IDEAS TO INDUSTRIES FORUM

COMMERCIALISATION CHALLENGES AND STRATEGIES

31 MAY 2016, DUBLIN CITY UNIVERSITY DUBLIN, IRELAND

IDEAS TO INDUSTRIES

This one-day forum at Dublin City University will explore the path from materials research to commercialisation and adoption by industry.

Speakers from research and industry will discuss the challenges and strategies to overcome them, in the path to commercialisation.

ARC Centre of Excellence for Electromaterials Science

DCU

PROGRAM: Ideas to Industries Forum

Date: Tuesday 31 May 2016

Venue: S206 & S209, Research & Engineering Building (Stokes Building)
Dublin City University, Ireland

8:30am	**Coffee and Welcome**
Session 1	
9:00am	Prof. Dermot Diamond (Dublin City University, Ireland) The Convergence of Concepts and Applications: How Materials Science is Driving a Revolution in Device Development
9:20am	Prof. Gordon Wallace (University of Wollongong, Australia) ACES: The Ideas to Industry Journey
9:40am	Prof. Dermot Brabazon (Dublin City University) Overview of Recent Laser Technology Developments and Applications
10:00am	Prof. Michael Morris (Amber Research Centre, Trinity College Dublin, Ireland) Challenges in Integrating Academic and Industry Research
10:20am	**Coffee Break**
10:40am	Prof. Robert Forster (Dublin City University, Ireland) Translating Electro- and Photo-active Materials into Devices: From Disease Detection to Sustainable Energy
11:00am	Prof. Kieran Drain (Tyndall National Institute, Ireland) Sensorized Testbeds and Pilot Line Facilities for Demonstrators and Prototypes
11:20am	Dr Peter Innis (University of Wollongong, Australia) The Australian National Fabrication Facility Materials Node - Supporting Researchers and Industry
11:40am	Prof. Chung-Yu Peter Wu (National Chiao Tung University, Taiwan) Ideas to Industries in Taiwan
12:00pm	**Lunch**
Session 2	
1:00pm	Dr Russell Jones (GlaxoSmithKline, UK) 'Business as Unusual' - Gene Therapy and the Challenge of Developing Product, Platform, New Technology and Supply Chain in Parallel
1:20pm	Dr Barry Burns (Henkel) Cyanoacrylate Adhesives and Polymers – Material Challenges
1:40pm	Prof. Tony Killard (University of the West of England) Printable Nanosensors in Point of Care Diagnostics
2:00pm	Dr David Moore (Viska Systems, Ireland) Challenges in High-throughput and High-accuracy Micro-machining with Fibre Lasers
2:20pm	Dr Jan Weber (Boston Scientific) Bridging the Gap Between Research and Industrial Application
2:40pm	**Panel Discussion**
3:30pm	**Finish**

Welcome

Colleagues, welcome to the ARC Centre of Excellence for Electromaterials Science-Dublin City University (ACES-DCU) Ideas to Industries Forum.

As we all confront the challenge to carve more clear-cut pathways through the ideas-to-industries nexus, it is important that we all engage with each other.

In the materials science area we have for decades amassed a stock pile of fundamental knowledge. We delved into the nanoworld, discovered new properties and unraveled new phenomena. The implementation of these discoveries has however been stymied by traditional approaches to manufacturing, delivery to markets and regulation.

Now we find ourselves in the midst of a manufacturing revolution.

Economic, political and scientific forces have converged to unveil and support new ways to manufacture.

These new ways are amenable to the introduction of new, more advanced, materials. They are amenable to localised and customised manufacture changing the way we need to think about delivery to different markets.

All of this, combined with the irrepressible enthusiasm and creativity of a highly skilled workforce in materials science and engineering, means that for many countries including Ireland and Australia we have unprecedented opportunities to take ideas to industries.

Welcome to the forum, the pre-circulation of this booklet has hopefully provided you with enough information about all your colleagues so that the discussions today can be most productive.

It is important that we learn from each other and build innovative approaches to take ideas to industries.

Best Wishes,

Professor Gordon Wallace
ARC Laureate Fellow
Executive Research Director - ARC Centre of Excellence for Electromaterials Science
Director - Intelligent Polymer Research Institute
Director - ANFF Materials Node

Professor Dermot Diamond
Principal Investigator, INSIGHT Centre
National Centre for Sensor Research
Dublin City University

Dermot Diamond

DSc PhD MSc BSc FRSC MRIA MICI

Professor Dermot Diamond received his Ph.D. and D.Sc. from Queen's University Belfast and joined DCU in 1987. He was Vice-President for Research at Dublin City University (2002-2004) and was director (2007-2015) and founding member of the National Centre for Sensor Research (www.ncsr.ie) at DCU. In 2002, he was awarded the inaugural silver medal for Sensor Research by the Royal Society of Chemistry, London. He was awarded the DCU President's Award for Research Excellence (2006) and the DCU President's Award for Innovation (2015). In May 2014, in recognition of his academic contributions and achievements, he was admitted to Membership of the Royal Irish Academy. In April 2015 he was awarded the Boyle Higgins Gold Medal by the Institute of Chemistry of Ireland in recognition of his research achievements. He is currently a principal investigator in the SFI INSIGHT Centre (http://www.insight-centre.org) and a member of the EU Future and Emerging Technologies programme advisory group (FETAG). His research is focused on the fundamental science of stimuli responsive polymers, the development of futuristic autonomous chemical sensing platforms, and the use of analytical devices and sensors as information providers for wireless networked systems i.e. building a continuum between the digital and molecular worlds. Further details of his research can be found at http://adaptivesensors.com/.

The Convergence of Concepts and Applications: How Materials Science is Driving a Revolution in Device Development

Dermot Diamond

Insight Centre for Data Analytics, National Centre for Sensor Research,
Dublin City University, Dublin 9, Ireland

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Through developments in 3D fabrication technologies and analytical techniques in recent years, we can now build and characterize much more sophisticated 3D platforms than was previously possible. Furthermore also we can use hybrid materials – mixtures of organic and inorganic materials, create regions of differing polarity and hydrophobicity, mix passive and binding behaviours, regions of differing flexibility/rigidity, hardness/softness. In addition, we can integrate materials that can switch between these characteristics – selecting when and where these behaviours exist – so-called '4D' materials, in which the 3D structure can change function and character over the 4th dimension - time. In this talk, I will present a series of examples of 'bioinspired' microfluidic building blocks that exhibit photoswitchable characteristics such as programmed microvehicle movement (chemotaxis), switchable binding and release, switchable actuation (e.g. valving based on soft polymers), and photodetection. These building blocks can be further integrated into microfluidic systems with hitherto unsurpassed functionalities that can contribute to bridging the gap between what is required for many applications, and what we can currently deliver. These disruptive advances should open the way to devices that can monitor, report and assist the management of an individual's personal health over longer time periods. These should be regarded only as point examples of impact in one focused area – the true potential of these developments is almost limitless, and it is therefore vital that discussions involving key industry and academic 'thinkers' are initiated to develop a research strategy in this area.

Gordon G. Wallace

FAA, FTSE, FIOP, FRACI

Professor Gordon Wallace is involved in the design and discovery of new materials for use in Energy and Health. In the Health area this involves using new materials to develop biocommunications from the molecular to skeletal domains in order to improve human performance via medical Bionics. In the Energy area this involves use of new materials to transform and to store energy, including novel wearable and implantable energy systems for the use in Medical Bionics. He is committed to the translation of fundamental discoveries into practical applications. He is a passionate communicator, dedicated to explaining scientific advances to all in the community from the lay person to the specialist. Gordon was recently appointed to the Prime Ministers Knowledge Nation 100. Gordon is a Fellow of the Australian Academy of Science, Australian Academy of Technological Sciences and Engineering (ATSE), Institute of Physics, and Royal Australian Chemical Institute (RACI). He has published more than 800 refereed publications; a monograph (3rd Edition published in 2009) on Conductive Electroactive Polymers: Intelligent Polymer Systems and co-authored a monograph on Organic Bionics (published 2012). He has recently co-authored an eBook on 3D BioPrinting He led the presentation of a MOOC on 3D Bioprinting on the FutureLearn platform. Gordon has supervised almost 100 PhD students to completion and has mentored more than 50 research fellows. Gordon completed his undergraduate (1979) and PhD (1983) degrees at Deakin University and was awarded a DSc from Deakin University in 2000. He was appointed as a Professor at the University of Wollongong in 1990. He was awarded an ARC Professorial Fellowship in 2002; an ARC Federation Fellowship in 2006 and ARC Laureate Fellowship in 2011.

ACES: The Ideas to Industry Journey

Gordon G. Wallace

ARC Centre of Excellence for Electromaterials Science, Intelligent Polymer Research Institute, AIIM Facility, Innovation Campus, University of Wollongong, Wollongong, NSW 2522, Australia

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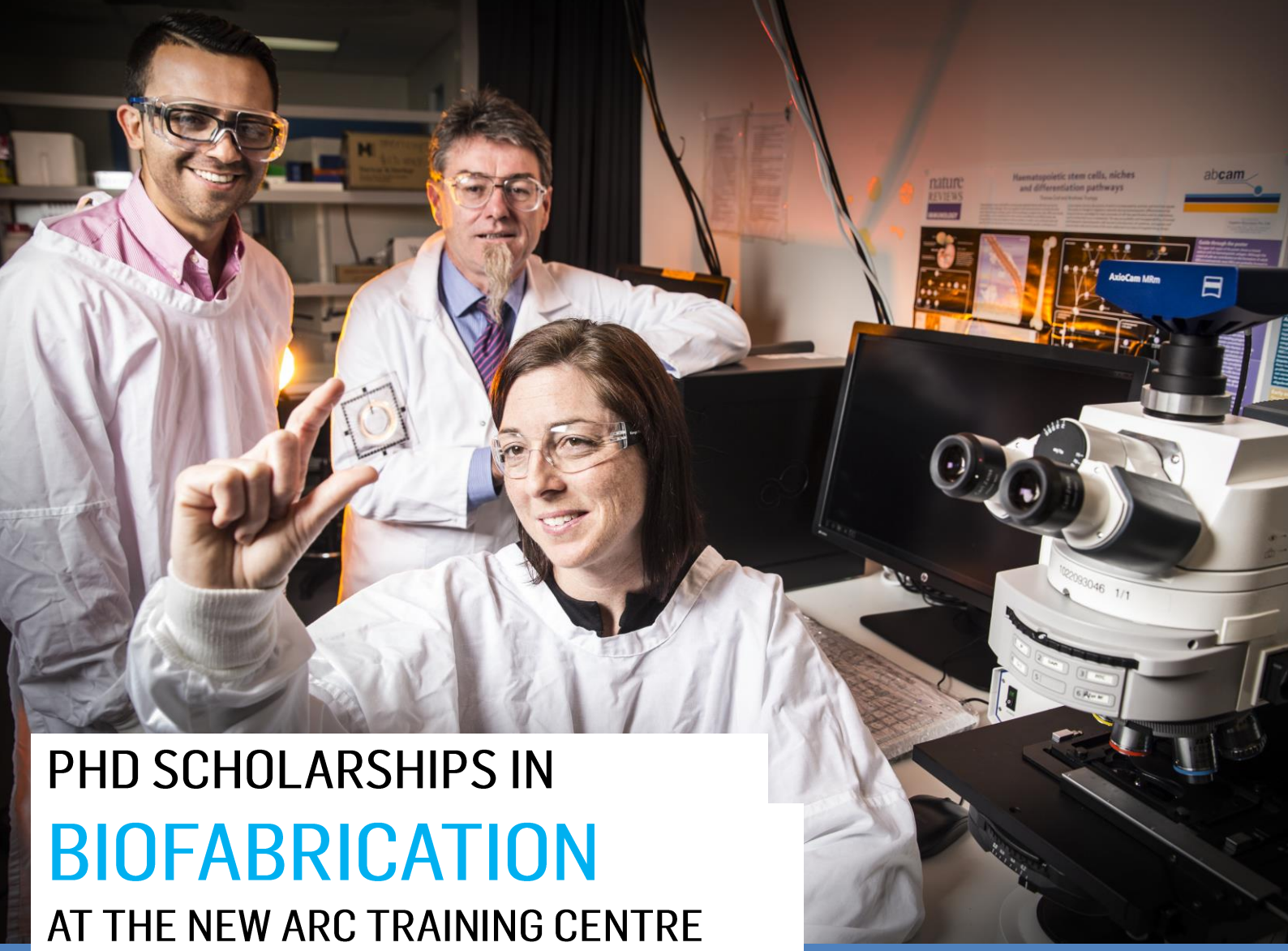
The quest to deliver scientific findings that will stand the test of time to enable sustained commercial developments is not always compatible with a desire to make financial gain as quickly as possible. However, a productive and sustainable relationship is only possible if both points of view are understood and respected and that can only come through persistent dialogue – talking and listening. Of course, this is not a new challenge – we have grappled with it for centuries and every now and again economic and political forces align to facilitate the introduction of innovative practices to help us cross the Ideas to Industries divide. One of those times is now!

Here we will discuss this latest revolution in the context of new approaches in biofabrication. The convergence of well established knowledge bases in areas such as materials science, stem cell biology, medical imaging and advanced fabrication is providing a spectrum of commercial opportunities. The realization in many countries that traditional manufacturing approaches will not sustain the economic activity required to keep us in the way we have become accustomed and the realization that traditional business models may not be applicable – has opened the window of opportunity a little wider. The embracing of technology by members of the clinical sector and the development of innovative clinical research Centre's is changing the way we work together.



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KEEN TO LEARN MORE?

ACES Director Professor Gordon Wallace is available to meet prospective students during May andJune 2016 in:

Dublin, Ireland
Bologna, Italy
Cimtec conference Perugia, Italy
Bath, UK

Email your expression of interest with CV and location to phils@uow.edu.au
www.electromaterials.edu.au

ARC Centre of Excellence for Electromaterials Science

Dermot Brabazon

BEng, PhD, CEng, FIMechE, MIoM^3, MIEI

Professor Dermot Brabazon received his BEng (Mechanical Engineering) and PhD (Materials Science) from University College Dublin. From 1995 to 2000 he worked with Materials Ireland, a state materials science research centre. He was appointed as a lecturer in the School of Mechanical and Manufacturing Engineering at Dublin City University (DCU) at the start of 2000, promoted to Senior Lecturer in 2006, Deputy Head of School in 2007, to Associate Dean for Research in 2009, and to Professor in 2014. In recognition of his academic achievements and contributions to development of engineering technologies, he was conferred with the President's Award for Research in 2009 and he was appointed as Fellow of the Institute of Mechanical Engineering in 2015. He is currently Director for the Advanced Processing Technology Research Centre at DCU. He has published over 200 internationally peer reviewed papers. His research is focused in the areas of materials and processing technologies and based on the pillars of Near Net Shape Forming, Laser Processing and Separation Science technologies. These overlapping activities are focused toward the development of advanced processing technologies to enable the improved efficiency and quality of production technologies for the benefit of MNC and SME companies, and the broader society. Details of his research can be found at the following links:
http://www.dcu.ie/apt
https://scholar.google.fr/citations?user=WlPcqhIAAAAJ&hl=fr&oi=ao
https://www.researchgate.net/profile/Dermot_Brabazon

Overview of Recent Laser Technology Developments and Applications

Dermot Brabazon

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In recent years there are an increasing number of new technology developments and applications being introduced for laser processing technologies. A general introduction to laser processing technologies will be given followed by an overview of specific developments from the research undertaken in the Advanced Processing Technology Research Centre at DCU. This includes the development of laser surface melting technology in order to prolong high temperature die life times, the biocompatibility and life time of orthopaedic implants, the implementation of laser shock peening and hardening for mining drill components, the commercialisation of laser surface textured interference fit pins, and the controlled laser production of nanoparticles with defined properties, and laser surface texturing and micromachining for the production of novel chemical and biological species separation.

Micheal A. Morris

Professor Michael Morris is the Director of AMBER and Professor of Surface and Interface Chemistry at Trinity College Dublin. AMBER is the national material research centre and is co-funded by government and industry to provide disruptive science into industry partners. Prof. Morris was at University College Cork for over 20 years before moving to Trinity and he retains a research group in Cork and the Tyndall National Institute. He has worked in the area of self-assembly for over 20 years and has published over 200 papers in this area. These self-assembly methods have been used to generate ultra-low dielectric constant thin films and create nanowires and nanowire arrays. His current work focuses on the development of block copolymer techniques to nanopattern surfaces for electronic device applications. Prof. Morris has also applied some of these techniques to the development of food packaging materials in both film and membrane form where nanopatterns can improve antimicrobial and hydrophobic properties of polymers. Prof. Morris is a partner on the EU sponsored PLACYD programme aiming to insert block copolymer lithography into device fabrication. Prof. Morris has worked closely with collaborators at Intel both in Ireland and in Components Research in Portland. He also works with a number of other industrial partners including, Alcatel-Lucent, Merck Millipore and Glantreo in examining how inexpensive nanopatterning and nanostructure may be used in other applications which include advanced surface cooling and antimicrobial surfaces.

Challenges in Integrating Academic and Industry Research

Michael A. Morris

AMBER, Surface and Interface Chemistry, Trinity College Dublin, Ireland

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The clearest path to commercializing research from university laboratories is by strong collaboration with industry partners. This form of research cooperation has increased very significantly over the last 15 years. This has been motivated by a number of factors including: the phasing out of blue-sky research in industry, cost of infrastructure, government recognition that innovation is critical to economic health and the willingness of researchers to participate in these programs. The AMBER centre is an SFI-industry funded materials research centre focused on partnering with industry to allow the exploitation of research output and expertise. This talk addresses the challenges that we had to address if industry-academic research partnerships are to be successful.

The first point that will be discussed is what success is; clearly this is different for each of the stakeholders. How can success be quantified? Clearly, each stakeholder must be rewarded for participation and this is key to defining a successful engagement. Provided a project meets these basic criteria there are other potential barriers. Technically a project may be challenging but not all potential solutions can be implemented and the integration phases is critical. Access to both foreground and background intellectual property is a critical issue. Further, good project management is pivotal in determining success. All these issues could be readily foreseen but other issues such as depth of expertise, the mobility of researchers, technical support, funding visibility are less obvious but equally critical.

One of the most important issues is how industry and academia can work together to carry out truly disruptive research that can address ‘grand-challenges’ requiring multi-industry and multi-academic partners across several fields. The barriers seen in smaller projects are crystallized and careful consideration should be given as to how we take our current learnings towards meeting the demands of this sort of collaboration.

Robert Forster

Robert Forster holds the Chair of Physical Chemistry within the School of Chemical Sciences at Dublin City University and is the Director of the National Centre for Sensor research. He has served as DCU Dean of Research and Associate Dean of the Faculty of Science and Health with responsibility for research. He is the author/co-author of more than 230 manuscripts and reviews and has been a Visiting Scientist to the California Institute of Technology and the University of California at Berkeley. He received the President's Research Award and was the first Irish based electrochemist to present a lecture at the Gordon Research Conference on Electrochemistry. He has contributed invited articles to more than eight Festschrift Issues celebrating the accomplishments of distinguished international scientists. Forster's research focuses on the creation of novel materials that have useful electronic or photonic properties because they are highly ordered on the molecular length scale. These materials, that include surface active transition metal complexes, metallopolymers and nanocavity arrays and metal nanoparticle composites. These materials are rationally designed for applications in molecule-based electronics, display devices and have produced sensors with attomolar limits of detection.

Translating Electro- and Photo-active Materials into Devices

Robert Forster

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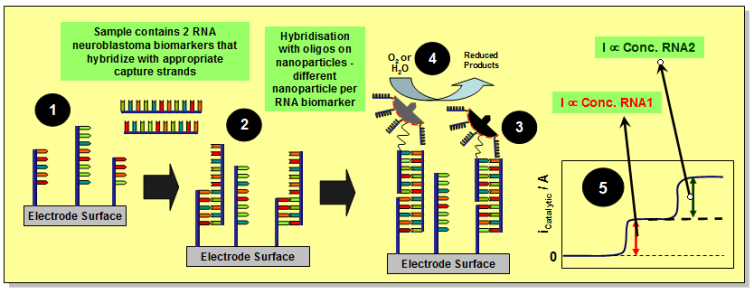
The healthcare industry is changing in dramatic ways with an increasing focus on patient outcomes, cost, and more personalized, "precise" medicine. The question for manufacturers of diagnostic devices and other clinical laboratory systems is how will this shift impact them—and what do they need to do to compete effectively, maintain or grow market share, and stay profitable? We believe that there are three key technical innovations that will help transform contemporary clinical practice. First, "Get closer to the Patient, Get Smaller". Second, use the power of big data and data analytics to cut through the complexity of multimodal, multiparameter techniques to extract information about patient's well being from complex data sets. Third, innovations in models for business-academic interactions. Examples from our work on nanoparticles and nanoscale sensors for biomarker detection, new materials for re-engineering/re-purposing existing point-of-care devices and the use of multimodal, multiparameter microscopy for disease diagnosis, will be used to show how smaller, better, faster devices can improve patient outcomes and manufacturer balance sheets alike. For example, we describe the use of electrocatalytic nanoparticles that generate dramatically enhanced Faradaic currents even when only a few copies of the miRNA target are present thus avoiding the need for PCR based amplification of the target. Calibration plots of the log[DNA] vs. faradaic current are linear from 10 fM to 1 μM and sub-pM concentrations can be detected without the need for PCR amplification of the target.



Finally, the value of applying the latest business methods of "futurecasting" to diagnostics is considered.

Kieran Drain

Kieran is a broadly experienced C-level Technology Executive with experience in Fortune 500, Nasdaq and Start-up company management and board positions. Currently he is CEO of the Tyndall National Institute in Ireland, one of Europe's premier ICT research institutes, has been most recently Vice President & General Manager at Rambus, Inc., and prior to that, President & CEO of Silicon Valley Technology company, NanoGram Corporation. Prior to joining NanoGram Corporation, he was Vice President and General Manager for the Performance Polymers Division of Avery Dennison Corporation with prior leadership roles at Ciba Specialty Chemicals and Loctite Corporation (now Henkel). Kieran has more than thirty years industrial experience in technology and business management in diverse industrial segments including solid state lighting, photovoltaics, rechargeable batteries, LCD displays, electronics interconnect, automotive, and composites.

Sensorized Testbeds and Pilot Line Facilities for Demonstrators and Prototypes

Kieran Drain

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The overarching need for the Irish manufacturing sector is transformational development of fully integrated and digitised design and operations, optimised for flexibility, speed, quality and productivity. Sensorization delivers actionable information throughout the manufacturing life cycle and product supply chain: from raw materials, finished products and components, through design, manufacturing and delivery. This intelligence is key to raising competitiveness and sustainability.

Peter C. Innis

A/Prof Peter Innis obtained his PhD (UTS) in 1997 in the field of electrochemical processing of conducting electroactive polymers (ICPs). He has been a recipient of an Australian Research Council (ARC) – Australian Postdoctoral Fellowship (1999-2001) and an ARC Queen Elizabeth II (QEII) Fellowship (2003-07). He has extensive experience in the area of conducting polymer synthesis and their application to technologies such as intelligent electronic textiles, polymer photovoltaics, polymer actuation and sensing technologies. He has authored published 66 papers in refereed international journals, 3 book chapters and 7 patents. His publications have attracted over 1147 citations (h-index 21). At present he is the Assistant Director of the Intelligent Polymer Research Institute at the University of Wollongong and the Manager of the Materials Node of the Australian National Fabrication Facility (ANFF). The capability provided by ANFF enables users to process hard materials (metals, composites and ceramics) and soft materials (polymers and polymer-biological moieties) and transform these into structures that have application in sensors, medical devices, and nanoelectronics.

The Australian National Fabrication Facility Materials Node - Supporting Researchers and Industry (From Electromaterials to Integrated 3D structures)

Peter C. Innis

Australian National Fabrication Facility – Materials Node,
ARC Centre of Excellence for Electromaterials Science (ACES) &
Intelligent Polymer Research Institute
University of Wollongong

Email: innis@uow.edu.au

In this presentation examples of assembly approaches of electro-materials into functional structures at ACES and the translational support to industry will be discussed. The exponential growth in the discovery and development of new materials, and the importance of nanostructures from them, poses some exciting challenges to those involved in device fabrication. The use of organic conductors in devices greatly opens up the possibility of new areas of application ranging from chem-sensors through to bio-medical applications. As fascinating as the properties of organic conductors are, they are only really useful when they can be seamlessly and effectively integrated with other materials to create functional devices. At ACES with the support of the ANFF electroactive polymers, nanocarbons and biopolymers have been fabricated into structures such as fibres, films and coatings and subsequently assembled or even printed into functional devices. Here we will report on our advances in translating these materials into functional devices ranging from fibres into textiles and materials based print media into 2 and 3D structures.

Under pinning these activities at ACES is the utilisation and modification of fabrication tooling supported by the ANFF. Additive fabrication (AF) techniques emerged in manufacturing industries during the mid 1980's. This family of layer-by-layer fabrication techniques have been adopted as a means to reduce product development time and give improved flexibility in producing small batches of products. Within the medical research field AF has received much attention as a means of on-demand automatic production of structures for implantation. At ACES we employ these technologies as a means to fabricate electrically stimulated devices. To this end, techniques such as Fused Deposition Modelling (FDM), Inkjet Printing and Selective Laser Melting (SLM) have been utilised via ANFF Materials Node to facilitate processing of complex composite materials into porous and fully dense functional 3D structures.

Chung-Yu Wu

Prof. Chung-Yu Wu received the M.S. and Ph.D. degrees in electronics engineering from National Chiao Tung University (NCTU), Hsinchu, Taiwan, in 1976 and 1980, respectively. Since 1980, he has been a Consultant to high-tech industry and research organizations and has built up strong research collaborations with high-tech industries. From 1980 to 1983, he was an Associate Professor with National Chiao Tung University. From 1984 to 1986, he was a Visiting Associate Professor with the Department of Electrical Engineering, Portland State University, Portland, OR. Since 1987, he has been a Professor with National Chiao Tung University. From 1991 to 1995, he served as the Director of the Division of Engineering and Applied Science, National Science Council, Taiwan. From 1996 to 1998, he was bestowed as the Centennial Honorary Chair Professor of National Chiao Tung University. From 2007 to 2011, he served as the President of National Chiao Tung University. He served as the Program Director of National SOC Program (2007-2011) and National Nano Technology Program (2011-2014). He received National Chair Professorship from Ministry of Education, 2015-2017. He is currently a Chair Professor of National Chiao Tung University and the program director of Biomedical Electronics Translational Research Center, NCTU. He has authored or coauthored over 300 technical papers in international journals and conferences. He holds 45 patents, including 22 U.S. patents. His research interests are biomedical electronic devices and systems, intelligent bio-inspired vision sensor systems, and nanoeletronic circuits and systems for RF/microwave communication. Dr. Wu is a member of Eta Kappa Nu and Phi Tau Phi. He was a recipient of the 1998 IEEE Fellow Award and a 2000 Third Millennium Medal. He and his team received the ISSCC 2013 Distinguished Technical Paper Award. He was also the recipient of numerous research awards presented by the Ministry of Education, National Science Council (NSC), and professional societies/associations in Taiwan.

Ideas to Industries in Taiwan

Chung-Yu Wu

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The gap between academia and industries has become a major concern in worldwide higher education sytems. It is a great challenge to push academic research achievement to industries through technology transfer and/or start-up. Meanwhile, it is rather difficult to integrate and synchronize the research in industries and academia. Thus pre-competitive technologies could be developed under the collaboration of academia and industries.

In this talk, the ideas to industries in Taiwan will be presented through two examples. One is the establishment of the TIARA (Taiwan Industries-Academia Research Association) which promotes the second edition of industries-academia research (IAR) projects, **IAR 2.0**. The TIARA projects are formed with the pre-competitive research topics and 60% of the budget is from semiconductor industries. The Association is responsible for project management and accounting, faculty/students incentives, and IPR transfer.

The other is the promotion of biomedical electronic medical devices. MOST establishes the infrastructure on industrialization projects, the super incubation center, and the biomedical industrial park. The potential teams are selected to fund a project so that they could form a start-up company or a new division of existing company. The teams are invited to the super incubation center with various technical supports from existing research organizations. Afterwards, a start-up company or a new business division could be formed in the biomedical industrial park.

Finally, some thoughts and ideas will be given and discussed.

Russell Jones

Dr Russell Jones is an Australian citizen who has worked in London for the last 17 years. He graduated with BSc Hons and PhD (Electroanalytical Chemistry) in Australia. Since then he has worked in the Food and Pharmaceutical Industries. He joined GlaxoSmithKline in 1993 a lead a New Product Development Department before moving to work in London. He has specialized in leading technical project teams during the late stage of drug development, technology transfer, registration and preparation for commercial launch. In 2014 he joined the new Cell and Gene Therapy Development Unit in GSK with the aim to share his extensive knowledge of late stage drug development and help to move the emerging portfolio of new medicines from Development in to Commercialisation.

‘Business as Unusual’ - Gene Therapy and the Challenge of Developing Product, Platform, New Technology and Supply Chain in Parallel

Russell Jones

GlaxoSmithKline, UK

Email: Russell.D.Jones@gsk.com

Gene Therapy treatments targeted at significant but rare diseases have the potential to transform the lives of patients. The early clinical data is compelling and the challenge is to put in place the technical infrastructure to support registration and commercial expansion.

We are actively developing the manufacturing platform and specialized supply chain to support the eventual widespread availability of this type of treatment, but in order to deliver the emerging medicine on a large scale a radical shift in business practices is required. This is a challenging and complex endeavour.

In this work we have to think differently and have a very open approach to learning in order to address the significant challenges we face. Business as usual will not provide the solutions that we need and I hope to stimulate the audience to help us to identify innovative technologies and new approaches for the future. This is a new area of medicine and we hope to be pioneers in bringing this type of product to market and expanding the use more widely around the world.

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Dr Barry Burns

Barry Burns is a Technical Director of Cyanoacrylate Technology, in Henkel's Global R&D organisation, with responsibility for the development of new cyanoacrylate/acrylate related technologies. Barry has twenty years' experience in Loctite-Henkel adhesives/polymers/materials development and has extensive experience in the development of stimuli responsive cure trigger systems for epoxy, cyanoacrylate and anaerobic adhesives and is the holder of numerous patents in these technology areas. He has won several Henkel innovation awards for the development of new crash resistant adhesives for the automotive industry which incorporate nanoparticulate toughening agents, and for the development of new hybrid cyanoacrylate technologies. Barry is a PhD organic chemist (Queens University Belfast, 1991) with postdoctoral research experience in medicinal chemistry (Strathclyde Institute for Drug Research), asymmetric synthesis (University of Bath) and molecular recognition and self-assembly (Trinity College Dublin). His current research interests include electrospinning of polymers, adhesion promotion through surface modification, and 3D printing of new adhesive/polymer systems.

Cyanoacrylate Adhesives & Polymers – Material Challenges

Barry Burns

Henkel

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Cyanoacrylates (CA's), more commonly known as "Superglue", are a class of highly reactive monomers used as instant adhesives in numerous consumer and industrial bonding applications. Sold under the Loctite brand these adhesives are an extremely successful and valuable business worth over €300M in annual sales for Henkel. The success of these materials lies mainly in their speed of cure, typically achieving fixture in seconds, but also in their excellent adhesion to a broad range of different substrate types including metals, plastics, ceramics, rubbers, wood and human skin. This combination of speed and high adhesive strength makes them an extremely versatile class of adhesive. Despite this success cyanoacrylate adhesives face many modern challenges particularly from the materials performance point of view. Polymerization of CA adhesives is surface initiated thus bonding occurs rapidly in bonded assemblies with very narrow bond gaps. However, as the gap is increased then the rate of polymerisation decreases leading to very slow cure speeds. Cured CA polymers are also known to have limited performance when exposed to hot/humid environments due mainly to a degradation mechanism which involves unzipping of the polymer chains resulting in adhesive bond failure. These challenges have been somewhat addressed in recent years by the development of a new class of hybrid CA adhesives, an approach designed to combine the unique speed and strength of CA's with the robustness of epoxy adhesives. New synthetic protocol for the manufacture of CA's are also now available allowing access to new-to-the-world cyanoacrylate monomers with a completely different performance portfolio – high elasticity/flexibility, high impact resistance, low odour/low bloom, improved thermal and moisture resistance, optically clear, superhydrophobicity, and improved plastics bonding. Such developments have gone somewhat to meeting the materials challenge presented by cyanoacrylates and are opening up new potential applications for CA's beyond the traditional instant adhesive "Superglue". In recent years CA's have been reported to be used in increasingly diverse areas such as nanoparticles for drug delivery, topical tissue bonding adhesives, fingerprint detection, low friction, or superhydrophobic coatings, and in 3D printing applications.

Tony J. Killard

Prof. Tony Killard holds the Chair of Biomedical Sciences at the University of the West of England (UWE) and is Adjunct Professor of Biomedical Diagnostics at Dublin City University. He is also co-founder and Chief Technology Officer at BreathDX (UK) Ltd. He received his BA(Mod) Natural Sciences in Microbiology at Trinity College, Dublin in 1993 and his PhD in Biotechnology at Dublin City University (DCU) in 1998. He became a Principal Investigator at the Biomedical Diagnostics Institute, DCU in 2005, until his appointment to the Chair of Biomedical Sciences at UWE. He co-founded BreathDX in January 2015 to exploit novel breath diagnostic technologies. He is a fellow of the Royal Society of Chemistry. His areas of interest are the development of chemical sensors, biosensors and biomedical diagnostic devices; application of novel electroactive materials (nanostructured conducting polymers and electrocatalysts) to electrochemical sensors and biosensors, while also making these amenable to low cost mass production using technologies such as screen printing, inkjet printing and polymer MEMS fabrication; integration of these sensors into functional diagnostic devices and systems e.g. point of care diagnostics using novel techniques such as breath monitoring and printed electronics technology and development of novel approaches to blood coagulation monitoring.

Printable Nanosensors in Point of Care Diagnostics

Anthony J Killard

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Over the last decade, research into the application of conducting polymers in sensing and diagnostics has moved from scientific concept to commercial reality. Research which began as a collaboration between Dublin City University and the University of Wollongong looking into the fabrication of polyaniline nanoparticles as a functional alternative to bulk chemical and electrochemical polymerisation led to the creation of stable, water-based dispersants which could be deposited into reproducible think films using inkjet printing. This gave the sensors excellent performance characteristics which were exploited particularly in the challenging application of trace breath gas detection for ammonia. The development of novel imedimetric and analytical methodologies allowed, for the first time, the effective measurement of ammonia in breath at physiological concentrations. This led to the development of a breath ammonia measurement system called AmBeR®. In January 2015, BreathDX was set up to develop and exploit this technology in a range of diagnostic applications. Recently, BreathDX has undertaken the design and development of a saleable system. This presentation will present the current status of the technology, its development and application and will also make reference to on-going research at DCU to explore a range of diagnostic applications for the technology.

David Moore

David Moore is the Managing Director of Viska Systems, a company which he founded in 2015, and that specialises in the design of customised high-accuracy manufacturing and metrology equipment mainly for the medical device and life-science industries. Previous to founding Viska Systems, David worked in the laser micro-machining industry, where he led engineering teams on the development of various laser based projects including the high-accuracy laser micro-machining of bio-medical polymers, micro-hole drilling, and multi-photon fluorescence microscopy. David graduated with First Class Honours in BEng in Computer Aided Mechanical & Manufacturing Engineering in 2008, and later went on to pursue a PhD in the area of laser micro-machining and high-accuracy surface metrology in the evaluation and improvement of solar cell performance. His main research and engineering interests are high-accuracy CNC systems, micro-manufacturing, optical metrology, multi-spectral analysis, and image processing.

Challenges in High-throughput and High-accuracy Micro-machining with Fibre Lasers

David Moore

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Industries such as the electronics and medical device industries have constant demands for part miniaturisation, higher machining accuracies, and lower investment and operational costs. These factors represent a challenge for machine designers and integrators to develop equipment that can meet the required performance characteristics as demanded by industry. For applications such as stencil cutting, as used in the production of printed circuit boards (PCBs), the speed and accuracy demands are ever increasing, with aperture placement accuracies of ±5µm over 800mm distances now a common requirement. Improving laser cut quality to reduce post-processing costs and improve the stencil process reliability are also considered important factors for this application. This presentation introduces the main requirements of this demanding application, and then discusses the practical considerations from both a high-accuracy motion control and a laser micromachining perspective. From a motion control perspective, there are high demands on the machine building process, from design to machining to assembly in order to meet the accuracy demands. From a laser processing perspective, fibre lasers offer an ideal solution for this laser micromachining application, however there are still opportunities for improved integrated laser processes that are discussed in this presentation.

Jan Weber

Senior Research Fellow, currently assigned to Corporate Research of Boston Scientific to scan the European technical and product landscape, 27 years' R&D experience in the large med industry through Cordis, J&J and Boston Scientific. Holder of 190 US patents.

Bridging the Gap Between Research and Industrial Application

Jan Weber

Boston Scientific

Email: Jan.Weber@bsci.com

It is unfortunately a very long road between early stage research and commercial applications, especially in the medical field.

Due to high remaining technical risks, but especially due to very high clinical trial costs, it has been shown over the last decade that there is a declining appetite of large companies in the medical device sector to invest in new external research. Looking at the portfolio of a typical large size medical company as Boston Scientific, it becomes clear that the product portfolio mainly exist of acquired products and evolutionary derivatives. Grow is driven through buying small and midsize companies with early stage successes. There are many contributing factors which reduces the appetite of large size med industry to switch this proven pathway, especially as the existing business model has been very successful. Factors as high clinical costs, high thresholds for new players to enter the market, a huge and diverse product portfolio and an abundance of available SME's with new products makes large med-industry very conservative in their behavior. The gap between research and large scale industrial applications will therefore have to be bridged through these entrepreneurial SME's. The question is how ?

We as industry are highly interested to bridge the gap, we are, but we simply still don't know how to improve the situation. This talk will not show the solution, but will highlight the huge non-existing bridge. It is an invitation to keep the dialogue open and perhaps to find small improvements.

Luis Fernando Arenas

Luis F. Arenas is a PhD research student at University of Southampton, UK. He holds a BSc degree in chemistry (graduated first in class) and a MSc in chemical technology from UAdeC, Mexico. During this period, he gained experience on corrosion monitoring of pipeline steel, electroanalysis of natural products via polarography and amperometric bio-sensors. He applied for his current position following an industrial placement at a materials research company (COMIMSA, SA), and academic stays at National Autonomous University of Mexico and University of Córdoba, Argentina. The Mexican government awarded him CONACYT and SEP scholarships and the University supports him with the Eustice scholarship. During his short career, Luis has published 6 peer-reviewed papers (with 4 in preparation), 6 congress memoirs and one popular science magazine article. He has presented his work in 4 posters and 8 talks in overseas conferences. He is member of RSC, ISE and ECS. His scientific interests include: electrochemical engineering, redox flow batteries, new manufacturing techniques, electrodeposition of metals and the electrochemical properties of rare earths. His current project is centred on the characterization of advanced porous electrodes for zinc–cerium flow batteries and other industrial operations involving cerium conversion.

Shannon E. Bakarich

Shannon is a postdoctoral research fellow in The Genetics and Biotechnology Laboratory, at The National University of Ireland Galway, Ireland. The aim of his current research is to fabricate novel bio-electrodes for microbial fuel cells using 3D printing technology. Shannon received his education at the University of Wollongong, Australia. In 2012 he joined The Intelligent Polymer Research Institute to study for a doctorate supervised by Prof. Geoffrey M. Spinks and Marc in het Panhuis. During his PhD research project Shannon developed a number of techniques for 3D printing 'tough' hydrogels and demonstrated 4D printing using hydrogels for the first time.

Aymen Ben Azouz

Aymen Ben Azouz is a multidisciplinary engineer with extended experience both in industry and academia. He graduated with an electrical engineering degree in 2005 and worked for a year with FG Wilson Ltd (Caterpillar UK) as an Electrical Engineer in the Product Maintenance Department. In 2007, Aymen joined the School of Mechanical and Manufacturing Engineering in Dublin City University (DCU) to work on the development of new sensing techniques for automatic milking systems. From this work, he obtained a masters degree in 2009. He subsequently joined the National Centre for Sensor Research where he completed a PhD degree in 2013. The focus of his PhD research work was on laser processing of polymer and glass materials for the purpose of developing new techniques of fabrication of microfluidics devices. He is now part of the Insight Centre within the Adaptive Sensors Group with Prof. Dermot Diamond, initially working on the development of wearable sensors for sleep apnea screening before taking the position of Postdoctoral Research Engineer on the NAPES (Next Generation Analytical Platforms for Environmental Sensing) project. His role in this project is to oversee the engineering aspects covering the development of the automated platform. This includes getting specifications and collaborating with chemists and biologists in the development of the bio-chemical sensors, designing and prototyping the electro-mechanic modules, liaising with industrial partners in the project and integration of the various developed elements within a compact autonomous sensing platform.

Probal Bose

I was born in Kolkata, India on January 15th, 1988. As I grew up in Kolkata, and as it was the previous capital of British colonised India, I had experienced a very diverse political and social culture of both east and west. I graduated from Lavan Hrad Vidyapith High School on 2005 and West Bengal University of technology, with a bachelor's degree of Electronics and Communications Engineering on 2009. On 2009 May, I joined Huawei Telecommunication (I) Co. Pvt. Ltd, as a Systems Engineer. I worked as an engineer in the deployment team for wireless radio access networks for several service providers. While in Huawei, I gained vast experience to work on different radio technologies. Most importantly I achieved the opportunity to commercially launch India's first EVDO RevB Network for TATA Teleservices Ltd. Apart from that I had actively deployed several 3G networks in various parts of India, and also worked in the team for deploying the MPLS backbone network for India's first commercial LTE network. Between 2009 to 2012 Huawei was the highest grossing Telecom equipment provider in India and among the first three in the world. I left Huawei on 2012 and joined Ericsson as an Assistant Engineer in Operations. My main responsibility in that position was to manage a deployed network along with optimization. In Ericsson my term was short, because I always had a dream to pursue Master degree, thanks to my mother. She always told me that having a master's degree makes one's education complete. So that it, on 2013, I began a new journey. It was a really big decision of my life, probably the biggest by then, Leaving a four years career and starting from the scratch again. So, on 2013 September I joined Dublin City University, Dublin, Ireland and graduated on 2014 with a Master's of Engineering in Telecommunication. Then began the harder part, looking for job. It took a while but I successfully bagged a job from IBM Research Laboratory, Dublin, Ireland. But then came the greatest opportunity to me till now I can think of, an offer from Insight Centre for Data Analytics, Dublin City University, working for the the National Centre for Sensor Research. Had to let IBM go. Now I work as a Research Assistant in Insight under Professor Dermot Diamond, working on different research projects. My main responsibilities are focused on wearable sensors and different electrochemical sensors. Along the road I am working on microfluidic designs to harvest human body sweat in the wearable devices, along with calibrating conductive properties of chemical solution using contactless conductivity, apart from that I am working on several electronics circuit designs and prototyping. My work profile gives an opportunity to design, fabricate and characterise the devices and prototypes I create for my projects. I design using different CAD tools, then use 3D printing, Photolithography and Laser cutting for fabrication, finally use interferometry and 3D microscope or SEM for full characterisation. I love working in these group as I can explore different side of science and engineering together, which is a rare and valuable opportunity. I am really grateful to Professor Dermot Diamond and My managers Dr. Larisa Elena Floria and Dr. Colm Delany and all my fellow colleagues, for their support and enthusiasm all along.

Mark Bowkett

Mark Bowkett is a founder and an owner Director of TE Laboratories Ltd since Incorporation in 1991. The company operates in the chemistry and analytical areas and is active across a number of divisions. Diversification has been achieved by Research and Development, innovation and acquisition. Current operating divisions include an Environmental Laboratory, Lubricating Oil "Machine Care" laboratory, Transformer oil (Transcheck) laboratory, chemical manufacturing laboratory and a R&D laboratory. The company operates from a 40000 sq. ft. dedicated laboratory complex. Significant resources are dedicated to export markets and R&D and the company works closely with a number of Irish and European Universities. Internal R&D funding is supplemented with external funding and the company has been active in many European funding schemes including Eureka, FP7 and H2020 as well as National funding schemes such as Fusion and Innova. Current research activities include: microfluidic environmental analysis instruments, low cost drinking water sensors, passive sampling and detection systems for water and air, low cost Ion chromatography systems.

Danielle Bruen

Danielle Bruen studied medicinal chemistry at Trinity College Dublin, Ireland (B. A. (Mod) Hons 2014). During her time there she was introduced to supramolecular coordinating polymers by Prof. Thorfinnur Gunnlaugsson and completed her undergraduate thesis in this field. In 2014 she joined the Adaptive Sensors Group at Dublin City University, under the supervision of Prof. Dermot Diamond, Dr. Larisa Florea and Dr. Colm Delaney, where she is currently persuing her Ph. D. Her research currently focuses on the design and synthesis of glucose sensors to be incorporated in to devices for continuous glucose monitoring.

Lorraine Byrne

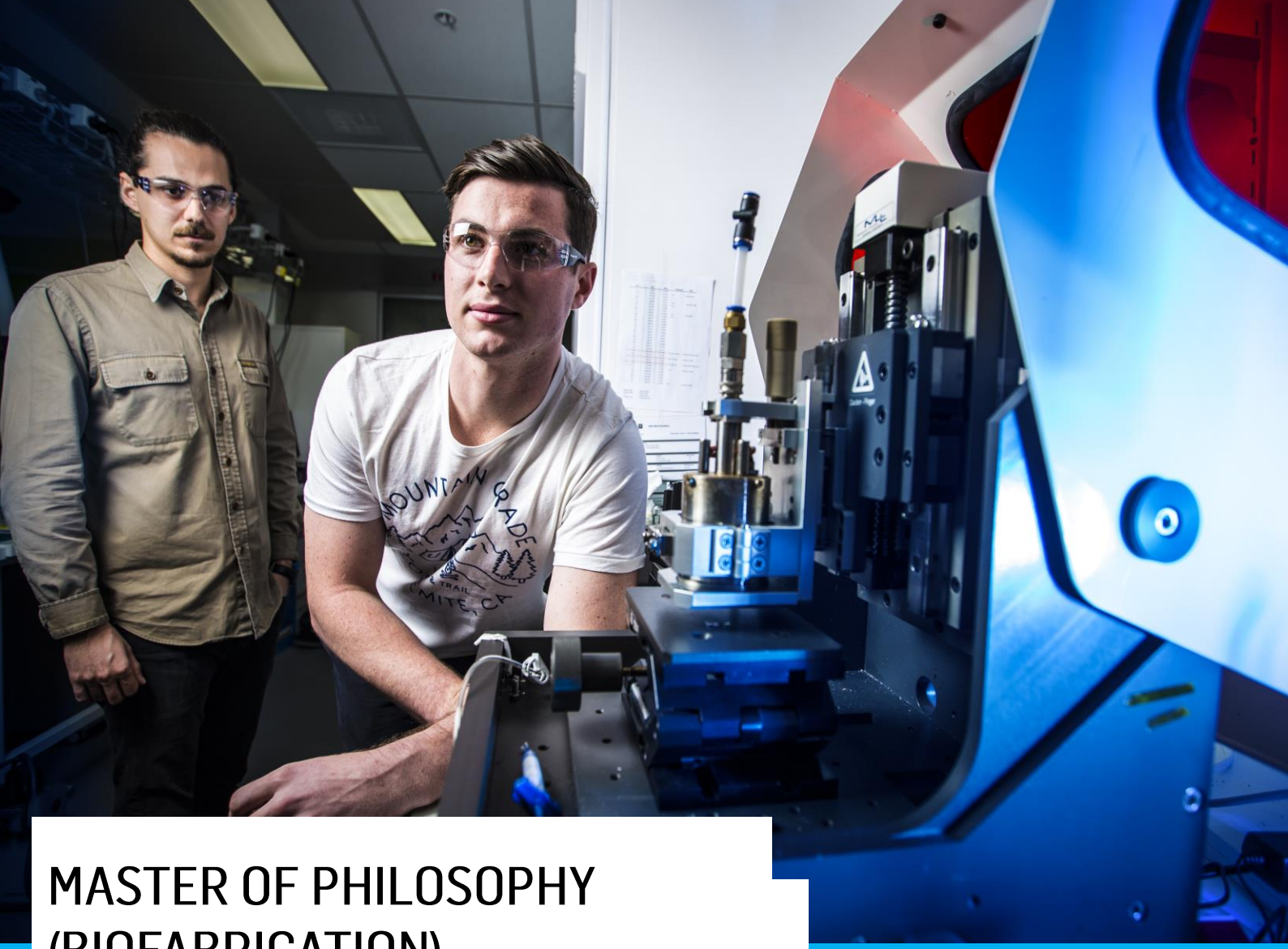
Dr. Lorraine Byrne is the Executive Director of the Advanced Materials and Bioengineering Research Centre (AMBER) and the Centre of Adaptive Nanostructures and Nano devices (CRANN) at Trinity College Dublin. She is responsible for the operational leadership of AMBER and in partnership with the director sets the strategic direction in terms of priority research areas, industrial engagement, financial management and funding diversification. Lorraine joined AMBER in February 2016 following an 18 year career with Hewlett Packard where she held a number of technology leadership and business development roles. Lorraine was responsible for the set up and growth of the chemistry and failure analysis infrastructure at the InkJet Manufacturing Site at Leixlip, Co. Kildare. More recently Lorraine was the founding member and led the local HP Emerging Technologies team at Hewlett Packard Ireland which was sponsored by the corporate R&D function to develop materials and processing technologies for flexible displays and sensors. This work involved significant collaborations with the Irish and European materials research ecosystem, most notably a large collaborative research project with CRANN in the area of flexible transparent conductors. Lorraine has a PG Certificate in Nanotechnology from the University of Oxford; PhD in Chemistry and a B.Sc in Analytical science both from Dublin City University.

Celia Chari

Born in Madrid (Spain) and raised in Dublin, Celia has recently completed the third year of her undergraduate degree in Nanoscience, Physics and Chemistry of Advanced Materials in Trinity College Dublin. She entered TCD in 2013, having been awarded an Entrance Exhibition Award. Studying modules in Physics, Chemistry, and Mathematics, she attained an overall first in her first two years of study in TCD, subsequently awarded a First class book prize both years. Beyond her undergraduate studies, Celia's experience includes having served as an intern at the Conservation Department of the National Gallery of Ireland in 2014. She has also worked in the inorganic chemistry lab of Prof. Bob Baker (TCD) in summer 2015. Starting September 2016 she will be working on her 4th year project entitled 'Fabricating 3D structured gel actuators' under the supervision of Professor Geoff Spinks at the Intelligent Polymer Research Institute headed by Prof. Gordon Wallace at the University of Wollongong. Celia's interests include playing the guitar, and being the Junior Sound Engineer in the student-run radio station Trinity FM, where she also hosts a music show called *Retropolitan*.

Simon Coleman

Dr. Simon Coleman received his B.Sc in Analytical Science in 2006 at Dublin City University and subsequently his PhD in 2010 under Prof. Dermot Diamond investigating the physicochemical properties of ionic liquids. Simon works as a postdoctoral research fellow and project leader with experience in European Union FP7 projects and industrial-academic research partnerships at the National Centre for Sensor Research (NCSR) with research interests in ionic liquids, polymer synthesis and stimuli responsive materials for sensor applications within the medical and environmental sectors. Research to date has included the development of bio-compatible materials for signal enhancement in wearable ECG monitoring platforms for sports and recreation, portable platforms for chemo and bio-marker monitoring of patients with bipolar disorder, production of low cost, portable microfluidic platforms for environmental assessment of chemical contaminants and non-contact, photo-responsive polymer valves for in-situ microfluidic chip flow regulation and control.



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Gearóid Collins

My name is Gearóid Collins and I am from West Limerick. I am currently a student of Trinity College, Dublin, studying Nanoscience, Physics and Chemistry of Advanced Materials. I have recently completed third year. The course, so far, has provided me with a good knowledge of various different physical and chemical concepts including: solid state materials, magnetic properties, semiconductor physics, quantum mechanics as well as analytical chemistry, statistical mechanics and molecular thermodynamics. In 2013 I received the Entrance Exhibition Award from Trinity College provost upon arrival at Trinity College. I am currently working as an engineer's assistant for an air-conditioning and refrigeration company. I hope to travel to Australia in the coming college term to carry out my final year project in material science. I currently tutor secondary school students in chemistry, physics, biology and maths. I spend my free time playing football with my local club and taking part in running events such as half marathons.

Jennifer Deignan

Jennifer Deignan received a B.Sc. (Hons) in general chemistry from Florida Institute of Technology in Florida, USA (2012). In 2012 she began consulting for the Wearable Sports Electronics division of the adidas Group in the area of sensor design and testing. In 2013 she began her PhD at the Insight Centre for Data Analytics at Dublin City University under the supervision of Prof. Dermot Diamond and Dr. Shirley Coyle. In 2014 Jennifer spent 3 months at the Intelligent Polymer Research Institute at the University of Wollongong studying CNT and polymer based strain sensor technologies under the supervision of Prof. Gordon Wallace and Assoc. Prof. Peter Innis. Her research interests include the design, production and applications of wearable sensors for sports and health monitoring.

Colm Delaney

Dr. Colm Delaney studied chemistry at Trinity College Dublin (TCD) and graduated with a B.A. Mod (Hons.). He subsequently carried out a research MSc. in Materials Chemistry on the topic of organic light-emitting materials. In 2015 Colm completed a PhD. in Organic Chemistry with Prof. Sylvia M. Draper in TCD, on the synthesis and application of novel materials for fuel-cell application. During this time, he received several awards for his lecturing and demonstration to undergraduate students. He subsequently joined the Adaptive Sensors Group, lead by Prof. Dermot Diamond, as a Postdoctoral Researcher. He is funded through the Nano-Bio Manufacturing Consortium, in which Dublin City University is the sole partner from outside the U.S.A. This research is performed in collaboration with GE Global Research, Air-Force Research Laboratories, University of Cincinnati and University of Massachusetts Amherst. His research involves the design and synthesis of sensing materials for the earlier detection of disease and monitoring of wellbeing.

Andrew P. Doherty

Dr Doherty graduated from Dublin City University in 1989 with a BSc in Analytical Sciences and in 1993 he completed a PhD in electrochemical sensors at DCU under the direction of Professors J. G, Vos and M. R. Smyth. Subsequently, Dr Doherty undertook post-doctoral research on molecular electrochemistry / electro-synthesis with Professors Andrew Hamnett and Keith Scott at the University of Newcastle upon Tyne. In 1995, Dr Doherty was awarded a University Research Fellowship from the Royal Society of London which he held at Newcastle until 1999 and subsequently at Queen's University of Belfast until 2003. Dr Doherty's is currently a lecturer in physical chemistry at QUB where his research interests include molecular electrochemistry, redox catalysis, electro-analysis, electrochemical applications for energy applications of ionic liquids and the development of electro-active ionic liquid materials. In addition to academic research, Dr Doherty also performs extensive consultancy to the Energy Industries. Full professional and academic profile is available from http://pure.qub.ac.uk/portal/en/persons/andrew-doherty%28f268e689-3c27-4c92-9d2a-b10901e7890a%29.html.

Douglas William Dowley

Douglas Dowley is a thought leader, strategy executive and investor with a particular focus on early stage private equity/venture capital investing across scientific disciplines. His portfolio of achievements validate his expertise across his domain. He is interested in opportunities in the domains of Medtech, Data Science, Material Sciences and IoT. Achievment Portfolio: Invested in an ocular modeling company in 2009 and work with the company to the present day after successfully divesting a technology within for a five fold return on investment. Invested in a Data Science Company in 2010 with the company sold in 2015 for an eight fold return on investment. Invested in an Internet Functional Layer management software company sold for a 20 fold return on investment. Invested in a peer to peer car sharing platform that has a mark to market of 15 times the invested capital. Sourced investment capital for 42.5m venture capital early stage mandate fund. Managed multiple realisation transactions from heads of terms to data rooms through to contract negotiation and deal closing. Contract negotiation obliged that no long tail risks persisted for the fund.

Emer Duffy

Emer Duffy is a postdoctoral researcher in the School of Chemical Sciences, Dublin City University, where she is currently working on the SFI funded Sensing SubCutaneously INvitro (SSCIN) project with Aoife Morrin. Her research is focused on interfacing materials science with the skin to study volatile biomarkers for non-invasive health screening and diagnostics. She obtained a BSc (Hons) in Analytical Science from Dublin City University and a BS in Chemistry from the University of Kansas, USA. She completed her PhD within the Australian Centre for Research on Separation Science at the University of Tasmania, Australia, where she developed new carbonaceous composite materials, and investigated their unique properties, thermal transitions and application as adsorbents. Her research interests include materials (composites, porous materials and nano-carbons) for chromatographic and sensing applications, and their integration in portable platforms for point-of-care and environmental analyses.

Gillian Duffy

Gillian Duffy B.Sc. is a final year PhD candidate at Dublin City University (DCU), under the supervision of Prof. Fiona Regan and Prof. Dermot Diamond. Her research is focused on the development of low cost, wet chemistry based optical sensors for water quality monitoring. This includes the development and optimisation of an autonomous phosphate sensor for long term deployments in freshwater, alongside the development of portable sensors for on-site determination of phosphate, chromium (III) and chromium (VI). These sensors incorporate microfluidic technology allowing for precise fluid manipulation and presentation of coloured products to low cost optical detection systems. Gillian was awarded a Naughton Fellowship from the University of Notre Dame (ND) in the U.S. to complete this research. The project is a collaboration between DCU and Prof. Jennifer Tank at ND. Gillian received a B.Sc. (Hons) in Analytical Science in 2013 from DCU. She received a Hamilton Research Scholarship in 2011, allowing her to carry out a summer research project on microfluidic technologies under the supervision of Prof. Jens Ducrée in the National Centre for Sensor Research (NCSR) at DCU. Her research interests include analytical chemistry, method development, optical sensor development and technology for environmental and medical applications, and microfluidic technologies.

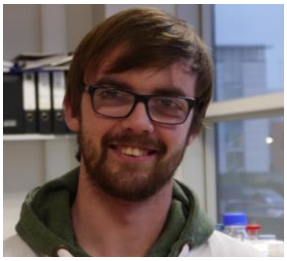
Aishling Dunne

Aishling Dunne started her PhD in 2013 under the supervision of Professor Dermot Diamond and Doctor Larisa Florea, in the INSIGHT Centre at Dublin City University. Aishling received her B.Sc. (Ord) in Pharmaceutical chemistry and Chemical Sciences from Dublin Institute of Technology (2012) and her B.Sc. (Hons) in Chemical Sciences with Medicinal Chemistry from Dublin Institute of Technology (2013). Aishling's research interests include the design, synthesis and applications of stimuli-responsive polymers.

Larisa Florea

Dr. Larisa Florea studied organic chemistry and chemical engineering at University "Politehnica" from Timisoara, Romania (B.Sc. Hons 2009). In 2009 she joined the Adaptive Sensors Group at Dublin City University where she earned her Ph.D. under the supervision of Prof. Dermot Diamond and Dr. Fernando Benito-Lopez. In 2011-2012, during her PhD, Larisa spent several months in Australia (University of Tasmania and University of Wollongong) as part of an extensive collaboration with The Australian Research Council (ARC) Centre of Excellence for Electromaterials Science (ACES) funded under the EU Marie Curie IRSES Program. Since 2013 she has carried out her postdoctoral research with Prof. Dermot Diamond in the INSIGHT Centre at Dublin City University, where she is currently Team Leader in smart materials and microfluidics. Larisa has 27 journal publications, 2 invited book chapters and 1 patent.

Wayne Francis



Wayne Francis is a PhD student in Professor Dermot Diamond's research group, in Dublin City University. Wayne received his B.sc. (Ord) in Analytical Chemistry from Institute of Technology Tallaght and his B.sc. (Hons) in Chemical Sciences with Medicinal Chemistry from Dublin Institute of Technology. Wayne's research interests include the design, synthesis and applications of stimuli-responsive materials and his PhD is focused on the development of synthetic biomimetic micro "vehicles".

Tom Glennon

I have a BSc in Biotechnology and an MSc in Biomedical Diagnostics. I worked as a research assistant in the Microfluidics platforms group in the Biomedical Diagnostics Institute (BDI) in Dublin City University from 2012 to 2014 developing centrifugal microfluidic platforms for various diagnostic applications. Since 2014 I have been a postgraduate researcher in Prof Dermot Diamonds group in the Insight Centre for Data Analytics, National Centre for Sensor Research, DCU. I am currently working on the development of SWEATCH a wearable watch-type platform for the analysis of electrolytes in sweat. The project is a collaboration between Insight, Shimmer in DCU Innovation Campus, and the Australian Research Council (ARC) Centre of Excellence for Electromaterials Science (ACES).

Thomas Higgins

Thomas completed his undergraduate degree in 2009 at the University of Wollongong having studied Nanotechnology. During the final year he carried out research on conducting polymer-biopolymer composite thin films for the neutral tissue, supervised by Prof. Gordon Wallace & Prof. Marc in het Panhuis. Following this, he joined the 'Chemical Physics of Low-Dimensional Nanostructures' group led by Prof. Jonathan Coleman at Trinity College Dublin. Here, he studied the properties of nanomaterial networks and nanomaterial-polymer composites produced by liquid-phase processing for electrochemical energy storage applications. He received his PhD in 2015. Recently, Thomas joined the 'Nanomaterials for Optoelectronics' group led by Prof. Jana Zaumseil at the Heidelberg University. He is studying the optoelectronic properties of printed nanomaterial networks thin film transistors that feature layered nanomaterials. This research is funded by a Horizon 2020 Marie Skodowska-Curie Individual Fellowship. For details see https://ie.linkedin.com/in/drthomashiggins

Jeroen Hugenholtz

Jeroen Hugenholtz was born on August 27th 1957 in The Netherlands. He obtained his academic training at the University of Groningen, under the supervision of Wil Konings and Hans Veldkamp. After completion of his PhD Thesis in 1986 entitled "Population dynamics of mixed starter cultures", he moved to The University of Georgia, Athens GA, USA, where he worked as a Post Doctoral fellow for three years on the bioenergetics of homoacetogenic clostridia. In 1989 he returned to the Netherlands and joined NIZO food research as Project leader in the Microbiology Department and later as Principal Scientist Food fermentation until his departure in 2010. In 1998 he also became projectleader and principal scientist at WCFS and later TIFN and from 2004 onwards till 2010 he lead the Kluyver Centre for Genomics of Industrial Fermentation as one of the directors. In 2006, Jeroen Hugenholtz was awarded a part-time professor chair (Industrial Molecular Microbiology) at the University of Amsterdam, a position he still holds today. In April 2010, JH moved from NIZO food research (and TIFN and Kluyver Centre) to Coca-Cola R&D Europe where he became responsible for global fermentation research. Jeroen Hugenholtz joined Corbion-Purac as Corporate Scientist Food Applications in 2013, where he was responsible for development of new ingredients for various food applications. In August 2015 Jeroen Hugenholtz moved to the Wageningen UR as Business Development Manager within the business unit of Biobased Products. Major commercial topics are biobased materials, such as silk/collagen-like proteins, but also efficient production processes towards bulk and fine chemicals using anaerobic fermentation. JH's major scientific interests are; (food) fermentation in general, physiology and metabolic engineering of fermentative bacteria and industrial microbiology/biotechnology. JH is author of over 200 scientific publications and 20 patents.

Carolyn Hughes

Dr Carolyn Hughes is the Director of Business Development – Physical Sciences within Invent, DCU's Technology Transfer Office and works closely with external industrial and commercial partners to develop collaborations and commercial exploitation of DCU's innovative technologies through licensing and the development of new start-up companies. Carolyn's portfolio is centred around the Sustainable Economies and Societies Research Hub which covers a broad range of research in the sectors of Water, Energy, Engineering and Manufacturing supported by DCU's underlying expertise in the areas of chemistry, analytical separation science, sensors, novel materials, physics, electronic and nanomaterials, plasma technology and engineering. Prior to joining DCU, Carolyn held a variety of commercial roles in industry spanning product management, new product introduction, business development and commercialisation management within the semiconductor, instrumentation and industrial gases sectors. Carolyn holds a B.Sc. (Hons) degree in Chemistry and a Ph.D. in Physical Chemistry from the University of Manchester, UK.

Matthew R. Jacobs

Matthew R. Jacobs is a research assistant at Insight Centre for Data Analytics and Dublin City University working as a member of Professor Dermot Diamond and Professor Aoife Morrin's research groups for medical sensor research. Specifically, he is working as a member of three research teams: developing on-body and real-time measurements of sodium concentrations *via* the Sweatch Sensor platform; strain measurements sensors for diagnosing ankylosing spondylitis, a degenerative disease that reduces spinal flexion; and the measurement of volatile organic compounds derived from skin for the purposes of diagnosing skin diseases such as melanoma, without recourse to conventional invasive biopsies. Matthew obtained a Bachelor of Medical Science (Medical Chemistry) at Macquarie University (Australia), and subsequently obtained an honours degree in analytical chemistry instrument design under the supervision of Dr Christopher McRae (Macquarie University). He has presently submitted his PhD thesis entitled "Multidimensional Gas Chromatography with resistively heated columns" after studying at the University of Tasmania as a member of the Australian Centre for Research on Separation Science (ACROSS) under the supervision of Dr Robert A. Shellie, Professor Emily F. Hilder and Professor Pavel N. Nesterenko. His broad research interests include analytical chemistry, environmental analysis, medical chemistry, sensors and detectors, electronics, programming, chromatography and portable analysis. In particular Matthew is interested in the development of portable analytical platforms for gaining new and valuable information complex samples in real time.

Chris Keely

Dr Chris Keely brings 20 years of experience working in and with, technology-focused multinational and indigenous Irish companies in the areas of new business generation and industry/academic engagement. In his current positon as the Senior Business Development Manager at the Office of Corporate Partnership and Knowledge Exchange (OCPKE) at Trinity College Dublin, he champions and is responsible for the successful delivery of the college's industry strategy; enabling and supporting the linking and commercial exploitation of academic research with industry. Whilst working in industry, Chris has led large-scale international programmes in product development, advanced materials engineering, manufacturing technologies integration and reliability engineering. Chris graduated with a first class joint honours degree in Physics and Mathematics from the National University of Ireland, Maynooth. He continued his professional education at Trinity College and was awarded a PhD in Experimental Physics in 1996. Chris is a passionate advocate of the use of technology in society and of lifelong learning.

James Kennedy

Dr James Kennedy has been a R&D Manager of Mazars since January 2016 with and works in the Taxation Advisory Services Department. An astute and innovative science, engineering and business professional with an impressive track record of operating both in the tertiary education and private sector. He engages in a strong professional development, attaining the status of Chartered Engineer to bolster already outstanding qualifications. He has demonstrated proficiency in assessing and developing advanced technology opportunities. While spearheading major projects and initiatives. He is capable of forging strong and sustainable relations with key stakeholders as well as securing millions of euros in funding from various sources. Possesses excellent experience of managing diverse teams in the successful completion of demanding initiatives to deadlines. James applies a participatory approach with a focus on striving for continuous improvement. James previously worked at Allergan Pharmaceutical and Boston Scientific in operational and technical roles. Prior to joining Mazars, he was a staff member of Athlone Institute of Technology, where he lectured for over 13 years in Polymer Engineering and Mathematics in the school of Engineering and was Director and Senior Research Fellow of a R&D Centre specialising in MedTech, Pharma, Engineering and Additive Manufacturing. He has overseen the successful completion of over 1300 industry projects, whilst securing over €5 million in funding from various sources i.e. SFI, EI, H2020 and private enterprise. He has also completed over 150 innovation vouchers and a number of innovation partnerships as well as European funding. James was also an IOTI policy advisor for UASnet and an IOTI representative for Research Prioritisation. He is also the European COST Irish representative for the improved protection of medical devices against infection. James is a member of the Board of the European Medical Polymers Division of the Society of Plastic Engineers and a founding member and steering and working group member of Metric Ireland. James is also a Science Foundation Ireland Principle Investigator and has published over 100 peer review journals, book chapters and conference proceedings. Within Mazars, James manages the R & D department to ensure its effectiveness in completing projects in line with key performance parameters including time, cost, quality and completeness. He also prepares projects briefs, ensuring that projects are clearly defined to meet client requirements and company performance criteria. He utilises his skills as a project manager to facilitate core projects and client portfolios across a range of technical sectors by providing technical consulting and funding support. He interfaces effectively with clients and collaborative partners including consultants, subcontractors, universities, research centres, etc. to provide scientific intelligence and market development research to optimise performance. He provides direction, decision and support to the project team.

Nigel Kent

Dr. Nigel Kent was awarded his undergraduate degree in Mechatronic Engineering from Dublin City University (2002). From there he was employed as a research assistant by the National Centre for Sensor Research. His main role was design and fabrication of polymer microfluidics devices for use in application areas such as environmental and chemical sensing. From there he moved to the Biomedical Diagnostics Institute (BDI) where the main focus of his work was on biological sensing techniques and the development of associated enabling instrumentation. He undertook his PhD in parallel with his position within BDI and in 2009 moved to the position of lecturer in what is now the School of Mechanical and Design Engineering in Dublin Institute of Technology where he lectures in the areas of electronics, instrumentation and control engineering. He remained formally involved with the BDI and in 2015 returned to Dublin City University on secondment to Professor Dermot Diamond's group. His main project was in the area of using additive manufacturing techniques to enable high throughput of microfluidic devices for environmental monitoring applications. Since Jan 2016 Dr. Kent has been working with Prof Dermot Brabazon in the Advanced Process Technology Research Centre in the area of powder metallurgy and additive manufacturing. Dr. Kent has also established himself as an independent consultant in the areas of microfluidic device manufacture and associated instrumentation development.

Senentxu Lanceros-Mendez

S. Lanceros-Mendez graduated in physics at the University of the Basque Country, Leioa, Spain. He obtained his Ph.D. degree at the Institute of Physics of the Julius-Maximilians-Universität Würzburg, Germany. He was Research Scholar at Montana State University, Bozeman, MT, USA and visiting scientist at the, Pennsylvania State University, USA and University of Potsdam. From 1998 he has been at the Physics Department of the University of Minho, Portugal, where he is Associate Professor. In January 2016 he joined the BCMaterials, Basque Center for Materials, Applications and Nanostructures, Derio, Spain, where he is Research Professor. From 2012 to 2014 he was also Associate Researcher at the INL – International Iberian Nanotechnology Laboratory. His work is focused in the area of smart materials for sensors and actuators, energy and biomedical applications, with over 380 ISI papers and 10 patents in the field. The developed technologies have been the basis of three spin-off companies.

Enrico Lucarelli

Dr. Enrico Lucarelli currently leads the Osteoarticular Regeneration Laboratory at Rizzoli Institute in Bologna Italy. He graduated in Biology Bologna in 1988. From 1990 to 1992 worked as a research fellow at Gaslini Hospital in Genova, Italy. In order to complete his research he moved to the National Institute of Health, Bethesda Maryland, USA as post-doctoral visiting fellow from 1992 to 1997. In 1997 he joined the Oncology Laboratory of the Rizzoli Institute in Bologna, Italy. His interests were not limited to the treatment of tumors, but also to the reconstruction of the bone tissue for patients after the resection of the osteosarcoma. In 1999 he funded with professor Davide Maria Donati the Osteoarticular Regeneration Laboratory. The Laboratory's focus is to develop stem-cell and tissue engineering products for bone and cartilage reconstruction and tumour treatment. Products developed by the laboratory have been tested in preclinical and clinical trials. He published 65refereed journal articles. His work has received more than1600 citations with an H index of 22. He is member of the Board of Directors of the Italian Mesenchymal Stem Cell Group.

Margaret McCaul

Margaret McCaul holds a BSc in Analytical Chemistry from the Limerick Institute of Technology and holds a PhD from Dublin City University in Organic Geochemistry, which involved the development of novel analytical techniques for the isolation and characterization of dissolved organic matter from freshwater and marine environments. Margaret has over six years industrial experience in the areas of analytical chemistry, environmental monitoring, and equine forensics. She has also held two postdoctoral positions in the areas of analytical science and science education. Margaret is currently working as a postdoctoral researcher in the adaptive sensors group in the NCSR.

Brendan O'Flynn

As Head of Group of the Wireless Sensor Network (WSN) group within the Tyndall National Institute (incorporating the NMRC) Brendan is responsible for developing the research vision for sensor networks as well as for the project management of industry funded and European projects; overseeing the day to day budget management and project administration (financial, personnel, delegation of work package responsibility etc.) and coordinating the activities of a multi-disciplinary team of researchers. He is involved in the development of the WSN Intern program, overseeing work placement students and various undergraduate programmes. His research into miniaturised wireless sensor systems has led to the publishing of a number of conference and peer reviewed journal papers and built up an international reputation for miniaturised wireless systems for the Wireless Sensor Networks team within Tyndall National Institute. This applied research agenda has led to multiple licences to industry and startup/spin out companies in Ireland and internationally Brendan has graduated a number of postgraduate students at Masters and PHD level and publishes widely in the field of smart sensing systems in a multitude of application spa.

Dame Bridget Ogilvie

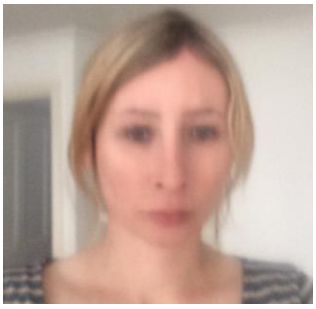
AC, DBE, FRS,FAA, FMedSci, FRBS

After my childhood and excellent early education in the Australian bush, in 1960 I went to the University of Cambridge where I received my doctoral degrees. I was a member of the scientific staff of the UK MRC at its National Institute for Medical Research from 1963-1980 undertaking research into the immune response to parasites. In 1980 I joined the staff of the Wellcome Trust, then a modest sized medical research funding charity. The Wellcome Trust grew to its present huge size by selling the pharmaceutical company it owned between 1986-1995. After 19 years, the last 7 as its Director, I retired in 1998. Since then I have enjoyed a non executive life on the board of many organisations, both large and small such as the Science Museum, Cancer Research UK, AstraZeneca and LloydsTSB and at present bodies such as Autistica and Sense about Science. I have been the Chair of the International Advisory Board of ACES for some years.

Juliana Oliveira

Juliana Oliveira graduated in Physics and Chemistry – Teaching course at the University of Minho in Braga (Portugal) in 2007 and obtained her Master in Physics of Advanced Materials in 2010 at the School of Science of the University of Minho. She is PhD student at University of Minho in the area of polymer-based sensors and actuators fabricated by printing technologies, working in the Electroactive Smart Materials group. In 2013 she was one of the co-founders of the company Nanopaint – design your technology (www.nanopaint-tech.com), which develops and commercialize electroactive inks for printed sensor applications.

Jemma Redmond



Jemma Redmond is a founder of Ouro-botics and an alum of the Hax accelerator program in Shenzhen. She has a passion for bioprinting and tissue engineering and is currently working on a modular open source bioprinting platform for the masses. She is a graduate of UCD with a Masters in NanoBioScience, and for her thesis, ("An Investigation into Osteoblast Adhesion on 3D printed Scaffolds") she decided to have a go at making human fingers by seeding osteoblasts onto 3D printed metacarpals and seeing if structure can affect cell growth and adhesion. Also having her funding cut she decided to play a little joke (scientist gives university the finger). She has also been experimenting with printing in liquid, integrating bioreactors into bioprinters and is super keen on tissue engineering. Prior to UCD, Jemma had a diverse background, she worked as an engineer for a number of years in different industries from oil and gas, mining and IT. She also ran a number of businesses during that time, and in university while studying applied physics. She rented property, rented out computers, filed her first patent and sold inventions while at university. She then went on to build up a vending machine business importing and exporting vending machines in Europe.

Fiona Regan

Fiona Regan is Professor in Chemical Science at Dublin City University and Director of the DCU Water Institute. Fiona studied Environmental Science and Technology and later completed a PhD in analytical chemistry in 1994. Following postdoctoral research in optical sensing in DCU, in 1996 she took up a lecturing position at Limerick Institute of Technology. In 2002 Fiona joined the School of Chemical Sciences as a lecturer in analytical chemistry, in 2008 she became senior lecturer and in 2009 became the Beaufort Principal Investigator in Marine and Environmental Sensing. Fiona has published over 100 original papers, chapters and conference proceedings and her research focuses on environmental monitoring. She has special interest in priority and emerging contaminants as well as the establishment of decision support tools for environmental monitoring using novel technologies and data management tools. Her work includes the areas of separations and sensors (including microfluidics), materials for sensing and antifouling applications on aquatic deployed systems.

Brendan Ring

Brendan is the Head of Business Development, Contracts and Commercialisation in AMBER the Advanced Materials and BioEngineering Research Centre. AMBER is €60M research centre, jointly funded by SFI and industry, focused on delivering world leading material science research and translating it into products, in tandem with our industry partners. Brendan leads a team responsible for Business Development – to scope projects, IP and Contracts – to establish legal agreements and Commercialisation – to transfer technology to industry. This has been very successful and has led to a number of large scale long term collaborative partnerships with leading companies in the medical technology, ICT and manufacturing sectors such as Intel, Nokia-Bell Labs, Merck Lifesciences and DePuy. In addition there have been a number of licence deals and spin-out companies such as Adama Innovations and Trinity Green Energies.

Raffaello Sbordoni

I am a graduate in Biomedical Engineering at University of Cagliari and I have just completed, with Distinction, a Master of Science in Biomaterials and Tissue Engineering, at University College London (UCL). Here I had the occasion to work with Dr Suwan Jayasinghe at the UCL Biophysics group on the manipulation of human cells via electrospray, in order to evaluate electrospray as a tool for tissue engineering. I am currently working as a visiting researcher at the UCL Institute of Child Health in the Stem Cell and Regenerative Medicine section. My project is supervised by Prof. Paolo De Coppi and it is centred on the decellularization and subsequent repopulation of decellularized lungs with induced pluripotent stem cells derived from amniotic fluid stem cells, in order to regenerate functional airways. I have an interest in 3d printing for medical applications such as implants, scaffolds for tissue engineering and tissue models for drug testing.

Robbie Sinnott

Robbie Sinnott is currently the manager of a new DCU initiative called STEP-IN (Science & Technology Enhancement Platform - Infrastructure Network) which is a programme to enable access to the large array of state of the art research equipment and facilities in DCU. With qualifications in Electronics and Information Technology, he started his career in electronic engineering working with Honeywell on sensing technologies but moved into process engineering after a couple of years with firstly Motorola and then IBM. A move to a small start up company (1999) called Xsil Ltd, who designed the first successful laser cutting machines for silicon wafers, he took over the Operations Manager post and held that for 8 years. Xsil Ltd had revenues in excess of €100M during that period. Moving to DCU in 2008, he has been the Operations Manager for BDI (Biomedical Diagnostics Institute - 3yrs) and the Centre Manager for NCSR (National Centre for Sensor Research - 2yrs). The goal of the current role is to achieve a sustainable model for DCU's infrastructure through provision of a professional and customer oriented service, generating research outputs of the highest verifiable standards.

Rui Amandi Sousa

CEng, PhD, MBA

Rui A. Sousa started to work in biomedical engineering in 1997, where he gained interest in the development of medical devices and novel advanced biomaterials. During the last decade, he has focused his work in tissue engineering and regenerative medicine, both as researcher and entrepreneur. Rui co-founded Stemmatters and, since then, lead the development of the overall business, by transforming a single page business concept into a fully integrated bio technology company. During this period, Stemmatters was able to develop and qualify its manufacturing operations according to GMP requirements, but also to reinforce considerably its intellectual property position around its key product development platforms and key therapeutic indications. Prior to his time in Stemmatters, Rui A. developed key scientific and industrial experience in several business and engineering sectors with strong emphasis on product development and innovation. Academically, he holds a first degree in Metallurgical and Materials Eng. (University of Porto), a PhD in Mechanical Engineering (Brunel University) and a Master in Business Administration (EGP-PBS). As a result of his activity, Rui A. Sousa holds more than 100 publications, including more than 70 papers in scientific journals with referee and book chapters.

Fletcher Thompson

A mechatronic engineer with experience customising and running some of Australia's most cutting-edge 3D printers, Fletcher takes care of the technical developments at Me3D. Fletcher's most recent experience includes consulting to heavy industry, and working as an Additive Fabrication Technician for ACES and the Australian National Fabrication Facility at the University of Wollongong where he developed highly specialised 3D printing equipment for future medical uses, such as printing living human cells and organs. Having built his own 3D printers from scratch for years, Fletcher is excited about the concept of teaching children how the process works. As opposed to standard 3D printers than can look like a black box, Fletcher designs Me3D products with the working parts visible and accessible so that children can tinker with them. He encourages kids to experiment with the printer and he gets a kick out of seeing how others have 'hacked' his designs. Fletcher's expertise is currently driving exploration of new areas for Me3D printers in the fields of medical bioprinting and industrial rapid manufacture, making what is currently an extremely expensive technology more affordable and accessible for researchers and users alike.

Alexandru Tudor

Alexandru Tudor is a PhD student in Prof. Dermot Diamond's research group at Dublin City University. He graduated from the University "Politehnica" of Timisoara, Romania with a M. Sc. in Micro and Nanomaterials, and the West University of Timisoara, Romania with a B. Sc. in Chemistry. Alexandru's PhD programme is part of the OrgBIO FP7 project. His research focuses on the synthesis and characterization of poly(ionic liquid)s for use as smart polymers and functional materials in organic bioelectronics.

Mercedes Vázquez

Dr. Mercedes Vázquez is Lecturer in Analytical Chemistry at the School of Chemical Sciences and a principal investigator at the National Centre for Sensor Research (NCSR), Dublin City University (DCU). She received her MSc in Analytical Chemistry from the University of Oviedo (Spain) in 1998 and her PhD from Åbo Akademi University (Turku, Finland) in 2005. Her PhD work was focused on the development of potentiometric ion sensors based on conducting polymers for various applications such as process control and clinical analysis. In 2006, she took up a postdoctoral position within the Centre for Bioanalytical Sciences (CBAS) at DCU, where she primarily focused on the development of analytical methods and technologies for the rapid screening of very complex media in biopharmaceutical processes. She then joined the Irish Separation Science Cluster (ISSC), DCU, in 2009, where she coordinated a research program focused on the development of novel microfluidic platforms for a wide range of (bio)analytical applications, including biotechnology and environmental analysis. Dr. Vázquez's current research interests are focused on the development and miniaturisation of analytical platforms capable of performing faster, more selective, efficient and cost-effective analysis in highly demanding applications within cutting-edge technology areas such as in-situ environmental monitoring, point-of-care diagnostics and in-process quality control.

Alexandra Whelan

CBiol MRSB
Business Development Ouro-botics.com
Bioprinting Human Tissue, Ending Animal Testing

Alexandra is a trouble shooter, facilitator and enabler who enjoys think tanking, diversity and connectivity. She has strong, creative, analytical and visualization skills. With over 20 years of varied life science and business development experience, her other interests include advocacy, Creatives, justice and entrepreneurship. Alexandra's aim is to use her creative and people skills to identify needs at a local level and with networked resources to apply them at a national or global level. A Be-The-Changer, Alexandra has juggled family duties with research into olfactory memory, laboratory set-up and management. She has contributed to feasibility and commercialisation of a mobile phone applications company and a genetherapy project using histotechnology techniques. Alexandra is currently assisting Jemma Redmond to bring her 3D Bioprinting vision to fruition at Ouro-botics.com, The Future of Bioprinting. We are currently seeking major investment.

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