and are enabled to actualize their own research visions. I would like to thank SFI again for this award, and look forward to continued collaborative progress in investigating the intricacies of information storage in the brain.”

SFI Industry Partnership Award

The SFI Industry Partnership Award celebrates a collaboration between an SFI-funded academic research group and industry.

Recipient: **Dr Ivan O’Connell, Tyndall National Institute**

Dr Ivan O’Connell is the Analog Mixed-Signal Principal Investigator at Microelectronic Circuits Centre Ireland (MCCI), hosted in the Tyndall National Institute. The SFI CONNECT targeted project (MCCIADC) is a large multi-year collaborative project funding both Masters and Ph.D., postgraduate students, with Analog Devices (ADI). This collaboration enables the researchers, within Dr. O’Connells’ research group to build close relationship with technical experts within ADI. Ivan’s primary research interests are in the area of Analogue Mixed Signal Circuits and data converters. He is particularly interested in the application of this research in the application areas including: Internet of Things, Biomedical, Smart Agri and Energy Harvesting. He is currently a principal investigator in a number of Innovation Partnerships. Dr O’Connell is an SFI CONNECT Funded Investigator and a successful SFI-NSF iCorps awardee.

SFI Best International Engagement Award

This award recognises the accomplishments of a Science Foundation Ireland-funded researcher/group specifically in the context of their international activities.

Recipient: **Dr Peter O’Brien, Tyndall Photonics**

Prof. Peter O'Brien obtained his Degree and PhD in Physics from Trinity College Dublin and University College Cork respectively. He was a postdoctoral scholar at the California Institute of Technology and research scientist at NASA's Jet Propulsion Laboratory in Pasadena. He was founder and CEO of a Photonic's start-up company developing specialised optical imaging systems for biomedical and pharmaceutical applications, which he successfully sold in 2009. Prof. O'Brien is currently collaborating in 12 H2020-EU projects, is Director of the European Photonic Packaging Pilot Line and Deputy Director of the Irish Photonic Integration SFI Research Centre (IPIC). He is an adjunct professor at the College of Optical Science, University of Arizona, Tucson and a visiting researcher at Columbia University.

SFI Entrepreneurship Award

The SFI Entrepreneurship Award celebrates an entrepreneurial achievement by SFI supported researchers.

Recipient: **Professor Eoin Casey, University College Dublin**

Professor Eoin Casey is Head of the School of Chemical and Bioprocess Engineering, University College Dublin. He has been an academic in UCD since 2002 having previously worked in industry and at TU Vienna. He has a bachelor's degree (1994) and PhD (1999) in Chemical Engineering. His research is focussed on the materials-biology interface with a particular interest in how this can be applied to novel water treatment processes. He is a co-founder of the UCD spin-out OxyMem and is a PI in the BEACON SFI Research Centre.

SFI Outstanding Contribution to STEM Communication

This award recognises an outstanding contribution to the popularisation of science, and recognises an individual who raises public awareness of the value of science to human progress.

Recipient: **Dr Niamh Shaw, Blackrock Castle Observatory and Cork Institute of Technology**

Dr Niamh Shaw is an Irish engineer, scientist and performer. She presents the human story of science, creating theatre shows, public events and contributions to media with this focus. She has set herself a life's mission to get to space, as artist and explorer. She hopes that by sharing the human story behind such a venture, it will help us better understand our place in the story of space, and the beauty of our planet Earth. She is artist in residence at CIT Blackrock Castle Observatory, working closely with them on their many STEM promotion activities, including Space week. An alumnus of the International Space University's 2015 Space Studies Programme, she was the Humanities co-chair and Core Lectures Assoc Chair in 2018 & 2017 respectively. Her theatre work has toured internationally, and created by through SFI's Discover 2014 & 2017 Programmes in partnership with CIT Blackrock Castle Observatory and supported by European Space Agency, Arts@CERN, Culture Ireland, Arts Council of Ireland. She writes for BBC's Sky at Night magazine.

Recipient: **Dr John O'Donoghue, RSC Chemistry Education Coordinator at the School of Chemistry, Trinity College Dublin**

SFI Best Reported Impact

The SFI Best Reported Impact Award recognises the potential impact of an SFI researcher's award and their commitment to maximising the impact of their research.

Recipient: **Professor Jane Farrar, Trinity College Dublin**

Jane is a Professor in the School of Genetics and Microbiology, Trinity College Dublin and has three decades of experience in the field of inherited ocular disorders. Jane and the team's research interests

have been focused on how genetic information is driving the individualisation of medicine and enabling the emergence of innovative potent therapeutic solutions for unmet clinical needs.

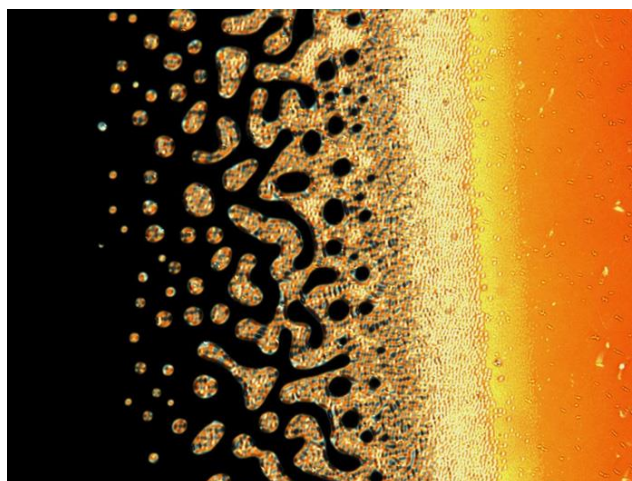
Recipient: Professor Gianpiero Cavalleri, SFI Research Centre FutureNeuro & RCSI

Gianpiero Cavalleri is Associate Professor of Human Genetics, Deputy Director of the FutureNeuro SFI Research Centre and Director of the Human Genetic Variation Research Group at the Department of Molecular and Cellular Therapeutics, RCSI. His research team is working on a diverse set of projects spanning population genetics, disease genetics and natural selection.

SFI Research Image of the Year

The Research Image competition celebrates images captured by Science Foundation Ireland funded researchers during the course of their research.

Recipient: **Dr Sithara Sreenilayam Pavithran, Dublin City University**



'Liquid Crystal Seashore'

The microscopic image shows sea shore like feature in the liquid crystal (LC) material at the isotropic to nematic phase transition. This seashore like feature is developed in a temperature gradient LC cell made up of two glass substrates. In the region, like water bubbles near shore, is the thread like defects that develops at the isotropic to anisotropic transition temperature and these defects are the proof of uniaxial nematic phase transition. The part in yellow colour, looks like shallow water, is the pre-transitional region just below the conditions for phase separation of anisotropic nematic where molecules are slowly possessing orientational order. In the region in orange colour, looks like deep water, the orientational order of molecules are spontaneously arising below isotropic to nematic phase transition. The colour of the image depends on the temperature, shape of LC molecule and sample thickness.

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Minister Creed launches €40 million VistaMilk SFI Research Centre

The Minister for Agriculture, Food and the Marine, Michael Creed, TD, today launched the new VistaMilk SFI Research Centre which is jointly funded by Science Foundation Ireland (SFI) and his Department.

The VistaMilk Centre will be hosted by Teagasc Moorepark, in partnership with a number of research performing organisations. Multinational and SME companies in the food and ICT sectors are also part of the consortium.

At the launch of the Centre in Moorepark, Fermoy today, the Minister said *“VistaMilk will be the largest Agri-Tech Centre covering the entire dairy production chain, with Exchequer funding of €26 million provided by SFI and my Department, together with industry funding of €14 million. This highlights the strong and collaborative commitment to building research and innovation capability that ensures the sustainability of the agri-food sector”*.

VistaMilk will assist the Irish dairy industry to be a world leader in fundamental and translational research for precision pasture-based dairying, with the outcomes impacting positively on the environment, animal well-being and the health of consumers.

The investment is in line with the Food Wise 2025 strategy and will help to address key issues facing the dairy sector, including establishing the health and nutrition benefits of dairy products, increasing carbon efficiency, and increasing innovation as a response to the uncertainties arising from Brexit.

Welcoming the launch of the new SFI Research Centre VistaMilk, Minister of State for Training, Skills, Innovation, Research and Development, John Halligan TD, said: *“Agriculture and dairy production are crucial to our economy in Ireland. Globally, these sectors are transforming rapidly, and it is crucial that Ireland occupies a leading position within them. Alongside the other SFI Research Centres funded by the Irish Government, VistaMilk will help to improve our country’s competitive edge and excellent*

innovation, enabling us to continue to attract and retain new investment and deliver effective and wide-ranging research outcomes.”

Professor Mark Ferguson, Director General of Science Foundation Ireland and Chief Scientific Advisor to the Government of Ireland, said: *‘We are delighted to officially launch VistaMilk, which will join an existing network of world-leading SFI Research Centres that focus on excellent science, as well as economic and societal impact to Ireland. VistaMilk will be an agent of growth for the Irish dairy industry by being a world leader in fundamental and translational research for precision pasture-based dairying.’*

Professor Gerry Boyle, Teagasc Director said; *“Research and innovation are the drivers of progress and VistaMilk encapsulates both. This Centre will have the capacity to enhance sustainability across the dairy supply chain, positively impacting the environment, animal well-being and the health of consumers. It will address the challenges right along the supply chain, from the soil through to the human gut.”*

Director of VistaMilk, Professor Donagh Berry said; *“To advance the state-of-the-art in Agri-Food and information sciences, VistaMilk has divided the problem domain into three main thematic areas; Soil and Pasture; Cow, and Food. Combined, these three areas cover the entire supply chain from soil to society. Within each of these thematic areas, VistaMilk has several targeted projects each of which will leverage the combined expertise of the VistaMilk partners. Each targeted project involves at least one industry partner, who represent the sectors dealing with grass-seed breeding, animal and human nutrition, animal health, animal breeding, dairy-food processing, data analytics, sensor development, communications and networks, and omics technologies.”*

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Invest in Ireland awards reflect rapid growth at Regeneron in Limerick



Biotechnology company Regeneron had two reasons to be cheerful after the inaugural Invest in Ireland Awards in October. **The company came away with the Grand Prix and also won the ‘Excellence in Regional Investment’ category.** The recognition follows five years of expansion in Ireland since the company first announced its presence here in 2013.

Regeneron’s own rapid growth as a company has been mirrored in its Ireland operations. It employs 800 people in Ireland and has invested \$750 million to transform the former Dell factory at Raheen Business Park in Limerick into a 400,000 square foot, state-of-the-art bulk biologics production facility. It is now the largest site of its kind in Ireland, producing life-transforming medicines for people with serious diseases.

Yet almost in contrast to the cutting-edge biotechnology, intuition played a part in the company’s choice of Limerick as the location for its biologics facility. “Gut feel is a large portion of any site selection,” said **Dan Van Plew, Executive Vice President and General Manager of Industrial Operations and Product Supply (IOPS) at Regeneron.** Speaking on a visit to Limerick, he said: “When we picked Limerick years ago, we simply felt good about the community, universities and people. A few years and a lot of experience later, I can now confidently say I know Limerick is a place where you can build and thrive as a biotech.”

Regeneron’s Regional Investment award takes on extra significance in light of Van Plew’s comments that much of the work on the site was completed by people who come from Munster. “These folks built, validated and began production in a way I’d put up against any other team on the planet. We feel at home here and the way we have been welcomed has made our ongoing growth and investment in Limerick rewarding on the most personal levels,” he said.

Ivor Downey, Regeneron’s HR director, said the Limerick location has proved beneficial in many ways. “We’ve been lucky on a number of fronts in that we’re based in the Midwest, so we’ve been able to provide an opportunity for experienced candidates – people from north Kerry, Clare, Tipperary who were

finding Dublin or Cork unaffordable and congested. Limerick provided a good opportunity for experienced people to come back and bring up their families here where housing is more affordable, and the quality of life is better. We've had a lot of success in attracting people from these locations and hiring from abroad the Irish diaspora."

The company's connection to the wider local community is cemented further through partnerships with universities and institutes of technology. "We've tended to beat our goals on a lot of the hiring rounds, with support from IDA Ireland, the local Chamber and American Chamber, local businesses and council. On the people front, colleges, primarily University of Limerick (UL), National University of Ireland Galway (NUIG), University College Cork (UCC) and Cork Institute of Technology (CIT), have all come on board in terms of supporting our internship opportunities and supporting our graduate programmes," said Downey. Regeneron recently doubled the scale of its internship programme with UL last year, and this is feeding talent for 2019 and beyond. This year alone, it will have more than 70 interns/co-ops on site.

Ireland was home to Regeneron's first international location. A year before construction began on the Limerick site, the company opened its first international location with an office in Dublin in 2013. The Dublin team is a multifunctional group consisting of clinical operations, regulatory affairs, external manufacturing, risk management, procurement and commercialisation, as well as finance and other administrative functions

By 2015, Regeneron was celebrating the hire of its 350th employee in Ireland and beginning construction on new quality control labs and process sciences building at the Limerick site, housing a team of specialists in commercial manufacturing, process sciences, quality assurance, quality control and supply chain, supported by the IT, HR, finance and procurement functions.

The company's positive experience in Limerick puts it on a solid footing for the years ahead – and potentially more Invest in Ireland awards. "The workforce, the available talent and the pipeline of talent in the future has given us confidence in terms of our growth plans into the future," Downey said. "Our organisation is now more mature and moving from a start-up mentality to focus on building an enduring culture and great place to work experience for our employees."

This article originally appeared in the Summer edition of Innovation Ireland Review magazine.

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Bausch Health will expand contact lens manufacturing facilities in Waterford, Ireland and Rochester, NY

LAVAL, Quebec, Nov. 13, 2018 – Bausch Health Companies Inc. (NYSE/TSX: BHC) (“Bausch Health,” the “Company” or “we”) today announced it will invest to expand contact lens manufacturing capacity at its Bausch + Lomb sites in Waterford, Ireland and Rochester, N.Y. The Company is adding multiple production lines at these two sites to support the manufacture of its innovative daily disposable silicone hydrogel (SiHy daily) contact lenses.

“Bausch + Lomb is one of the world’s most respected eye health brands, due in large part to the high-quality contact lenses manufactured at the Rochester and Waterford sites. By expanding the production capacity at both locations, we will continue to build on their legacies as we invest for the future,” **said Joseph C. Papa, chairman and CEO, Bausch Health.** “The increased manufacturing capabilities will enable us to meet our anticipated global customer demand for the Bausch + Lomb daily disposable silicone hydrogel contact lenses, a product that is critical to both our ongoing transformation and to our mission of improving people’s lives globally.”

SiHy daily contact lenses are known as one of the Company’s “Significant Seven,” which is a suite of seven key products that collectively are expected to generate more than \$1 billion dollars of annualized revenue, at peak, in the next five years. Bausch Health believes these products will help drive the long-term, future growth of the Company. Recently launched in Japan, SiHy daily contact lenses are expected to be approved and launched in other areas of the world over the next few years.

Bausch Health has been working closely with the public and private sectors in support of the capacity expansions in both Waterford and Rochester. The investment in Ireland is supported by the Irish Government through IDA Ireland, the agency responsible for the attraction and development of foreign direct investment in Ireland. The investment in the Bausch + Lomb Optics Center in Rochester is being assisted by Empire State Development, the Monroe (N.Y.) County Department of Planning and Development and Rochester Gas & Electric.

It is expected that these site expansions will lead to the creation of more than 200 jobs over the next four years. Bausch Health currently employs approximately 1,350 people in Waterford and more than 1,000 people in Rochester.

Damain Finn, vice president, Manufacturing and Supply Chain, Bausch + Lomb, said: “Rochester and Waterford have been collaborative partners for many decades, and both locations are now synonymous with innovation in the development and manufacture of contact lenses and eye health products that improve the quality of life for our customers. This investment will support the development of an important new line of contact lenses and represents a new chapter in the success story of collaboration and co-operation between the two sites.”

Mark Hennessy, Bausch + Lomb Waterford site lead said, “This investment, which will create 100 new jobs, is a testament to the efforts and commitment of all employees in the Waterford facility. It enables us to take advantage of the opportunities that are emerging in the contact lens and eye health sector in the coming years. The corporation has placed enormous confidence in our team with this investment, and it is a reflection of our track record of recent performance and an acknowledgement of our commitment to continue to deliver into the future.”

“This investment will further strengthen the Waterford plant’s position in supporting Bausch + Lomb’s efforts to increase its share of the contact lens market, following an earlier investment between 2015 and 2017. That programme added 300 employees at the Waterford facility, bringing the current total employment there to 1,350. I am looking forward to the coming years as a time of great opportunity and further growth,” he added.

Welcoming the investment news, **Minister for Business Enterprise and Innovation, Heather Humphreys TD**, said: “I am delighted to see this investment which will result in a significant jobs boost for the South East. Bausch + Lomb is one of the best-known and most respected health care brands in the world, and I look forward to our mutually beneficial relationship continuing to develop even further in the years ahead.”

Minister of State at the Department of Business, Enterprise and Innovation, John Halligan TD, said: “Bausch + Lomb has a long and proud history in Waterford, and this significant investment reaffirms its continued commitment to the county. They are on course to have well over 1,350 people employed on the site. This investment is a great vote of confidence in what the region has to offer and I wish them well for the future.”

Martin Shanahan, CEO IDA Ireland said: “I welcome the news that Bausch + Lomb is to expand its manufacturing capabilities at its Waterford, site creating an additional 100 jobs. This adds to Ireland’s reputation in this sector; we are the second largest exporter of MedTech products in Europe with 33 per cent of the global supply of contact lenses made here. Winning investment for regional locations is a key focus for IDA Ireland and the resulting increase in employment this expansion will create is very important for the South East Region and I wish the company continued success.”

About Bausch + Lomb

Bausch + Lomb, a Bausch Health Companies Inc. company, is a leading global eye health organization that is solely focused on helping people see better to live better. Its core businesses include over-the-counter products, dietary supplements, eye care products, ophthalmic pharmaceuticals, contact lenses, lens care products, ophthalmic surgical devices and instruments. Bausch + Lomb develops, manufactures and markets one of the most comprehensive product portfolios in the industry, which is available in more than 100 countries. For more information, visit www.bausch.com.

About Bausch Health

Bausch Health Companies Inc. (NYSE/TSX: BHC) is a global company whose mission is to improve people’s lives with our health care products. We develop, manufacture and market a range of pharmaceutical, medical device and over-the-counter products, primarily in the therapeutic areas of eye health, gastroenterology and dermatology. We are delivering on our commitments as we build an innovative company dedicated to advancing global health. More information can be found at www.bauschhealth.com.

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 Agilent Technologies

Agilent Ireland Hosts Open Day for Partners and Customers



Eddie Enright, country general manager, Agilent Ireland Minister of State David Stanton TD Richard Fernandes, founder, and chief executive officer, Luxcel Biosciences.

Agilent invests in home-grown business through expansion of R&D facility

Little Island, Co. Cork, Nov. 16, 2018

Agilent Technologies Ireland Ltd. today held the official opening of a new, purpose-built research and development extension to its Little Island, County Cork facility.

The opening of this state-of-the-art research facility is a landmark moment for Agilent Ireland as it integrates recently acquired local start-up biotech company Luxcel Biosciences. Housing both cell analysis and biosensor development capabilities, this not only expands Agilent's reach within the rapidly growing live-cell analysis market but will also further new and innovative technology advancements that will help drive cutting-edge product development for Agilent globally.

“Technology advancements allowing researchers to examine cell health and function kinetically, and in real-time, are driving global demand for complete cell analysis solutions,” said **Todd Christian, general manager, Agilent Cell Analysis Division**. “The Luxcel acquisition underscores Agilent’s continued commitment to the cell analysis market and is an important step in expanding our leadership in this field.”

“This exciting acquisition significantly enhances our goal of providing broader solutions to our customers in Ireland and beyond,” said Eddie Enright, country general manager, Agilent Ireland. “There is a strong

cultural fit of innovation and delivering customer-centric solutions between both companies. We are delighted to welcome Luxcel into the Agilent Ireland team.”

The investment underlines the pledge of Agilent towards top-tier research and innovation, based on positive collaboration and support of local and European-wide business and academic partnerships. “This expansion reflects the scale of Agilent’s engagement to both internally-driven product development, as well as external collaborations, creating an environment for transformational innovation that is exciting to be a part of and contribute to,” said **Richard Fernandes, founder, and chief executive officer, Luxcel Biosciences.**

The open day highlighted future developments and investments within Agilent, while academic and industry experts showcased the importance of partnerships, and knowledge transfer required to develop and deliver reliable laboratory solutions and workflows, particularly in the life science environment. The morning culminated in a tour of the new facilities.

Agilent welcomed David Stanton, Minister of State at the Department of Justice and Equality in Ireland. Key members from local authority and educational institutions also attended, as well as business representatives from technology and science, and medical/technology organizations.

Officially opening the extension of the facility, **Minister of State David Stanton** said: “Cork has a well-established life sciences cluster and Agilent Ireland’s research facility further strengthens this. I would like to congratulate the team on this important day and wish the company continued success into the future.”

“We’re excited that Agilent has invested in Ireland,” said **Martin Shanahan, chief executive officer, IDA Ireland.** “Luxcel has partnerships and active research programs in Ireland, and with major EU and UK research institutions. This expansion will not only provide the most up-to-date and advanced solutions for Agilent’s customers but will also have a significant positive impact within the Irish and European innovation ecosystem.”

About Agilent Technologies

Agilent Technologies Inc. (NYSE: A) is a global leader in life sciences, diagnostics, and applied chemical markets. With more than 50 years of insight and innovation, Agilent instruments, software, services, solutions, and people provide trusted answers to customers' most challenging questions. The company generated revenues of \$4.47 billion in fiscal 2017 and employs 14,500 people worldwide.

Information about Agilent is available at www.agilent.com. To receive the latest Agilent news, subscribe to our Newsroom. Follow Agilent on Linked In, Twitter, and Facebook.

Tánaiste recently paid a visit to Teva's world-leading Waterford respiratory facility



Left to right; Frank Rian IDA Chairman, Simon Coveney Tánaiste, Julian Blair-Director R&D Left to right; Frank Rian IDA Chairman, Simon Coveney Tánaiste, Julian Blair-Director R&D

Site visit allows Tánaiste to see first-hand ground-breaking respiratory product development underway at their R&D Centre of Excellence

Waterford facility's work in developing 'smart inhalers' showcased during visit

The Tánaiste and Minister for Foreign Affairs and Trade Simon Coveney paid a visit to Teva Waterford recently.

The Waterford site is focussed upon the research, development and production of next generation products for the treatment of respiratory conditions.

The visit to the facility formed part of a wider series of events undertaken by the Tánaiste across the county and culminated in an address by the Tánaiste to the Waterford Chamber Annual Dinner.

Teva's Waterford facility, located in the Waterford Industrial Estate, has been in operation since 1985 and currently employs 610 people from the county and surrounding areas.

The facility is recognised as a global leader, not just in the Teva network but in the wider pharmaceutical industry, in the development of next generation respiratory products used in the treatment of asthma and chronic obstructive pulmonary disease (COPD). Today the facility manufactures and exports products with a net value of over €1 billion to markets across the globe.

The Tánaiste's delegation included Frank Ryan, Chairman of the IDA Ireland, Shay Power, VP Pharmaceuticals Development, IDA Ireland and Brendan McDonald, South East Regional Manager, IDA Ireland, who were greeted and given a tour of the facility by Teva management including Julian Blair, Vice President – R&D, Andy Crowley, General Manager & Managing Director, Teva Waterford and Paddy McMahon Director of HR.

The Tánaiste's visit, overall, had a clear emphasis on acknowledging the significant achievements already realised by local pharma companies such as Teva in developing Waterford as an important cluster for pharmaceutical manufacturing in Ireland, whilst also exploring how these successes can be built upon.

The Tánaiste's site visit to Teva's Waterford facility followed through on this theme of building and innovating for the future, with much of his site visit focused on the innovative research currently underway at the R&D facility.

As part of the visit the delegation were briefed on the ground-breaking research underway at the facility to develop state-of-the-art inhalation devices to more effectively treat chronic respiratory conditions such as asthma.

Poor adherence to inhaled therapies is widespread among patients with asthma and COPD and is often associated with poor inhaler technique. This can lead to suboptimal control of symptom burden and impaired quality of life. Research conducted in Teva Waterford has resulted in the development of a digital inhaler that can gather and track accurate data on inhaler use which in turn could help support and inform clinical decision making.

Commenting on the visit, Julian Blair noted “We were delighted to welcome the Tánaiste to our facility. Teva has a long history in Waterford stretching back over 30 years. Throughout that time, our company has always been focused on the future of healthcare and pharma and developing and innovating new products and devices to meet that objective.

“Over the past three decades, in addition to our dedicated and committed staff, key stakeholders such as Government and local elected representatives, State agencies like the IDA Ireland, and the wider local community have all played a role in supporting our company” added Dr. Blair.

“The visit by the Tánaiste and wider delegation acknowledges our track record as a pharmaceutical leader and significant employer in the region. However, even more importantly, the visit was an opportunity for Teva to reaffirm our commitment to Waterford and set out our plans for the future to the Tánaiste and wider Government which he represents.

“We are currently working to enhance and develop our facility for the future, with further developments expected in the period ahead.

“Our existing strong track record in research and development and pharmaceutical device innovation in

particular, with initiatives such as the Digital Inhaler, are testament to the exciting work underway at our Waterford site and our potential to continue our innovation journey,” added Dr. Blair.

Commenting on the company’s presence in Waterford, IDA Ireland’s South East Regional Manager Brendan McDonald said “Teva is an innovative and progressive Pharmaceuticals company which is located in a significant cluster of Life Science companies in Waterford and the wider South East Region. The SE Region has much to offer potential investors - a good mix of skills and talent, the required infrastructure and excellent support services which all assist companies wishing to scale and grow. We are delighted to continue to work with Teva as they grow and diversify their product ranges here in Waterford.”

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About Sigma-Aldrich: Sigma-Aldrich is a leading Life Science and High Technology company whose biochemical, organic chemical products, kits and services are used in scientific research, including genomic and proteomic research, biotechnology, pharmaceutical development, the diagnosis of disease and as key components in pharmaceutical, diagnostics and high technology manufacturing.

Sigma-Aldrich customers include more than 1.3 million scientists and technologists in life science companies, university and government institutions, hospitals and industry. The Company operates in 35 countries and has nearly 9,000 employees whose objective is to provide excellent service worldwide.

Sigma-Aldrich is committed to accelerating customer success through innovation and leadership in Life Science and High Technology.

For more information about Sigma-Aldrich, please visit its website at **www.sigma-aldrich.com**

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Minister Pat Breen TD leads 34 Irish companies on Enterprise Ireland Trade Mission to Germany

13th November 2018



Wolfram Diener, MD Messe Dusseldorf GmbH welcoming Minister Breen to MEDICA, the world's largest medical trade fair where 16 Irish companies are exhibiting

Irish medtech and agritech innovative solutions will be showcased at world-renowned Medica and Eurotier trade fairs

Minister of State for Trade, Employment, Business, EU Digital Single Market and Data Protection, Pat Breen TD commences a two-day Enterprise Ireland trade visit of 34 companies to Germany today (13th November 2018). The trade mission is part of Enterprise Ireland's Brexit response which aims to accelerate exports to Europe by 50% by 2020.

Central to the itinerary are two world-renowned trade fairs; Medica, the leading global event for manufacturers of medical technologies, and Eurotier the world's largest exhibition for agricultural innovations.

Speaking on his arrival in Düsseldorf Minister Breen said; "Germany is a key export market for Ireland. As Europe's largest economy and the fourth largest in the world, it offers substantial growth opportunities and potential for increased collaboration in the agritech and medtech sectors for innovative and ambitious Irish companies. This trade visit provides a valuable opportunity for the participating Irish companies to present their innovative solutions to buyers and potential partners attending these huge fairs - Medica in Düsseldorf and Eurotier in Hannover. I wish the 34 participating companies every success in pursuing the opportunities that will arise and increasing their presence in the German and wider Eurozone markets".

Medica, the world's largest medical trade fair, takes place in Düsseldorf from 12th to 15th November and will attract over 120,000 visitors. The 16 participating Irish companies will present their technology solutions in the areas of electromedicine, laboratory medicine, medical technology and diagnostics to potential buyers.

Minister Breen will meet Irish companies at their exhibits on the Enterprise Ireland pavilion, including; AltraTech Ltd; Arrotek Medical Ltd.; ATD emolda Ltd.; Fleming Medical Ltd; Novaerus Ltd.; PMD Solutions Ltd and Synecco Ltd.

The theme at EuroTier 2018, which takes place at Hannover Exhibition Center, Germany, from 13th to 16th November 2018, is "Digital Animal Farming". Over 160,000 visitors will attend this event focused on highlighting technologies for successfully combining productivity and animal welfare, as well as information management and the sustainable use of natural resources.

18 Enterprise Ireland agritech clients will showcase their innovative products, services and technologies to potential customers at EuroTier, including Cheetah Electronics; HerdInsights and Lir Analytical which will exhibit on the dedicated Irish Pavilion.

The exhibitors on the Irish Pavilion will promote their products and services under the Enterprise Ireland #IrishAdvantage banner, a campaign promoting the advantages of sourcing suppliers from Ireland directly to buyers in key Eurozone markets.

A growth in exports of medtech and agritech products and services to Germany is part of Enterprise Ireland's strategy to support clients to deliver 60,000 new jobs, increase exports to the Eurozone by 50% and add an additional €5bn in exports from 2017 – 2020.

Stephen Creaner, Executive Director, Industrial, Lifesciences & Consumer at Enterprise Ireland who is accompanying Minister Breen on the mission said; "This Enterprise Ireland trade visit to Germany is supporting Irish businesses to diversify into new markets as part of our key Brexit response and is one of the ways Enterprise Ireland is helping exporters increase their global footprint".

"Germany is a leading industrial nation in life sciences, agritech, automotive, software and engineering services. Enterprise Ireland's mission is to help Irish exporters to even greater success there. Even before the Brexit vote, Irish companies were increasingly accessing the German market. Enterprise Ireland client company exports from Ireland to Germany in 2017 totaled €1.11 billion, representing a growth rate of 14%. With uncertainty hanging over Ireland UK trade, there has never been a better time to focus on the giant opportunity that is the German market", said Mr. Creaner.

According to Anne Lanigan, Enterprise Ireland Director, Eurozone, "Brexit or no Brexit, the Eurozone offers considerable untapped opportunities for Irish companies. It has the added advantages of zero currency risk, unfettered access, regulatory alignment and an increasing recognition of the innovative nature and quality of Irish products and services. Germany, the biggest market in the Eurozone, delivered 14% growth in 2017 for Enterprise Ireland clients. This trade mission demonstrates Enterprise Ireland's ongoing commitment to support Irish companies in continuing to deliver double digit growth in this attractive market".

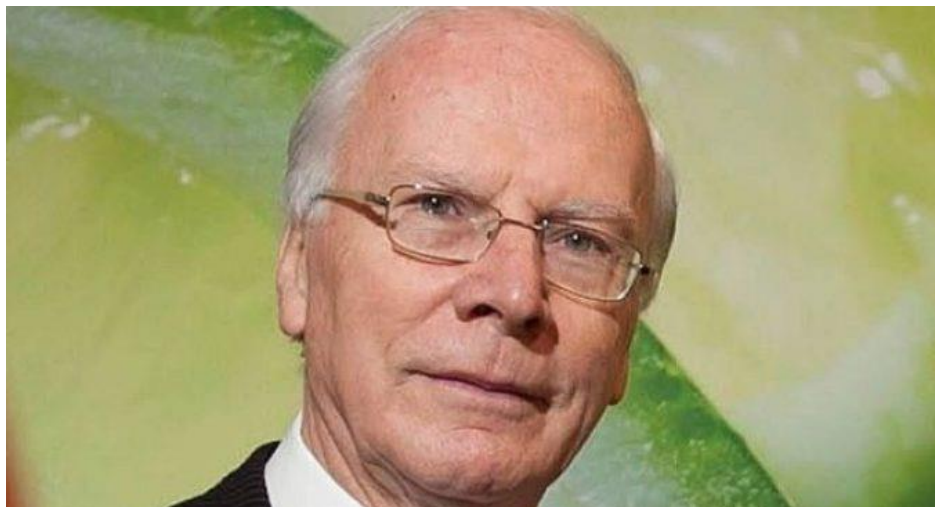
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Ireland Leads in Fight For Manufacturing Jobs For Now



October 23 2018

These are good days for Ireland's manufacturers as a resurgent economy driven by home-grown and foreign investment provide the biggest turnaround since the financial collapse 10 years ago, writes **John Whelan**.

Irish manufacturing firms recorded the highest increase in industrial production across all EU countries in the year to August 2018, according to new Eurostat figures.

The rate of growth at 15% was particularly striking — the average industrial growth rate recorded across all EU countries was a mere 1.2% in the period.

To put the performance in perspective, manufacturing now accounts for almost a third of all economic output by GDP, double of the share of a decade ago of 17%, and well above the global average, leaving countries such as Germany, the US, and the UK well behind.

The dramatic growth in Irish industrial production shows that Government policies to rescue the sector after decades of neglect and decline have borne fruit.

There has been a push by many governments across the world, and not just in President Donald Trump's America, to pull their economies out of the recession by pushing for more manufacturing in their home bases.

The results in Ireland have come about by incentivising foreign companies such as Intel, Medtronic, Schneider Electric, Cook medical Ireland, Boston Scientific, to name just a few.

But the indigenous sector has also moved significantly into the holy grail of advanced manufacturing and robotics with strong support from Enterprise Ireland.

“Making it in Ireland; Manufacturing 2020” was the policy document released in the thick of the recession in 2012 as the Fine Gael Government came to power and needed to get Ireland back to work quickly.

Abroad, Narendra Modi, the Indian prime minister, introduced his “Make in India” programme in 2016 achieving spectacular success attracting investments from firms such as General Motors, and from Korea’s oldest car manufacturer KIA.

In August, the Chinese government launched “Made in China 2025”, a state-led industrial policy that seeks to make China dominant in global manufacturing. The Chinese move, in particular, enraged President Trump who sees the move as one that may undermine his “Make America Great Again” mantra.

However, behind the bluster, US administrators know that manufacturing has become a very competitive game. Earlier this month, Washington released its “Strategy for American Leadership in Advanced Manufacturing”.

The US administration said at the time: “This century saw dramatic changes with significant decline in US manufacturing employment starting in the 1990s and accelerating losses during the 2008 recession.

“In the face of intense global competition, the Trump Administration has taken strong action to defend the economy... strong actions are required to combat unfair global trade practices and help US manufacturers reach their full potential.”

The UK has shown up as one of the laggards with industrial production growth of 1.6% in the year to August. It is finding difficulty moving up its production base from below 10% of national output where it has been stuck for the past decade.

Amid weaker international demand for British goods, its manufacturers have suffered negative growth in the first six months this year — meeting definitions for an economic recession in the sector.

They face a difficult autumn as the Brexit deadlock continues and Trump’s trade sanctions hit exports. England’s misfortune could be Ireland’s opportunity.

But the fight for manufacturing jobs has become a key focus of so many major economies that it may not be a case of jobs moving from Britain to Ireland, but from Europe to Asia, or to the US.

On the immediate horizon, there is the worrying move by the White House which last week notified US Congress of its intent to start three separate trade agreement talks with Japan, the EU, and the UK.

The US has a trade deficit with all three of these regions. That means the US will buy fewer products made in Ireland, the rest of the EU, as well as from the UK and Japan.

John Whelan is a leading consultant on Irish and international trade.

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Diaceutics is Developing a Data Science Platform in Belfast to Improve Patient Diagnostic Testing Globally



Pictured (L-R) are: Grainne McVeigh, Director of Life Sciences, Invest NI; and Peter Keeling, CEO, Diaceutics.

October 26 2018

Precision Medicine and diagnostics commercialisation service provider, Diaceutics, is investing £2 million in R&D to create a new data platform leveraging data from global clinical laboratories, which will improve the way patients are tested in advance of treatment. Invest Northern Ireland has offered the company over £480,000 towards its project which is expected to leverage the employment of 20 additional staff at a Diaceutics' Belfast-based data hub.

Diaceutics is the world's leading provider of precision medicine data analytics, software and service solutions. The company works with the pharmaceutical industry to further the application of precision medicine, an approach which tailors medical treatments to the individual characteristics of each patient.

Commenting on the investment, Peter Keeling, CEO of Diaceutics, said: "Precision medicine relies on a step change in the way patients are being tested in advance of treatment. High levels of missed and misdiagnosed patients still curtail the promise of precision medicine across the globe and along with the

support of Invest NI we will continue to expand our collection, management and analysis of some of the most important patient testing data shaping the precision medicine space today.

“Specifically Invest NI’s support of our research and development work is enabling us to offer a competitive advantage in the marketplace by providing real world evidence, more accurate forecasting and more detailed physician segmentation. We will be working with pharmaceutical firms in the coming months, to build awareness of our advanced insights here and explore opportunities to integrate those insights earlier into their commercial investments.”

Grainne McVeigh, Director of Life Sciences at Invest NI, added:”Diaceutics is undertaking an exciting investment that, through the work with their pharmaceutical clients, will equip physicians with the information and tools to deliver targeted patient care based on their molecular profile, improving outcomes and containing the costs associated with a trial-and-error approach to disease treatment. Life and health science is an area of high growth opportunities and we are delighted to be supporting Diaceutics’ efforts to lead the innovation and commercialisation of solutions that will develop the diagnostics market worldwide.”

Invest NI’s support is part funded by ERDF under the EU Investment for Growth and Jobs Programme 2014-2020. Two of the 20 new positions are already in place.

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Fire Science Firm Efectis Establishes Testing Centre in Northern Ireland



Pictured (L-R) are: Daniel Joyeux, President, Efectis; and Susan O’Kane, Eastern Regional Manager, Invest NI.

November 1 2018

Efectis is establishing a new business in Northern Ireland, offering fire testing services to UK and Ireland based manufacturing businesses who are servicing the construction sector. Seven new roles will be created as part of Efectis’ investment, which is locating at Ulster University’s Fire Safety Engineering Research and Technology Centre in Jordanstown.

Welcoming the investment, Invest Northern Ireland’s Eastern Regional Manager, Susan O’Kane, said: “We are delighted to secure this investment for Northern Ireland which will generate specialist employment opportunities for graduate and experienced fire engineers. Fire in buildings and infrastructure is a crucial, complex issue and one that attracts close regulatory scrutiny. There are growing market opportunities in this area and as the only provider of fire testing services to the construction sector in Ireland, Efectis is now strategically positioned to benefit. The new jobs, to be recruited by 2020, include laboratory technicians,

operators, as well as administrator and leadership positions and will generate more than £200,000 annually in additional salaries to the local economy.”

Daniel Joyeux, Efectis’ President, said: “We wanted to build on our growing network of fire testing and research laboratories in Europe and the Middle East. Establishing a dedicated fire testing centre in Northern Ireland at Ulster University’s FireSERT facility was the ideal location for us. Over the next three years, we plan to recruit experienced engineers who will be responsible for carrying out the UKAS accredited fire tests to British and European standards. Our Northern Ireland testing centre is part of our strategy to establish a strong relationship with academic organisations. We are delighted to be working with Invest NI and Ulster University in this endeavour.”

UKAS accredited, Efectis UK/Ireland Limited is a joint venture between Innovation Ulster Limited and the Efectis Group, a French-owned leading international fire testing and engineering company with 16 offices and laboratories across Europe.

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Scope

PCCP (Physical Chemistry Chemical Physics) is an international journal for the publication of cutting-edge original work in physical chemistry, chemical physics and biophysical chemistry. To be suitable for publication in *PCCP*, articles must include significant new physical insights; this is the prime criterion that referees and the Editors will judge against when evaluating submissions.

The journal has a broad scope which includes spectroscopy, dynamics, kinetics, statistical mechanics, thermodynamics, electrochemistry, catalysis, surface science, quantum mechanics and theoretical developments play an important part in the journal. Interdisciplinary research areas such as polymers and soft matter, materials, nanoscience, surfaces/interfaces, and biophysical chemistry are especially welcomed whenever they include a physico-chemical approach.

PCCP is proud to be a Society journal and is co-owned by 19 national chemical societies. The journal is published by the Royal Society of Chemistry on a not-for-profit basis for the benefit of the whole scientific community.

Impact factor: 4.493*

Publishing frequency: 48 per year

Indexed in MEDLINE and Web of Science

<http://pubs.rsc.org/en/journals/journalissues/cp#!recentarticles&adv>

Carrick Therapeutics Co-founder Wins 2018 EY Emerging Entrepreneur of the Year Award



November 2 2018

Dr Elaine Sullivan (pictured), co-founder and CEO of Carrick Therapeutics, is the winner of the 2018 EY Emerging Entrepreneur of the Year™ (EOY) Award. Carrick Therapeutics was established in 2016 with the aim of building Europe's leading oncology company. It brings together world-class cancer researchers and drug development experts, backed by some of the most eminent scientific investors.

The company, which has raised \$95 million in funding, is a University College Dublin (UCD) spin-in company and is headquartered at NovaUCD, the Centre for New Ventures and Entrepreneurs.

Tom Flanagan, Director of Enterprise and Commercialisation, UCD, said: "Elaine is a highly valued member of our community of entrepreneurs who chose to spin-in her company to UCD and locate at NovaUCD and winning this Award is truly well deserved. I would like to wish Elaine and her team continued success as they develop first-in-class treatments to target aggressive forms of cancer."

Joe Healy, Divisional Manager, High Potential Start-Ups, Enterprise Ireland, said: "The work Elaine and her team at Carrick Therapeutics are doing is fantastic. The company are targeting new treatments for the most aggressive and resistant cancers. Since being established, Carrick has made excellent progress and is

now developing two clinical assets and a pre-clinical pipeline that have the potential to meet significant unmet needs for patients. The work they are doing has the potential to have a major impact on the lives of patients and transform how cancer is treated.”

Carrick Therapeutics’ lead investors are; ARCH Venture Partners and Woodford Investment Management, with participation from Cambridge Enterprise, Cambridge Innovation Capital, Evotec, GV (Google Ventures), and Lightstone Ventures.

Research partners include: Cancer Research UK, University of Oxford, University of Cambridge and Imperial College London. Carrick has also assembled a team of internationally recognised clinicians and scientists for its scientific advisory board, including Professor William Gallagher, Director, UCD Conway Institute.

Peter Coppinger and Dan Mackey, the founders of Cork technology firm Teamwork, was named overall winner of the 2018 Entrepreneur of the Year™(EOY) Award in addition to winning the 2018 EY International Entrepreneur of the Year™ (EOY) Award.

Bill Wolsey, founder, Beannchor, a Belfast-based hospitality group that employs more than 750 people, was named winner of the 2018 EY Industry Entrepreneur of the Year™ (EOY) Award.

The EY Entrepreneur Of The Year™ Ireland programme is designed to support, promote and connect Ireland’s entrepreneur community, and the Teamwork will now go on to represent Ireland at the World Entrepreneur of the Year Awards event in Monaco, in June 2019.

Chaired by the 2006 EY Entrepreneur Of The Year™ overall winner Anne Heraty, the judging panel includes previous EY Entrepreneur Of The Year™ (overall and category) winners; Michael Carey, Mark Roden, Evelyn O’Toole, Dr Edmond Harty, Joe Hogan, Jerry Kennelly, Brendan Mooney, Pat McDonagh and Denis O’Brien as well as Joe Healy from Enterprise Ireland and Jeremy Fitch from Invest Northern Ireland.

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EU Ban on Throwaway Plastics By 2021



Chemists have a role in solving this global problem with biodegradable material, reduction and elimination

November 7 2018

Single-use plastic items such as plates, cutlery, straws, balloon sticks or cotton buds, will be banned in the EU. These products, which make up over 70% of marine litter, will be banned from the EU market from 2021, under draft plans approved by the European Parliament.

MEPs added to this list of plastics banned from the EU market from 2021: products made of oxo-degradable plastics, such as bags or packaging and fast-food containers made of expanded polystyrene.

The consumption of several other items, for which no alternative exists, will have to be reduced by member states by least 25% by 2025. This includes single-use burger boxes, sandwich boxes or food containers for fruits, vegetables, desserts or ice creams. Member states will draft national plans to encourage the use of products suitable for multiple use, as well as re-using and recycling.

Other plastics, such as beverage bottles, will have to be collected separately and recycled at a rate of 90% by 2025.

MEPs agreed that reduction measures should also cover waste from tobacco products, in particular cigarette filters containing plastic. It would have to be reduced by 50% by 2025 and 80% by 2030.

One cigarette butt can pollute between 500 and 1000 litres of water, and thrown on the roadway, it can take up to twelve years to disintegrate. They are the second most littered single-use plastic items.

Member states should also ensure that at least 50% of lost or abandoned fishing gear containing plastic is collected per year, with a recycling target of at least 15% by 2025. Fishing gear represents 27% of waste found on Europe's beaches.

Making producers more accountable

Member states would have to ensure that tobacco companies cover the costs of waste collection for those products, including transport, treatment and litter collection. The same goes for producers of fishing gear containing plastic, who will need to contribute to meeting the recycling target.

Frédérique Ries (ALDE, BE), rapporteur, said: "We have adopted the most ambitious legislation against single-use plastics. It is up to us now to stay the course in the upcoming negotiations with the Council, due to start as early as November. The vote paves the way to a forthcoming and ambitious directive. It is essential in order to protect the marine environment and reduce the costs of environmental damage attributed to plastic pollution in Europe, estimated at 22 billion euros by 2030."

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ILC Dover to Open New Production Facility in Cork



November 6 2018

ILC Dover, a global leader in flexible containment solutions for the pharmaceutical and biopharmaceutical industry, is expanding its Irish production footprint by opening a location in Blarney, County Cork, creating up to 70 jobs over two years. The project is supported by the Irish Government through IDA Ireland.

Welcoming the announcement, Minister for Business, Enterprise & Innovation, Heather Humphreys TD said: “I am delighted to see ILC Dover expand its footprint in Cork. Ireland’s reputation as a centre of manufacturing excellence continues to grow, due to our experience in this area but also the availability of talent and skills required to manage outsourced production on an international scale. Ireland is now a major player and a very attractive location for companies like ILC Dover to grow their operations and I look forward to a mutually beneficial partnership developing.”

Mary Buckley, Executive Director of IDA Ireland, said: “I welcome the news that this global leader in flexible containment solutions is to expand its production capabilities in Blarney creating up to 70 jobs. Manufacturing excellence in pharmaceutical and biopharmaceuticals is a hallmark of Ireland’s success in the sector and is one of the primary reasons as to why Ireland is home to 10 of the top 10 global pharmaceutical companies. Winning investment for regional locations is a key focus for IDA Ireland and the resulting increase in employment this expansion will create is very important and I wish the company every success here and will follow your progress with interest.”

The building will be operational in the first quarter of 2019 and outfitted with 4,000 square feet of ISO 7 clean room capacity and 6,500 square feet of Class 8, both dedicated to the company’s pharmaceutical and biopharmaceutical product lines. When at full production, the company expects to hire 60-70 new ILC

Dover employees. The new roles will include management, production, quality, design and support. For more information, visit the [ILC Dover Career Center](#). The company's original operation in County Cork will be relocated to the Blarney site as part of the expansion project.

ILC Dover President and CEO Fran DiNuzzo expressed enthusiasm about the new launch: "The expansion of our production capabilities in Ireland will allow us to better serve our global customer base and strengthen our position as the leading single-use powder handling solutions provider to the global pharmaceutical and biopharmaceutical marketplace."

In addition to production space, the new facility will contain state-of-the-art offices, meeting rooms and a product demonstration area for client visits.

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- Agriculture, Food and [...]...

Launch of the Inaugural Manufacturing and Supply Chain Awards 2019



Pictured (left to right): John Whelan, Chair of the Judging Panel; Gearoid Mooney of Enterprise Ireland; Michael Cassidy of IMR; and Minister Heather Humphries at the launch of the 2019 IMR Manufacturing Awards.

November 23 2018

Manufacturing excellence, teamwork and professionalism are set to be celebrated and acknowledged at the upcoming IMR Manufacturing and Supply Chain Awards 2019. The event, which was officially launched in Dublin recently, will showcase exceptional achievement, teamwork and innovation in Irish manufacturing industry. Irish Manufacturing Research (IMR) is an independent not-for-profit Research Organisation, funded under the Enterprise Ireland/IDA Technology Centres programme, to provide applied research solutions and advanced manufacturing expertise, technology transfer and training to the manufacturing sector in Ireland.

The Manufacturing and Supply Chain Awards 2019, which will be presented in association with Irish Manufacturing Research, was launched by Heather Humphreys TD, Minister for Business, Enterprise and Innovation, and Gearóid Mooney, Director of Research and Innovation, Enterprise Ireland.

The awards are unique in recognising not only the achievements of Irish manufacturing companies and but also of collaborating teams within them.

The 2019 awards will take place at a VIP award ceremony at The Citywest Hotel on the 17th of January 2019. With 15 categories covering Ireland's key industry sectors and 6 of those based on teams, judges are calling on small, medium and large manufacturers to submit their entries as soon as possible.

Categories for the 2019 event include:

- Small, medium and large manufacturing company
- Chemical manufacturing team of the year
- Smart factory manufacturer of the year
- Pharma manufacturing team of the year
- Engineering manufacturing team of the year
- Supply chain manufacturing partner
- ICT manufacturing team of the year
- Industry research partner of the year
- Medtech manufacturing team of the year.

Innovative thinking, collaborative teamwork and operational excellence will play a large part in the decision-making process for judges. Those on the panel include: Eoin O’Driscoll, Chairman of Tyndall Institute; Barry Kennedy, Chief Executive of IMR; Caroline Spillane, Director General of Engineers Ireland; Bob Barbour, Chief Executive, Competitiveness Centre; Professor Eamon Murphy, University of Limerick; Dr Christopher Keely, Trinity College Dublin; and John Whelan, Chairman of Premier Publishing and Events.

Speaking at the launch of the Awards, Minister Humphreys said: “Since its inception with the support of the Government, through Enterprise Ireland, Irish Manufacturing Research has been committed to high-tech job creation across the island whilst simultaneously driving efforts to secure Ireland’s future as the location-of-choice for advanced manufacturing industries. The IMR Manufacturing and Supply Chain Awards provide a platform to showcase and celebrate Irish manufacturers, leading edge research, and strong collaboration with academic researchers in the field. The Awards aim to further promote the manufacturing and supply chain industries further leveraging Ireland’s strong international reputation in the sector.”

John Whelan, Chairman of Premier Publishing and Events, said: “Premier Publishing and Events are proud to collaborate with Irish Manufacturing Research (IMR) to showcase the very best in innovation and technology in the manufacturing sector across the island of Ireland. The Manufacturing and Supply Chain awards 2019 are the first awards programme to exclusively focus on the manufacturing sector, bring the tremendous achievements of manufacturing companies and their supply chains into the spotlight and highlighting the performance of the outstanding teams driving their success.”

Micheal Cassidy, Chief Technology Officer of Irish Manufacturing Research (IMR), added: “IMR’s mission is to support Irish manufacturers in becoming leaders in next generation manufacturing and global competitiveness by adopting advanced manufacturing capabilities. We are delighted to recognise the exceptional standard of manufacturing teams in Ireland who ensure manufacturing remains a key driver of our economy through exceptional teamwork, innovation and world-class delivery.”

To enter visit <https://www.awards.manufacturingevent.com/>

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Pioneering Proteomics Researcher and Entrepreneur Receives the NovaUCD 2018 Innovation Award



December 10 2018

The NovaUCD 2018 Innovation Award has been presented to University College Dublin's (UCD) Professor Stephen Pennington (pictured), a global leader in proteomics (the study of proteins) research and innovation. The Award was presented to him in recognition of his commitment and success in protein biomarker research, undertaken during the last 15-years at the UCD School of Medicine, and previously in the UK, and the conversion of this research into diagnostic tests for clinical use which can have a positive impact on the lives of patients worldwide.

Professor Pennington is the founder and Chief Scientific Officer of Atturos, a UCD spin-out company, which is developing a portfolio of novel multi-marker blood tests. Atturos' first test, OCProDx, is a prostate cancer test which will help some men avoid unnecessary over treatment of their cancer. The company is planning to launch this test onto the market in 2020.

Every year over 1.2 million men globally receive a diagnosis of prostate cancer and the aim of Atturos' test is to determine whether or not the cancer remains in the prostate or has spread beyond it. With this information, patients can make a more informed decision about their treatment, including the opportunity of monitoring the disease via active surveillance.

Professor Pennington is also the incoming President of the Human Proteome Organisation (HUPO), the international scientific organisation of over 1000 members representing and promoting proteomics, which is headquartered in Vancouver, Canada. He is the first researcher from an Irish University to be elected to this prestigious position.

Professor Andrew J. Deeks, UCD President, said: “The Award recognises the quality and impact of his peer-reviewed research, over many years, and his commitment and continuing enthusiasm to convert the outputs of his protein biomarker research into diagnostic tests for clinical use. Atturos, the company established by Professor Pennington, is currently developing a blood test to help men diagnosed with prostate cancer make more informed decisions about their treatment. This test can have significant benefit to patients worldwide and I wish him and the Atturos team every success with the launch of this test onto the global market.”

He added: “This Award also recognises Steve as an innovation and entrepreneurial leader who combines excellence in teaching and research with a proven commitment to translating his research outcomes into commercial applications to impact the lives of people.”

Before moving to UCD in 2003 Professor Pennington was a Wellcome Trust lecturer at the University of Liverpool. There he became deeply involved in a new field of biochemistry research, now called proteomics, and co-authored the first review of this newly emerging field. While at Liverpool he also developed strong links with industry partners such as AB Sciex and Waters and was actively involved in technology licensing.

On moving to Ireland Professor Pennington helped to establish the University’s proteomics facility at the UCD Conway Institute. During the last 15-years he has been active in the implementation of collaborative proteomics projects, in particular clinical translational projects that align significant clinical needs to basic research.

In recent years this has been focused on the discovery and subsequent quantitative measurement of protein biomarker signatures, the latter using targeted proteomics strategies. It is this experience and expertise that lead to the establishment of Atturos.

On receiving the NovaUCD 2018 Innovation Award, Professor Stephen Pennington, said: “It is a great honour to receive this prestigious Award and to follow in the footsteps of previous awardees. This Award reflects the valued guidance and input of many colleagues and collaborators over many years and the ‘can do’ attitude instilled in me by two remarkable ladies, my mother and grandmother. It also reflects the recent invaluable mentorship of Mike Feeny formerly of the IDA and Enterprise Ireland.”

He added: “I am very excited about the potential of Atturos to make a significant impact in the new era of personalised medicine initially by helping men diagnosed prostate cancer make the life changing decisions they face. I would like to take this opportunity to acknowledge the huge support of Enterprise Ireland, NovaUCD, Agilent Technologies and MSC, amongst others, who have supported me and the Atturos team on our journey to date.”

He concluded: “The Award also recognises the significant support and commitment of a large number of research colleagues, as well as current and past research students, who have worked closely with me over many years to help to develop our contribution to the proteomics research and innovation ecosystem at UCD, in Ireland and internationally.”

Professor Pennington is a named inventor on 4 priority patent filings and has also published over 90 scientific papers, edited and contributed to several books including editing one of the first books on proteomics that was translated into Chinese and Japanese. He is on the editorial board of several journals and regularly reviews manuscripts and grants for a number of organisations.

On an international level Professor Pennington has been the President of the British Society for Proteome Research since 2016 and in 2017 he was the lead organiser of the 16th Annual World Congress of the Human Proteome Organisation, held in the Convention Centre in Dublin. This Congress attracted 1500 delegates and included a gala dinner, in the Royal College of Physicians, at which former Vice-President Joe Biden was the guest of honour.

The NovaUCD Innovation Award was established in 2004 to highlight University College Dublin's commitment to innovation. The Award is presented annually to an individual, company or organisation or group in recognition of excellence in innovation or of success achieved in the commercialisation of UCD research or other intellectual activity.

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